A PLACE OF SMALL CANOES:

AN ARCHAEOLOGICAL INVESTIGATION OF CAYUCOS, CALIFORNIA

By

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ABSTRACT

A PLACE OF MANY SMALL CANOES:
AN ARCHAEOLOGICAL INVESTIGATION OF THE CAYUCOS AREA

Kaya Wiggins

Located on the Central Coast, within the northern portion of Estero Bay, Cayucos remains an under-investigated area, and with over 8,000 years of human occupation there, it has the potential to inform about local and regional precontact history. Though relatively few archaeological investigations have occurred in Cayucos, by synthesizing studies in the area, a baseline of information emerges to build upon. This thesis reviews every recorded archaeological site with a precontact component, in the vicinity of Cayucos. These records, along with other relevant studies and theoretical framework, provide clues about the past associated with local settlement, technology, and the environment. Sources of information have been culled from site records and studies, authored by a variety of experts and non-experts including avocationalists, rock art scholars, residents, local CRM archaeologists, and others. One source of information comes from the orphaned Cayucos Bench Collection. Produced in the 1960s by the San Luis Obispo County Amateur Archaeologists, the collection is associated with 11 archaeological sites along the Estero Bluffs and includes site and artifact records, photographs, and a report. The collection is important because it represents the only artifact collection associated with the bluffs, a major portion of the research area. An aspect of this research includes comparative analysis of Cayucos with the Morro Bay Estuary, just south of Cayucos, in order to establish the relationship

between these areas and identify regional patterns. The findings of this research begin to fill in the research gap remaining in the northern portion of Estero Bay.

ACKNOWLEDGEMENTS

This thesis received funding from the Society for California Archaeology (SCA) and was developed in collaboration with the help of many. Words cannot describe how grateful I am for the support I have received from the SCA and certain individuals, but I will attempt to do that in following paragraphs.

In 2018, the SCA awarded this project the Orphaned Collections Grant of $1,000. The financial award went towards the radiocarbon dating of shell specimens, collected from the orphaned Cayucos Bench Collection. The acquired dates contributed to other chronological data used to identify temporal patterns in the Cayucos area.

The very first person I must acknowledge for their tireless and limitless generosity to this project is Ethan Bertrando. As a thesis committee member, mentor, and former professor and supervisor of mine, Ethan has always challenged me to do my best, providing guidance along the way. He never once ignored a text, phone call, or email, and was always available to help me with the Cayucos Bench Collection and other research issues. He helped during every phase of this project including, formulating the idea for my thesis, artifact analysis, and reporting. He provided resources, advice, constructive criticism, time, energy, etc. All his efforts occurred simultaneously while teaching, doing archaeological work, his personal life, and much of it during a pandemic. I cannot emphasize enough how helpful he was to this process and his seemingly boundless support for his students and friends. Thank you so much.

Thank you to the rest of my thesis committee: Terry Jones, Marisol Cortes-Rincon, and Barb Klessig for their participation. Terry – also a mentor, former professor and supervisor – set a high standard. While many urged me to get my degree as quickly as possible, Terry encouraged me to take my time on this project and contribute something important to the local area. Beyond directly helping me develop my thesis document, so much of Terry's previous work has contributed to the context of this project.

Hugh Radde performed the records search at the Central Coast Information Center, with the help from Info Center Assistant Coordinator, Matt Lombiondo. Additional records and resources were provided by Luther Bertrando (San Luis Obispo County Archaeological Society), Christina MacDonald and Krista Kiaha (Caltrans), Kate Ballantyne and Blaize Uva (County of San Luis Obispo), Chad Jackson (California State Parks), the San Luis Obispo County Historical Society, Sarah Nicchitta (Albion Environmental, Inc.), Erin Enright and Jasmine Kidwell (Applied Earthworks, Inc.), and Rachael Letter (Padre Associates, Inc.).

A major component of this thesis was the analysis of the orphaned Cayucos Bench Collection. The collection had been housed among the Legacy Collections at the San Luis Obispo County Archaeological Society (SLOCAS). SLOCAS provided curation materials, staff support, and a lab. Specific SLOCAS members who helped me with my project were Luther Bertrando, Ethan Bertrando, and Christina MacDonald. Luther granted me open access to the Cayucos Bench Collection and demonstrated patience and understanding throughout the 3+ years I have taken to complete analyses of the collection. Christina

MacDonald, who was the acting SLOCAS Collections Manger at the time and mentor of mine, introduced me to the collection and encouraged me to use it as a part of my thesis. Christina also connected me with Lynn Singer, the widow of local archaeologist Clay Singer. Lynn was kind enough to donate Clay's collection of archaeological documents associated with his work in Cayucos.

The Cayucos Bench Collection required the review of hundreds of photographs and records, and a report, as well as the analysis of an artifact assemblage, during which a handful of individuals helped me. Another mentor and friend of mine, retired Caltrans District 5 Environmental Branch Chief, Valerie Levulett, and retired California State Parks Archaeologist, Elise Wheeler, helped me with the initial inventory the collection. The three of us spent multiple days trying to match artifacts with their associated records, attempting to establish provenience for some of the artifacts. Valerie Levulett was also a huge contributor of published and unpublished resources that I used throughout my research. Artifact analyses were assisted by Jeanne Binning and Ethan Bertrando for flaked stone; Cris Lowgren, Ethan Bertrando, and Rick Fitzgerald for groundstone; and Ethan Bertrando for battered stone. Cris Lowgren and Ethan Bertrando helped with marine shell identification, and Lise Mifsud analyzed bone specimens.

My former coworkers at Albion Environmental, Inc., including Sarah Nicchitta, Cris Lowgren, Reilly Murphy, Ryan Phillip, Robert Johnson-Ramirez, Paul Rigby, Hannah Ehrlich, and Emily Bales were also supporters of mine. I could talk to them about my progress, exchange ideas with them, and always count on them to ask me if I was finished yet. I needed that. Sarah Nicchitta was especially helpful to this process, allowing me time away from work to write, on more than one occasion. Sarah offered the Albion office and lab to conduct analysis and write. Paul Rigby, with his considerate eye for detail helped with some of the editing of this document which was so helpful when fatigue had set in.

My uncle, Cris Lowgren was a significant force in the development of this thesis. He and my grandmother first inspired my interest in archaeology when I was young. As a kid, Cris began teaching my sister and I how to speciate marine shell during beach walks at Morro Rock. Later, Cris put together a shell reference collection for me that I used during faunal analysis. Recently, Cris and I have put together a groundstone reference collection, gathered from my grandmother's orphaned artifacts, while we collaborated on developing a groundstone classification method. His assistance, using decades of archaeological experience, was extremely helpful to me during this project. It has been a rewarding and fun experience working with and learning from such a thoughtful, practical, and intelligent person.

Finally, I must acknowledge members of my family who provided support throughout these last few years. My mom, mother-in-law, dad, brother, sisters, and husband provided encouragement and childcare, which enabled me to follow through in completing my degree. It was in the middle of this project that the most important thing happened to me – I gave birth to my son Killian. This provided me with less time for my thesis however, my son has become my main motivator for finishing and I am so thankful for him. Perhaps my biggest supporter has always been my husband, Bryan. In the beginning of our

relationship, Bryan inspired me to attend community college and from then onto now, he has been a constant source of stability. The ever-patient partner, Bryan has enabled me to explore my interests and passions in archaeology, for which I could not have accomplished without him.

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CHAPTER 1: INTRODUCTION

Located along the Central Coast of California, Estero Bay has only recently been acknowledged as an under-researched archaeological region, with the potential to inform about the last 8,000 years or so of California's past (Figure 1). Solid archaeological contributions by Mikkelsen et al (2000) and Jones et al. (2019), have addressed the research gap, revealing information about subsistence, technology, settlement, trade, and the environment, associated with the Morro Bay Estuary. The Morro Bay Estuary covers the southern and middle portions of Estero Bay, in and around the city of Morro Bay and community of Los Osos. However, the northern portion of the Estero Bay, in and around the community of Cayucos, remains to be addressed.

This research differs from previous investigations of the Estero Bay, because it compiles previous studies and does not include any field investigation designed to answer the research questions. This type of approach leans on the existing data to reveal information about the research area and is, therefore, limited due to the scope of previous studies differing from the scope of this research. The objectives of this research are intended to provide a foundation of information for future researchers to build upon with more complex studies. Using theory and archaeological evidence, this research will concentrate on answering rudimentary questions, well-documented in most other regions of coastal California, but not here.

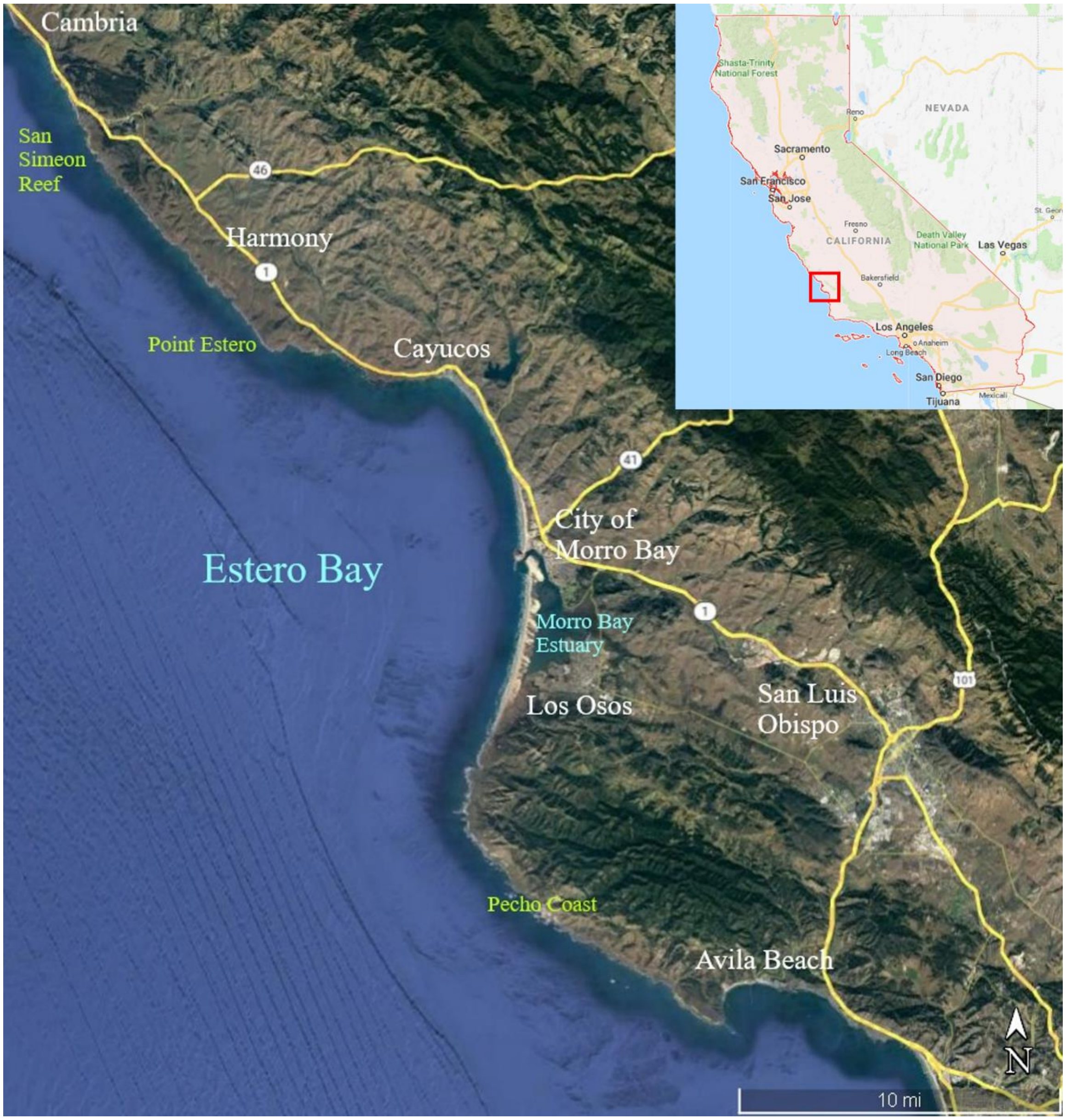

Figure 1. Vicinity map

The questions this research seeks to answer are: 1) What is the antiquity of human activities in the area? 2) What types of technology were being employed? 3) Are there any settlement trends evident in the archaeological record? 4) How does Cayucos articulate with the rest of Estero Bay and neighboring areas? Beyond the questions proposed here, any other patterns visible in the archaeological record will be explored. Only after these questions are answered, can we begin to have a more complete understanding of the precontact[1] past in Estero Bay.

The goal of this research is to address the research gap by synthesizing and interpreting data from 92 archaeological sites within an area covering approximately 7.5 miles of coastline and slightly into the interior, between Point Estero and Toro Creek, in the northern reaches of Estero Bay (Figure 2). Data comes from previous archaeological studies and the analysis of the orphaned Cayucos Bench Collection.

The Cayucos Bench Collection is an artifact assemblage that was produced in the 1960s by avocational archaeologists. While we know the artifacts came from the Estero Bluffs, the research potential is limited by a lack of site and context provenience. The

1 Refers to the time pre-1769 CE – before Europeans made contact in the study area. Contact occurred in 1769 CE, when the Portola Expedition made an overland journey in the study area. The term is used in lieu of the word ‘prehistoric’ which implies non-Europeans have no history prior to contact with Europeans.

collection is the only available artifact assemblage associated with the Estero Bluffs, which makes up nearly half of the research area and the reason for why analysis of the collection is so important to this research.

Conventional artifact recovery and analysis is guided by tailored research designs and theoretical framework. Though analyzing orphaned collections comes with many challenges due to the absence of provenience and associated research designs, they should not be assumed to have zero data potential. Leventhal and Daniels (2013: 22), argue that information is not rhetorically lost from orphaned objects, which should be managed with the same ethical standards applied to artifacts with significance – not like “abandoned children”. Precedents for using and managing orphaned collections to successfully interpret the past exist are available and include examples such as the Cuyama Valley Collection Project (Mikkelsen et al. 2014), San Luis Obispo Chinatown Project (Konzak and Praetzellis, 2016); and the Market Street Chinatown Archaeological Project (Kane 2011). Ethical considerations compel archaeologists to explore the research potential of existing orphaned collections in lieu of creating new ones which result in impacts non-renewable cultural resources and use up limited curation space.

Figure 2. Research area

Thesis Organization

This thesis is organized after this introduction to include background information, methods, results, discussion, and conclusion. The background chapters will include environmental and cultural information, as well as a review of previous archaeological research to provide context for data. Methods will detail those used during research and laboratory analysis of the Cayucos Bench Collection. Chapter 6 provides data extracted during the analysis of the Cayucos Bench Analysis. Included in the Results chapter is a summary of findings specific to the Cayucos Bench Collection, connecting theory to data. Following the Results will be a discussion on the archaeological synthesis of Cayucos. The chapter will discuss all 92 sites studied for this research, including the 11 sites associated with the Cayucos Bench Collection. For better report organization and flow of this paper, data from all 92 sites is provided in Appendix A. When reading the discussion chapter, please reference Appendix A for site data such as location, resource descriptions, age, and associated recording events and report citations. Finally, this thesis ends with the conclusions derived from this research. Additional appendices include radiocarbon dates from CA-SLO-348 (acquired during this research) (Appendix B), site records associated with the Cayucos Bench Collection (Appendix C), and collection catalogue (Appendix D).

Theoretical Framework: Cayucos Bench Collection

The theoretical framework used for this research focuses on extrapolating information from artifacts found within the orphaned Cayucos Bench Collection. Theory was applied to assist with the identification of patterns evident in flaked stone and groundstone assemblages, as these artifact groups make up the bulk of the Cayucos Bench Collection. Using theory provides clues about technology production and mobility, site, and regional function, as well as the environment.

Flaked stone Production and Mobility Patterns

Flaked stone artifacts are often a focus of archaeological studies due to their durability and prevalence, when compared to other artifact types (Bertrando and Harro 1997). Such studies may explore chronological patterns, production, settlement/mobility patterns, economies, craft specialization, and gender. The theoretical framework of this research will focus on the production and mobility patterns visible in the lithic data.

In their look at lithic scatters in the Chorro Valley, located approximately 10 miles southeast of the study area, Bertrando and Harro (1997) developed a theoretical framework, based on the work of Andrefsky (1994), to better understand the variable behaviors associated with toolstone quality and quarry distance. According to Bertrando and Harro (1997), high-quality toolstone material is preferable for producing formal tools, as opposed to low-quality toolstone, because of the associated increased risk for success that comes with low-quality material, as well as labor/time costs. Additionally, in areas where locally available material is low quality, formal tools will be imported and will occur in lower frequencies (Andrefsky 1994; Bertrando and Harro 1997). In such instances, low-quality toolstone material is preferable for producing expedient tools, where less risk and investment is involved. In areas with high-quality material, no preference for expedient or formal tool production is evident.

However, distance between quarries also effects the rate of expedient vs. formal tool production. The transportation costs associated with importing formal tools decline as the distance between toolstone procurement sites/quarries decreases, because formal tools can be moved and stockpiled much easier. Therefore, when quarries are located in proximity, less production risk is involved, resulting in the increased production of expedient tools. This is because producing and importing formal tools become less necessary (Bamforth, 1990; Bertrando and Harro, 1997).

Applying Bertrando and Harro’s (1997) theory on the Cayucos Bench Collection flaked stone assemblage, this research expects to demonstrate two things: 1) the abundance of chert sources within a short distance of each other will produce a higher frequency of expedient (low-input) tools, as opposed to formal (high-input) tools; 2) Lower quality cherts will correlate with low-input production and higher quality cherts will correlate with high-input production (Bertrando and Harro, 1997). For the purposes of this research, high-input flaked stone artifact types will include projectile points, bifaces, and awls, as these are high-investment production artifacts. Low-input tools will only include flaked tools. Flaked tools can sometimes exhibit characteristics of being a high-input tool, such as retouching, however this lithics analysis will not explore the nuances of such artifacts. Bertrando and Harro’s (1997) theoretical framework is applicable to the current study because theirs and the current study area share the same geological landscape and culture history.

Technological Organization

Margaret Nelson's (1991) explanation of previous research on the subject of technological organization theory, along with her own contributions, serves as the theoretical framework for understanding the groundstone assemblage in the Cayucos Bench Collection. Nelson's (1991) theory on technological organization helps with identifying patterns association with behavior and regional function.

Archaeologists research the organization of certain behaviors, reflected by material culture. Research has often focused on behaviors associated with economics, social complexity, politics, ideologies, and/or combinations of those cultural aspects of behavior (Nelson, 1991). In the 1980s, researchers began to focus on technological organization as another aspect of cultural behavior. Technological organization is the study of the relationship between humans and the tools they use, regarding strategies for making, using, transporting, and discarding them. Those who study the technological organization of communities focus on the dynamic economic and social variables that influence behaviors related to technology. Nelson (1991) provides an outline of the hierarchy of levels for this theoretical framework (Figure 3). She asserts that the levels were established according to "their distance from material implications" (Nelson 1991: 58), but these do not reflect any scale of importance within the framework; rather the levels are dynamic in their influence.

Not unlike optimal foraging models, Strategies for technological organization are influenced by multiple environmental conditions, including resources predictability, distribution, periodicity, productivity, mobility, size and patchiness of resources areas, and potential hazards (pp. 59-60).

Technological strategies. Two strategies of technological organization are 1) curation and 2) expediency; however, Nelson (1991) offers a third strategy to the theory – opportunistic behavior. These three strategies are evident in the archaeological record. Curated tools are those that have been manufactured in response to planning in advance of use. This is a continuous strategy and represent artifacts manufactured in preliminary stages for transport, or finished tools created for a future intended use.

Expedient tools are those that have been manufactured at the time of use. According to technological organization theory, an expedient strategy relies on three conditions: 1) material availability is anticipated; 2) availability of time for manufacture; 3) regular use of the area. Opportunistic tools are those that have been manufactured in response to an immediate need. Opportunistic behavior differs from expedient behavior because one is planned (expedient) and the other is unplanned (opportunistic) (Nelson, 1991: 62-65).

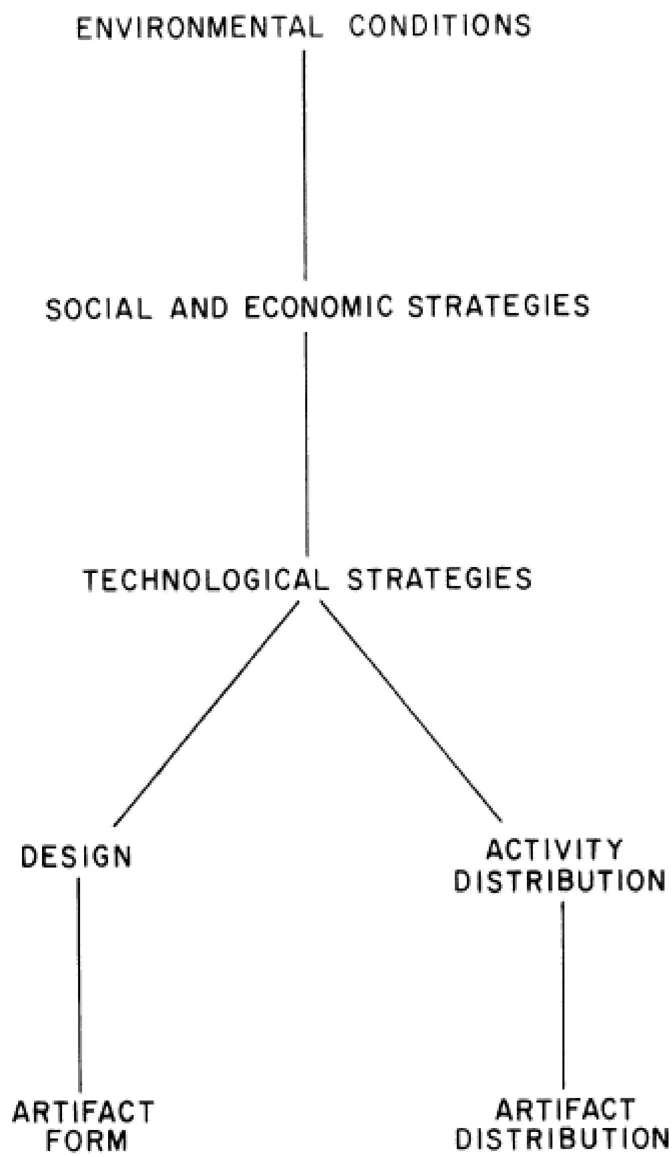

Figure 3. Technological organization

Design. The design of tools and toolkits are influenced by five variables that may or may not overlap, depending on the tool: 1) reliability, 2) maintainability, and 3) transportability (Nelson 1991). A reliable design is overly designed and created specifically for a task. This design is durable. Reliable tool kits include spare parts that can be used in the event a tool or part fails. By definition, reliable designs are not created using an expedient strategy. Maintainable designs are manufactured to work under multiple situations. Maintainable designs can be versatile or flexible. Maintainable versatile designs are those of a general form that can perform a variety of functions, such as a hybrid tool. Maintainable flexible designs are those that when modified in form, they are able to perform multiple functions. A transportable design is meant to not constrain the mobility of the user but should be durable; it may also be reliable, flexible, or versatile.

Activity Distribution. The distribution of activities is evident in the distribution of artifacts found in areas – the result of "dropping out of the system" (Nelson 1991, p. 78). This happens when artifacts are abandoned, lost, or discarded. According to technological organization theory, the distribution of artifacts shows patterns that predict site function. Residential and camp sites will show similar patterns of artifact distribution, including the prevalence of curated and expedient materials, tool manufacture debris of all stages (including retouched, broken, and exhausted tools), and raw material. The interpretation of this, is that habitation areas allow for downtime (seasonal or between activities), providing opportunities for tool manufacture. Habitation areas should also make great places for establishing caches to manufacture curated tools. Furthermore, habitation sites tend to be near sources of raw material and therefore, expedient tools could be produced and stockpiled.

Conversely, opportunistic tools would be uncommon in residential/camp sites when planning is available. This type of behavior would be more common in areas less frequently used. Additionally, curated materials would be found in sites of the same type, due to being lost. Expedient tools are not common in areas that are not frequented by human activity, provided raw material availability is limited. This is because expedient tools are manufactured at the time of use, assumed to be for a single purpose and without intentions for being transported. Therefore, they were not intended to be versatile, flexible, maintainable, or reliable. They would not have enough invested in them for a person to take away from the source.

With the help of theoretical framework and modern analytical methods, the research potential of the Cayucos Bench Collection is explored, in order to extrapolate information about the precontact period at the Estero Bluffs. The revitalized data from the Cayucos Bench Collection is added to the research of previous studies, which are synthesized and interpreted here, contributing to our understanding of chronology, regional function, and the environment in northern Estero Bay. This thesis will provide the most up-to-date understanding of what has been found in the Cayucos area with the intention of producing a foundation of general information about an area which has not yet been summarized by scholars and which can be built upon by future researchers.

CHAPTER 2: ENVIRONMENTAL CONTEXT

The research area is a south-southwest facing coastal zone encompassing the community of Cayucos and immediate vicinity in northern Estero Bay. Estero Bay is located on the Central Coast of California, about halfway between Monterey Bay and Point Conception. The bay is bound by Point Estero to the north and Point Buchon to the south. The crenulated-shaped bay mostly consists of sandy beaches; however, rocky headlands occur in the south and north, as well as estuaries located at the mouths of major creeks. At the midway point of the bay is Morro Rock, a dacite volcanic plug among a volcanic chain extending into the interior, called the Morros.

Three important features of the Estero Bay are the estuaries: the Morro Bay Estuary, located in the southern half of Estero Bay; Morro Creek, located just north of the Morro Bay Estuary; and Villa Creek, located north of Cayucos and within the research area. The largest is the Morro Bay Estuary, classified as a trapped estuary. Trapped estuaries form by the movement of sand from wave action and long-shore migration of sandspits. Both the Morro Creek and Villa Creek estuaries are classified as hydraulic. Hydraulic estuaries are formed when erosion and sedimentation of river mouths occur after large flooding events. These types of estuaries can be episodic if dry periods result in the formation of a sandbar, closing it off to the sea (Jacobs et al. 2010).

Climate

The climate of the Central Coast is Mediterranean, characterized by cool and wet winters and warm and dry summers. In the summer, fog frequently occurs along the coast. In Morro Bay, the mild climate produces an average temperature of 13.9°C (56.9°F). Cayucos has slightly less annual precipitation with an average of 308 mm (12.1 in), compared to Morro Bay's 384 (15.1 in). The south-southwest facing aspect of Cayucos' protected coastline creates a sunnier, slightly warmer, and drier area of Estero Bay. The wettest month is January, averaging 62 mm (2.4 in), and the driest is in June, averaging 1 mm (0.0 in). The average sea surface temperature in Cayucos is 13.7°C (56.66°F), ranging between April's average of 11.8°C (53.24°F) and September's average of 15.6°C (60.08°F) (Climate-data.org).

Geology

Estero Bay is situated in the South Coast Range geomorphic province. West of California's Central Valley, the 250-mile-long South Coast Range is oriented along a north-to-south axis, paralleling the Pacific Ocean coastline. The South Coast Range province developed as a result of folding caused by the subduction of the Pacific Plate under the North American Plate. The geology of the South Coast Range generally consists of marine-derived Miocene and Pliocene-age sedimentary rocks (Burcham 1957).

The research area can generally be divided into two geological units with pockets of other intrusive units, such as Mesozoic volcanic rocks and ultramafic rocks associated with the coast ranges. (Jennings et al. 2010). The geological unit found within the eastern half of the research area, south and southeast of San Geronimo Creek, is the Franciscan Complex, sometimes called the Franciscan Mélange. The Franciscan Mélange is characterized by an amalgamation of many sedimentary, igneous, and metamorphic rock types, including greywackes (sandstone), quartz, feldspar, shale, schists, serpentinite, limestone, and radiolarian cherts (Norris and Webb, 1976; California Geological Survey, 2016). The mélange formed in the Jurassic (180–135 mya) and Cretaceous (135–70 mya) during a mud flow, or other turbidity current, into a deep marine basin (Norris and Webb, 1976). The major lithological constituents of this unit consist of sandstone, and mudstone (Jennings et al. 2010). Soils in this area are primarily mapped as Cropley clays, moderately well drained alluvium derived from calcareous shale (USDA 2019).

The geological unit found in the western half of the research area, including the Estero Bluffs, is undivided upper Cretaceous and Paleocene marine deposits, the major lithological constituent consisting of sandstone (Jennings et al. 2010). Soils in this area consist of late Pleistocene and Holocene colluvial and alluvial deposits, including the dominant Old Paralic marine deposit found on the Estero Bluffs, dated to 120,000 years Before Present (BP) (California Geological Survey, 2016; Hanson et al., 1994). The deposit is characterized by sands and gravels, containing the remains of fossils and shells. The rest of the surface geology in the western half of the research area includes other Late Pleistocene and younger alluvium deposits of unconsolidated cobbles, gravels, sand, silt, and clay. (California Geological Survey 2016).

Flora

The study area consists of a diversity of habitats containing numerous floral species that were important to indigenous cultures. Floral species became well-adapted to withstand a variety of conditions ranging from the extreme in the intertidal zone to relatively stable found in the interior (Walgren et al. n.d.) (Table 1).

Table 1. Major habitats and associated floral species found in the study area vicinity

Habitat	Species
Intertidal: Characterized by constant wave action, fluctuating exposure to the sunlight and atmosphere, and variable salinity	*Phyllospadix*, *Zostera*, *Macrocystis pyrifera*, *Nerecystis luetkeana*
Estuarine: Requires salt-tolerant and are often low growing herbaceous species	*Alicornia subterminalis*, *Jaumea carnosa*, *Frankenia salina*, *Scirpus* sp., *Juncus acutus*, *Salicornia virginica*, *Distichilis spicata*, *Cotula coronopifolia*, *Atriplex californica*, *Frankenia salina*, and *Suaeda californica*
Coastal Scrub: The coastal scrub habitat is among the highest in terrestrial plant diversity, in Estero Bay. Plant communities include semi-woody, branchy, drought deciduous, and fire adapted	*Artemisia californica*, *Salvia mellifera*, *Eriogonum parvifolium*, *Baccharis plularis*, *Mimulus aurantiacus*, *Eriophyllum staechadifolium Eriophyllum confertiflorum*, *Toxicodendron diversilobum*, *Rubus ursinus*, *Pteridium aquilinum*, *Dudleya lanceolate*, *Dudleya caespitosa*, *Potentilla glandulosa*, and *Sanicula crassicaulis*
Grasslands: Serpentine outcrops are a refuge to native grasses due to high calcium and heavy metal contents, which non-native species have not adapted to	*Nassella pulcra*, *Castilleja densiflora obispoensis*, *Dudleya blochmaniae*, *Sanicula maritima*, *Layia jonesii*, *Danthonia californica*, *Distichlis spicata*, *Leymus condensatus*, *Leymus mollis*, *Nassella lepida*, *Melica imperfecta*, *Vulpia microstachys*, *Agrostis* sp., *Brachypodium distachyon*, *Bromus carinatus*, *Danthonia californica*, and *Elymus glaucus.*
Riparian: Characterized by dense vegetation, found along creeks, streams, and rivers	*Salix lasiolepsis*

Fauna

A complete list of faunal species can be compiled from Jones et al. (2019), Joslin (2010), Andreano et al. (n.d.), Christopher (n.d.), Beaulieu et al. (n.d.), Gerdes et al. (1974), and the University of California Agriculture and Natural Resources (2014).

Marine Mollusks

Estero Bay contains three marine shellfish habitats including rocky intertidal, sandy bottom/beach, and mudflat/estuary, and all three can be found in Cayucos. Rocky intertidal habitat can be found along the south-facing stretch of coast, in the northern reaches of Estero Bay. Sandy beaches are located throughout most of the community of Cayucos, extending south along the Morro Strand. There are also isolated sandy beaches north of the community, located adjacent to the mouths of drainages. A mudflat/estuary habitat is located at the mouth of Villa Creek. Species provided in Table 2 are collected from sources such as Joslin (2010) and Jones et al. (2019).

Table 2. Marine Mollusk Species

Habitat	Species
Rocky Intertidal	Abalone (*Haliotis* spp.), California sea mussels (*Mytilus californianus*), and limpets (*Lottia* spp.) (Jones et al. 2019). Other intertidal species found in the Cayucos Bench Collection include barnacle (*Ballanus* spp.), gooseneck/leaf barnacle (*Pollicipes polymerus*), turban snail (*Chlorostoma* spp.), slipper shell (*Crepdiula* spp.), gumboot chiton (*Cryptochiton stelleri*), rock snails (*Nucella* spp.), and sea urchin (*Strongylocentrotus* spp.).
Sandy Bottom/Beach	Pismo clam (*Tivela stultorum*) and razor clam (*Siliqua patula*) (Jones et al. 2019). Additional sandy bottom species identified in the Cayucos Bench Collection included gumboot chiton (*Chryptochiton stelleri*) and the purple olive snail (*Callianax biplicata*)
Mudflat/Estuary	gapers (*Tresus nuttallii*), Washington clam (*Saxidomus nuttallii*), and basket cockle (*Clinocardium nuttallii*) (Jones et al. 2019). Estuary species identified in the Cayucos Bench Collection include pacific littleneck clam (*Leukoma staminea*), bent-nose clam (*Macoma nasuta*), Olympia oyster (*Ostrea lurida*), gumboot chiton (*Chryptochiton stelleri*), California jackknife clam (*Tagelus californianus*), and Lewis's moon snail (*Neverita lewisii*).

Fish Species

Multiple environments provide a variety of habitats for fish species in the research area. For marine species, there are three habitats occupied. In the rocky intertidal zone fish species include lingcod (*Ophiodon elongatus*), Pacific staghorn sculpin (*Leptocottus armatus*), rockfish (*Sebastes* spp.), pricklebacks (*Stichaeidae* spp.), kelp greenlings (*Hexagrammus spp.)*, rock or black prickleback (*Xiphister* spp.), cabezon (*Scorpaenichthys marmoratus*). In the sandy bottom zone, there is surfperch (*Embiotica* spp.). In the Kelp beds Giant kelpfish (*Heterostichus rostatus*), señorita (*Oxyjulis californica*), Pacific hake (*Merluccius productus*) are found. Lastly, within the inshore/offshore migratory zone are Pacific herring (family Clupeidae), Pacific sardine (*Sardinops sagax*), northern anchovy (*Engraulis mordax*), and silversides (family Atherinidae)

Species found in lagoons and near creek fronts include multiple fish species including California killifish (*Fundulus parvipinnis*), coastal threespine stickleback (*Gasterosteus aculeatus aculeatus*), coastrange sculpin (*Cottus aleuticus*), Pacific lamprey (*Entosphenus tridentata*), prickly sculpin (*Cottus asper*), south central California coast steelhead/coastal rainbow trout (*Oncorhynchus mykiss*/*Oncorhynchus mykiss irideus*), Sacramento Sucker (*Catostomus occidentalis occidentalis*), Staghorn sculpin (*Leptocottus armatus*), starry flounder (*Platichthys stellatus*), tidewater goby (*Eucyclogobius newberryi*). Freshwater/anadromous fish include south central California coast steelhead/coastal rainbow trout (*Oncorhynchus mykiss*/*Oncorhynchus mykiss irideus)*

Mammal species

Mammalian species found in the research vicinity include those from marine and terrestrial environments. Marine mammals include Harbor seals (*Phoca vitulina*), California sea lion (*Zalophus californianus*), and northern elephant seal (*Mirounga angustirostris*), northern fur seal (*Callorhinus ursinus*), Steller sea lion (*Eumetopias jubata*), southern sea otter (*Enhydra lutris nereis*), humpback whale (*Megaptera novaeangliae*), gray whale (*Eshrichtius robustus*), bottlenose dolphin (*Tursiops truncates*), harbor porpoise (*Phocoena phocoena*).

Familiar terrestrial species include Coyote (*Canis latrans*), gray fox (*Urocyon cineroargenteus*), black bear (*Urus americanus*), mountain lion (*Felis concolor*), bobcat (*Lynx rufus*), mule deer (*Odocoileus hemionus columbianus*), black-tailed jackrabbit

(*Lepus californicus*), brush rabbit (*Sylvilgus bachmani*). Native species historically linked to the area include Tule Elk (*Cervus elaphus nannodes*), Pronghorn Antelope (*Antilocapra americana*), Grizzly Bear (*Urusus californianus*), and Morro Bay Kangaroo Rat (*Dipodomys heermanni morroensis)*.

Birds

Birds found in the research area, year-round, include: Double-crested cormorant (*Nannopterum auritum*), pelagic cormorant (*Urile pelagicus*), Brandt's cormorant (*Urile penicillatus*), great blue heron (*Ardea herodias*), black-crowned night heron (*Nycticorax nycticorax*), mallard (*Anas platyrhynchos*), turkey vulture (*Cathartes aura*), northern harrier (*Circus hudsonius*), white-tailed kite (*Elanus leucurus*), red-shouldered hawk (*Buteo lineatus*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), California quail (*Callipepla californica*), western snowy plover (*Charadrius alexandrinus nivosus*), killdeer (*Charadrius vociferus*), black oystercatcher (*Haematopus bachmani*), willet (*Tringa semipalmata*), western gull (*Larus occidentalis*), mourning dove (*Zenaida macroura*), great horned owl (*Bubo virginianus*), barn owl (*Tyto alba*), Anna's hummingbird (*Calypte anna*), downy woodpecker (*Dryobates pubescens*), Nuttall's woodpecker (*Dryobates nuttallii*), northern flicker (*Colaptes auratus*), black phoebe (*Sayornis nigricans*), western kingbird (*Tyrannus verticalis*), western scrub-jay (*Aphelocoma californica*), oak titmouse (*Baeolophus inornatus*), bushtit (*Psaltriparus minimus*), wrentit (*Chamaea fasciata*), American robin (*Turdus migratorius*), northern mockingbird (*Mimus polyglottos*), European starling (*Sturnus vulgaris*), common yellowthroat (*Geothlypsis trichas*), California towhee (*Melozone crissalis*), song sparrow (*Melospiza melodia*), dark-eyed Junco (*Junco hyemalis*), western meadowlark (*Sturnella neglecta*), brown-headed cowbird (*Molothrus ater*), red-winged blackbird (*Agelaius phoeniceus*), Brewer's blackbird (*Euphagus cyanocephalus*), purple finch (*Haemorhuous purpureus*), house finch (*Haemorhous Mexicanus*), lesser goldfinch (*Spinus psaltria*), and American goldfinch (*Spinus tristis*).

Paleoenvironment

Paleoenvironmental modeling and/or reconstructions are commonly based on data collected from ice cores, deep marine sediments, shell and pollen samples from archaeological deposits, tree rings, and regional geology (West et al. 2010: 14-17). Masters and Aiello (2007) and West et al. (2007) provide general and regional climate and environmental information with implications for the research area. However, the most relevant study of the paleoenvironment comes from Jones et al. (2019), which focuses on paleo sea surface temperatures and marine productivity, climate, and sea levels in the Morro Bay area.

The Pleistocene was a glacial period in Earth's history, and as a result, sea levels were much lower than they are today (Jones et al. 2019). It was around 18,000 years ago when the former shoreline in Morro Bay extended approximately 4 miles further west than the modern shoreline of the sandspit. At that same time, a global warming trend began, and sea levels began to rise.

It was during the Younger Dryas (12,900–11,500 BP) that sea levels temporarily stabilized (Jones et al. 2019; Masters and Aiello 2007). The 1,000-year-long standstill and increased sedimentation caused shallow coastal valleys to fill in and estuaries to develop. This may be the explanation supporting evidence for a much larger paleo estuary near Morro Bay (Orme 1990; Jones et al. 2019). Flandrian estuary mud deposits have been identified off the coast of Morro Bay. These deposits indicate that a larger and older estuary underlies the ocean and modern sandspit. Similar estuary development occurred off the coast of San Diego County during the YD, which produced bathymetry also similar to that of Morro Bay's offshore geomorphology (Jones et al. 2019).

Towards the end of the Younger Dryas and into the Holocene, global climate change produced a climate even warmer than in the modern era (West et al. 2007; Jones et al. 2019). Evidence for environmental change at the onset of the Holocene 10,000 years ago comes from pollen samples indicating coniferous trees were replaced by oak woodland, chapparal, and coastal sage plant communities. Sea levels rose, filling in the paleo estuary in Morro Bay. A weakened California Current resulted in increased sea surface temperatures, reduced upwelling, and lower marine productivity. The global warming trend peaked at around 9000 BP, though this may have happened later on in the Central Coast, possibly between 6000 and 4000 BP (Mikkelsen et al. 2000).

Sometime around 9000 BP, sea surface temperatures began cooling as the California Current intensified and upwelling and marine productivity increased until 4800 BP (Jones et al. 2019). In the meantime, the Morro Bay Estuary developed around 8100 BP. Sea levels were still lower than today – the former shoreline being 18–20 meters below modern sea level – and the estuary was more expansive, encompassing Morro Creek (Mikkelsen et al. 2000; Jones et al. 2019).

Near 6000 and 5000 BP, sea level rise began to stabilize, though by 4000 BP, the sandspit in Morro Bay was still migrating east and was located 7 meters below the modern sea level (Masters and Aiello 2007; Jones et al. 2019). Increased flooding events associated with El Niño Southern Oscillations (ENSOs) between 4800 and 3600 BP allowed for fine sand sediments to seep out from estuaries and sandy shores to develop over rocky coasts and reefs (Masters and Aiello 2007). These ENSO events also brought in sediment along the marine coast, forming littoral cells. Landscape features also influenced littoral cell development along California's Coast. For example, Morro Rock acted as a sand retention feature in Estero Bay (Masters and Aiello 2007). Accreting sediments formed sandbars in front of estuaries, shutting them off from the coast. Estuary productivity would have declined as they transformed into wetlands. In northern Estero Bay, Point Estero protected the south-facing coastline from wave erosion, resulting in sand accretion during increased ENSOs (Masters and Aiello 2007). This may have allowed the estuary located at Villa Creek to form, during a time of mega floods opened wetlands, after 200 year-long megadroughts. Combined factors during the last 5,000 years or so likely influenced the current formation of the Villa Creek Estuary, which is classified as a hydraulic estuary and can be episodic during climate fluctuations (Jacobs et al. 2010).

During the middle and late Holocene, a general climate cooling trend occurred, while sediment cores indicate habitat stability in Morro Bay (Jones et al. 2019). After 3600 BP, modern seasonal cycles of the California Current were established and consisted of increased upwelling during spring and early summer months and warmer sea surface temperatures in the early fall.

Between 2600 and 1400 BP, evidence indicates there was seismic event or events that caused a sudden deepening of Estero Bay and sea level rise (Gallagher 1996). This would likely result in habitat upheaval; however, it appears that general brackish conditions prevailed.

West et al. (2007) characterizes the climate of the South Coast in last 3,000 years as generally stable but also highly variable, acknowledging that climate change during the late Holocene had less of an environmental impact than the Pleistocene/Holocene transition, but notes increased frequency of droughts and El Niño events. Sudden climatic shifts associated with the Medieval Climatic Anomaly (MCA) – generally a time of increased droughts and resource stress in California (1150–600 BP) – and the Little Ice Age (600–150 BP) plunged the climate back into near glacial conditions.

In the last 700 years the upper floodplain of the Holocene terrace stabilized in the south coast, and increased sedimentation in Morro Bay has occurred in the last 200 years (West et al. 2007; Jones et al. 2019).

CHAPTER 3: CULTURAL CONTEXT

The Central Coast Sequence

California's precontact era should not be interpreted as having a single linear path in history. The state's environmental diversity has produced one of the most complex cultural tapestries in the North American continent. Because of this, multiple chronological sequences have been developed and assigned to different regions of the state. The Central Coast Sequence was developed by Terry Jones and Georgie Waugh (1995) based on their work at CA-SLO-175 and CA-SLO-1259. The sequence was later updated in Jones et al. (2007) and further refined specific to Morro Bay in Jones et al. (2019) (Table 3).

The Central Coast Sequence has been applied to the area between San Simeon and Point Conception and is broken into six periods with the following date ranges established in Jones et al. (2007): the Paleo-Indian (pre-8000 BCE), Millingstone (8000–3500 BCE); Early (3500–600 BCE); Middle (600 BCE – 1000 CE); Middle-Late Transition (1000–1250 CE); and Late (1250–1769 CE). These periods were organized based on artifact assemblages (beads, projectile points, ground stone, burials, etc.) that demonstrate significant cultural change over time and would be "unwise to overlook" (Jones, et al., 2007: 134).

Table 3. Central Coast Chronology

Period	Associated artifacts and features
Late Period 850 – 250 BP (700 250 BP in Morro Bay)	• Cottonwood and desert side-notched points • Stone Drills • Circular shell fishhooks • Steatite beads • *Olivella* callus (Class K) and lipped (Class E) shell beads • Bedrock and hopper mortars
Middle-Late Transition 1000 -850 BP (950-700 in Morro Bay)	• Contracting-stemmed, small leaf shaped and double side-notched projectile points • Circular shell fishhooks • *Olivella* saucer (Class G) and cupped (Class K) shell beads • Notched stones
Middle Period 2600 – 1000 BP (2550-950 in Morro Bay)	• Contracting-stemmed, Año Nuevo long-stemmed, and lanceolate projectile points • Bone gorges • Circular fishhooks • Steatite beads • *Olivella* saucer (Class G) shell beads • Grooved stone
Early Period 5500 - 2600 BP (5700-2550 in Morro Bay)	• Contracting-stemmed, Rossi square-stemmed, large side-notched, Año Nuevo long-stemmed, and lanceolate projectile points • Bone gorges • *Olivella* thick rectangle (Class L) shell beads • Steatite beads • Bowl mortars
Millingstone Period 10,500–5500 BP (10,000-5700 in Morro Bay)	• Large side-notched, lanceolate, and eccentric crescent projectile points • Millingslabs and handstones • Core tools abundant in sites
Paleo-Indian Pre- 10,000 BP	• Crescent and fluted projectile points

Because Jones et al. (2019) established date ranges specific to the research vicinity, the refined Central Coast Sequence for Morro Bay is applied in this thesis. Detailed chronological patterns for the Morro Bay Estuary, near the research area, can be found in Jones et al. (2019).

Tribal Territories

Within the research area, is thought to be the northern boundary between the Chumash and Salinan tribes. Scholars have debated the location of the northern Salinan-Chumash boundary for decades; however, none has been secured. Scholars attempting to do so have leaned on linguistic evidence from mission records. Unfortunately, the records further complicate the issue because they implicate a third group in the boundary area, the Playaño.

Mission records document baptisms of individuals who came from the *playa* and spoke a language different from Chumashan and Salinan. The extent for where these people lived is not clear in the records; however, some assign them to the area between Point Estero and San Simeon (Baldwin, 1969; Joslin, 2010). Milliken and Johnson (2005:128) map the *Playaño* as possibly far south as Morro Bay (Figure 4). While it is possible that the *Playaño* language may represent an isolate, it is more likely that it is a dialect of either *Obispeño* (Northern Chumash) or Salinan (Joslin, 2010; Milliken and

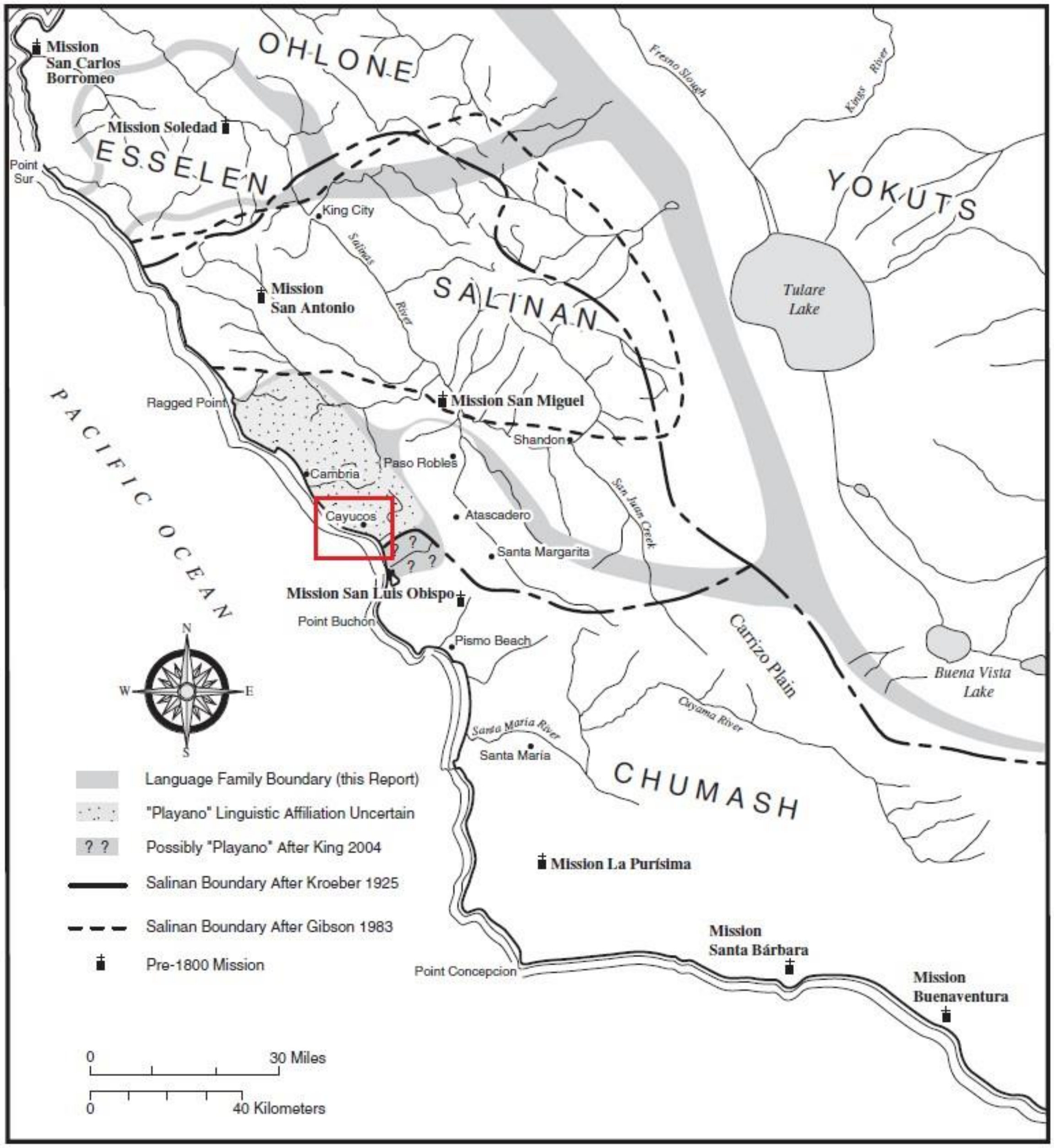

Figure 4. Tribal territories interpreted by Milliken and Johnson (2005).

Johnson, 2005; Gibson, 1983; Baldwin, 1969). Unfortunately, information about the *Playaño* language is nearly non-existent.

The debate regarding territorial boundaries in the research area and who the *Playaño* were continues but it is not a topic expanded upon in the current research. Defining territorial boundaries can be important, it is not fundamental to answering the research questions proposed for this thesis. I identify the issue here because both the Chumash and Salinan tribes are considered in this research and following chapters.

The Chumash

The Chumash people were a maritime chiefdom level society, with one of the largest populations in precontact California. They occupied areas of Los Angeles, Ventura, Santa Barbara, and San Luis Obispo Counties, as well as the Northern Channel Islands. They are considered one of the most complex hunter-gatherer societies to have existed on earth (Arnold and Walsh 2010:100-124; Glassow et al. 2007; Gibson, 1994a). At their most complex, the Chumash lived in permanent villages and practiced craft specialization. The economic influence the Chumash had on other tribal groups with the *Olivella* shell bead industry is seen throughout the archaeological record of North America's west coast and into the interior.

Chumashan, originally identified as the language spoken on one of the Northern Channel Islands was subsequently applied to all groups who spoke languages within the same language family (Gibson, 1994a; Jones et al., 2019). Chumashan is divided into three branches: Northern Chumash (*Obispeño*, the language spoken in San Luis Obispo County), Central Chumash, and Island Chumash (Golla 2007). The *Obispeño* language was the most distinct of the branches and was probably not intelligible to speakers of the other branches, especially Central Chumash speakers (Golla 2019).

The Chumash language is an isolated language (Golla 2007, 2019). It shares no relationship with any other California language or language family, suggesting it is one of the oldest languages spoken in California. Archaeological and skeletal evidence in the Santa Barbara Channel supports cultural stability spanning through the Holocene. These lines of evidence point to the Chumashan language having "deep roots" in the Santa Barbara Channel (Golla 2007:240). However, Golla (2007, 2019), points out the limited linguistic diversity and suggests recent expansions of the Chumash language, perhaps in the last two millenia. Golla (2007, 2019) suggests that Chumashan was originally localized to a much smaller area, compared with their historic territory. He explains that the language likely expanded out in two waves with the *Obispeño* expansion first, followed by the Central Chumash expansion. Based on lexical and structural evidence, Golla concludes that this would have happened within the last couple thousand years (Golla 2007, 2019). Meanwhile, Jones et al. (2019) points out radiocarbon date gaps coinciding with the late Early Period/early Middle Period (2900-2300 BP) and Middle Period (1700-1100 BP), interpreting the potential for *Obispeño* migration north, replacing an older Hokan language (Golla 2007, 2019; Jones et al. 2019).

While they spoke languages within the same family, Chumash speaking groups were not the same. Archaeological evidence tells us that they may have had more in common with their Salinan neighbors to the north than with their relatives to the south. A study of material culture similarities and differences between those north and south of the channel is provided in Baldwin (1969). She explains that the exposed west-facing coastline north of the channel, produced cultures with an artifact assemblage she described as "crude, poor, variable, serviceable and practical," when compared to the archaeological record produced within the protected and south-facing Santa Barbara Channel (1969: 44).

Settlement size in the research area ranged from small camps of five individuals to villages of upwards of 120. Spanish baptismal records from Missions San Miguel, San Luis Obispo, and La Purisima estimated that 1,400 Chumash were living in approximately 40 villages within San Luis Obispo County, including at least a dozen villages in the vicinity of the Morro Bay estuary (Gibson 1994a).

The Salinan

Unfortunately, much less information about the Salinan tribe is available when compared to other California groups. Mason (1912) remarked that information about the Salinans before the missions "amounts to practically nothing" (p. 109). The reasoning for this is that early European exploration of California was along the coast, where their boats could harbor. The rugged Big Sur coast and south of it provided very little entry points for those to visit the interior. In fact, Cabrillo concluded that the stretch of coast was uninhabited (Mason 1912). By the time, ethnographers arrived in the area, most of the Salinans had died, along with much of their culture. In *Handbook of the Indians of California*, Kroeber (1925) surmised that only 40 Salinans remained alive.

Salinans occupied areas along the rugged coastal cliffs and interior mountains and hills of the South Coast Range, in San Luis Obispo and Monterey Counties (Mason 1912). In the interior, they lived along creeks and rivers and within floodplains. On the coast, they camped along shorelines. Villages were autonomous with a chief ruling a single or multiple village hamlets. Chiefs may have been hereditary, but they also needed to be approved of by the community (Mason 1912).

The Salinan population during the precontact era is difficult to estimate. Mason (1912) guessed that the Salinan population consisted of no more than a few thousand. In 1769, the Portola Expedition noted 10 villages, their populations ranging between 30 and 400, and an aggregate of 1,200 people. However, these numbers were reported within a geographical area between San Luis Obispo and Monterey and likely do not only reflect the Salinan population (Kroeber 1925:546). Fages noted that there were 20 villages within a 20-mile radius of Mission San Antonio (in Mason 1912).

Sharing territorial boundaries with Salinan were the Esselen (to the north and northwest), Costanoans (to the north), Yokuts (to the east), and Northern Chumash (to the south). The Salinan apparently had friendly relationships with their Esselen and Yokut neighbors but were often hostile with the Costanoans and Northern Chumash (Hester

1978). Resource competition was likely a factor that put the Salinan at odds with the Costanoans and Northern Chumash. While researchers have speculated about trade barriers between the Salinans and the Northern Chumash and the Costanoans, we do know that items such as columella ornaments, wooden dishes, and steatite were traded with the Salinan in exchange for acorns, grasshoppers, and deer skins (Hester 1978; Greenwood 1978).

Their relationship with the Yokuts was quite beneficial to the Salinans, who were able to acquire items such as obsidian, salt grass, lake fish, seeds, and tanned antelope and deer skins. Furthermore, the Salinan were known to make trips to fish at Tulare Lake, and the Yokuts were given access to the coastline where the Salinans occupied (Hester 1978).

Golla (2019) indicates that the geographical extent for which Salinan was spoken was much greater in the past than determined at the time European contact. Salinan territory shrank as Costanoan speakers moved in from the north and *Obispeño* speakers moved up from the south. Evidence for *Obispeño* absorption of Salinan communities and substratum is demonstrated in the unique phonology of the Northern Chumash language when compared to the rest of the Chumashan branches.

The Salinan language is included in the Hokan stock. Hokan is one of the oldest linguistic phyla in western North America, possibly 8,000 years old (Golla 2007, 2019). Evidence suggests that one or more Hokan languages may have been a substratum of later Athabaskan, Algic, Uto-Aztecan, and Penutian. The distribution of Hokan language families in California is not contiguous. Rather, it is spread out, spotting areas of California in the north, south, east, and west (Golla 2007). Comparative linguistic evidence points to a proto-Hokan origin in the North American interior, and possibly connected to Mexico and Central America.

Within the Salinan language family are two dialects documented at the missions, the *Antoniaño* (to the north and west) and the *Migueleño* (to the south and east) (Golla 2019:114-115). The names for each dialect were given by the Spanish and come from the languages spoken at the missions. They were not naming the Salinan used for themselves. In fact, the term Salinan was not a word they used for themselves either. R. G. Latham (1856:85 in Golla 2019:117) placed *Migueleño* and *Antoniaño* dialects within a "Salinas" language family, which he dubbed for the nearby Salinas River. Originally included in the language family were the Esselen, Rumsen and Chalon Costanoan, and Guiloco; however, after further investigation, Powell (1889:101-102 in Golla 2019:117) reorganized the Salinan family to include only *Migueleño* and *Antoniaño* dialects.

Golla (2019:114) claims that *Migueleño* and *Antoniaño* were "shallowly differentiated" and Mason (1912:104) argued that the two were mutually intelligible. However, Golla (2019) also supposed that assigning only two dialects to the Salinan language family is probably more of a reflection of mission standardization obscuring a greater dialect diversity.

Ethnohistory

Early Spanish Accounts

Spanish exploration and missionization of the surrounding areas provide the first sources of information about the people living in Estero Bay. Perhaps, the first mention of the research area comes from Cabrillo's voyage of 1542 although, there is no indication that Cabrillo had any interaction with natives there (Milliken and Johnson 2005). In 1595, Sebastian Rodriguez Cermeño did have contact with an *Obispeño* group at sea, when some natives came aboard from their tule balsa canoes, bringing Cermeño's crew food and trading with them (Milliken and Johnson 2005). Cermeño spoke of the people there positively, describing some of them as painted with stripes, their hair cut round, and with beards; women's skirts made of grass and bird feathers; bows and arrows; and food consisting of bitter acorns and fish. Along the shore, he counted 300 people, including men, women, and children, and said the land was good (Jones et al., 2019:18). He noted that the Indians he met knew the words "Christian" and "Mexico", indicating they had knowledge of Europeans prior to Cermeño's visit. It is unclear if Cermeño was in Morro Bay, San Luis Bay, or the Diablo Coast (Jones et al., 2019; Krieger, 1990).

The Portola Expedition of 1769 was the first time on record that Europeans had an overland venture through the area. The purpose of the expedition was to identify good locations for establishing missions. From the expedition, we have records from Father Juan Crespi and Miguel Costanso. The Spanish noted how those north of Point Conception were "poorer than on the Channel of Santa Barbara" (Kroeber, 1925: 551). Their groups were more mobile and less populous, and the political structure was more fluid when compared to in the Channel. This idea is contradicted by at least one notable chief among the Northern Chumash was Buchón (a Spanish term for the goiter or tumor that hung from one side of the chief's neck). He was described as a "king," receiving tribute from people within 20 leagues in every direction (Gibson 1994a:19).

In Crespi's diary, we know some details about the expedition's journey through Los Osos, Morro Bay, and Cayucos. When first traveling through Los Osos, there was no village there, which Crespi attributed to the grizzly bears. Crespi remarked about Morro Bay having no outlet to the ocean, alluding to why the area had not been documented prior to their expedition.

Traveling north on September 8, 1769, Crespi mentioned a village that was in view of Morro Rock. It was named San Adriano. The village consisted of approximately 60 individuals and only one subterranean house (Milliken and Johnson 2005; Jones et al. 2019). Costanso's diary confirms the amount of people but indicates not a single house was in the village (Milliken and Johnson 2005).

On September 9, 1769, the group passed through the Cayucos area, making camp at the mouth of Villa Creek without any mention of natives. They named the creek *Santa Serafina*. The following day, they traveled inland six miles, along Villa Creek, to where a village had recently been established. At the village, the party was presented with fish (Milliken and Johnson 2005).

North of the village, Costanso wrote in his diary about; “Some mountain Indians coming down to visit us brought along a [bear] cub... which they were taming and offered it to us. They must have been about sixty men” (Boneu Companys 1983:206 in Milliken and Johnson 2005: 10). Milliken and Johnson (2005) suggest that these natives came from a large village of potentially 200 people, located further inland. At the time, the expedition party was near Santa Rosa Creek, east of Cambria, which they called the area *San Benvenuto*.

After this, the party ventured north and outside of the research area. However, their return south included more details. Near to where the party had encountered the “mountain Indians” on September 10, on December 25, 1769, the Portola Expedition were visited by some 200 natives who brought food with them. Continuing south, the same day, the party made it to the Cayucos area, where they rested at a village, not previously mentioned in the northward trip. There, they bought food and were later gifted more food by “a large number of heathens” (Costansó in Boneu Companys 1983:277 in Milliken and Johnson 2005: 11). Upon their return to *San Adriano* in Morro Bay on December 26, no Indians or the single subterranean house were mentioned (Milliken and Johnson 2005).

A second journey by Portola occurred in the Spring of 1770. In between Morro Bay and Cambria, possibly in the Cayucos area, Crespi documented this hostility among tribal groups (Brown, 2001 in Jones et al., 2019: 21-22).

Ethnographic Studies

Early ethnographic studies of the late 1800s come from those focused-on linguistics. Taylor and Pinart provided Salinan vocabularies as well as Taylor's 1864 map, sent to the Smithsonian, illustrating the locations of California's tribal groups (in Milliken and Johnson 2005).

H. W. Henshaw collected notes from tribal members about their languages in 1884. He identified the different Chumash dialects and geographical areas for which they were spoken. While he only spoke to a single Northern Chumash speaker, he noted that the dialect spoken in San Luis Obispo County was the most unique, compared to the others spoken at San Buenaventura, Santa Barbara, Santa Rosa Island, Purisima, and Santa Inez. Henshaw was informed that only a dozen people existed that spoke the Salinan language. His primary informant, Hilario Mora, told him that only five people knew the San Antonio dialect (Milliken and Johnson 2005).

C. Hart Merriam collected linguistic, ethnobotanical, and ethnogeographic information from Salinans, at a place known as "The Indians," near Mission San Antonio, in 1902 (Milliken and Johnson 2005). "The Indians" had become a place of refuge for Salinan peoples after secularization (Rivers and Jones 1993). Merriam was a trained biologist and focused some of his time on learning about the differences between the acorns of the different oak species (Milliken and Johnson 2005). In 1933, Merriam visited the Milpitas Valley, west of Mission San Antonio, to interview Tito Encinales and his wife. In a summary of his work that year, he described the Salinan-Chumash boundary at Morro Creek, though this may have been misinterpreted. Tito had also described Salinan territory as much smaller and was probably a description of land formerly owned by his family. Tito did not speak English. An important contribution from Merriam came from the alphabetized list of rancheria names, collected from San Luis Obispo, San Miguel, and San Antonio mission records. Merriam used the list to spark the memories of his informants. After his death, C. F. Heizer edited and published Merriam's work (Merriam 1955:201-216 and Merriam 1968).

J. Alden Mason was sent by A.L. Kroeber to obtain information about the Salinan language. Mason's first visit was near Jolon in 1910. He identified 13 *Migueleño* and 28 *Antoniaño* Salinans, stating that "little purity of speech or blood is possible" (Mason, 1912:117). It was clear that much of the Salinan culture had already disappeared. Mason described the trip as not "profitable" (Mason 1918:4).

During his second trip in 1916, Mason found that most of his consultants had died. However, he had identified "better linguistic informants" in Dave Mora – a "pure Antoniano Indian" – and Maria Ocarpio – a "pure Migueleño" (Mason 1918:4). During that same visit, Mason also learned some Salinan mythology from Juan Quintana, translated by Maria Encinales and David Mora (Milliken and Johnson 2005).

Mason's work provided information about postcontact Salinan occupations near the Salinas River but nothing regarding the old villages. While he did not provide information about the language spoken on the coast, he did note the existence of the "Playanos," west of San Miguel and supposed it was an extinct language – probably a dialect of Salinan (Mason 1912: 105).

One of the most famous sources of ethnographic information on California groups comes from the *Handbook of Indians of California*, written by Alfred Kroeber (1925). The section on tribes from the South Coast range is mostly from others works. Kroeber spent only a few days in the field with Salinan informants and did not speak to a single Northern Chumash descendant. His combined chapter on the Esselen and Salinan cultures focuses on language and lacks detail. Rivers and Jones (1993: 150) considered Kroeber's (1925) description of Salinan culture "wholly impressionistic". In the handbook, Kroeber mapped Salinan and Chumash territories, but did not provide boundary information regarding the Northern Chumash. He based the map on Mason's 1912 map and included the *Playaño* language within the Salinan family. While the map does not provide secure locations for Chumash and Salinan placenames, the map was accepted and used by scholars until recently (Milliken and Johnson 2005).

Perhaps the most important ethnographer of the last living speakers of Salinan and *Obispeño* was John Peabody Harrington. Harrington contributed salvage ethnographies that became critical to our understanding of the Salinan and Northern Chumash tribes, especially for the locations of their rancherias (Harrington 1985). Armed with Henshaw's linguistic information and Mason's folklore notes, Harrington conducted rigorous field interviews (Milliken and Johnson 2005). He was a prolific note taker but never published a map or report. What we have from his work are 4,500 pages of often difficult to understand notes, that were published on microfilm (Harrington 1985). Harrington would often alternate between a Native language, Spanish, and English – all used sometimes in the same sentence (Rivers and Jones 1993). Harrington's informants included individuals from Salinan and Chumash groups. He considered the *Playaño* a divergent language of Salinan (Milliken and Johnson 2005).

<u>Studies on Ethnohistoric Villages in the Research Area</u>

Following the in the footsteps of ethnographers, modern researchers have continued looking over the data collected from early explorers' diaries, mission records, interviews, and archaeological data in order to learn more about the Salinans and Northern Chumash groups and the areas they occupied.

Robert Gibson "pioneered the use of kinship charts" and "the use of personal name suffix analysis" while establishing the locations for many Salinan and Chumash ethnographic villages and language boundaries (Milliken and Johnson 2005:52). He challenged Kroeber (1925), asserting that the Salinan-Chumash language boundary was at San Carpojo (San Carpoforo) Creek, as opposed to approximately 40 miles south at northern Morro Bay. Gibson based his conclusion on Spanish diary accounts, inter-marriage networks, and female name endings reported in mission records and reported differences among people at San Antonio and San Luis Obispo (Gibson 1983; Milliken and Johnson 2005).

The most complete ethnogeography of Salinan and Chumash placenames is provided in Milliken and Johnson (2005). Their report provides the most exhaustive summary of ethnographic studies for the research area, as well as the most up-to-date information regarding Salinan and Chumash placenames. Milliken and Johnson (2005:83) were able to identify 132 baptized adults coming from the Estero Point region and 121 baptized adults from the Morro Bay Region. Both regions combined to encompass an area stretching from the Cambria vicinity to north of Point Buchon.

In the Morro Bay region (Toro Creek to Point Buchon and inland area), Milliken and Johnson (2005) suggest a pre-mission population of 280 people. They indicate these people came from the villages of *Guejetmimu*, *Chano*, *Petpatsu*, *Chotcagua*, and *Chmimu* (Figure 5). Based on modeling, Milliken and Johnson (2005) have placed other recorded villages in the Morro Bay region: Rancheria del Mar de San Luis, *Zatzama*, *Zoacàu Zey*, *Tipepspa*, and *Taxpalala*.

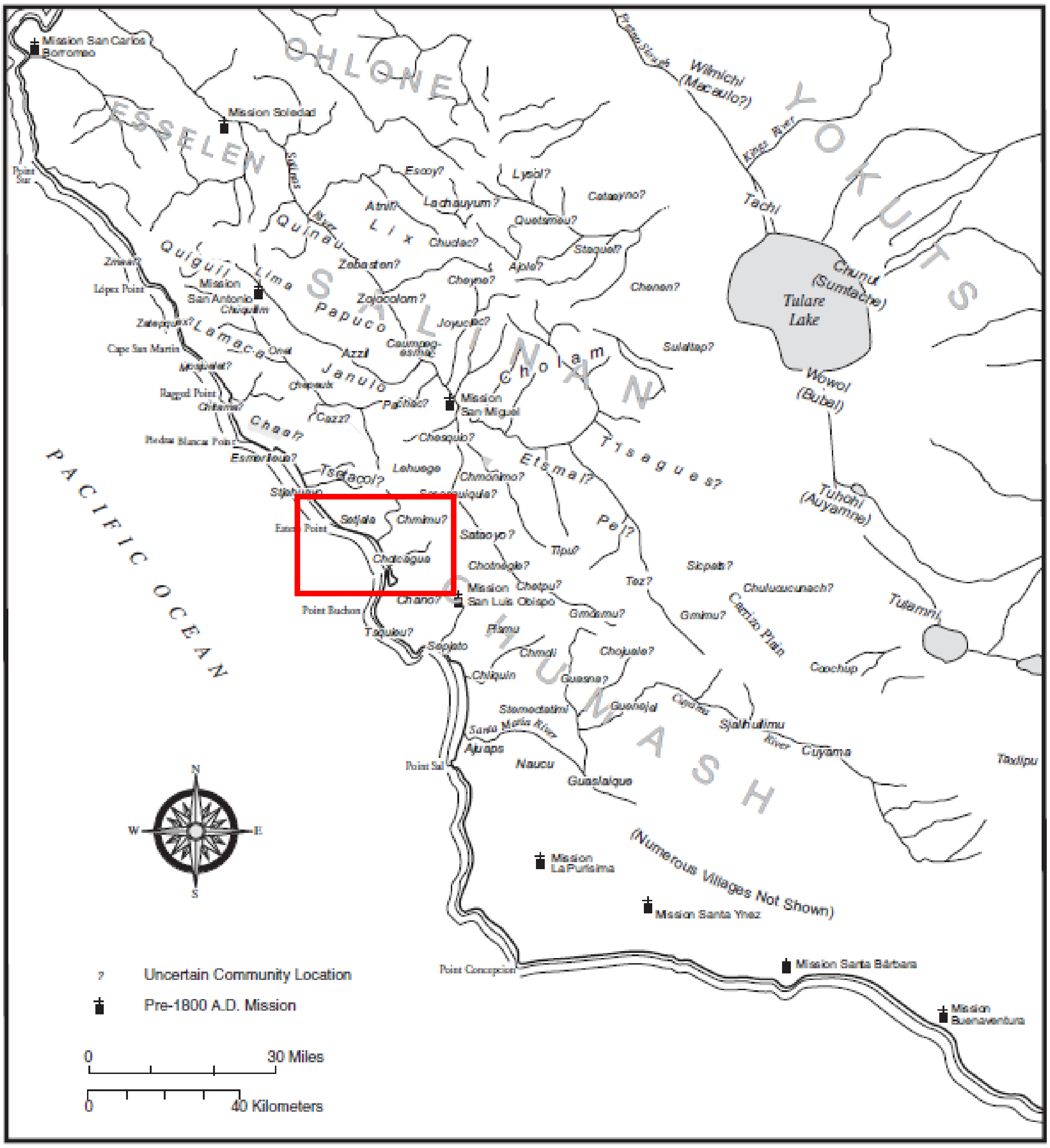

Figure 5. Locations of Missions and Ethnohistoric villages as proposed in Milliken and Johnson (2005).

Of the 121 registered adult baptisms, 107 were at Mission San Luis Obispo, 13 were at Mission San Antonio, and one was at Mission San Miguel. The locations for the villages in the Morro Bay region have not been identified; however, Milliken and Johnson (2005) have interpreted some of their locations: *Chano* and *Chmimu* were the largest of the Morro Bay villages, possibly containing 100 individuals each. *Chmimu* was probably along Toro Creek. The location for *Chano* is disputed, even by Milliken and Johnson. Both believe the village was located somewhere in the Estero Bay region, based on multiple lines of evidence including a baptism entry for a young man coming from the *Chano* village, near *Scahuayo*, which is placed north of Estero Bay. Another mission reference indicates that the principal port for ships that traded with Mission San Luis Obispo was at *Chano*, and historical evidence tells us that a prominent port was once located at Cayucos. Based on the later fact, Johnson believes that *Chano* was located south of Estero Point, at Cayucos. However, Milliken believes that *Chano* was located inland from Morro Bay, possibly along Chorro Creek, or in the Los Osos Valley. Furthermore, Milliken believes that the word *Chano* was used as a general term for the entire Estero Bay region. Milliken notes that while information documented from Rosario Cooper testaments places *Chano* west of See Canyon, Milliken argues that it does not fit within the population distribution model. *Chotcagua*, located in North Morro Bay, was the village of approximately 60 people and referred by the Spanish as San Adriano. Just south of Morro Bay were the hamlets of *Petpatsu* and *Guejetmimu*.

From the Point Estero region (Cambria area to Toro Creek and inland area), Milliken and Johnson (2005) suggest a pre-mission population of 280 people. Records indicate that the 132 baptized adults came from villages *Steleglamo*, *Zassalet*, *Stjahuayo*, *Pinal*, *Zizayho Zixja*, *Escon*, *Tsetacol*, and *Setjala*. People from the Estero Point region went to all three missions between 1773 and 1806, but this was not in a predictable pattern and about half of them had been baptized by October 1803. Most of them went to Mission San Antonio to the north and furthest away, 38 went to Mission San Luis Obispo to the southeast and closest, and 15 went to Mission San Miguel to the northeast. Identifying the locations for these villages is “impossible,” wrote Milliken and Johnson (2005:98). However, the authors suggest that *Steleglamo* was near Mission San Antonio; *Stjahuayo*, *Zasselat*, *El Pinal*, and *Tsetacol* were in the Cambria vicinity, and *Setjala* was along Cayucos Creek.

CHAPTER 4: PREVIOUS ARCHAEOLOGICAL RESEARCH

This chapter summarizes previous archaeological studies in the research area as well as adjacent areas, including south of the research area, in the vicinity of the Morro Bay estuary and north of the research area in the vicinities of Harmony and Cambria. A review of previous archaeological studies in adjacent areas provides context for the current study. Furthermore, past syntheses of the Morro Bay estuary served as examples to guide the current research. This chapter ends with a detailed review of previous archaeological studies in the current research area in the vicinity of Cayucos (Appendix A). Information is organized by area and then in chronological order.

The Cayucos area has been overlooked for research potential, and while the current research does not expect to produce the same amount of data and interpretations for the Cayucos area as was produced for the adjacent areas, the data gap is being addressed in the current research. The lack of understanding we have of this remaining portion of Estero Bay compels this research.

Morro Bay Estuary

Notable archaeological research of the Morro Bay estuary was initiated as a result of development projects, including the Los Osos Junior High School (Hoover and Sawyer 1977), Highway 41 improvements (Jones et al. 1994; Mikkelsen et al. 2000), and the Los Osos Wastewater Project (Far Western Anthropological Research Group, 2016; Jones et al. 2019).

During the 1950s, archaeologists focused attention on the town of Morro Bay. During his 1951 survey of the stretch of coast between Morro Bay and Avila, Arnold Pilling was the first to record many of the archaeological sites in Estero Bay. Unfortunately, no report was generated from his efforts (Greenwood 1972 in Jones et al., 1994). Clemmer (1962) conducted a study of the shell middens at CA-SLO-239, where the PG&E power plant now exists in the city of Morro Bay. Clemmer (1962) provided a thorough discussion of his findings which included a house floor; 10 flexed burials; and an assemblage of flaked stone, groundstone, shell, and bone implements. However, his interpretation of the chronology within the disturbed stratigraphy is contested by Jones et al. (1994: p. 60) and the applied ecological model was seen as “crude” and insufficient. In the 1970s, the San Luis Obispo County Archaeological Society (SLOCAS), produced important reports on local archaeology from Riddell (1960), Hoover and Sawyer (1977), Tainter (1971) and others (Jones et al. 1994).

Hoover and Sawyer (1977) provide their report on excavations at CA-SLO-214 – the Los Osos Junior High School Site. This site was described as an expansive shell midden. Numerous beads, house pits, midden, and other artifacts revealed the largest archaeological site in San Luis Obispo County “and probably the largest site to exist in that region in prehistoric times”, at the time of discovery (Hoover and Sawyer 1977: 1). Human burials were also reported in the east area of the site, but these were not excavated. Though no radiocarbon dates were produced to support their interpretations, diagnostic shell beads and projectile points found at the site can be temporally associated with the Late Period

(750–200 BP). The presence of six chert drills and numerous shell beads show evidence for shell bead manufacturing at the site.

For the widening project of Highway 41, two documents were produced by Jones et al. (1994) and Mikkelsen et al. (2000). Both reports include archaeological investigations at CA-SLO-165, which became fundamental to our understanding of the precontact era in Morro Bay. Findings provided interpretations of the complex relationship between humans and the ever-changing environment throughout the Holocene. Mikkelsen et al. (2000) also expanded on the discussion of the local paleoenvironment, introduced by Jones et al. (1994). Their reconstruction of the paleoenvironment included non-archaeological data, such as sediment studies. Based on the data, the authors point out that the former conditions of the Morro Bay Estuary were far more expansive than today. The authors were also able to apply environmental data with newly developed local chronological sequence outlined by Jones and Waugh (1995). Using the Central Coast Sequence, site stratigraphy revealed a minimum of four occupations: Millingstone, Early, Middle, and Middle-Late Transition. The Early Period (5500–2600 BP) in particular is well represented at the site, evidenced by the presence of a large, residential, year-long base camp (Mikkelsen et al. 2000). A diverse assemblage of artifacts and human burials, dated to the Early Period, point to the stability and importance of the site during that time. The estuary environment during the Early Period would have been favorable for supporting such a large residential camp.

Additional focus on the Morro Bay Estuary occurred during Far Western's and Cal Poly's studies for the Los Osos Wastewater Project (Far Western Anthropological Research Group 2016; Jones et al. 2019). The results of the 15-year long Los Osos Wastewater Management Project work provide a history stretching back over 8,000 years, lasting until approximately 300 years ago. Regional stratigraphy revealed 10 temporal components, including a modest Millingstone occupation, followed a by a burst in population during the Early Period, a Middle Period collapse, a rebound in occupation during the Middle-Late Transition, and ending with a Late Period migration inland (Far Western Anthropological Research Group 2016). A lack of glass beads suggests postcontact area abandonment, similar to the findings of Hoover and Sawyer (1977) at CA-SLO-214 and Mikkelsen et al. (2000) at CA-SLO-165.

In the flaked stone analysis section of Far Western's report, Hildebrandt discusses Monterey and Franciscan chert frequencies, identifying a potentially diagnostic pattern for tool stone preference. Monterey chert frequencies indicate the material is the higher quality tool stone for tools and bifaces, even though Franciscan sources were locally available and Monterey chert quarries were not. The pattern is evident up until the Middle-Late Transition, when Franciscan chert appears in higher frequencies but then reverses again in the Late Period. This contrasts with the higher frequency of Franciscan chert used for cores reduction, persisting until the Middle Period when Monterey chert becomes equally and slightly more important moving into the Late Period. Hildebrandt suggests that these patterns point to increased long-term reliance on the local environment, as opposed to acquiring toolstone outside of the area.

Jones et al. (2019) builds on the results of the Los Osos Wastewater Management Project and continues to support the idea introduced in Far Western's research of CA-SLO-165 (Mikkelsen et al., 2000) that the extent of the Morro Bay estuary changed over time, affecting habitat productivity and the humans living within it. The authors hypothesize that the Morro Bay estuary served as a "refugium" to indigenous peoples when the climate became warmer and dryer and marine productivity soared. Jones et al. (2019) explains that Morro Bay has been "overlooked" for centuries by those of European descent – beginning with the Spanish, who only first explored the area in 1769, concluding the bay was useless. However, the authors conclude it is a mistake to continue to dismiss Morro Bay as a non-contributor to our understanding of the coastal peoples in California. In fact, they argue that the region provides a high concentration of diverse habitats conducive to resource abundance and is indeed worthy of study.

In addition to their archaeological data supporting evidence for exceptionally diverse resource exploitation, Jones et al. (2019) reference sea level, sea surface temperature, climate, and geological studies to provide a more complete and holistic view of the Morro Bay estuary environment over time and to allow for a better interpretation of the cultures behaving within an ever-changing landscape. The book is a synthesis of archaeological investigation of the Morro Bay Estuary, identifying unique archaeological patterns associated with environmental shifts, and points out data gaps where further research is warranted. It provides context for the current research as well as serves as an example for approaching the synthesis of archaeological investigation of the remaining portion of Estero Bay in Cayucos.

Southern San Simeon Reef

Similar to the Morro Bay estuary, the stretch of coastline along San Simeon reef, north of the current research area, has rarely seen significant archaeological attention but has demonstrated the potential to produce meaningful information about the precontact era (Jones and Waugh 1995; Jones and Ferneau 2002; Joslin 2010). One important study of this area, and the most recent, comes from Joslin (2010). Joslin (2010) focused on human coastal adaptations along the San Simeon reef, over a 5,000-year period, during the middle and late Holocene. Her research incorporated archaeological survey and excavation as well as biological data and paleoenvironmental analysis. The data produced from her study informs us about precontact subsistence and settlement of the area, enabling interpretations about hunting, gathering, and fishing adaptive strategies over time. Joslin’s work tells us that high-ranked resources, such as red abalone, exploited during the middle Holocene is one example of people adapting to their environment. This strategy shifted by the Late Holocene, as the environment pressured populations to innovate new technologies and change their subsistence strategies as resources became scarce. This is evidenced by a higher frequency of lower ranking species and diversity of artifacts in the archaeological record, reflecting higher search and handling costs. The subsistence shifts also provide clues to social organization, when processing, storing, manufacture, maintenance, and procurement elements are implied.

Joslin (2010) found that the area just north of the current research area contained a low and dispersed population throughout the 5,000-year period. Her conclusion is interpreted from the size of shellfish that did not appear to decrease over time. She also concludes that environmental stress forced occupants in the area to adapt by cultural means such as trade, marriage, and social reorganization. This is based on evidence for shellfish appearing at inland sites during droughts associated with the Medieval Climatic Anomaly. This is an important study to the current research due to its location, which provides context to the current study.

Cayucos

While Jones et al. (2019) argue that the Morro Bay Estuary has been overlooked, the same can also be said for just north of Morro Bay, only more so. In fact, archaeological research in the Morro Bay and Los Osos areas has been synthesized and updated a handful of times (Jones et al. 1994; Mikkelsen et al. 2000; Far Western 2016; Jones et al. 2019). However, no similar attempt has been made for the northern portion of Estero Bay in the vicinity of Cayucos. Dozens of the sites in the Cayucos area have been poorly recorded and only a handful have received appropriate investigation proportionate to their data potential. Cayucos remains the missing piece to our understanding of the past of Estero Bay.

Early Archaeology in Cayucos

Archaeological site investigations of Cayucos started in 1948, with the recording of two sites (CA-SLO-74 and CA-SLO-78) by Walker. The site record for CA-SLO-74 merely mentions a shell midden with charmstones, and CA-SLO-78 consists of a habitation site with human burials. Unfortunately, hardly any of either record was filled out and no maps are included in the record. The quality of site recordation seen in these first examples is fairly representative of the quality seen in the subsequent records throughout the next few decades. In fact, the bulk of information about Cayucos comes from only a handful of sites, studied numerous times, during projects related to construction of the Whale Rock Reservoir, Highway maintenance, development near Chevron's Estero Bay Marine Terminal, and residential developments. The sparse amount of information from a small sample of sites presents one of the limitations for this research.

It was in the 1950s that archaeology took off in Cayucos, with the recordation of a handful of sites by people such as Pilling and Baumhoff (1950–1952), Brooks (1952), and McKusick (1959). No maps are provided with these records, and they contain only bits of information. Arnold Pilling did not even visit CA-SLO-78 for his update that he started in 1950 and finished with Baumhoff in 1952. Pilling is known for his recording of the first sites in San Luis Obispo County, during his northbound survey of the coast, starting in

Montana de Oro (Jones et al., 2019). Baumhoff (1952) provided a slightly better record for CA-SLO-129, by including information such as erosion, buildings, destruction, and two artifacts (a chert scraper and blade fragment); however, he failed to identify the significance of the site (Breschini and Haversat 1990). Brooks recorded CA-SLO-126 as a large village site, and nothing more.

McKusick and Riddell recorded 16 sites (CA-SLO-148 through -163) during archaeological reconnaissance for the construction of the Whale Rock Dam and Reservoir between 1959 and 1960 (Riddell, 1960; Reinman, 1961). CA-SLO-154 was included in the study but is located away from the reservoir along Old Creek. The remaining 15 sites were destroyed by the project and now exist beneath reservoir water. Fortunately, McKusick and Riddell did a much better job of recording these sites than their predecessors did, even when considering the methods and standards of that time. The final report (Reinman 1961) informs much about the sites including details about burials, artifacts, and impacts. It was the first of a few important studies conducted in the Cayucos area and occurred much earlier than those of equal quality in Morro Bay and Los Osos.

Avocational Work of the 1960s

During the 1960s, site recording rapidly increased beyond those recorded for the Whale Rock Reservoir project. Dalidio (1964) was the first to record CA-SLO-181, which would later be subsumed within the site boundary of CA-SLO-879.

A major contribution of archaeological research during the 1960s was made by avocational archaeologists. The San Luis Obispo County Amateur Archaeologists (predecessors to SLOCAS) recorded many sites in San Luis Obispo County, including 15 in Cayucos. The group was led by their Chairman and Canadian archaeologist Boyd Wettlaufer. They designated sites with temporary or "T" numbers prior to trinomial designations (San Luis Obispo County Archaeological Society, 1968; Farrell, 2000a). Of particular interest to this research are the first sites identified by the group (T-1 through T-11). They recorded and reported on 11 sites along the Estero Bluffs – an area they termed the "Cayucos Bench". During their survey, which included testing of two sites (CA-SLO-325 and CA-SLO-348), sites were mapped and photographed, and numerous artifacts collected and documented on artifact records. Their entire effort on the bench was documented in a well-developed report (San Luis Obispo County Archaeological Society, 1968). It is the materials produced from these 11 sites that make up the orphaned Cayucos Bench Collection. It represents the only archaeological collection associated from the undeveloped parkland bench to date and is an important resource to the current study, since the bench comprises a large portion of the research area.

At the end of the 1960s, Charles Dills took over Chairman duties from Wettlaufer for the SLO County Amateur Archaeologists. Dills was a professor of math, physics, and chemistry at California Polytechnic State University, San Luis Obispo (San Luis Obispo County Tribune, 2014). His contribution to the Cayucos Bench endeavor included mapping and photographing sites. He may have been the main author of the 1966 report given his academic background; however, that detail is not clear. His lack of formal education in archaeology may be the explanation for why Dills produced work that lacked detail. In fact, many of his records did not include enough locational information for the Information Center to map. Several early records from the Cayucos area made note of that. That being said, Dills contributed radiocarbon dates in with his studies, including at least five for sites in Cayucos. Dills remained a prominent person in the local archaeological community into the 1990s.

Rock art in the 1970s

Archaeological site recording during the 1970s was done mostly by rock art enthusiasts Jay von Werlhof and Georgia Fleshman. Better known for his rock art studies in the Colorado desert (Whitley, 2014), von Werlhof recorded half a dozen archaeological sites in 1970 along Villa Creek, just north of Cayucos. Von Werlhof's records provided detailed artifact counts, sketch maps, and artifact illustrations. Though von Werlhof did not record or update any rock art sites in Cayucos, he did note that he had learned about a site from SLOCAS member and avocational archaeologist Geneva Hamilton. Hamilton was likely speaking of CA-SLO-324, as it is located in the vicinity of where von Werlhof had been working along Villa Creek. CA-SLO-324, a pit-and-groove rock art site recorded by Wadhams and Wadhams (1962), may have been the motivation for von Werlhof's work in the area, though there is no indication he visited the site.

Georgia Fleshman (later Georgia Lee) did visit CA-SLO-324 the same year von Werlhof mentioned it, in the site record for CA-SLO-550. It is unclear whether Dills and Fleshman worked with each other at CA-SLO-324, but at some point, Dills provided illustrations of the pit and grooves. Fleshman is mostly known for her studies of rock art in Rapa Nui; however, early in her career she focused on Chumash rock art (Bahn et al. 2016), which is probably what brought her to Cayucos. Fleshman recorded four other sites during the 1970s, three of them rock art sites (CA-SLO-601, -657 and -745). The non-rock art site, CA-SLO-667, was recorded as several rock outcroppings with bedrock mortars. The two provenienced rock art sites Fleshman recorded are located near Villa and Cayucos Creeks. She documented these as pit or cup and groove rock art designs (Fleshman 1975). One of the sites (CA-SLO-601) also includes a design seen outside of the research area, called pecked curvilinear nucleated (PCN) and discussed by Gillette (2011). The PCN design is seen more frequently to the north and most commonly in the northern San Francisco Bay area. The culture associated with this design, as well as the meaning and temporality, is unknown. The cluster of pit-and-groove sites in this area are the only pit-and-groove sites in San Luis Obispo County, exhibiting an interesting pattern for Cayucos and later discussed.

Cultural Resources Management in the 1980s and 1990s

After the 1970s, archaeology in Cayucos consisted mostly of cultural resources management (CRM) studies by a handful of individuals. As a result, many more reports were generated. People like Dills, Gibson, Parker, and Singer did many studies in Cayucos for the next couple of decades, though companies such as Far Western, Applied Earthworks, Cultural Resources Management Services (CRMS), and Archaeological Consulting contributed as well.

During the 1980s, Dills continued his work recording many precontact and postcontact sites with W. B. Sawyer. Most of their work was done along Villa Creek. The sites Dills and Sawyer recorded along Villa Creek (CA-SLO-1217, -1218, -1219, -1220, -1221, -1222, and -1539) are located on private and California State Park land. These have not been updated, nor are they publicly accessible, and no report was generated from their efforts. Essentially, all we know about the sites is from their two-page records (including a one-page map).

Robert Gibson began recording sites at the end of the 1970s. The first two sites Gibson recorded, CA-SLO-880 and CA-SLO-881, can be included in with the rest of the Whale Rock Reservoir sites, and CA-SLO-881 consists of a PCN rock art site, recorded as 10 pecked rings. Gibson conducted numerous studies in Cayucos throughout his career including at CA-SLO-877 and CA-SLO-879, as well as sites along the Cayucos Bench (Gibson 1980a, 1980b, 1988b, 1990a, 1990b, 1990c, 2002, 2005).

Clay Singer only recorded seven new sites (CA-SLO-1187, -1247, -1248, -1362, -1820, -1914, -2088, and -2089) in Cayucos, although he did a considerable amount of survey, monitoring, and excavation in the area including at sites CA-SLO-129, -877, and -

879, along Villa Creek, and along the Cayucos Bench (Singer 1987, 1989, 1992, 1993, 1994, 1995a, 1995b, 1995c, 1996a, 1996b, 1996c, 1997; Singer and Atwood, 1991). In 1989, he surveyed 145 acres of the coastal bluff and produced "the most comprehensive archaeological survey" of that area, according to Farrell (2000a: 10), in which he updated site records for CA-SLO-126, -509, and -510, and recorded two new sites (CA-SLO-1247 and -1248) (Singer, 1989). At CA-SLO-129 Singer conducted Phase III studies during construction monitoring. This methodology would not likely be approved of today, though Singer's work at CA-SLO-129 was arguably the most substantial until a recent Phase III study, reported by Laurie et al. (2017).

Another round of studies at CA-SLO-129 were conducted by Breschini and Haversat (1989, 1990, 1993). Other studies completed by the pair included at two significant archaeological sites, CA-SLO-877 and -879. At CA-SLO-877, Breschini and Haversat (1988) produced the oldest radiocarbon date in the Cayucos area of 8080 years BP. That said, the single date is troubling, as the sample was from a mixture of shell with not a single specimen from a provenienced stratum.

John Parker tested a parcel of land potentially within the site boundary of CA-SLO-877 (Parker 1989). Between 1993 and 1999, Parker recorded and updated six sites in Cayucos. Most of these were along Villa Creek (CA-SLO-326, -1217, and -1539), but two Franciscan chert quarries (CA-SLO-1903 and -1904) were recorded near the Whale Rock Reservoir.

Woodward, Wheeler, and Rumming, of California State Parks, recorded three sites during their 1986 survey of CA-SLO-1156 and -1157, and updated CA-SLO-877. Their record for CA-SLO-877 was much more complete than the original, including photos, auger data, geology, etc. The results from their survey are documented in a form version of a report (Woodward, 1986).

A cultural resources inventory of rural highways in the Caltrans District 5 was completed by Far Western in 2001, which included a portion of Highway 1 in Cayucos (Mikkelsen et al. 2001). During their study, Far Western updated site records for CA-SLO-129, -164, -509, -514, and -877. The survey purpose was to mostly identify sites that were within the Caltrans right-of-way. Not very much new information is provided in the updated DPR forms, except when site boundaries were determined to be inaccurate.

Cultural Resources Management Services (CRMS) surveyed the Estero Bluffs California State Park in 2000 (Farrell 2000a). The survey consisted of approximately 350 acres of coastal bluff that would be transferred to the State of California Department of Parks and Recreation by The Trust for Public Lands. CRMS assessed all previously recorded sites in the project area (CA-SLO-126, -348, -509, -510, -511, -512, -513, -514, -515, -516, -1221, -1222, -1247, and -1248). In their report (Farrell 2000a), the crew identified three possible precontact sites (EB-1-3) and two historic features (EB-4 and -5). These sites were not included in the records search results and do not appear to have been recorded on DPR site records. Furthermore, two of the sites (EB-3 and -4) are included within the site boundaries of, or immediately adjacent to, previously recorded sites (CA-SLO-126 and -509/H) and are not likely new. In fact, Farrell (2000a) describes both CA-SLO-509 and EB-4 as containing a historic corral and determines that the sites overlap. Additionally, EB-3 is mapped as either within or immediately adjacent to the very large and "potentially several acres" large archaeological site CA-SLO-126. It appears that EB-3 and CA-SLO-126 are the same site.

Commercial and Residential Development in Cayucos in Modern Times

In the late 1990s and into the 2000s, development produced many CRM studies in commercial and residential areas of Cayucos. Not many archaeological sites have been identified within the developed areas of town. Archaeological studies either indicate that people did not settle in these areas during the precontact era; precontact sites were impacted/destroyed by development, prior to any archaeological investigation; or a combination of the two. The latter option seems the most likely, as environmental laws have initiated numerous studies in residential areas of Cayucos. The sites recorded in developed Cayucos cluster near creeks. One important site, located in the heart of Cayucos and along Little Cayucos Creek, is CA-SLO-1914/H. In 2000, CRMS evaluated and conducted a Phase III data recovery of the site (Farrell, 2000b; Farrell et al. 2004). CRMS identified multiple occupations at the site including Late Period, based on *Olivella* shell bead types, and postcontact era based on radiocarbon results and one glass bead.

It is in between the creeks that there are gaps in the archaeological record. The small number of sites that have been identified away from water sources appear to be mostly mixed deposits, including unstratified precontact and postcontact materials. Near CA-SLO-1914/H and the Cayucos Elementary School are sites CA-SLO-1418, -2195, and -1769. CA-SLO-1214 is also near CA-SLO-1914/H; however, it is a postcontact site (the Cass House) and is not discussed in this report as it is not associated with precontact activities. CA-SLO-1418, -1769 and -2195 have only been surveyed and not much is known about the sites (Conway, 2001; Singer, 2005a; Bertrando and Bertrando, 1996; Bertrando, 1996; 2002). Bertrando (1996) determined that CA-SLO-1769 is redeposited material, possibly from nearby CA-SLO-78. Conway's (2001) survey report concluded he had observed precontact materials that were included in the site boundaries of either CA-SLO-1003 or -1418. This was a mistake, as there is no CA-SLO-1003 recorded in the area.

In the residential areas of Pacific Avenue and Studio Drive are only four recorded sites: CA-SLO-1157, -1478, -1497, and -2424. CA-SLO-1157, -1478, and -1497 are highly disturbed, according to site records. Only surface artifacts were recorded at CA-SLO-1157, after testing occurred by Woodward et al. (1986). Parker (1991a) and Murphy et al. (2019) tested CA-SLO-1478 and concluded the deposit was highly mixed. Parker (1991a) found no subsurface precontact era artifacts in the portion of the site he tested, and it was suggested by Anastasio (1993) that the presence of shell in that parcel may have been the result of modern beachcombing. Singer recommended that CA-SLO-1497 be deaccessioned after noticing that the site Dills recorded in 1994 was redeposited sand (Singer, 2005b). CA-SLO-2424 was not tested (Parker, 2005); however, Kidwell and Enright (2018) tested a parcel located across the street from the recorded site boundary and identified precontact materials mixed with postcontact materials.

Recent work at the Estero Marine Terminal

Located at the mouth of Toro Creek and meeting with Highway 1 is Chevron's Estero Marine Terminal. That area has been the source of work for many archaeologists for decades, and especially in the last 10 years. Since the 2000s, numerous Phase I, II, and III studies have occurred there (Lloyd et al. 2005; Conway 2011; Letter et al. 2012; Denardo et al. 2012; Berg et al. 2014; Hannahs 2008, 2015; Enright and Schinsing 2017b; Mikkelsen and Berg, 2017; Wendell and Enright 2017). Within the research area, nine out of the ten most recent newly recorded sites (CA-SLO-2725, -2736, -2737, -2738, -2740, -2741, -2742, -2743, and -2744) are located on the Chevron property, adjacent to Toro Creek. The sites clustered near Toro Creek contain precontact and postconact components. The largest and most thoroughly studied precontact site, CA-SLO-879, also recorded as CA-SLO-181, encompasses sites CA-SLO-1187, -1378, and -2736.

2021 Assessments of Estero Bluffs Sites

In a serendipitous turn of events, at the time of drafting this thesis, California State Parks decided to assess the archaeological sites located at the Estero Bluffs State Park. The San Luis Obispo Coast District Associate Archaeologist Chad Jackson surveyed sites along the bluffs and updated site records in 2020, assessing the degree of erosion and updating records for CA-SLO-126, -348, -509, -510, -511, -512, -514, -515, -516, -1221, and -1248. Archaeological site records not updated were CA-SLO-513 and -1247. Jackson noted that the dispersal of cultural constituents at both CA-SLO-510 and -1248 led him to interpret the sites as being one site. No intact deposit, save for a minor amount of shell fragments and one flake, was identified at CA-SLO-512. The site appears to have eroded away since its recording in 1964. The site boundary at CA-SLO-1221 was extended to subsume CA-SLO-1222. Jackson noted looting of archaeological materials and crystals at many of the sites. CA-SLO-325, associated with the Cayucos Bench Collection, is located just outside of State Parks property and was not accessible to Jackson at the time of his study.

CHAPTER 5: METHODS

Research Methods

Initial archival research was conducted, and information was collected from several sources such as information repositories, archaeologists, consulting firms, and government offices. Sources included: San Luis Obispo County Archaeological Society (SLOCAS), San Luis Obispo County Historical Society, John Parker, Lynn Singer (on behalf of Clay Singer), Albion Environmental, Applied Earthworks, Inc., Garcia and Associates (now Kleinfelder, Inc.), County of San Luis Obispo, California State Parks, California Department of Transportation, District 5.

A formal records search was conducted for the project area, on August 12, 2020, by Hugh Radde and Matt Lombiondo, Assistant Coordinator at the Central Coast Information Center (CCIC), California Historical Resources Information System (CHRIS). The records search results provided by the CCIC, included a list of all previously recorded cultural resources, and submitted studies within the project area (Appendix A).

Native American Outreach

Communication with some members of the local Native American community is ongoing. Specific tribal members included Mona Tucker, Chairperson for the Northern Chumash *yak tityu yak tilhini (ytt)*, Lori Laguna *(ytt)*, and Patti Dunton, Tribal

Administrator of the Salinan Tribe of San Luis Obispo and Monterey Counties. All individuals feel an ancestral connection to the study area and expressed interest in receiving copies of this research as well as viewing the Cayucos Bench Collection.

Laboratory Methods: Cayucos Bench Collection Analysis

Laboratory work consisted of analyzing and curating materials from the Cayucos Bench Collection. Most of the artifacts were found loosely in boxes, having no provenience attached. In the beginning phases of this research efforts were made to identify the provenience of some artifacts by comparing specimens with illustrations and photographs provided on artifact records, completed by the SLO County Amateur Archaeologists. Matched artifacts and records were assigned an ‘Artifact #’, in order to keep track of the artifacts for later artifact group analysis. These numbers are provided as comments on artifact tags which. The collection will continue to be housed at SLOCAS.

Materials in the collection included flaked stone, groundstone, battered stone, Marine shell, and bone. All materials were categorized, counted, weighed, bagged and tagged with individual specimen numbers, provenience (when possible), and attribute information. Data acquired from the archaeological materials was input to excel spreadsheets for coding and cataloging. Digital and hardcopy versions of the artifact catalog are included in Appendix A. Laboratory analyses provide data for interpreting the environment, chronology, and technology along with other social behaviors in Northern Estero Bay.

Flaked Stone

The method used for classifying the lithic materials in the Cayucos Bench Collection was modified by one established by Andrefsky (2005[1998]). His method is quite simple and comprehensive for basic lithics analysis. Andrefsky's general morphological typology (2005[1998]:76) was adopted but modified for this research (Figure 6). Artifacts were divided into tools or debitage. Tools were subdivided into bifaces (projectile points, bifaces, and awls) and non-bifaces (flaked tools and cores). Flaked tools were either unimarginal or bimarginal. Debitage was subdivided into percussion flakes or biface thinning flakes. Flaked stone artifacts were classified by type and material. Tools were bagged individually. Each tool was measured by maximum length, width, and thickness, weighed, and material type identified. Debitage was subdivided into percussion flakes, biface thinning flakes, or shatter. Debitage subdivisions were counted, weighed, and bagged together, according to material.

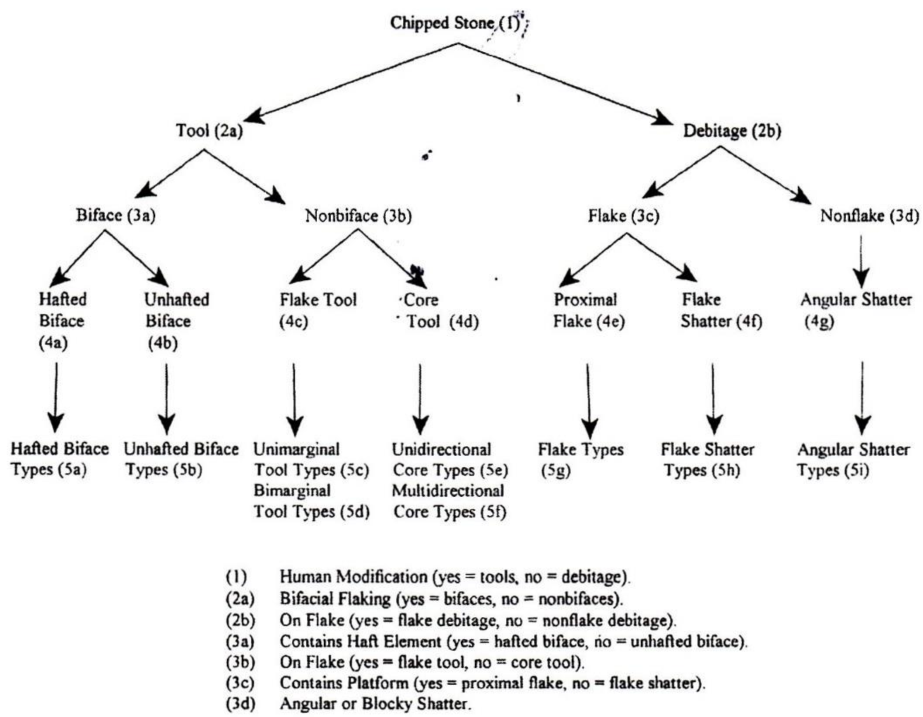

Figure 6. Andrefsky's typology flow chart.

Groundstone

The method used for classifying the groundstone materials in the Cayucos Bench Collection was one borrowed from the work of multiple sources including, the extensive research of archaeologists Patricia Mikkelsen (1985; Basgall and Hildebrandt 1989: Appendix B) and Richard Fitzgerald (1993), as well as from the Jenny Adams (2014). Other authors such as Terry Jones and his contributors (Cook et al. 2017; Jones and Waugh 1995; Jones et al. 2007; Jones and Codding 2019; Jones et al. 2019; Webb and Jones 2018) provide locally (the Central Coast) nuanced approaches for defining and organizing groundstone classes, which were also used. While each of these sources provides quality analytical methods and/or classification parameters, alone they are insufficient for addressing the Cayucos Bench Collection.

Every artifact was categorized and quantified by class (e.g. handstone, pestle, mortar, etc.); condition (e.g. whole/complete, near complete, interior, medial section, indeterminate margin, end, or fragment), maximum length, maximum width, maximum thickness/height, weight, material description (e.g. igneous, sedimentary, or more specific), surface constituents (e.g. asphaltum, pigment, etc.), evidence for being fire-affected, evidence for secondary modification, and any comments with additional pertinent data were noted. All attribute data entered into Excel spreadsheets organized by class. Specific artifact classes required special attention to their unique attributes. These classes are defined, and their attributes are discussed below.

Battered Stone

Every artifact was analyzed according to class (hammerstone, anvil, pitted stone, and battered cobble); condition (whole/complete, near complete, interior, medial section, margin, indeterminate end, or fragment), maximum length, maximum width, maximum thickness/height, weight, material, and any potential of exhibiting fire-affected and/or secondary modification qualities. Furthermore, any additional pertinent information was noted as a comment.

Olivella Shell Bead

Olivella shell beads are manufactured from the Purple Olive snail, formally known as the species *Olivella biplicata*. The species was changed relatively recently by biologists and is now known as *Callianax biplicata*, though it still resides within the Olivellidae family. Since its scientific name change, archaeologists continue to use the term Olivella in literature and I will do the same.

The Olivella shell bead from the Cayucos Bench Collection was classified using the Bennyhoff & Hughes (1987) method. The single Olivella shell bead required identifying the class and subclass, based on morphology and measurements for maximum diameter, length, and diameter of perforation, as well as weight.

Marine Shell

The shell remains from the collection did not include specific provenience information and was recovered using an unknown sampling strategy. Therefore, shell specimens were organized by site (when possible) and species, and were weighed.

Bone

Bone specimens were analyzed by Senior Osteologist Lise Mifsud, M.A. Bone specimens were organized according to the lowest taxonomic classification possible.

Other

Fire affected rock (FAR) and Pigment were organized into an 'Other' category. These were counted, weighed, material type identified, with additional pertinent information provided in the comments.

Accelerator Mass Spectrometry Dating

Radiocarbon samples were submitted to Direct AMS Radiocarbon Dating Service, for analysis using accelerator mass spectrometry (AMS). The results of the AMS analysis were calibrated using the Calib 8.2 software (Stuiver, M., Reimer, P.J., and Reimer, R.W., 2021, CALIB 8.2 [WWW program] at http://calib.org), with a marine reservoir correction value of 140±25 (Heaton et al. 2020).

CHAPTER 6: RESULTS OF THE CAYUCOS BENCH COLLECTION ANALYSIS

The archaeological sites associated with the Cayucos Bench Collection are CA-SLO-126, 325, 348, 509, 510, 511, 512, 513, 514, 515, and 516. These sites are mostly located within the Estero Bluffs State Park. One site, CA-SLO-325 is located further away from the bluffs and now on private property. The archaeological sites are primarily shell middens including lithics, groundstone, and battered stone artifacts.

In this section, the results of laboratory analyses are provided and organized by site. Tables listing materials noted at each site, identified in the original 1968 report are also provided. The field methods used by the SLO County Amateurs varied by site. Therefore, site data is demonstrated in the tables slightly differently in order to accommodate the varying methods used during the original study. For example, at some sites materials were observed, at others, items were collected. At one of the sites, CA-SLO-325, a trench excavation was completed.

Data from the original report is provided because that information is the only available for some of the sites. The collection as it is today, is mostly unprovenienced, with the majority of the artifacts not accounted for during lab analysis. Handwritten artifact records for the collection do exist, containing site provenience, a description, and illustrations, but only for four sites (CA-SLO-126, -325, -348, and -516). Even for the sites with artifact records, the records were only helpful in a handful of cases when illustrations were representative enough to match with physical artifacts.

Artifact and ecofact identification during the recovery of the collection was completed by non-professionals and in the past. The words I use to describe the contents of the 1968 report are consistent with the language used by the authors of the original report. I have not interpreted their words to mean things that would be more familiar, even when I think it is possible. For example, the original authors used the word ‘jasper’ to describe the materials of some flaked stone artifacts, which I could interpret as Franciscan chert. It is my thinking that in changing their words, it leaves the potential for misinterpretation and spread of inaccurate information.

CA-SLO-126

CA-SLO-126 is a precontact archaeological site covering approximately one-acre along a bluff, on the eastern bank of San Geronimo Creek, where it meets the Pacific Ocean. The site likely extends to the western bank as well, where a multicomponent site is recorded as CA-SLO-509. The condition of the site is good though impacts to the site include looting and bluff erosion.

The site was recorded as a large village by someone whose only name provided was Brooks, in 1952. The site was visited multiple times and the subject of multiple studies such as by Farrell (2000a) and Singer (1989) however, no excavation of the site has occurred. The site is a shell midden measuring approximately one meter in depth, containing multiple artifact groups including flaked stone, groundstone, battered stone, FAR, and a variety of faunal shell and bone. A hearth feature was observed in the eroding bluff approximately 24 inches below the surface during the 1964 survey by Geneva Hamilton (San Luis Obispo County Archaeological Society 1968). In the most recent site record update, in 2021 by Jackson, human remains, Olivella shell beads, and projectile points were identified at the site. Two radiocarbon dates (1640 +/- 95 BP and 1550 +/- 90 BP) from the site suggest a middle period occupation.

CA-SLO-126 was given the temporary designation of T-1, by the SLO County Amateur Archaeologists (San Luis Obispo County Archaeological Society 1968). Of the 30 specimens reportedly collected during the 1968 study (Table 4), there are 21 artifact records included in the Cayucos Bench Collection. The artifact records are numbered consecutively from 1-21, with none missing in between. Thirteen artifact records were matched with artifacts analyzed during this research (Table 5).

Table 4. CA-SLO-126, materials noted in 1968 report

	Materials picked up and examined	Additional materials noted
Artifacts	• 16 anvil stones, used also as hammer stones. Occasional stones showed indications of use for rubbing. All were beach cobbles • 1 bowl fragment, which had been adapted as a hammerstone. • 6 pestles or fragments thereof • 1 whole blade used as a knife • 1 broken blade • 1 scraper • 1 core tool	• Hearth stones • Numerous fire stones
Shell		• 15 species of shell fragments and whole shells (abalone, mussel, pismo clam, Olivella, turban and 5 types of limpets)

Table 5. CA-SLO-126 artifacts analyzed for this research

PPT	Biface	Awl	Flake tool	Core	Debitage	Hand stone	Pestle	Muller	Mortar	Milling stone	Net Weight	Ham. grinder	Misc.	Anvil	Pitted Stone	Bat. cobble	Olivella bead	Other
							2		1						9			1

Artifact Total: 13

Groundstone and Battered Stone

Table 6. CA-SLO-126 Groundstone and Battered stone

Artifact	Subdivisions	Material	Total
Pestle	Cylindrical (1) Conical (1)	Sandstone	2
Mortar	Bowl	Sandstone	1
Pitted stone	Bifacial, one pit (6) Bifacial, two pits (1) Indeterminate (2)	Sandstone	9

Secondary Modification. One bowl mortar fragment, consisting of a portion of the rim and margin, was recovered from CA-SLO-126. The specimen includes one pit on the existing margin. The pit was likely created after the mortar was broken, given the central location of pit. The bowl was manufactured from sandstone. Two of the pitted stones (bifacial, one pit and bifacial, two pits) shows secondary modification of battering and shaping indicating additional use as a hammerstone and/or handstone. Two other pitted stones (both bifacial, one pit) show indeterminate evidence for battering and spalling suggesting previous or post use as a handstone or hammerstone.

Fire-affected Rock

One piece of fire-affected rock was identified from CA-SLO-126.

CA-SLO-325

Wadhams and Wadhams recorded this site extending over one acre, and four feet deep. The site is just west of Villa Creek, south of its confluence with Ellysly Creek, approximately 500 meters north of the Pacific Ocean. In the vicinity of the site, Villa Creek would have provided episodic estuarine habitats for a diversity of floral and faunal species. The site is part of an operating abalone farm property, bound to the west by a steep rise of hills and to the east, is a marshy area. Impacts to the site have occurred by livestock and the development of a water tank, dirt roads, and telephone poles. State Route 1 is located approximately 150 meters north of the site.

CA-SLO-325 was given the temporary designation of T-11, by the SLO County Amateur Archaeologists (San Luis Obispo County Archaeological Society 1968). The group completed a survey and surface collection of the site followed by the only excavation completed by them on the bench. According to the report, for the field survey and surface collection, the site was divided into four unequal areas. The materials identified in the 1968 report, provided in Table 7, come from a sampling of materials.

Table 7. CA-SLO-325, sample of collected surface materials, as noted in 1968 report

	Area 1	Area 2	Area 3	Area 4
Artifacts	• Burned stone	• 1 chopper, also used as a hammer • 3 anvil stones • 6 hammer stones • 1 broken projectile point • 2 blade fragments • 1 bowl fragment	• 6 hammer-anvil stones • 3 anvil stones • 1 core chopper • 2 cores • 1 broken blade • 1 possible scraper	• 5 hammer-anvil stones • 1 chopper
Shell	• Red abalone • Mussel • Pismo clam • Turban snail • Olivella • Chiton	• 2 pieces chiton • Giant chiton • Olivella • Turban snail • Limpet • Abalone • Purple hinged scallop • Pismo clam	• Whale barnacle • Giant chiton • Limpet • Turban snail • Pismo clam • Mussel • Unicorn shell	• Abalone • Turban snail • Limpet • Chione

The location of the 10-foot long, 2 feet wide trench was selected west of a road cut where the midden was seemingly undisturbed. Soils were dug by shovel and screened. It does not appear that methods were systematic, as no provenience was recorded for any of the recovered materials. The size of the screen mesh is unknown. The group did complete illustrations of the trench sidewall profile which included four strata above sandstone bedrock that occurred irregularly between approximately 43 and 51 inches below the surface. The top 13 inches (plus or minus) consisted of roots. The second strata included a layer of FAR extending to a depth of 23 to 30 inches below the surface. The authors of the report noted that the stones were not “numerous” and “did not appear to be in any concentrated grouping” (San Luis Obispo County Archaeological Society 1968: p. 4).

Extending 36-39.5 inches below the surface is the third strata- a single layer of whole abalone, *Tivela stultorum* (Pismo Clam), and *Hinnites giganteus* (*Crassadoma gigantea* / giant rock scallop) with abalone being the dominate shell. Below the shell lens and above bedrock, a bowl fragment and grooved stone were recovered. Cultural constituents identified at the site include Bedrock mortar (BRM) features and a variety of artifact groups such as flaked stone, groundstone, battered stone, FAR, and a variety of faunal shell. The BRMs are located in the northeastern portion of the site where there are multiple rock outcrops. The report notes that the rocks were highly exfoliated but guesses that there were 17 mortars in total.

There are 20 individual artifact records in the collection for this site, associated with Areas 3 and 4. The recorders for Area 4 used a number system for organizing the artifacts they collected. For Area 4, there are 13 artifact records numbered 1-13 consecutively, with none missing in between. The seven records for Area 3 are not numbered. Of the 20 artifacts records, six were matched with artifacts analyzed during this research, including six pitted stones from Area 3 and one pitted stone from Area 4 (Table 8). No quantity or list of artifacts was provided in the report for the subsequent trench excavation at the site however, I was able to associate an abalone shell and Pismo clam shell with the excavation by illustrations provided in the report.

Table 8. CA-SLO-325 artifacts analyzed for this research

PPT	Biface	Awl	Flake tool	Core	Debitage	Hand stone	Pestle	Muller	Mortar	Milling stone	Net Weight	Ham. grinder	Misc.	Anvil	Pitted Stone	Bat. Cobble	Olivella bead	Other
1									1		1				6			

Artifact Total: 8

Flaked stone

One projectile point fragment was recovered from CA-SLO-325. Most of the base and some of the midsection is intact. This type of projectile point is a large side-notch and diagnostic of Millingstone (10,000-5,500 BP) and Early (5,500-2,600BP) periods. The tool was manufactured from Monterey Chert.

Groundstone and Battered Stone

Table 9. CA-SLO-325 Groundstone and Battered Stone

Artifact	Subdivisions	Material	Total
Mortar	Bowl, globular (1)	Sandstone	1
Net Weight	Grooved, oval (1)	Sandstone	1
Pitted stone	Unifacial, one pit (1) Bifacial, one pit (4) Bifacial, two pits (1)	Sandstone	6

Secondary Modification. The net weight includes battering on both ends as well as battering and grinding on one face, producing a plano-convex morphology, and appears to be fire-affected. On the opposing surface, located in the center and intersecting with the groove is a pit. In addition to functioning as a net weight, the specimen appears to have also functioned as a hammerstone, handstone, and pitted stone. Two of the pitted stones (bifacial, one pit) exhibited clear battering and grinding on the available ends, indicating additional use as a handstone. Both specimens have an end broken off and the pits are located in the center, suggesting that they were pitted after the original stone was broken.

Marine Shell

The shells associated with CA-SLO-325 were originally not labeled however, both shells listed below were identified in the 1968 report illustrations as coming from Strata 3 of the trench excavation. Two marine shell specimens were identified for CA-SLO-325 (Table 10).

Table 10. CA-SLO-325 Marine shell species identified during this research

Habitat	Species	Common Name	# of specimens	Weight (g)
Estuarine	*Saxidomus nuttallii*	Washington Clam	1	68.1
Rocky coast	*Haliotis rufescens*	Red abalone	1	209.3

CA-SLO-348

CA-SLO-348 is a precontact shell midden and dense lithic scatter, with a single bedrock mortar feature. The site is located on a bluff above and overlooking the Pacific Ocean and Villa Creek from the west bank. The site is dense and covers approximately 7 acres horizontally, extending approximately three to five feet deep, as estimated by Farrell (2000a). Cultural constituents at the site include artifact groups such as flaked stone, groundstone, battered stone, and a diversity of faunal marine shell and bone. The condition of the site is good however, coastal erosion abutting the Pacific Ocean and Villa Creek threaten the perimeter of the site, including southeast extent of the site where the BRM is located. During his 2021 site record update, Jackson recorded multiple loci including one covering a large portion of the central southern end of the site where the lithic scatter is at its most dense and two where the midden is substantially denser than the rest of the site. The two shell midden loci are located in the center of the site (covering approximately half an acre) and a smaller area located near and surrounding the BRM feature. No excavation has occurred at the site, as far as this research could find.

CA-SLO-348 was given the temporary designation of T-10, by the SLO County Amateur Archaeologists (San Luis Obispo County Archaeological Society 1968). Materials noted at the site in the 1968 report were documented inconsistently with the rest of the report. Seemingly, because the quantities of artifacts at this site were significantly more numerous than the other sites, CA-SLO-348 was divided into 10 sections for the 1964 surface collection, and only a sample of two sections were itemized in the report (Table 11). A second visit to the site occurred in 1966. The second drip was completed as a training review, during which another surface collection was completed, and the site was surveyed by Charles Dills, using a “transit” instrument (San Luis Obispo County Archaeological

Society 1968). The latter survey focused their surface collection on three areas (A, B, and C), as these were identified as occupation areas (Table 11).

Table 11. CA-SLO-348 sample of artifacts, as noted in 1968 report

	Section 4: Lillian Wadhams	Section 4: Ethel Muir	Section 10: Jerry DeCou
Artifacts	• 1 metate • 5 choppers • 5 oval hammerstones – sandstone • 2 broken oval hammerstones – beach boulders • 1 oval hammerstone – beach boulder • 4 fragments of round hammerstones – sandstone • 2 triangular fired stones • 1 core – green jasper • Flakes (27 green jasper, 25 brown jasper, 37 tan and cream chert, 70 black and white chalcedony)	• 1 hammerstone – sandstone • 2 hammerstones – broken • 1 mano – broken • 1 core – chalcedony • 2 artifacts quantified but not described • 41 chalcedony flakes • 20 chert-jasper flakes	• 5 firestones • 3 core-hammerstones • 4 hammerstones • 1 mano • 1 pestle • 1 part of a bowl – rim • 3 choppers • 2 cores • 1 large metate – 25 lbs. • 10 jasper flakes • 50 spalls
Shell	• 14 fragments of abalone and pismo clam, • 1 Olivella • 1 turban	• 14 fragments of abalone and clam	• Shell – clam fragments

The artifact records in the collection are associated with both the 1964 and 1966 surface collections. For the 1964 surface collection, there are artifact records for Sections 1, 4, 6, 8, 9, and 10. There are five records with a 1964 date, that lacked concrete connections to the sections. It is unknown if the available records for each section are complete because a complete list of materials is not provided in the report. I am inclined to think the records are not complete, given so much of the entire collection is unaccounted for.

For the 1966 surface collection, all three areas (A, B, and C) have associated records. Like for the previous site visit, it is unknown whether the records for Areas A, B, and C account for all the artifacts collected during that visit, as no list was provided in the report.

I was able to connect 110 artifacts to CA-SLO-348 (Table 11) based on records and artifact labeling. Of the 76 artifact records I had for CA-SLO-348, 41 were matched with artifacts in the collection.

Table 12. CA-SLO-348 artifacts analyzed for this research

PPT	Biface	Awl	Flake tool	Core	Debitage	Hand stone	Pestle	Muller	Mortar	Milling stone	Net Weight	Ham. grinder	Misc. GDS	Anvil	Pitted Stone	Bat. cobble	Olivella bead	Other
	1		14	5	40	6	1		1	1		6	2	1	25	2		

Artifact Total: 105

Flaked stone

Table 13. CA-SLO-348 Flaked Stone

Artifact	Subdivisions	Material	Total
Biface	N/A	Monterey chert	1
Flake Tool	Unimarginal (11) Bimarginal (3)	Franciscan (1), Monterey (7), Indeterminate (3) Franciscan (1), Monterey (2)	14
Core	N/A	Monterey (5)	5
Debitage	Biface thinning flakes (6) Percussion flakes (34)	Franciscan (2), Monterey (3), shale (1) Franciscan (1), Monterey (33)	40

Groundstone and Battered Stone

One of the six hammergrinders was anomalous in size and morphology, when compared to the others. It is characterized as an elongate, plano-convex shaped artifact with a heel along a portion of one of the long sides. It has a large and rough planar surface, which appears produced from battering and grinding/rubbing, as well as the presence of a. There is heavy pecking and possible rubbing present along the central portion of one margin, creating a semicircle shape and rounded facet where the convex and planar surfaces meet. Moving toward the available end on the same margin, the margin is flaked, creating a blunt edge where the convex and planar surfaces meet. The specimen was made from sandstone. While the specimen does not necessarily deviate from True's definition, it is unique in size which is why I have provided details about it.

Table 14. CA-SLO-348 Groundstone and Battered Stone

Artifact	Subdivisions	Material	Total
Handstone	Unshaped unifacial, convex (2) Unshaped complete, convex (1) Shaped unifacial, convex (1) Shaped complete, twist (1) Shaped complete, flat (1)	Sandstone	6
Pestle	Bulbous	Greenstone	1
Mortar	Shaped cobble	Sandstone	1
Millingstone	Shaped unifacial	Sandstone	1
Hammergrinder	N/A	Sandstone (3), schist (1), indeterminate (2)	6
Misc. Groundstone	N/A	Sandstone	2
Anvil	N/A	Sandstone	1
Pitted Stone	Unifacial, one pit (2) Unifacial, two pits (1) Bifacial, one pit (15) Bifacial, two pits (2) Indeterminate (5)	Sandstone Sandstone Sandstone (13), volcanic (1), shale (1) Sandstone Sandstone	25
Battered cobble	Oval shaped, globular form	Franciscan	2

Secondary Modification. One unshaped unifacial handstone showed possible incipient pecking on the surface without usewear. Another unshaped unifacial handstone exhibited battering on both ends. An unshaped complete, convex handstone showed battering on one end, which appears to have functioned solely as a hammerstone in that area. The single bulbous pestle is highly shaped, with striations and heavy polish on both faces indicating that it was also used a handstone. Six pitted stones (four bifacial, one pit and two bifacial, two pits) showed evidence for battering or pecking and battering on one of their surfaces. These may have had additional use as a handstone before or after use as a pitted stone.

Marine Shell

Seventeen marine shell species were identified from CA-SLO-348 (Table 15). Five estuarine species were identified with a combined weight of is 218.6 grams (does not include slipper shell weight). Nine rocky coast species of shellfish were identified, with a combined weight of 126.5 grams (does not include slipper shell weight). Four sandy bottom or beach species of shellfish were identified, with a combined weight of 65.5 grams (does not include slipper shell weight); however, one Pismo clam shell fragment was large, weighing 28.2 grams – almost half of the bulk weight for Pismo. The rest of the Pismo clam sample included much smaller and younger specimens.

Indeterminate Species. Eighteen pieces of shell were not able to be speciated because they were highly fragmented and weathered. The combined weight of the indeterminate species was 13 grams.

Table 15. CA-SLO-348 marine shell species identified during this research

Habitat	Species	Common Name	# of specimens	Weight(g)
Estuarine/Rocky Coast/Sandy Bottom	*Crepidula* spp.	Slipper shell	6	3.1
Estuarine	*Leukoma staminea*	Littleneck Clam	15	18.3
	Macoma nasuta	bent-nose clam	17	13.6
	Ostrea lurida	oyster	<200	127.6
	Saxidomus nuttallii	Washington Clam	5	14.7
	Tresus nuttallii	Pacific Gaper Clam	15	44.4
Rocky Coast	*Balanus spp.*	Barnacle	6	8
	Tegula spp.	Turban snail	8	6.1
	Cryptochiton stelleri	Gumboot chiton	4	10.2
	Haliotis rufescens	Red abalone	2	46.8
	Lottia spp.	Limpet	1	0.9
	Mytilus californianus	California mussel	<80	54.2
	Pollicipes polymerus	Gooseneck/Leaf barnacle	1	0.2
	Stongylocentrotus	Sea urchin	1	0.1
Sandy bottom	*Clinocardium nuttallii*	Basket/heart/Nuttall’s cockle	1	8.7
	Siliqua patula	Pacific razor clam	3	1.5
	Tivela stultorum	Pismo clam	19*	55.3

Bone

Two bone specimens were recovered from CA-SLO-348. One was classified as a vertebra, belonging to a bony fish species. The other is a fragment, belonging to large mammal, with human being a possibility. The latter of the two is too fragmented and both are too small and have been fire-affected, making speciating impossible (Mifsud, personal communication 2021). The large mammal bone fragment was seen by three osteologists and none were able to determine species, based on the condition of the specimen.

Accelerator Mass Spectrometry Results

Two samples of oyster (*Ostrea lurida*) from the Cayucos Bench Collection were retrieved from the CA-SLO-348 shell assemblage and submitted to Direct AMS Radiocarbon Dating Service for accelerator mass spectrometry analysis. As with the rest of the assemblage, these were recovered from the site surface, during the original survey by the San Luis Obispo County Amateur Archaeologists. Both samples point to an occupation at CA-SLO-348 within the Middle Period (Table 16).

Table 16. CA-SLO-348 radiocarbon dates

Sample ID	Sample/species	Radiocarbon age	Corrected date range (2 sigma)	Corrected midway point
T-10-1	Marine shell, *Ostrea lurida*	2825 +/- 26 B.P.	cal BC 405-91	2248 B.P.
T-10-2	Marine shell, *Ostrea lurida*	2680 +/- 30 B.P.	cal BC 281-277, cal BC 270- Cal AD 98	2279 B.P., 2086 B.P.

CA-SLO-509

CA-SLO-509 is a multicomponent site consisting of a precontact shell midden and lithic scatter with a historic era corral, eucalyptus tree, and windmill are contained within the boundary. The site is located on the western bank of San Geronimo Creek, across from CA-SLO-126, extending nearly to the ocean shoreline. In the recent 2021 update by Jackson, the site boundary encompasses an area of approximately 6.5 acres. The precontact component of the site contains multiple artifact groups including flaked stone, groundstone, battered stone, FAR, and faunal marine shell. The condition of the site is good though impacts to the site include agricultural activities and erosion along the creek. State Route 1 is located less than 30 meters north and without any subsurface studies, I would assume that construction of the road has impacted the site in the northern end.

CA-SLO-509 was given the temporary designation of T-2 by the SLO County Amateur Archaeologists (San Luis Obispo County Archaeological Society 1968). During lab analysis for this research, there were no materials in the Cayucos Bench Collection provenienced to CA-SLO-509 however, a list of collected materials was provided in the report (Table 17).

Table 17. CA-SLO-509 materials noted in 1968 report

	Materials collected	Additional materials noted
Artifacts	• 2 pecking hammers • 1 mano fragment • 1 scraper • 1 core – quartzite • 1 core – worked to a tip • 1 reworked flake	• Very few hearthstones • Equal amounts of jasper and chalcedony
Shell	• 3 limpet • 1 chiton • 2 turban • 2 types of sand clams • Rock clam • Pismo clam • Abalone • Olivella	

CA-SLO-510

CA-SLO-510 is a precontact archaeological site covering less than approximately 0.25-acre. The site overlooks the immediately adjacent ocean and is located approximately

250 meters west San Geronimo Creek and archaeological site CA-SLO-126. The site is an extensive BRM feature with a shell midden and lithic scatter. The rock outcrop is very red in color and highly exfoliated. It is exposed as it juts away slightly from the bluffs. The midden containing lithics, groundstone, battered stone, and FAR is shallow, filling in the pockets of the formed in the topography of the bedrock surface. In the recent 2021 update by Jackson, 32 BRMs were counted. The purpose of the BRMs is unknown. The environment calls for salt-tolerant floral species which precludes their use for acorns, at the least. Singer (1989) suggests that their use may have been for the purposes of pulverizing marine resources. Impacts to the site include coastal erosion and looting.

CA-SLO-510 was given the temporary designation of T-3 by the SLO- County Amateur Archaeologists (San Luis Obispo County Archaeological Society 1968). During lab analysis for this research, there were no materials in the Cayucos Bench Collection provenienced to CA-SLO-510 however, a list of collected materials was provided in the report (Table 18).

Table 18. CA-SLO-510 materials noted in 1968 report

	Materials collected
Artifacts	• 1 small blade • 1 blade fragment • 1 crystal • Quantities of mano fragments
Shell	• California chiton • Abalone • Periwinkles • Wentletraps • Bentnose clam • Pismo clam • Rock clam

CA-SLO-511

CA-SLO-511 is a precontact archaeological site that covers approximately 0.5-acre and consists of a mainland area overlooking the immediately adjacent ocean and an offshore rock formation. Both areas may have once been connected and part of a paleo shoreline but have since been separated because of coastal erosion. The location of the site is approximately 1000 meters west of Cayucos Point. The nearest archaeological sites are CA-SLO-512, approximately 300 meters to the north, and CA-SLO-1247, approximately 900 meters to the east. The site contains artifact groups such as flaked stone, groundstone, battered stone, FAR, and faunal marine shell and bone. Though the SLO County Archaeologists did identify shell midden soils on the offshore outcrop, that area was only recently examined during the site record update by Jackson in 2021. Jackson describes this portion of the site to include a very dense midden approximately one meter deep, with a rock shelter and a hearth feature inside. Impacts to the site include heavy coastal erosion and looting in the mainland portion, with the offshore midden more intact and less accessed by looters.

CA-SLO-511 was given the temporary designation of T-4, by the SLO County Amateur Archaeologists (San Luis Obispo County Archaeological Society 1968). During lab analysis for this research, there were no materials in the Cayucos Bench Collection provenienced to CA-SLO-511 however, a list of collected materials was provided in the report (Table 19).

Table 19. CA-SLO-511 materials noted in 1968 report

	Materials collected	Additional materials noted
Artifacts	• 2 possible cooking stones • 2 possible tools (core tool, chisel) • 5 banded chalcedony • 1 plain chalcedony • 3 chert • 1 glass • 14 jasper rejects	• Hearths with hearthstones at two locations
Shell	• 5 pieces of limpet • Quantities of abalone and periwinkle	

CA-SLO-512

CA-SLO-512 is a precontact archaeological site that covers approximately less than 0.5-acre. The site is located along the coastal bluff and southeastern bank of a seasonal drainage, approximately 300 meters north of CA-SLO-511. The site consists of dark soil with sparse amounts of shell. Both during the original survey and later during the 2021 update, by Jackson, it is suggested that the dark soil represents the remnants of a shell midden that has since washed away.

CA-SLO-512 was given the temporary designation of T-5, by the SLO County Amateur Archaeologists (San Luis Obispo County Archaeological Society 1968). Only two pieces of burned rock were observed on the surface during the original survey of the site. No materials associated with CA-SLO-512 are included in the Cayucos Bench Collection.

CA-SLO-513

CA-SLO-513 is a multicomponent site including a precontact shell midden and tilling deposits and dump associated with a historic era gravel mining operation, according to the most recent site record update by Jackson, in 2021. The site covers an area of approximately three acres, extending on both sides of Swallow Creek, where it meets the Pacific Ocean, with most of the site situated west of the drainage. During the original survey, the profile along the southeast bank of the creek revealed the midden extends one to three feet below the surface. Impacts to the site include activities associated with the historic deposit and looting.

CA-SLO-513 was given the temporary designation of T-6, by the SLO County Amateur Archaeologists (San Luis Obispo County Archaeological Society 1968). Cultural constituents noted at the time of the original survey were shell and burned stones. The recent update adds flaked stone and groundstone to the artifact assemblage. Though the report does not suggest any materials were collected, a single battered stone artifact was identified in the Cayucos Bench Collection in association with CA-SLO-513 (Table 20).

Battered Stone

Table 20. CA-SLO-513 Battered Stone

Artifact	Subdivisions	Material	Total
Pitted Stone	Bifacial, one pit	Sandstone	1

CA-SLO-514

CA-SLO-514 is a precontact shell midden covering approximately an 0.25 acre, atop and surrounding a discrete and low-lying bedrock outcrop. The site and rock outcropping are situated on a generally flat area, slightly removed from the coastal bluff, approximately 50 meters away, with Swallow creek 150 meters to the southeast. State Route 1 is approximately 150 meters northeast of the site, and the nearest archaeological sites are CA-SLO-513, approximately 150 meters to the southeast, and CA-SLO-515 approximately 230 meters to the west. The site includes a variety of artifact groups such as flaked stone, ground stone, battered stone. Impacts to the site include rodent disturbance, and looting.

CA-SLO-514 was given the temporary designation of T-7, by the SLO County Amateur Archaeologists (San Luis Obispo County Archaeological Society 1968). The group performed a surface collection at the site (Table 21) however, during lab analysis for this research, no materials in the Cayucos Bench Collection were provenienced to CA-SLO-514. No artifact records are available for this site.

Table 21. CA-SLO-514 materials noted in 1968 report

	Materials collected
Artifacts	• 5 anvil stones • 1 mano fragment • 2 hammerstones • 2 jasper flakes
Shell	• Red abalone • Cockle shell • 3 types of limpets with owl predominating • Giant California chiton • Mussels • Quantities of large Olivella

CA-SLO-515

CA-SLO-515 is a small precontact shell midden covering an area of approximately 1 acre on the eroding coastal bluff and surrounding a discrete and low-lying bedrock outcrop. The site is located approximately 500 meters northwest of Swallow creek, with State Route 1 approximately 250 meters to the northeast. The nearest archaeological sites are CA-SLO-514 approximately 230 meters to the east, and CA-SLO-1222, approximately 175 meters to the northwest. The site includes a variety of artifact groups such as flaked stone, ground stone, battered stone. Impacts to the site include significant coastal erosion.

CA-SLO-515 was designated as T-8, by the SLO County Amateur Archaeologists (San Luis Obispo County Archaeological Society 1968). During their survey, they remarked on the degree of which most of the site had likely eroded away. They performed a surface collection at the site, noting only three artifacts were gathered (Table 22). No artifact records are available in the collection and during lab analysis for this research, no materials were provenienced to CA-SLO-515.

Table 22. CA-SLO-515 materials noted in 1968 report

	Materials collected
Artifacts	• 1 chopper • 1 flat metate • 1 mano

CA-SLO-516

CA-SLO-516 is a precontact shell midden covering approximately three acres along a coastal terrace overlooking the beach. Near this site the coastal bluff transitions to a sandy beach, where Villa Creek opens into the ocean, approximately 300 meters west of the site. The site is bound by State Route 1, approximately 25 meters to the northeast, and a fence and unnamed drainage. During the original survey the site was estimated to extend between 2.5 and 5 feet below the surface, with the deepest portion of the site visible along the “bank” (San Luis Obispo County Archaeological Society 1968). The midden includes a variety of artifact groups such as flaked stone, ground stone, battered stone.

CA-SLO-516 was given the temporary designation of T-9, by the SLO County Amateur Archaeologists (San Luis Obispo County Archaeological Society 1968). In the report, a list of materials is given though it is not indicated whether the list represents materials collected (Table 23). We know that the group collected some artifacts from the site because four artifacts available in the Cayucos Bench collection were found in association with CA-SLO-516 (Table 24). Five artifact records were recovered from the collection, but I was unable to connect them to any artifacts. One of the artifact records describes a pestle, which was not mentioned in the report.

Table 23. CA-SLO-516 materials noted in 1968 report

	Materials noted
Artifacts	• 1 hammerstone with anvil (2 fragments) • 1 basin style metate • 1 possible pot metate • 1 good chopper • 1 possible chopper • 1 small crude blade • 2 scrapers • 1 scriber or graver • 1 side scraper (modified, worked flake) • Materials (20 reddish jasper, 3 yellow jasper, 6 green jasper, 1 variegated chalcedony flake, 3 black chalcedony flakes, 1 brown chalcedony flakes, beach pebble
Shell	• Olivella • Turban • Abalone • Limpet of 3 varieties • Clam of 2 varieties • Chiton • 4 purpula

Table 24. CA-SLO-516 artifacts analyzed for this research

PPT	Biface	Awl	Flake tool	Core	Debitage	Hand stone	Pestle	Muller	Mortar	Milling stone	Net Weight	Ham. grinder	Misc. GDS	Anvil	Pitted Stone	Bat. cobble	Olivella bead	Other
							2								2			

Artifact Total: 4

Groundstone and Battered Stone

Table 25. CA-SLO-516 Groundstone and Battered Stone

Artifact	Subdivisions	Material	Total
Pestle	Cylindrical (1) Bulbous (1)	Sandstone	2
Pitted Stone	Indeterminate	Sandstone	2

Marine Shell

The shell recovered from CA-SLO-516 were all held together within midden soil trapped in a large red abalone shell (Table 26). The sort of shell package had not been washed. This abalone shell is not to be confused with the above-mentioned artifact record, as it is noted on the record that the shell had been washed. Two estuarine species of shellfish were identified from CA-SLO-516. There are two specimens represented in these species, including one gaper clam that had broken.

Table 26. CA-SLO-516 marine shell species identified during this research

Habitat	Species	Common Name	# of specimens	Weight (g)
Estuarine	*Saxidomus nuttallii*	Washington Clam	1	68.3
	Tresus nuttallii	Pacific Gaper Clam	1	30.7
Rocky Coast	*Tegula spp.*	Turban snail	1	<1
	Haliotis rufescens	Red abalone	1	191.4

Bone

One small bone fragment was recovered from CA-SLO-516 (<1 gram). It was found within the soil matrix holding two shells together. The species of the bone fragment was classified as indeterminate, but possibly rodent (Mifsud, personal communication 2021).

Cayucos Bench

The materials discussed in this section are artifacts, shell, and bone that did not have any provenience. Most of the collection lacks provenience (Table 27). These materials are identified in the catalog and tags as coming from the Cayucos Bench, as we know that at the least. The Cayucos Bench was the name used by the SLO County Amateur Archaeologists to identify the area now known as the Estero Bluffs. It is unknown whether the materials discussed below are from one site, such as CA-SLO-348, multiple sites, or all the sites where surface collections occurred.

Table 27. Materials analyzed having no provenience.

PPT	Biface	Awl	Flake tool	Core	Debitage	Hand stone	Pestle	Muller	Mortar	Milling stone	Net Weight	Ham. grinder	Misc. GDS	Anvil	Pitted Stone	Bat. cobble	Hammerstone	Olivella bead	Other
2	10	1	57	10	275	5		1	1	1	1	5			35	2	2	1	2

Artifact Total: 411

The results of laboratory analysis and research of the entire collection demonstrate that the sites located on the bluff show very similar site descriptions and artifact/ecofact assemblages. Because the sites occur in a contiguous landscape and are so similar it is reasonable to assume that the region shares a cohesive past. Even the materials with no site provenience have the potential to inform about the precontact era along the bench, or Estero Bluffs (Tables 28-30).

Flaked stone

The Monterey chert used to manufacture both projectile points are very different in appearance (Table 28). The Rossi square-stem is tan in color. This type is sequenced to the Early period (Jones and Waugh, 1995; Jones et al., 2007). The second projectile point is very black and looks similar to the Monterey chert cobbles found on the nearby beaches. It is a midsection piece from near the original base. The specimen was too fragmented to type, though based on size alone it may have been a lanceolate. It is possible the specimen was an arrow point; however, the thickness (6mm) is indicative of a larger projectile point type.

Table 28. Unprovenienced flaked stone

Artifact	Subdivision	Material	Total
Projectile Point	Rossi square-stem Indeterminate	Monterey	2
Biface	N/A	Franciscan (4) Monterey (6)	10
Awl	N/A	Monterey	1
Flaked Tool	Unimarginal (46) Bimarginal (11)	Franciscan (12), Monterey (33), quartzite (1) Franciscan (5), Monterey (6)	57
Core	N/A	Franciscan (5), Monterey (4), Siltstone (1)	10
Debitage	Biface thinning (9) Percussion (251) Shatter (15)	Monterey Franciscan (72), Monterey (174), Indeterminate (5) Franciscan (13), basalt (1), quartz (1)	275

Groundstone and Battered Stone

Table 29. Unprovenienced groundstone and battered stone

Artifact	Subdivision	Material	Total
Handstone	Unshaped bifacial, convex (1) Unshaped bifacial, flat (1) Shaped bifacial, convex (1) Shaped complete, flat (1) Shaped complete, convex (1)	Sandstone	5
Muller	N/A		
Mortar	Bowl	Sandstone	1
Millingstone	Shaped	Sandstone	1
Net Weight	Grooved	Sandstone	1
Hammergrinder	N/A	Metamorphic	5
Hammerstone	N/A	Basalt	1
Pitted Stone	Unifacial, one pit (5) Bifacial, one pit (17) Bifacial, two pits (8) Indeterminate (5)	Sandstone Sandstone (15), volcanic (2) Sandstone	35
Battered Cobble	Oval shaped, globular form	Franciscan (1), Monterey (1)	2
Hammerstone	N/A	Franciscan (1), Basalt (1)	2

Secondary Modification. One completely shaped, convex handstone shows secondary modification of central pitting on both surfaces, including two pits on each side for a total of four pits. One hammergrinder included battering on one end of the specimen. At one point in time, possibly signifying use as a hammerstone. Four pitted stones (bifacial, one pit) showed evidence for battering and may have been used as hammers. One of these showed evidence for battering and grinding on the available end as well as pecking on opposing sites, creating notches. The artifact may have been used as a handstone and notched net weight.

Olivella Shell Bead

One large spire lopped Olivella shell bead (A1c) was identified, without provenience. This bead type has no temporal association, as it can be found during any time period.

Pigment

One piece of pigment was identified without provenience. The specimen is a chunk of possibly cinnabar or Franciscan chert. The rock is very red, similar to the Franciscan chert outcrops along the bench, with one surface including a powdery substance that may have been applied or a part of the rock.

Fire-affected Rock

One piece of fire-affected rock was identified without provenience. The specimen is highly fire-affected and exfoliated giving the appearance of being battered however, without conclusive evidence I have not included it within any artifact classes.

Marine Shell

Eight estuarine species of shellfish were identified, without provenience (Table 30). The combined weight of Estuarine species is 457.6 grams (not including slipper shell). Ten rocky coast species of shellfish were identified without provenience, with a combined weight of 238.4 grams (not including slipper shell). Three sandy bottom species of shellfish were identified, with a combined weight of 55.3 grams (not including slipper shell). Slipper shell habitat can include estuaries, rocky coasts, and sandy bottom. One piece of undifferentiated crab shell was identified, without provenience (0.9g). Two other pieces of shell were not able to be speciated (4.3g).

Table 30. Marine shell species identified, having no provenience

Habitat	Species	Common Name	# of specimens	Weight (g)
Estuarine/Rocky Coast/Sandy Bottom	*Crepidula* spp.	Slipper shell	4	3.8
Estuarine	*Leukoma staminea*	Littleneck Clam	26	35.2
	Macoma nasuta	bent-nose clam	25	24.9
	Neverita lewisii	Lewis' moon snail	4	11.4
	Ostrea lurida	oyster	<500	324.8
	Saxidomus nuttallii	Washington Clam	8	9.5
	Tagelus californianus	California jacknife	1	0.8
	Tresus nuttallii	Pacific Gaper Clam	24	47.2
Rocky Coast	*Acmaea mitra*	Whitecap limpet	1	0.9
	Balanus spp.	Barnacle	11	19
	Cryptochiton stelleri	Gumboot chiton	6	17.5
	Haliotis chracherodii	Black abalone	1	10.6
	Haliotis rufescens	Red abalone	2	29.4
	Lottia spp.	Limpet	3	6.9
	Mytilus californianus	California mussel	107	112.5
	Nucella emarginata	Dogwinkle, rock snail	6	14.5
	Tegula spp.	Turban snail	14	23.3
Sandy bottom	*Callianax biplicata*	Purple olive snail/Olivella	8	14.6
	Tivela stultorum	Pismo clam	21	36.9

<u>Bone</u>

Three bone specimens were recovered, without provenience (weight <1.0g). One fragment was fire-affected and classified as mammalian but determined to be too dense to be human. One long bone fragment belonged to an indeterminate species. A third specimen was a vertebra belonging to an indeterminate species (Mifsud, personal communication 2021).

Summary

The Cayucos Bench Collection produced a diversity of materials mostly consisting of flaked stone, groundstone, and a variety of marine shellfish species. While the provenience was limited to a few sites and the rest coming broadly from the bench (Estero Bluffs), theoretical framework and analysis helped glean some information about technology, mobility, regional function, and settlement along the Estero Bluffs, in Cayucos.

Flaked Stone

Chronology. Two diagnostic projectile points were recovered from the Cayucos Bench collection – one large side-notch and one Rossi square-stemmed. Both of these are associated with Millingstone and Early Period assemblages, with the Rossi square-stem type persisting into the Middle Period (Jones et al. 2019).

Sources of Monterey Chert. No primary sources of Monterey chert, such as from the Monterey Formation, have been identified in the research area however, Monterey chert cobbles prolifically scatter along the beaches of the Estero Bluffs. There are two explanations for the presence of Monterey chert on the beaches and in the orphaned collection: 1) Monterey chert materials were imported by humans, from outside sources and used; or 2) Monterey chert materials were brought to the area by natural geological processes and later used.

The presence of Monterey chert in archaeological contexts, far removed from natural sources has been the topic of past research (Jones and Waugh 1995; Parsons 1990). Parsons (1990) provides a relevant explanation for how Monterey chert cobbles have ended up in the Año Nuevo area. Parsons indicates that the Año Nuevo area is one major source of Monterey chert within central California's Coast Range, including beaches distributed with boulders, cobbles, and pebbles of Monterey chert. However, Parsons also indicates that Monterey chert materials found at Año Nuevo are from secondary deposits, not *in situ* sources. He explains that the nearest *in situ* source of Monterey chert originates in a secondary conglomerate deposit within the Purisima Formation, on the north side of Point Año Nuevo. In this area, the Purisima Formation outcrops into the ocean for approximately one-quarter mile. Geologists have hypothesized that it is remnant of a much larger outcrop that has since eroded away by ocean waves, and the down-shore current brought Monterey chert materials south and onto the beaches. Evidence in support of the hypothesis comes from the distribution of Monterey chert materials that occur in lower frequencies and shrink in size as they are found further south from Point Año Nuevo, a result of being worn down in the process.

Jones and Waugh (1995) also noticed the high frequency of Monterey chert artifacts in the vicinity of Piedras Blancas, which they supposed came from a small outcrop of the Monterey Formation at San Simeon Point, as well as from conglomerate deposits found on local cliffsides. Additionally, Jones and Waugh speculated about other potential outcrops of the Monterey Formation that had not yet been identified by geologists.

In light of the work by Jones and Waugh (1995) and Parsons (1990), I suggest the possibility that Monterey chert materials found along the beaches in Cayucos, as well as the specimens found in the Cayucos Bench Collection, originated from a former extent of a Monterey chert outcrop, associated with the Monterey Formation. Because the California Current moves south along the coast of the research area, this former extent (like at Point Año Nuevo) would have been north of the Cayucos area, possibly once connected to the sliver of Monterey Formation identified in the San Simeon area. Further research is needed to support this and may include the analyses of distribution and size of Monterey chert materials in Cayucos and moving south.

Production and Mobility Patterns. The data in the flaked stone assemblage is not complete, however, the theoretical framework from Bertrando and Harro (1997) assist with interpretation of the results. Based on their model there were two expectations for the Cayucos Bench flaked stone assemblage 1) the abundance of chert sources within a short distance of each other would produce a higher frequency of expedient (low-input) tools, as opposed to formal (high-input) tools; 2) Lower quality cherts will correlate with low-input production and higher quality cherts will correlate with high-input production. Both of these expectations were met.

The quantity expedient tools (low-input) far exceed the quantity of formal tools (high-input). In fact, the quantity of formal tools in the collection (projectile points, bifaces, and awl) is 15, representing approximately 3.6% of the total flaked stone assemblage (416 flaked stone artifacts). The theory tells us that because two sources of chert (Monterey and Franciscan) were locally available, transportation costs associated with importing formal tools declined as formal tools could be moved and stockpiled much easier. Furthermore, less production risk is involved in the production of expedient tools so manufacturing and importing formal tools become less necessary.

Correlations between quality of raw material and artifact type is also evident in the flaked stone assemblage. Monterey chert is the higher quality chert compared to the Franciscan. Bertrando and Harro’s (1997) theory tells us that Franciscan chert artifacts would correlate with low-input artifacts and Monterey chert artifacts would correlate with high-input tools, which is somewhat consistent with the findings of this research. The high-input tools indeed show a preference for Monterey chert by approximately 73% (11 Monterey vs. 4 Franciscan) however, all flaked stone classes and subdivisions showed a preference for Monterey chert, except for shatter (Table 31). In fact, Monterey chert artifacts make up for approximately 69% of the entire flaked stone assemblage. Other raw material types were marginal in comparison to chert use, comprising only approximately 3% of the assemblage.

Table 31. Flaked stone by material type

FLS Class	Franciscan Chert	Monterey Chert	Other	Total
Projectile Point	-	3	-	3
Biface	4	7	-	11
Awl	-	1	-	1
Flaked Tool	19	48	4	71
Core	5	9	1	15
Debitage	88	219	8	315
Total	116	287	13	416

Groundstone and Battered Stone, Technological Organization

The groundstone assemblage provided information about the technological behavior of the indigenous inhabitants of the Cayucos Bench. Of the three technological strategies Nelson (1991) identifies, two of them are evident in the groundstone assemblage of the Cayucos Bench Collection. These include curated and expedient strategies. The manufacture of curated tools and expedient tools are planned which is why an opportunistic strategy is not apparent in the assemblage.

Curated tools in the collection include shaped handstones, millingslabs, mortars, pestles, grooved net weights, and the muller. These classes require a higher investment of manufacture because of their associated time and labor costs but also these could be cached and relied upon for future use. The curated strategy is “continuous rather than a categorical effect" (Nelson 1991:63). The locally available raw material for manufacturing curated tools allows for their manufacture to be planned – a requirement of this strategy.

The expedient tools include unshaped handstones, anvils, pitted stones, and notched netweights and are manufactured at the time of use. These artifacts represent tools with raw material readily available for their time of manufacture and could be relied upon by seasonal occupants to manufacture in response to an immediate need.

The designs of the groundstone and battered stone artifacts, found in the collection include reliable, maintainable, and potentially transportable (1991) (Table 32). Assigning design to the groundstone artifact is somewhat subjective.

Most groundstone designs were reliable designs. The reliable tools were those specialized to a specific task thought they may overlap with other designs, such as if they are transportable or if they break and become used for something else. The reliable designed artifacts identified in Table 32 are dependable and sturdy when needed, with tool/toolkits including replaceable fitted parts (e.g., grooved netweight, mortar and pestle, etc.). The artifacts show designs that "minimize interference with work time…" (Nelson 1991: 67).

Many of the artifacts include design overlap and some researchers may argue against some of the artifacts categorized as maintainable. The justification for assigning the maintainable designs comes from the many artifacts what showed secondary modification, representing flexible or versatile design patterns. Furthermore, evidence for pitting on exhausted artifacts was prolific in the collection. Given that many of the artifacts showed secondary use either in a general form (versatile) or modified form (flexible), provided support for assigning them to maintainable designs. That being said, the true versatile design is represented in the muller, which is a hybrid tool, functioning as a pestle and handstone. The benefit to the muller is the potential for dual functions. The downside is mullers are less successful at both functions, when compared to the tools designed for their specific purpose.

Transportable designs seem the least important in Cayucos Bench Collection. In general, curated tools, such as a biface, often have transportable designs, however, given that groundstone and battered stone artifacts are heavy, transportability costs associated with this artifact group seem too high. Expedient tools do not fall within the transportable design because their value, associated with manufacture, are not enough that a person would transport them elsewhere, according to Nelson’s (1991) theory. I have included grooved net weight and pestle as potential transportable designs because those seen in the Cayucos Bench Collection demonstrated a size and weight that would allow them to be transported away from the site and exhibit characteristics for curation.

Assigning hammergrinders, battered cobbles, and hammerstones to designs proved too difficult. The function of hammergrinders and battered cobbles are unknown which makes assuming their design speculative. The hammerstones were manufactured by an expedient strategy and it is tenuous to determine that they are designed at all, beyond the requirement of durability for striking another rock.

Table 32. Artifact designs

Design	Artifacts
Reliable	Shaped handstone, pestle, mortar, millingstone, grooved net weight
Maintainable, flexible	Pestle, handstone, millingstone, mortar
Maintainable, versatile	Muller, pitted stone, handstone, mortar
Transportable	Pestle? grooved net weight?

The activity distribution of the expedient and curated tools, of a variety of designs but mostly reliable, predicts that the sites along the Estero Bluffs were residential/habitation sites. The location of these types of sites tends to be near sources of raw material and within areas that allow for downtime opportunities to manufacture tools. These are ideal locations for producing and storing artifacts. This is evident in the high frequency of curated and expedient tools, including those of multiple stages of production. Stages of production are evident in the assemblage and include artifacts showing incipient usewear, as well as exhausted/broken tools, and those that were modified for secondary use.

Groundstone and battered stone artifacts are not great temporal markers, though the high quantity of pitted stones and presence of notched stones shows a similar pattern of Middle Period sites. The groundstone tool serving as the best temporal marker is the muller, which occur post 1200 B.P. (Middle-MLT).

Marine Shellfish

Marine shellfish identified in the Cayucos Bench Collection included species from estuarine, rocky shore, and sandy bottom habitats. Shellfish produced from CA-SLO-348 provides the best sample from the collection for limited interpretations about diet and the environment because of the quantity and because of provenience. Very little shell was produced from the other sites and the remaining sample has no provenience.

CA-SLO-348 produced a shellfish assemblage weighing a total of 419.9 grams. Approximately 52.8% of the sample included estuarine species; 30.86% was rocky shore; 16.34% was sandy bottom. These numbers suggest that the primary habitat that the shellfish processed at CA-SLO-348 was from the nearby estuary, located at Villa Creek. Two oyster samples produced AMS dates within the Middle Period. This tells us that the estuary had developed by that time and was viable (Villa Creek is classified as a hydraulic estuary which implies that conditions can be episodic during climate fluctuations). The remaining shell was also likely collected on-site as a sandy stretch of sandy beach exists to the east and rocky tide pools are to the west and further east from the beach. That being said, the temporality for those shells is uncertain. It is possible that other species were exploited at the same time or during other occupations, perhaps during a time when the estuary was shut off from the ocean.

The Cayucos Bench Collection indicates the area was used for repeated habitation during multiple components in history. Radiocarbon dates from CA-SLO-126 and CA-

SLO-348, and presence of Middle Period technologies suggest that the Estero Bluffs was occupied at its highest was during the Middle Period. Diagnostic projectile points suggest that an older occupation of the bench is possible, but this has not been attested. The presence of BRMs and mortar and pestle technology suggest a possible Late Period occupation as well.

CHAPTER 7: DISCUSSION

The scope of this thesis encompasses analysis of an orphaned collection, robust literature review of the last eight decades of archaeological investigation in Cayucos, and a synthesis of data coming from 92 precontact archaeological sites (Appendix A). While copious amounts of data from records, reports, etc., were researched for this thesis the information is sparse. The information produced only limited evidence for some chronological, functional, and environmental patterns, providing only a vague understanding of the research area.

Many of the sites recorded in Cayucos consist of poorly documented lithic and shell scatters, lacking quality data with the potential to provide information to better interpret the past. Some adequate studies have been completed at sites such as at CA-SLO-877, 879, and 129. Sites with radiocarbon data are those that allow us to place artifacts and activities in time, being a good place to start (Table 33). Identifying the chronological patterns visible in northern Estero Bay and how they relate to the Central Coast Sequence is challenging at this point due to the sample of radiocarbon dates being small. The best this research can offer is to present the available dates and suggest patterns that may be clues about the sequence of events in Cayucos.

Table 33. Environmental and cultural events

Age (B.P.)	Central Coast Sequence (MB)	Cayucos Dates	Marine SST	Climate (Age in years BP)	Sea levels (Morro Bay)
Today	Late (700-180 BP)	8 Dates: SLO-879, 1217, 1914, 2195, 2743		L. Ice Age 600-150	Increased sediment
1,000	MLT (950-700 BP)	8 Dates: SLO-74, 879, 2195	Modern seasonal cycles established - increased upwelling in Spring/Summer, increased SST in early Fall (3,600- now)	MCA 1150-600	No major changes
	Middle (2550-950 BP)	8 Dates*: SLO-126, 129, 157, 879			
2,000		3 Dates: SLO-348, 879			Sudden deepening of Bay 2,600-1400
		4 Dates*: SLO-129, 879		Cooling trend of the Neoglacial (peak at 2500)	
3,000		3 Dates*: SLO-1218, 879			7 m below modern level, 4000 B.P.
	Early (5700-2550 BP)	1 Dates: SLO-879			
4,000			Slack current, increased ENSOs (4800-3600)		Rate of sea level rise begins to wane; ENSOs increase; Estuaries in CA shallow
		4 Dates: SLO-129, 879			
5,000		1 Date: SLO-879			
		3 Date: SLO-877			
6,000	Millingstone (10,000-5700 BP)		Southward flow of CA current intensifies, cooler SST, increased upwelling (9000-4000 BP)	Warming trend (peaks at 9000); coniferous plans in SB Channel replaced by Holocene (oak woodland, chapparal, and coastal sage)	
7,000		1 Date: SLO-877			MB Estuary develops, possibly 8100 BP; shoreline 18-20 m below modern sea level
8,000		1 Date: SLO-129			
		1 Date: SLO-877			
9,000		No data			
10,000	Paleoindian and before (pre-10,000 years)		Weak California current, reduced upwelling, warm SST (12,000-9000)		Sea level rise after Younger Dryas
11,000					
12,000		* Indicates Middle Period gaps in Morro Bay	No data	Younger Dryas (12,900-11,500)	Sea level rise standstill
13,000					

Millingstone Period (10,000-5700 B.P.)

The Millingstone Period is represented by three dates at two sites, CA-SLO-129 and CA-SLO-877 (Table 34) (Laurie et al. 2017; Breschini and Haversat 1988). Given the period of time within the Millingstone is 4,300 years, the ratio of radiocarbon dates to Millingstone years is approximately 1:1,433. The sample is small, but other Millingstone sites may have existed on the ancient shoreline. We know that the Morro Bay shoreline extended further out, approximately 18-20 meters below the modern sea level 8,000 years ago, so we can expect the same thing in Cayucos. Something interesting about the available radiocarbon dates is that they cluster within a range of 1215 years and one coincides with a gap in radiocarbon dates in Morro Bay – post 7,000 years B.P.

Table 34. Millingstone sites

Trinomial	Location	Radiocarbon Date
CA-SLO-877	Willow Creek	8080 B.P.
CA-SLO-129	Old Creek	8020-7680 B.P. (midway point of 7,850 B.P.)
CA-SLO-877	Willow Creek	6865 B.P.

The Millingstone Period is marked by a global warming trend and productive marine habitats, including within estuaries, such as at Morro Bay and possibly Villa Creek. The earliest radiocarbon date in Cayucos, and all of Estero Bay, is 8490 B.P. and comes from CA-SLO-877 (Breschini and Haversat 1988). CA-SLO-129 may have been settled slightly later and possibly for a shorter amount of time, with a single date range of 8020-7680 BP (midway point is 7,850 BP) (Singer 2002).

Both CA-SLO-129 and CA-SLO-877 are located in close proximity to each other, approximately 0.75-mile apart, at the modern mouths of Old Creek and Willow Creek. The Millingstone component at CA-SLO-877 includes a shell midden consisting of flaked stone tools and debitage, groundstone, beads, faunal bone and shell, and human remains. In the 23rd issue of *Archives of California Prehistory*, Breschini and Haversat (1988) suggested that CA-SLO-877 was a major village center during the Millingstone and/or Early periods. It is unknown if CA-SLO-877 was a village but it does appear to have been a long-term habitation site. The extent of the site is unknown however, Breschini and Haversat (1980) suggested that CA-SLO-164 is a part of CA-SLO-877 and not a separate site.

Breschini and Haversat (1993) described CA-SLO-129 as a moderately large shell midden, including flaked stone, groundstone, battered stone, incised pebble, tarring anvil, shell and stone beads, bone gorge, faunal bone and shell, fire-affected rock, cinnabar, and human remains. The faunal assemblage indicates a diet dominated by marine shellfish, mostly open sandy beach species with some species associated with rocky intertidal zones. A diversity of terrestrial fauna, birds, and fish appears to be less prevalent. Like CA-SLO-877, CA-SLO-129 is also a multi-component site with an artifact assemblage somewhat consistent showing a pattern of few milling equipment artifacts and projectile points, and a preference for marine resource exploitation.

The limited evidence available suggests that during the Millingstone Period, people colonized Estero Bay, possibly first in Cayucos, settling in a discrete location near Willow and Old Creeks. These sites functioned as residential bases during seasonal or longer occupations. People that lived there consumed a diet based on the locally available marine shellfish found at the sandy beaches and tide pools.

With consideration of CA-SLO-877 being so close in age and location to CA-SLO-129, these sites may represent a migration of the same people, alternating locations to escape hazards associated with accrued waste, infestations, and/or other possible outcomes of residing in an area for a prolonged period of time. The visible pattern (though sparse) of these sites lasted for only about a 1,200-year term within the Millingstone Period and may differ with that seen in the Morro Bay area. Firstly, the sample of radiocarbon data suggests that while Morro Bay appears to have been intermittently abandoned between 5,900 and 7,000 years ago, CA-SLO-877 was occupied approximately 6865 years ago, during that gap. Secondly, Jones et al, (2019) identifies two Millingstone settlement types in Morro Bay: 1) complex interior sites focused on terrestrial resources and 2) short term shoreline sites focused on marine resources. Without arguing over the semantics for what a short-term site means, I assume the definition contrasts with the interpretations and complex artifact assemblage documented at CA-SLO-877 and CA-SLO-129. It is possible that Millingstone activities in Cayucos were similar to the short-term activities noticed in Morro Bay however, the quantity of radiocarbon dates and site assemblage, especially at CA-SLO-877, could suggest otherwise.

The Early Period (5700-2550 B.P.)

The Early Period in Cayucos is represented by 12 dates from four archaeological sites (CA-SLO-129, -877, -879, and -1218) (Table 35). The current ratio of Early Period dates to years is approximately 1:262, representing an increase of 449.84%. This suggests that the population in Cayucos did increase after the Millingstone, but with such a small sample size it is tenuous to compare it to the sudden increase seen in the southern half of Estero Bay. The Early Period dates occur after a gap of 1,445 years between the last Millingstone date and the first Early Period date.

The environment during the Early Period transitioned from the global warming trend and productive marine activity to a cooling trend, slackened California current, and increase El Niño Southern Oscillations (ENSO) between 3.600 and 4,800 BP (Jones et al. 2019). Also, while sea levels were further out and still rising during this period (the Morro Bay Sandspit estimated to be seven meters below the modern shoreline) the rate of sea level rise waned while increased sedimentation associated with ENSO resulted in decreased estuary activity (Jones et al. 2019). It was during the Early Period that Morro Bay experienced a sudden burst in population. A similar phenomenon may have occurred in Cayucos. While the shores of Old Creek and Willow Creek continued to be inhabited during the Early Period, other areas began to be inhabited as well, such as at Toro Creek and Villa Creek. The sites are located along the shore, with the exception of CA-SLO-1218, which is located near the west bank of Villa Creek, north of State Route 1.

Table 35. Early Period dates.

Trinomial	Location	Radiocarbon Date
CA-SLO-877	Willow Creek	5420 B.P.
CA-SLO-877	Willow Creek	5280 B.P.
CA-SLO-877	Willow Creek	5150 B.P.
CA-SLO-129	Old Creek	4920 B.P.
CA-SLO-129	Old Creek	4820 B.P.
CA-SLO-879	Toro Creek	4840-4540 B.P. (midway point of 4690 B.P.)
CA-SLO-129	Old Creek	4510 B.P.
CA-SLO-879	Toro Creek	4525-4300 B.P. (midway point of 4413 B.P.)
CA-SLO-879	Toro Creek	3370-3090 B.P. (midway point of 3230 B.P.)
CA-SLO-879	Toro Creek	2910-2730 B.P. (midway point of 2820 B.P.)
CA-SLO-879	Toro Creek	2845-2700 B.P. (midway point of 2773 B.P.)
CA-SLO-1218	Villa Creek	2730 B.P.

Based on archaeological studies and the quantity of radiocarbon dates, it does appear that activities increased at CA-SLO-129 in the Early Period and continued into the Middle Period. The flaked stone assemblage generally indicates late-stage reduction strategies focused on material brought to the site. Toolstone quantities are similar between Franciscan and Monterey cherts, with a preference for Franciscan chert used for flake tool production. Laurie et al. (2017) alluded to the site being a long-term village location during the Early Period explaining that the artifact assemblage and faunal record suggested self-sufficiency within the locality. They identified trade at the site with the presence of obsidian and faunal species like Big Horn Sheep, that would have been from the interior, and remarked on the lack of local estuarine shellfish species

Analysis of radiocarbon dates may suggest that the occupation of CA-SLO-877 was shorter than during the Millingstone, perhaps a few hundred years as opposed to attested Millingstone occupations spanning over a millennium. During his bead analysis at CA-SLO-877, Gibson (1988b) concluded that the Olivella shell beads and detritus spanned the Early, Middle, and Late periods, with the site being the location for manufacturing Olivella class L thick rectangles and a major habitation center during the Early Period. He also noted the similarities between the contexts observed at CA-SLO-877 with other Chumash sites seen in the Santa Barbara Channel.

CA-SLO-879 is also a multi-component site, located in the southern end of the research area, covering both sides of Toro Creek, near its confluence with the Pacific Ocean. Repeatedly discussed in this thesis, CA-SLO-879 represents an archaeological site that has been recorded multiples times with different trinomials including CA-SLO-181, -1187, -1378, and -2736. Objectively this site has been the most studied in the vicinity of Cayucos. The earliest attested component at CA-SLO-879 is assigned to the Early Period. While an impressive amount of radiocarbon dates has been contributed over the years – over 20 dates spanning the Early Period into the postcontact – the site has seen impacts from decades of development and assigning activities within temporal occupations is challenging.

CA-SLO-879 is documented as a large habitation site by Wendell and Enright (2017) – perhaps the location of a village as is suggested in the site record. Cultural constituents documented at CA-SLO-879 include flaked and groundstone debris, bedrock milling features, midden deposits of marine shell, whistles, beads, ochre, and human remains. Like CA-SLO-129, it is difficult to identify patterns specific to each component at this site as multiple dates were produced within multiple periods, most of which occur during the Middle Period, and the site has experience mixing from impacts. A possible Class L thick rectangle points to an Early Period deposit, along with shell bead detritus suggesting Early Period shell bead manufacture similar to the interpretations of Early Period activity by Gibson at CA-SLO-877 (1988b). Findings from the site include a late-stage reduction strategy and preference for Monterey chert for biface reduction and Franciscan chert for expedient tools, similar to that seen at CA-SLO-129. Enright and Schinsing (2017a) identified two unique reduction strategies at the site, bipolar flaking and Topaz Mountain reduction which are both strategies for removing flakes from difficult to reduce cobbles or cores. The faunal assemblage also indicates a similar pattern for exploiting locally available marine resources, with the addition of the suggestion by Wendell and Enright (2017) that many small mammals, including rodents, were pulverized and eaten. These findings may be representative of the Early Period or later periods.

Middle Period (2550-950 B.P)

Though generally well represented on the Central Coast, the Middle Period is not a well understood period in Morro Bay, especially during the late Middle Period (Jones et al. 2019). North of the study area, along the San Simeon Reef there is also a paucity of Middle Period occupations, with the exception of CA-SLO-175 and CA-SLO-179.

However, many of Cayucos's radiocarbon dates fit within the Middle Period, including a total of 15 dates from four sites (Table 36). The current ratio of Middle Period dates to years is approximately 1:107 years, representing an increase of 144.86% from the Early Period.

At the end of the Early Period and during the Middle Period, there are two gaps in the archaeological record in Morro Bay occurring between 2900 and 2300 B.P. (Late Early Period/Early Middle Period) and between 1700 and 1100 B.P. (Middle Period). Jones et al. (2019) interpreted seismic activity to have been a cause of this, due to the result of the Morro Bay Estuary being cut off from the ocean and impacting resource productivity. An important find of this research is that in Cayucos, there are radiocarbon dates within both Morro Bay gaps identified by Jones et al. 2019. There are potentially seven dates produced from two sites in Cayucos (CA-SLO-879 and -1218) that are within the first late Early-early Middle Period gap in Morro Bay. During the second gap there are potentially eight radiocarbon dates, associated with four archaeological sites in Cayucos. In fact, most of the Middle Period dates in Cayucos occur within both gaps seen in Morro Bay. While the sample of dates is still small, it is a compelling find for demonstrating different settlement patterns in the two nearby areas. If the environment and the people were indeed impacted by seismic activity in Morro Bay, maybe some of them migrated to Cayucos.

Table 36. Middle Period dates.

Trinomial	Location	Radiocarbon Date
CA-SLO-879	Toro Creek	2675-2345 B.P. (midway point of 2510 B.P.)
CA-SLO-879	Toro Creek	2650-2330 B.P. (midway point of 2490 B.P.)
CA-SLO-879	Toro Creek	2640-2285 B.P. (midway point of 2463 B.P.)
CA-SLO-879	Toro Creek	2300-2250/2170-900 B.P. (midway point of 2275/1535B.P.)
CA-SLO-348	Bench	cal B.C. 405-91 (median probability: 2248 B.P.)
CA-SLO-348	Bench	cal B.C. 281-277/cal B.C. 270-cal AD 98 (med. prob.: 2279/2084 B.P.)
CA-SLO-129	Old Creek	2285-2043 B.P. (midway point of 2164 B.P.)
CA-SLO-157	Whale Rock	1660 B.P.
CA-SLO-126	Bench	1640 B.P.
CA-SLO-879	Toro Creek	1705-1505 B.P. (midway point of 1605 B.P.)
CA-SLO-126	Bench	1550 B.P.
CA-SLO-129	Old Creek	1580-1280 B.P. (midway point is 1430 B.P.)
CA-SLO-879	Toro Creek	A.D. 610-780 (midway point is A.D.695)
CA-SLO-879	Toro Creek	A.D. 610-810 (midway point is A.D. 710)
CA-SLO-879	Toro Creek	1410-1210 B.P. (midway point it 1310 B.P.)

The settlement pattern seen during the Middle Period in Cayucos suggests that the area near Willow Creek became abandoned however, occupations at the shores of Old Creek and Toro Creek persisted with expansions to the mouth of San Geronimo Creek, as well as into the interior along Old Creek (Whale Rock Reservoir).

Along the Cayucos Bench, the two dated archaeological sites (CA-SLO-126 and -348) produced Middle Period dates. CA-SLO-126 was recorded as a large village site by in the original site record by Brooks in 1952. Farrell et al. (2000a) described the site as significant habitation site with dense shell midden. The site record has been updated a handful of times with the most recent update by Jackson (2021) describing the site to include marine shell, flaked stone, groundstone, hearth stone, faunal and other cultural materials. While we have two radiocarbon dates, both within the Middle Period, the site has not been the subject of any excavation. According to the most recent record update by Jackson (2021), human remains were recorded in 2000, 2016, and 2019. Based on the complex assemblage found at the site and the presence of human remains, CA-SLO-126 was likely an important site to its former occupants. Perhaps it was a long-term residential base for people, during the Middle Period.

Much of our understanding of CA-SLO-348 comes from this current research and is summarized in the discussion of the Cayucos Bench Collection. CA-SLO-348 is a complex shell midden with documented cultural constituents including groundstone, flaked stone, battered stone, ochre, and fire affected rock (FAR). Given the presence of milling equipment and projectile point types, the site was occupied as early as the Millingstone, but radiocarbon dates tell us that it was certainly occupied during the Middle Period. Furthermore, given the presence of freshwater at the site and the availability of resources, the site was possibly visited after as well. The diversity of marine shell species recovered from the site are from estuary, sandy beach, and rocky shore habitats that are locally available. The artifact assemblage and environment also indicate an area suitable for tool production especially expedient technologies. Monterey chert was the preferred toolstone for all artifacts, but especially for formal tools. The Middle Period occupants of the site would have procured much of their dietary and material resources from on-site.

CA-SLO-129 also included a Middle Period component. It has been difficult to summarize the stratigraphic temporal patterns at CA-SLO-129 because of recurring impacts to the site. While previous studies have produced copious amounts of data, assigning that data within temporal occupations was not clear. For example, obsidian was found at CA-SLO-129. According to Jones et al. (2019) the obsidian trade peaked during the early Middle Period in Morro Bay. The obsidian was not dated or sourced and could have been associated with the Early or Middle Periods at CA-SLO-129. Furthermore, burials were found at the site in Early Period contexts but, as Singer (2002) explained, these were dug into those contexts by occupants of the Middle Period. Evidence for the burials being associated with the Middle Period comes from Singer interpreting the funerary objects such as shell beads, mortar and pestle, and whistle as more common during the Middle Period. Laurie et al. (2017) suggests that CA-SLO-129 may have functioned primarily has a long-term habitation site (possibly a village) during the Early Period and as a sacred place in association with nearby residential sites during the Middle Period.

Another Middle Period occupation was identified at CA-SLO-157. Reinman (1961) produced the only archaeological study of the site, along with 15 other nearby sites located adjacent to the terminus of Old Creek and Cottontail Creek. The work was done in preparation for the construction of the Whale Rock Reservoir. Reinman remarked on the quantity of sites in relation to the size of the valley and guessed that three of the sites were villages. Unfortunately, little is known about this area which was probably an important habitation site for indigenous peoples, perhaps during the Middle Period. A single radiocarbon date of 1620 +/-80 for CA-SLO-157, places at least one occupation of the site in the Middle Period (CARD canadianarchaeology.ca; Reinman 1961).

Reinman (1961) described CA-SLO-157 as a fairly extensive midden with stacked rock features and burials. Recorded artifacts included marine shell, lithics, and bone. Marine shell identified at the site included species from rocky shore, sandy beach, and estuary habitats, with a much higher diversity of rocky shore species. The presence of estuary species indicates they were brought from either Morro Bay or Villa Creek, as those are the nearest, with Villa Creek being the closest but less substantial than the Morro Bay Estuary.

The documentation of four burials encountered at CA-SLO-157 provides the most substantial data available in Cayucos for learning about burial features. Three of these were dug into pits in midden soil. The fourth (Burial 1) had been exposed by an eroding terrace. All but Burial 3 appeared to Reinman to be in tightly flexed positions, two of these oriented east/west, and one oriented north/south. Burial 3 appeared to be a fetus, it's position, orientation and internment were marked with a question mark. All of the burials were too damaged to identify sex. Burials 2 and 4 were also identified to have unerupted permanent teeth signifying those three of the four burials died prematurely. Perhaps early deaths are suggestive of violence, or disease. Clustered rocks identified near the burials may have once stood as burial cairns.

The Middle Period pattern seen at CA-SLO-879 is difficult to tease out because of stratigraphic mixing. The highest frequency of precontact dates produced from CA-SLO-879 fall within the Middle Period date range, with two of those slightly overlapping with the Early Period. While not much is known specifically about activities at CA-SLO-879 during the Middle Period, it does seem to be a time of heightened activity in the Toro Creek area. If there were indeed seismic events going on in Morro Bay, as suggested by Jones et al. 2019, perhaps CA-SLO-879 was a place people escaped to.

Middle-Late Transition (950-700 B.P.)

There are eight Middle-Late Transition (MLT) dates from three sites, in Cayucos (Table 37). The current ratio of dates to years is approximately 1:31.25, representing an increase of 242%. MLT dates show up in the highest frequency compared to any other Period in Cayucos.

Table 37. Middle-Late Transition Sites

Trinomial	Location	Radiocarbon Date
CA-SLO-2195	Little Cayucos Creek	990-805 B.P. (midway point of 898 B.P.)
CA-SLO-879	Toro Creek	A.D. 1060-1320 (midway point of A.D. 1190)
CA-SLO-2195	Little Cayucos Creek	915-720 B.P. (midway point of 818 B.P.)
CA-SLO-74	China Harbor	770 B.P.
CA-SLO-879	Toro Creek	820-655 B.P. (midway point of 738 B.P.)
CA-SLO-879	Toro Creek	900-530 B.P. (midway point of 715 B.P.)
CA-SLO-879	Toro Creek	700-540 B.P. (midway point of 620 B.P)
CA-SLO-879	Toro Creek	A.D. 1230-1450 (midway point of A.D. 1340)

The MLT is generalized as a time of extreme droughts and ENSOs (Jones et al. 2019). On the Central Coast, areas are abandoned as terrestrial environments degraded. The Morro Bay Estuary on the other hand has been described by Jones et al. (2019) as a "refugium" for humans during the MLT, as marine environments would have provided sustainable areas for living. A similar pattern is seen north of the research area in San Simeon and the same may be said for Cayucos (Jones et al. 2019).

Attested areas of Cayucos occupied during the MLT include new areas such as Little Cayucos Creek and China Harbor while Toro Creek continues its long history of human habitation. All three areas are quite spread out from one another. The location for

China Harbor is interesting because it is not located near an identified water source. Upon inspection of a modern aerial showing the vicinity of CA-SLO-74, there is the potential for a spring or seasonal creek to exist north of the site, but I could not confirm this. Beyond a lack of water, CA-SLO-74 is situated within a large cove on a south-facing bluff with rocky shores available for procuring marine shell. The site was the first recorded by Walker in 1948 and later by Dills in 1988, who noted a creek and submitted shell for dating. Dills (1988) called CA-SLO-74 important. No other investigation of CA-SLO-74 has occurred. The site records only tell us that CA-SLO-74 is a dense shell midden containing lithics, FAR, a BRM, with charmstones found nearby.

During the MLT, people were occupying the riparian area of Little Cayucos Creek. CA-SLO-2195 and CA-SLO-1914/H are located on either side of the creek, possibly representing one site, as suggested by Bertrando (2002). While CA-SLO-2195 produced dates within the MLT and Late Period, CA-SLO-1914/H produced Late Period beads and a postcontact radiocarbon date (Bertrando 2002; Schinsing et al. 2016; Farrell et al. 2004).

After data recovery of CA-SLO-2195, Schinsing et al. (2016) described the site as developing from “long-term” use. It is documented as a shell midden with mostly rocky shore marine shell species, flaked and groundstone tools, beads, and FAR. The combined technologies of millingstone and mortar and pestle use and the results from macrobotanical analysis indicate a diversity of diet strategies and consumption. The plant remains included seeds and nut species that would have been locally available from spring through the fall and stored in the winter. Faunal remains show a preference for marine over terrestrial animals. Schinsing et al. (2016) remarked on pitted stone and tarring pebbles being common at the site, but net weights and fishhooks were absent. Flaked stone materials were produced from local sources with expedient tool manufacture common. When comparing CA-SLO-2195 with CA-SLO-1914/H, Schinsing et al. (2016) described similar subsistence ratios and marine intensification patterns.

Schinsing et al. (2016) interpreted MLT patterns demonstrated at CA-SLO-2195 and other sites, suggesting that people during that time may have been forced to disperse from larger group settlements and settle in smaller residences with extended family. If trade networks broke down during the MLT, the result of environmental collapse, perhaps the Cayucos area would have provided an environment with resources to sustain life.

Late Period (700-250 B.P.)

The Late Period in Cayucos is represented by potentially 10 dates from five sites (Table 38). The current ratio of dates to years is 1:45, producing a decrease of approximately 30.56% after the MLT. The pattern of radiocarbon dates in the research area suggests an increasing population over time, except during the Late Period when the frequency of dates decreases. This may be the result of a small sample size, or it might be demonstrating a decreasing population in the Cayucos area. In other nearby areas, such as in the coast valleys and Santa Barbara Channel, patterns show increased cultural complexity during the Late Period. However, after indigenous peoples experienced sustained contact with Europeans, disease spread, and many indigenous peoples left their territories avoiding missionization (Jones et al. 2021). Researchers like Jones et al. (2019) and Farrell et al. (2004) have speculated that subsistence shifts, focused on terrestrial foods may have also been the cause of coastal abandonment.

Table 38. Late Period Sites

Trinomial	Location	Radiocarbon Date
CA-SLO-2743	Toro Creek	A.D. 1330-1480 (midway point of A.D. 1255)
CA-SLO-879	Toro Creek	A.D. 1280-1450 (midway point of A.D. 1365)
CA-SLO-879	Toro Creek	A.D. 1290-1460 (midway point of A.D. 1375)
CA-SLO-879	Toro Creek	700-540 B.P. (midway point of 620 B.P.)
CA-SLO-2195	Little Cayucos Creek	720-605 B.P. (midway point of 663 B.P.)
CA-SLO-2743	Toro Creek	A.D. 1420-1640 (midway point of A.D. 1310)
CA-SLO-879	Toro Creek	A.D. 1710-1950 (midway point of A.D 1590)
CA-SLO-1217	Villa Creek	290 B.P.
CA-SLO-1914	Little Cayucos Creek	Post contact: 390-110 B.P. (midway point it 250 B.P.)
CA-SLO-879	Toro Creek	Post contact: A.D. 1710-1950 (midway point of A.D. 1830)

Geographically, Late Period dates are assigned to areas including Toro Creek, Little Cayucos Creek, and inland along Villa Creek, showing a similar pattern to the MLT, with sites being situated far from each other. The site along Villa Creek, CA-SLO-1217, is described by Dills in the 1988 site record as a shell midden seen in the “root ball” of an uprooted eucalyptus tree and provided a Late Period date of 290 +/-85 B.P. In a 1995 update, Parker noted a full range of marine shell species, chert debris, and three BRMs located in the creek bed.

The Toro Creek area appears to have been repeatedly inhabited by people, including during the Late period. Radiocarbon dates from CA-SLO-2743, as well as at CA-SLO-879, where Class K cupped Olivella shell beads were also found, provide evidence for a Late Period occupation in the vicinity of Toro Creek. Archaeobotanical evidence at CA-SLO-879 point to Spring and Summer use of the site during the Late Period (Enright and Schinsing 2017b). While human burials have not been placed within any temporal occupation, several of them have been reported at CA-SLO-879 including 11 near the Toro Creek bridge in 1901, six on either side of Highway 1, in 1964, and Charles Dills cited an informant's encounter of burials on either side of the creek during the installation of a pipeline, in the original 1979 site record of CA-SLO-879. Burials, along with repeated use of the site, the size, and the complexity of the artifact and ecofact assemblages suggests that CA-SLO-879 was the location of a village. The ethnohistoric record tells us that at the time of contact no village was observed in the Cayucos vicinity, however mission records indicate people did come from villages nearby. Milliken and Johnson (2005) identify the names of possible villages near Cayucos, and while they speculate where some of them are, Setjala may be the village recorded as CA-SLO-879.

Another site along Toro Creek but further inland (approximately 2.3 miles as a crow flies) is CA-SLO-2743. During a Phase II/III study carried out by Garcia and Associates, CA-SLO-2743 was recorded, evaluated, and recommended eligible for listing on the CRHR. Denardo et al. (2012) described the site as a large lithic scatter including flaked stone, groundstone, battered stone, a possible piece of ochre, and shell. Flaked stone artifacts included two arrow-sized projectile points (contracting stem and leaf-shaped) and groundstone artifacts included mortar fragments. Descriptions of the resources are not provided in the report by Denardo et al. (2012). Two radiocarbon dates point to a Late Period occupation at the site. Denardo et al. (2012) interpreted the results of their Phase II testing at CA-SLO-2743, to be the location of a seasonal and/or long-term campsite or settlement albeit with little evidence to support the conclusion.

Along Little Cayucos Creek at CA-SLO-1914 and CA-SLO-2195, are Late Period occupations, possibly representing a single site with multiple occupations spanning the MLT into the postcontact era. CA-SLO-1914/H produced a date range mostly within the postcontact era (post-1769) however, bead types recovered from the site included Class K cupped and Class E thin lipped which are diagnostic of the Late Period. One glass cobalt trade bead, dated to A.D. 1785-1820, was also recovered from the site pointing to the mission period. It is the only glass trade bead that has been identified in study area during research.

The site assemblage at CA-SLO-1914/H indicated a variety of domestic activities including processing plant resources and marine shellfish, as well as cooking in baskets. Other activities suggested by the flaked stone artifacts include hunting, and “working” other items like wood, shell, and others (Farrell 2004: 58). Fishing is evidenced by a single net weight and shell fishhooks. The amount of fishbone encountered at the site was low and included the remains of very small fish. Farrell et al. (2004) remarked that fishing was not an important activity at the site. While a variety of artifact and ecofact evidence suggests a range of subsistence strategies at CA-SLO-1914/H, Farrell et al. (2004) concluded that the site was specialized to marine resource consumption, citing the prolific amounts and diversity of marine shellfish species, as well as the groundstone tools used for marine resource procurement. The authors suggested that the site may have been used by people who alternated between the coast and inland areas. The fact that only one glass trade bead was identified in Cayucos, and none in Morro Bay, presents the notion - identified by Jones et al. (2019) – that no villages were occupied on the coast at the time of the Missions. One last note of Farrell et al.'s (2004) study was pointing out the dominance of Turban Snail in the faunal assemblage, for which the authors speculate it being evidence for overexploitation of mussel beds, which could be an interesting issue worth future research.

Rock Art

This research identified 11 rock art sites in or in the vicinity of the research area (Table 39). The rock art sites include pit and groove and pecked curvilinear nucleated (PCN) traditions. Unfortunately, the rock art sites have not been assigned with any temporal significance, which is why this topic is not covered in the above sections of this chapter.

The presence of this cluster of rock art sites is an interesting find for this research because their presence in the research area is somewhat anomalous and their greater cultural and temporal significance continues to elude researchers. Gilreath (2007) relates PCN rock art with Pit and Groove traditions suggesting that the PCN tradition was a “basal” form and quite old. She considers three styles of pit and groove types: the first is cupules present on boulder; the second is pit and groove which include one or two cupules connected to or by a groove; the third being complex pit and grooves which have been attributed to vulvaforms (Gilreath 2007; Payen 1966). What we see in the study area vicinity are complex pit and groove sites - those where sometimes dozens of cupules are found in association with hundreds of grooves. Chronologically, pit and groove rock art is thought to be old but seems to have persisted into the Late and historic periods (Gilreath 2007). Gillette (2011) too believes that PCN sites are quite old, possibly between 5,000 and 8,000 years old, but also entertains the possibility that they are more recent.

Table 39. Rock art in the study area vicinity

Site	Location	Description	References
CA-SLO-225	Green Valley,	Serpentine outcrop with pit and groove and PCN elements. Eastern side of rock is dominated by grooves with pits clustered mostly on the top. The rock was split after the rock art was created. Many of the grooves radiating outward from the pits, resembling a sunburst. Site was found in association of with midden and a burial ground was reported by landowners, in the vicinity.	Wadhams 1967; Fleshman 1975, 1977; Gillette 2011
CA-SLO-324	Villa Creek	Serpentine outcrop with pit and grooves. Grooves are very deep and dominate on the northeast face. Many cupules have radiating grooves forming in sunburst design. Site is near to multiple archaeological sites, as well as a reported cemetery.	Wadhams and Wadhams 1962; Fleshman 1970, 1975; Dills, n.d.
CA-SLO-601	Cayucos Creek,	Serpentine outcrop with pit and groove and PCN elements. Boulder contains less pits and grooves than other sites as documented by Fleshman, who also reported the site to be the least typical of the others. Owners of land collected numerous artifacts from site and reported nearby burials.	Mossberg and Fleshman 1971; Fleshman 1975; Gillette 2011
CA-SLO-619	Hearst Ranch,	Serpentine outcrop consisting of two rocks, with PCN rock art. Site is on a westerly facing hillside with rocks being highly altered, according to Baldwin.	Baldwin 1971; Gillette 2011
CA-SLO-620	Hearst Ranch,	Sandstone outcrop with PCN elements. Designs are crude, rough ovals in a line.	Baldwin 1971; Gillette 2011
CA-SLO-657	Villa Creek	Serpentine outcrop with pit and grooves. One side is dominated by grooves, with pit and grooves on south face. The rock is highly exfoliated. Owners of land collected numerous artifacts from site.	Fleshman 1975
CA-SLO-745	Villa Creek	Serpentine outcrop with three pecked holes on vertical surface of rock. “Many Indian findings” (Fleshman 1975).	Fleshman 1975
CA-SLO-881	Whale Rock Reservoir	Serpentine outcrop with PCN elements and a single cupule. Site is recorded as ten pecked rings. Chert flakes, and a quarried rock found in association.	Gibson 1979
CA-SLO-1440	Harmony	PCN site; Site record describes the site as including “shallow depressions that look almost as if one were starting a mortar, but many touch each other… there are a number of areas that have been chipped into a kind of horshoe shape… It might be a cupule site” (Dills and Bertrando 1991).	Dills and Bertrando 1991; Gillette 2011
No trinomial	Unknown;	PCN site identified by Gillette (2011) but not described	Gillette 2011
No trinomial	Whale Rock Reservoir	Small serpentine ground exposure, with multiple horizontal and vertical grooves, identified during this research. No other artifacts observed in association.	

We do not know the origin of both traditions. In fact, the pit and groove tradition is ubiquitous, seen throughout the globe (Gilreath 2007). In California, the tradition is mostly seen in the northern and central Sierra Nevada, North Coast Ranges, and San Francisco Bay area, where Hokan languages were spoken (Gilreath 2007). Similarly, PCN sites are more frequently located in the North Coast Ranges and North San Francisco Bay area, again, where many Hokan speakers are from (Gillette 2011). Conversely, Fleshman related pit and groove and cupule artwork with Chumash culture (1975).

The function of these sites is also unknown. Fleshman (1975) noted the hypothesized functions for these art expressions including for fertility purposes, weather control, and other magical symbolism. Gilreath (2007) adds in trail markers, strength tests for boys, and vessels for paint. Gillette (2011) hypothesized they were ceremonial areas created by romantic partners who ventured away in the hopes of conceiving. The fact that these cluster near the Chumash/Salinan northern boundary is also a curious find. Cayucos has long been the speculated boundary between the two groups (Milliken and Johnson 2005) and given the presence of these features in the area, perhaps they are territory markers.

Patterns observed during this research includes the similarities between these sites, their clustering near Cayucos, and their presences near other archaeological resources. These sites are nearly identical in appearance and landscape setting. General similarities include designs, rock type (serpentine), and being situated on west-facing slopes near creeks.

Serpentine outcrops in the study area vicinity were selected as the sites for creating pit and groove and PCN rock art. Serpentine ridges occur south of the research area, into the Chorro Valley, yet no PCN or pit and groove sites have been identified.

An interesting pattern observed with the rock art sites in the research area is that they are located near archaeological sites and possibly cemeteries, because it opposes Gillette’s (2011) findings. Her primary finding for her research of PCN sites in the North Bay area was that they are located far removed from other archaeological sites – a fact which has made it difficult for her to connect the rock art tradition with a culture and age. The fact that many of these sites were recorded near other archaeological sites and potentially cemeteries, may be a meaningless correlation given that the rock arts sites may have been created at different times than when the nearby archaeological sites were inhabited. On the other hand, perhaps the rock art sites were contemporary with the nearby archaeological sites, and their locations conveniently situated far enough away for privacy but also close enough for frequent accessibility.

CHAPTER 8: CONCLUSIONS

The research questions sought to address in this research were related to chronology, technology, and settlement, as well as how the research area articulates with the rest of the Estero Bay and surrounding vicinity. Additional findings included the numerous rock art sites found in the area.

The earliest attested occupation of Cayucos is in the Millingstone, with activities increasing in the Early Period, Middle Period, and even more so in the MLT. During the Late Period, the frequency of sites decreases for the first time. The presence of Early and Middle dates that fall within the radiocarbon date gaps in Morro Bay is an interesting find of this research. The evidence for environmental impacts outside of Cayucos occurring simultaneous with increased radiocarbon dates leads to the conclusion that Cayucos also served as a refugium, though perhaps to a lesser extent than the rest of Estero Bay, during other times.

The decline in Late Period dates is consistent with the rest of the Central Coast. It seems that by the time of the missions Morro Bay had been abandoned. If not for the single glass trade bead found at CA-SLO-1914/H the same would be said for Cayucos. No other site provides artifactual evidence contemporary with the missions.

All of the radiocarbon dates for the research area are provided, which give us clues about the past, however, it is still too low a number for drawing any real conclusions about the past.

The Cayucos Bench Collection was analyzed and found to be incomplete and mostly lacks provenience, however, the collected provides clues about technology and chronology along the Estero Bluffs. The sites located along the Estero Bluffs are characterized as residential/habitation areas. This is based on flaked stone and groundstone patterns and the contents of the sites, including burials. The people living there had access to a variety of marine resources and raw material, for expedient tool production. Frequenters to the sites could rely on these resources during their visits. The four radiocarbon dates from CA-SLO-126 and CA-SLO-348, suggest increased importance of this area, during the Middle Period, when the Villa Creek Estuary experienced an episode of productivity.

Patterns seen on the Estero Bluffs appear to be consistent for the rest of the research area. The general settlement trends for the 92 sites in the vicinity of Cayucos, are that people clustered along creeks and near to the ocean, at temporary and long-term residential bases. The south-southeast facing coastal zone found at the north end of Estero Bay would have protected people from winds and ocean swell coming from the northwest. The shores would have been ideal for collecting shellfish, fishing, and netting fish and birds year-round.

Mission records tell us that people came from villages in the Cayucos vicinity. Milliken and Johnson (2005) reason that *Chmimu* was located at Toro Creek and *Setjala* at Cayucos Creek, which is interesting given that the only trade bead was recovered nearby at CA-SLO-1914/H on Little Cayucos Creek. Johnson believes Chano existed in the vicinity of Cayucos as well, though this is argued by Milliken (Milliken and Johnson 2005). Based on the research presented here, the locations for ethnohistoric villages could have been at Toro Creek, along Old Creek where the Whale Rock Reservoir now exists, and Villa Creek. All three of these locations provide an environment conducive for human habitation and provide archaeological data (though sparse) to suggest an intense human presence. While Villa Creek has not produced archaeological studies worthy of making such interpretations, the fresh water and access to estuary and marine resources make it a unique area in Cayucos.

The presence of numerous pit and groove PCN sites, suggest a cultural pattern for rock art that is worthy of further research. These rock art styles are uncommon outside of the North Coast Ranges. The temporality of these styles is unknown. If research can provide that information or cultural affiliation, it will be an important contribution to the research area.

While a great deal of information is still required in order to provide a precontact context on par with other areas, such as in the Morro Bay Estuary, this thesis presents a foundation of information for future researchers of Cayucos to build upon. Prior to this thesis, information was segmented into site records, technical studies, and an orphan collection, but is made whole here.

REFERENCES CITED

Anastasio, Rebecca

1993 *Archaeological Surface Survey*. Rebecca Loveland Anastasio. Submitted to John Pryor and Louise Etzenhauser. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Andreano, Lisa, Jeremy Beaulieu, and Michael Walgren

n.d. *Terrestrial Mammals of the Estero Bay Area*. Morro Bay National Estuary Program. DOI: Microsoft Word - final NEP Mammal Guide NEP 2-7-06.doc (elfin-forest.org), accessed January 19, 2021.

Andrefsky, William

1994 Raw Material Availability and the Organization of Technology. *American Antiquity* 59:21-34.

2005 *Lithics: Macroscopic Approaches to Analysis*. 2nd ed. Cambridge University Press, Cambridge, UK.

Arnold, Jeanne and Michael Walsh

2010 *California's Ancient Past: From the Pacific to the Range of Light.* The SAA Press, Washington, DC.

Bahn, Paul G., Mike Chamberlain, Paul Horley, William Hyder, William Liller, Mary Dell Lucas, Grant McCall, Marker Oliver, Kay Kenady Sanger, and Joan Seaver Kurze

2016 Remembering Georgia Lee. *Rapa Nui Journal*, 30(2): 101-114.

Baldwin, Marry Alice

1969 Archaeological Evidence of Cultural Continuity from Chumash to Salinan Indians in California. *San Luis Obispo County Archaeological Society Occasional Paper*, 6.

Bamforth, Douglas B.

1990 Settlement, Raw Material, and Lithic Procurement in the Central Mojave Desert. *Journal of Anthropological Archaeology* 9(1): 70-104.

Beaulieu, Jeremy, Lisa Andreano, Michael Walgren

n.d. *Common Birds of the Estero Bay Area*. Morro Bay National Estuary Program. DOI: Microsoft Word - Final NEP Bird Guide 1-12-06.doc (mbnep.org), accessed January 19, 2021.

Berg, John, Philip Kaijankoski, Sharon Waechter, Nathan Stevens, and Patricia Mikkelsen

2014 *Archaeological Survey Report for the San Luis Obispo Bridge Rail Replacement Project, Highway 1 Near Cayucos and Highway 58 Near Santa Margarita, San Luis Obispo County, California.* Submitted to the California

Department of Transportation, District 5. Copies available at Far Western Anthropological Research Group, Inc., Davis.

Bertrando, Ethan

1996 *Cultural Resource Monitoring of the Dill Parcel, 200 "D" Street APN: 064-112-017 Cayucos, San Luis Obispo County, CA*. Bertrando and Bertrando Research Consultants. Submitted to Evan Dill. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

2002 *Cultural Resource Inventory of the M & R Investments Parcel, Lots 3, 4, 5, & 6 of Block 3 APN: 064-112-002 Cayucos, CA*. Bertrando and Bertrando Research Consultants. Submitted to John MacDonald. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Bertrando, Ethan and Betsy Bertrando

1996 *Extended Phase 1 Cultural Resource Investigation of the Dill Parcel, APN: 064-112-017 Cayucos, CA*. Bertrando and Bertrando Research Consultants. Submitted to Evan Dill. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Bertrando, Ethan and Douglas Harro

1997 Correlations Between Lithic Raw Material Quality and Availability and the Formation of Flaked Stone Tool Assemblages: Examples from the Chorro

Valley, San Luis Obispo County. *Proceedings of the Society for California Archaeology* 10: 123-130. San Diego, California.

Breschini, Gary and Trudy Haversat

1980 *Preliminary Archaeological Reconnaissance and Preliminary Mitigation Plan for 3114 Studio Drive, Cayucos, San Luis Obispo County, California*. Prepared for Mr. Al Curtis. Prepared by Archaeological Consulting. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1888 Analysis of South-Central Californian Shell Artifacts: Studies from Santa Cruz, Monterey, San Luis Obispo, and Santa Barbara Counties (editors). *Archives of California Prehistory*. Coyote Press, Salinas.

1989 *Preliminary Archaeological Report and Archaeological Management Recommendations for CA-SLO-129, Cayucos, San Luis Obispo County, California*. Prepared for Mr. A. Cutright. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1990 *An Archaeological Evaluation of CA-SLO-129, in Cayucos, San Luis Obispo County, California*. Archaeological Consulting. Submitted to Los Padres Saving Bank. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1993 *An Archaeological Evaluation of CA-SLO-129, in Cayucos, San Luis Obispo County, California*. Prepared for John Stahl, Los Padres Saving Bank. Prepared by Archaeological Consulting. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Brown, Alan

2001 *A Description of Distant Roads: Original Journals of the First Expedition into California 1769-1770*. San Diego State University Press, San Diego, California.

Burcham, L.T.

1957 *California Range Land: An Historic-Ecological Study of the Range Resources of California*. California Department of Natural Resources, Division of Forestry, Sacramento.

California Geological Survey

2016 Geological Map of the Cayucos 7.5' quadrangle, San Luis Obispo County, California: version 1.0 by M. Delattre, map scale 1:24,000.

Carbone, Larry

2002 *An Extended Phase 1 Archaeological Test Auger Program for a Proposed Cingular Wireless Site (LA-53012-P2), Cayucos, San Luis Obispo County, California*. Prepared for The Alaris Group, LLC. Prepared by Western Points.

Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Christopher, Susan V.

n.d. *Amphibians and Reptiles of the Estero Bay Area*. Morro Bay National Estuary Program. DOI: Microsoft Word - mjw edits 12 12 05 Amphibian Reptile Guide.doc (elfin-forest.org), accessed January 19, 2021.

Clemmer, J.S.

1962 *Archaeological Notes on a Chumash House Floor at Morro Bay*. Central California Archaeological Foundation. Manuscript on file at Archaeological Lab, California Department of Parks and Recreation, West Sacramento.

Climate-data.org.

n.d. Cayucos Climate (United States of America). Retrieved from Cayucos climate: Average Temperature, weather by month, Cayucos water temperature - Climate-Data.org (climate-data.org). Accessed 1-15-2021.

Conway, Thor

2001 *A Phase 1 Cultural Resources Surface Survey of the Hauff Property, 360 Cayucos Drive, Cayucos, San Luis Obispo County, California*. Heritage Discoveries. Submitted to Gus and Gloria Hauff. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

2003 *Phase II Archaeological Sub-surface Testing at 2246 Pacific Avenue, Cayucos, California*. Heritage Discoveries. Submitted to Steven Pults & Associates. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

2009 *Archaeological Monitoring Plan for the Estero Marine Terminal Project, Morro Bay, San Luis Obispo County, California*. Prepared for Padre Associates, Inc. Prepared by Heritage Discoveries, Inc. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

2011 *Archaeological Monitoring and Data Recovery at the Toro Creek Site (CA-SLO-879), Chevron Estero Source Removal Project, Morro Bay, California*. Heritage Discoveries. Submitted to Padre Associates, Inc. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Cook, Emma, Terry L. Jones, and Brian Codding

2017 The Function of Pitted Stones: An Experimental Evaluation. *Journal of California and Great Basin Anthropology*, 37(2): 220-231.

Denardo, Carole, Rachael Greenlee, and Jay Sander

2012 *Archaeological Phase II/III Testing at Proposed Well Sites along Toro Creek, Chevron Estero Marine Terminal, Morro Bay, San Luis Obispo*

County, California. Garcia and Associates. Submitted to Padre Associates, Inc. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Dills, Charles

1980a *Archaeological Potential of Borradori Property, Cayucos.* Prepared for Central Coast Engineering. Prepared by Charles E. Dills. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1980b *Re-visitation of Cayucos Sewer Project.* Prepared for James M. Montgomery, Engineers. Prepared by Charles E. Dills. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1989 *Archaeological Potential of 73-acre Parcel, 0.5 mi. West of Cayucos Point*. Submitted to Richard Mires, Santa Barbara. Copies available at the Central Coastal Information Center, UCSB.

1994 RE: Elaboration of Day Project (letter report). Prepared for John McKenzie, County of San Luis Obispo. Prepared by Charles E. Dills. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Enright, Erin and Simone Schinsing

2017a *Extended Phase I Report CA-SLO-129 (P-40-000129) Old Creek Bridge Replacement Project State Route 1, Cayucos, San Luis Obispo County, California.* Prepared for California Department of Transportation, District 5. Prepared by Applied Earthworks, Inc. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

2017b *Extended Phase I Report and Archaeological Evaluation Report P-40-000879 (CA-SLO-879/H) Toro Creek Bridge Replacement Project State Route 1, Cayucos/Morro Bay, San Luis Obispo County, California*. Applied Earthworks, Inc. Submitted to Caltrans District 5. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

ERCE

1991 *San Luis Obispo Water Lines and Facilities Project. Prepared for the County of San Luis Obispo*. Prepared by ERCE. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Far Western Anthropological Research Group, Inc.

2016 *Archaeological Investigations for the Los Osos Wastewater Project, San Luis Obispo County*. Submitted to the County of San Luis Obispo. Copies Available at Far Western Anthropological Research Group, Inc., Davis.

Farrell, Nancy

2000a *Cultural Resources Reconnaissance of a +/- 350 Acre Parcel Between the Town of Cayucos and Villa Creek and Between California and Highway 1 and the Pacific Ocean, San Luis Obispo County, California*. Submitted to Morro Group, Inc. Copies available at Cultural Resources Management Services, Paso Robles.

2000b *Archaeological Phase II Testing at Site SLO-1914/H, Cayucos* (letter report). Cultural Resources Management Services. Submitted to Andy Hinsdale. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Farrell, Nancy, Todd Hannahs, and Nathan Stevens

2004 *Archaeological Investigations at CA-SLO-1914/H, Cayucos, San Luis Obispo County, California.* Cultural Resources Management Services. Submitted to Andy Hinsdale. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Farrell, Nancy and Jeannette Simons

2015 *Phase I and Extended Phase I Archaeological Investigation for the Proposed Expansion of the Bella Vista Mobile Home Park, Cayucos, San Luis Obispo County, California*. Prepared for Katie Morris, Bella Vista MHP, LLC. Prepared by Cultural Resources Management Services. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Fitzgerald, Richard T.

1993 Archaic Milling Cultures of the Southern San Francisco Bay Region. *Archives of California Prehistory* 35. Coyote Press, Salinas.

Fleshman, Georgia Lee

1975 Pit-and-Groove Rocks and Cupules in San Luis Obispo County. In Papers on the Chumash, *San Luis Obispo County Archaeological Society Occasional Paper* 9. San Luis Obispo County Archaeological Society.

Fugro-McClelland (West), Inc.

1993 *Cultural Resources Monitoring Report for the Estero Marine Terminal Berm Construction Project Morro Bay, San Luis Obispo County, California*. Prepared for Chevron Pipeline Company. Prepared by Fugro-McClelland (West), Inc. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Gerdes, Gene L., Edward R.J. Primbs, and Bruce M. Browning

1974 *Natural Resources of Morro Bay, Their Status and Future*. State of California Department of Fish and Game. Coastal Wetland Series 8.

Gibson, Robert

1980a *Archaeological Element of Environmental Impact Report for Lot 64-275-30 (3114 Studio Drive) Cayucos, California*. Prepared for Mr. Allen Curtis. Prepared by Robert O. Gibson. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1980b *Archaeological Evaluation and Recommendations for Cayucos Sanitary District, Project C-06-1454 Archaeological Investigations for Revised Alignment.* Gibson's Archaeological Consulting. Submitted to James M. Montgomery Consulting Engineers. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1981 *Archaeological Study of the Proposed Development of Old Creek Greens R.V. Park and Panorama Estates Mobile Home Park Near Cayucos San Luis Obispo County. Prepared for Creston Star Route, Paso Robles*. Prepared by Robert O. Gibson. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1983 *Ethnography of the Salinan People: A Systems Approach*. Unpublished M.A. thesis, Department of Anthropology, California State University, Hayward.

1988a *Results of Archaeological Surface Survey for the Proposed Shrimp Farm, San Luis Obispo County, CA*. Submitted to Robert Saidi, Morro Bay. Copies available at Gibson's Archaeological Consulting, Paso Robles.

1988b Preliminary Results of Shell Bead Analysis for CA-SLO-877, Cayucos, San Luis Obispo County, California. *Archives in California Prehistory*, 23: 65-75.

1990a *Results of Phase One Archaeological Surface Survey of the Jack Rarig Parcel Cayucos, CA.* Gibson's Archaeological Consulting. Submitted to Steven Wise. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1990b *Results of Phase One Archaeological Surface Survey of Lot at 3449 Studio Drive Cayucos, CA*. Gibson's Archaeological Consulting. Submitted to Jim Searby. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1994a *The Obispeño Chumash of San Luis Obispo County, CA.* Prepared for Robert Orlins, Resource Management Division, Department of Parks and Recreation, Sacramento. Copies available Gibson's Archaeological Consulting, Paso Robles.

1994b *Archaeological Review of Pump Station No. 5 and SLO-879, Near Toro Creek, San Luis Obispo County, CA*. Gibson's Archaeological Consulting.

Submitted to Cayucos Sanitary District, Cayucos, CA. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

2002 *Results of Archival Records Check and Phase on Archaeological Surface Survey for the Pacbell Cambria-Cayucos New Fiber Optics Cable Project, Cayucos and Highway One*, *San Luis Obispo County, CA*. Gibson's Archaeological Consulting. Submitted to the Morro Group, Inc. San Luis Obispo, CA. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

2005 *Results of Archival Records Search and Phase One Archaeological Surface Survey for the Morro Bay to Cayucos Bike Path Project, San Luis Obispo County, CA.* Submitted to Mr. Karl Mikel, Morro Group, Inc. Copies available at Gibson's Archaeological Consulting, Paso Robles.

Gillette, Donna Lee

2011 *Cultural Markings on the Landscape: the PCN Pecked Curvilinear Nucleated Tradition in the Northern Coastal Ranges of California*. PhD Dissertation. Department of Anthropology, University of California, Berkeley

Glassow, Michael A. Lynn H. Gamble, Jennifer E. Perry, and Glenn S. Russell

2007 Prehistory of the Northern California Bight and the Adjacent Transverse Ranges. In *California Prehistory: Colonization, Culture and Complexity*, edited by Terry L. Jones and Katherine A. Klar, p. 191-213. Alta Mira Press, Lanham.

Golla, Victor

2007 Linguistic Prehistory. In *California Prehistory: Colonization, Culture, and Complexity,* edited by Terry L. Jones and Katherine A. Klar, p.71-82. Alta Mira Press, Lanham.

2019 *California Indian Languages*. University of California Press, Berkeley.

Greenwood, Roberta

1972 9000 Years of Prehistory at Diablo canyon, San Luis Obispo County, California. *San Luis Obispo County Archaeological Society Occasional Paper*, (7).

1978 Obispeño and Purisimeño Chumash. *Handbook of North American Indians* 8 p.520-523.

Greenwood and Slawson

2005 *Historical Resources of the Pierson Ranch: CA-SLO-2088 and CA-SLO-999.* Prepared for Mr. David Pierson, the Pierson Ranch. Prepared by Greenwood and Associates. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Hannahs, Todd

2008 *Phase I Archaeological Survey of a Proposed Equipment and Materials Staging Area, Chevron Estero Marine Terminal, San Luis Obispo County, California*. Prepared for Padre Associates, Inc. Prepared by Cultural Resources management Services, Paso Robles. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

2015 *Phase III Archaeological Data Recovery at a Proposed Water Well at the Chevron Estero Marine Terminal, San Luis Obispo County, California.* Cultural Resources Management Services. Submitted to Brendan Clark. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Harrington, John Peabody

1985 The Papers of John Peabody Harrington, Vol. 2, Northern and Central California. Washington: Smithsonian Institution, National Anthropological Archives. (Microfilm Edition. Millwood, NY: Kraus International Publications).

Haversat, Trudy and Gary Breschini

1981 *Preliminary Archaeological Reconnaissance of Nine Proposed Early Warning Siren Locations in San Luis Obispo County*. Prepared for Pacific Gas and Electric Company. Prepared by Prepared by Archaeological Consulting. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Hester, Thomas Roy

1978 Salinan. *Handbook of North American Indians* 8 p.501-504.

Hoover, Robert

1985a Survey letter report. Prepared for King. Prepared by Robert L. Hoover. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1985b Survey letter report. Prepared for Maul-Stuart Associates. Prepared by Robert L. Hoover. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Hoover, Robert and W.B. Sawyer

1977 Los Osos Junior High School Site: 4-SLO-214. *The San Luis Obispo County Archaeological Society Occasional Paper*, No. 11.

Jacobs, David, Eric D. Stein, and Travis Longcore

2010 *Classification of California Estuaries based on Natural Closure Patterns: Templates for Restoration and Management*. Southern California Coastal Water Research Project, Technical Report 619.

Jennings, C.W., C. Gutierrez, W. Bryant, G. Saucedo, and C. Wills

2010 *Geological Map of California*. California Geological Survey.

Jensen, Peter M.

2001 *Archaeological Inventory Survey: Proposed Nextel CA-6214A Cell Tower Site within the Bella Vista Mobile Lodge Travel Trailer Park at Cayucos, San Luis Obispo County, California*. Prepared for Robert Young & Associates. Prepared by Jensen & Associates. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Jones, Terry, Kathleen Davis, Glenn Farris, Steven Grantham, Teresa Fung, Betty Rivers

1994 *Toward a Prehistory of Morro Bay: Phase II Archaeological Investigations for the Highway 41 Widening Project, San Luis Obispo County, California*. Submitted to District 5, San Luis Obispo Department of Transportation. Copies available at Caltrans District 5 office, San Luis Obispo.

Jones, Terry L., Georgie Waugh

1995 *Central California Coastal Prehistory: A View from Little Pico Creek.* Regents of the University of California, Los Angeles

Jones, Terry L., and Kathryn A. Klar (editors)

2007 *California Prehistory: Colonization, Culture, and Complexity.* Alta Mira Press, Lanham.

Jones, Terry L., Nathan E. Stevens, Deborah A. Jones, Richard T. Fitzgerald, and Mark G. Hylkema

2007 The Central Coast: A Midlatitude Milieu. In *California Prehistory: Colonization, Culture and Complexity*, edited by Terry L. Jones and Katherine A. Klar, p.125-146. Alta Mira Press, Lanham.

Jones, Terry, Deborah Jones, William Hildebrandt, Kacey Hadick, and Patricia Mikkelsen

2019 The Prehistory of Morro Bay Central California's Overlooked Estuary. *University of Utah Anthropological Papers* #132. University of Utah, Salt Lake City.

Joslin, Terry L.

2010 *Middle and Late Holocene Hunter-Gatherer Adaptations to Coastal Ecosystems Along the Southern San Simeon Reef, California*. Ph.D. dissertation, Department of Anthropology, University of California, Santa Barbara.

Kane, Megan

2011 *Reconstructing Historical and Archaeological Context of an Orphaned Collection: Report on Archival Research and Feature Summaries for the Market Street Chinatown Archaeology Project. Submitted to History San*

Jose. Copies available at the Historical Archaeology Laboratory, Stanford Archaeology Center, Stanford.

Kidwell, Jasmine and Erin Enright

2018 *Cultural Resource Investigations at 30 16th Street, Cayucos, San Luis Obispo County, California*. Applied Earthworks, Inc. Submitted to Gretchen Ross and Michael Foster. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Konzak, Sandra and Adrian Praetzellis

2016 *Archaeological Excavations at CA-SLO-64H, San Luis Obispo, California, The Palm Street Parking Garage Project*. Prepared for The City of San Luis Obispo. Copies available at the Anthropological Studies Center, Sonoma State University, Rohnert Park.

Krieger, Daniel

1990 *San Luis Obispo County: Looking Back into the Middle Kingdom.* Second edition. Windsor Publications, Inc., Chatsworth, California.

2014 Idyllic Cayucos has a History of Lively and not Always Legal Activity. The Tribune. Retrieved from https://www.sanluisobispo.com/news/local/news-columns-blogs/times-past/article39489090.html

Kroeber, A.L.

1925 Handbook of the Indians of California. 1970: 3rd printing ed. California Book Company, Ltd., Berkeley.

Laurie, Leroy

2016 *29 23rd Street: CA-SLO-129 Exploratory Auger Borings*. Prepared for Keith Boone and Vassi Gardikas. Prepared by SWCA Environmental Consultants. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Laurie, Leroy, Chad Jackson, and John Dietler

2017 *Archaeological Monitoring and Data Recovery at CA-SLO-129 for a Residential Project at 41 23rd Street Cayucos, San Luis Obispo County, California*. SWCA Environmental Consultants. Submitted to Jonathan van den Berg. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Lee, Sean

2006 Archaeological Investigations at CA-SLO-2195, the M & R Investments Parcel, Lots 3, 4, 5, and 6 of Block 3 APN 064-112-002 in the Town of Cayucos, San Luis Obispo County, California. Central Coast Archaeology, Cayucos, California.

Letter, Rachael, Carole Denardo, and Jay Sander

2012 *Cultural Resources Survey Report: Chevron Estero Marine Terminal Morro Bay, San Luis Obispo County, California*. Garcia and Associates. Submitted to Padre Associates, Inc. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Leventhal, Richard and Brian Daniels

2013 "Orphaned Objects", Ethical Standards, and the Acquisition of Antiquities. *DePaul Journal of Art, Technology and Intellectual Property Law*, 23(2).

Lloyd, Jay B., Joseph Schuldenrein, and Barry A. Price

2005 *Archaeological Testing at CA-SLO-879 for the Estero Marine Terminal Source Removal Project San Luis Obispo County, California*. Prepared for Rincon Consultants, Inc. Prepared by Applied Earthworks, Inc. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Maki, Mary

1998a *Phase I Reconnaissance of Two Revised Fiber-Optic Cable Routes for the Telecommunications Facility Project, Chevron Estero Bay Property, San Luis Obispo County, California – addendum report*. Prepared for Padre Associates, Inc. Prepared by Conejo Archaeological Consultants. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1998b *Extended Phase I Subsurface Testing at CA-SLO-879 and Historic Assessment of CA-SLO-1889H for the Telecommunications Facility Project Chevron Estero Bay Property San Luis Obispo County, California*. Prepared for Padre Associates, Inc. Prepared by Conejo Archaeological Consultants. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1999a Subject: Completion of Cultural Resources Monitoring at Site CA-SLO-879 for the Geo-Probe Testing at the Chevron Estero Marine Terminal (letter report). Prepared for Mr. Matt Carpenter, ENTRIX. Prepared by Conejo Archaeological Consultants. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1999b *Phase I Archaeological Survey and Impact Assessment of Approximately 87 Acres and 2.4 Linear Miles of Pipeline for the Estero Marine Terminal Abandonment Project Morro Bay, San Luis Obispo County, California*. Prepared for Padre Associates, Inc. Prepared by Conejo Archaeological Consultants. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

2000a Subject: Monitoring Results – Chevron Estero Marine Terminal April 26, 2000 (letter report). Prepared for Mr. Matt Carpenter, ENTRIX. Prepared by

Conejo Archaeological Consultants. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

2000b Subject: Initial Archaeological Monitoring Results for the Cleanup of Truck Accident Diesel Contamination within Archaeological Site CA-SLO-879 on the Chevron Estero Bay Property – 12/09/99 (letter report). Prepared for Mr. Joe Gonzalez, Chevron Pipeline Company. Prepared by Conejo Archaeological Consultants. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

2001a Subject: Archaeological Monitoring Results for the Ballast Outfall Line & Water Line Relocation Project, Chevron Estero Bay Property – 07-03-01 (letter report). Prepared for Mr. Joe Gonzalez, Chevron Pipeline Company. Prepared by Conejo Archaeological Consultants. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

2001b Subject: Archaeological Monitoring Results for the Chevron Estero Shore Plant Pipeline Removal Project, Chevron Estero Bay Property – 12/10-16/01 (letter report). Prepared for Mr. Joe Gonzalez, Chevron Pipeline Company. Prepared by Conejo Archaeological Consultants. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Mifsud, Lise

2018 Burial Report. San Luis Obispo County Sheriff Case#181109341.

Mikkelsen, Patricia and John Berg

1994 *Phase I and Extended Phase I Investigations for Proposed Traffic Signals and Lane Widening on State Highway 1 in Cayucos, San Luis Obispo County, California.* Prepared for the California Department of Transportation, District 5. Prepared by Far Western Anthropological Research Group, Inc. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

2017 *Phase II Studies at CA-SLO-879/H for the Morro Bay to Cayucos Connector Project, San Luis Obispo County, California*. Far Western Anthropological Research Group, Inc. Submitted to Terre Verde. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Mikkelsen, Patricia, William Hildebrandt, and Deborah Jones

2000 Prehistoric Adaptations on the Shores of Morro Bay Estuary: Excavations at Site CA-SLO-165, Morro Bay, California. *The San Luis Obispo County Archaeological Society Occasional Paper,* No. 14.

Mikkelsen, Patricia, Laura Leach-Palm Jennifer Hatch, Elizabeth Kallenbach, and Jerome King

2001 *Cultural Resources Inventory of Caltrans District 5 Rural Highways, San Luis Obispo County, California: Highways 1, 41, 56, 101, 166, 227, and 229*. Far Western Anthropological Research Group, Inc. Submitted to Caltrans District 5, San Luis Obispo. Copies available at Caltrans District 5, San Luis Obispo.

Mikkelsen, Patricia, Paula Carr, Shelly Tiley, Julia Costello, Nathan Stevens, and John Johnson

2014 *The Long Road Traveled: Archaeology, Native Americans, and Europeans in Cuyama Valley*. Far Western Anthropological Research Group.

Mikkelsen, Patricia, Jack Meyer, Adrian Whitaker, Valerie Levulett, Eric Wohlgemuth, and Nathan Stevens

2014 *Cuyama Valley – A Corridor to the Past*. Volume I: Archaeological Synthesis.

Mikkelsen, Patricia, Nathan Stevens, Jeffrey Rosenthal, and Deborah Jones

2014 *Cuyama Valley – A Corridor to the Past.* Volume II: Site Reports. Far Western Anthropological Research Group, Inc. Submitted to Caltrans District 5. Copies available at Caltrans District 5, San Luis Obispo.

Milliken, Randall and John Johnson

2005 *An Ethnogeography of Salinan and Northern Chumash Communities – 1769 to 1810.* Submitted to the California Department of Transportation, District 5, Contract No. 06A0148 & 06A0391. Copies available at Far Western Anthropological Research Group Inc., Davis.

Murphy, Reilly, Sarah Nicchitta, and Cris Lowgren

2019 *Phase II Cultural Resource Evaluation of CA-SLO-1478/H at 18 10th Street, Cayucos, Californi*a. Albion Environmental, Inc. Submitted to Kelly and Nancy Byde. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Nelson, Margaret

1991 The Study of Technological Organization. *Archaeological Method and Theory* 3: 57-100.

Nicchitta, Sarah, Kaya Wiggins, and Robert Johnson-Ramirez

2019 *Extended Phase I Cultural Resource Inventory for the Cayucos Ranch Access Road, San Luis Obispo County, California*. Prepared for Will Tucker. Prepared by Albion Environmental, Inc. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Noble, Michelle D.

2012 Learning more from Ground Stone Assemblages: Results from a Northern California Study. *SCA Proceedings*, 26.

Norris, Robert M. and Robert W. Webb

1976 California Geology. John Wiley & Sons, Inc., Santa Barbara.

Orme, Anthony R.

1990 The Instability of Holocene Coastal Dunes: The Case of the Morro Dunes, California. In *Coastal Dunes: Form and Process*, edited by Karl Nordstrom, Norbert Psuty, and Bill Carter, p.315-333. John Wiley & Sons Ltd, Chichester, England.

Parker, John

1989 *Archaeological Investigation of the Gullmert Property 3140 Studio Drive Cayucos, California*. Prepared for Mr. G.A. Gulmert. Prepared by Parker & Associates. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1991a A*rchaeological Test Excavation of the Bowin Property, Ninth and Pacific, Cayucos, CA.* Parker & Associates. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1991b *Archaeological Investigation of a Portion of the Estero Shore Plant Chevron Pipeline Company*. Prepared for S.K. O'Nesky, Chevron Pipeline Company. Prepared by Parker & Associates. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1993 *Archaeological Monitoring of Demolition and Fill Placement at the Intersections of Cass Ave., 23rd, and 24th Streets Cayucos*. Prepared for John Stahl, Los Padres Savings Bank. Prepared by Parker & Associates. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1995a *Cultural Resource Testing Report for the Miles Parcel APN 061-412-018 Studio Drive, Cayucos*. Prepared for Rodney Miles. Prepared by Parker & Associates. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1995b *Cultural Resource Investigation of a Portion of the J.A. Alexander Ranch APN 046-009-038 Villa Creek*. Prepared for Frank Oaks, The Abalone Farm, Inc. Prepared by Parker & Associates. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1996 *Cultural Resource Investigation of the Kniffen Parcel APN 061-264-038 Hacienda Dr. and South Ocean Ave*. Cayucos. Prepared for Bruce Koontz. Prepared by Parker & Associates. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1998 *Cultural Resource Investigation of the Martin Parcel 44 24th St, Cayucos*. Prepared for Forest Martin. Prepared by Parker & Associates. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1999 *Cultural Resource Investigation of the Old Creek Road Strom Damage Project.* Prepared for the San Luis Obispo County Engineering Department. Prepared by Parker & Associates. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

2001 *Cultural Resource Survey and Testing Report for the Garcia Ave. Paving Project Cayucos CA-SLO-877*. Prepared for the San Luis Obispo County Public Works Department. Prepared by Parker & Associates. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

2003 *Cultural Resource Investigation of the Waldrip Parcel APN 064-242-030 2246 Pacific, Cayucos*. Prepared for John MacDonald. Prepared by Parker & Associates. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

2005 *Cultural Resource Investigation of the Franklin Parcel 1550 Pacific Ave., Cayucos*. Parker & Associates. Submitted to Larry Franklin. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

2007 *Archaeological Monitoring and Mitigation Report for Cayucos Elementary School Construction APNs 064-025-003, 064-024-021, and 064-022-016 301 Cayucos Drive, Cayucos*. Parker & Associates. Submitted to Cayucos Elementary School District. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Reinman, Fred

1961 *Archeological Investigations at Whale Rock Reservoir, Cayucos, California.* Submitted to the California Department of Natural Resources, Division of Beaches and Parks. Copies available at the University of California, Los Angeles.

Riddell, Francis

1960 *Archeological Reconnaissance of Whale Rock Damn and Reservoir San Luis Obispo County, California*. State of California Department of Natural Resources, Division of Beaches and Parks. Submitted to State of California Department of Water Resources Division of Design and Construction Engineering Laboratories. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Rivers, Betty and Terry Jones

1993 Walking Along Deer Trails: A Contribution to Salinan Ethnogeography Based on the Field Notes of John Peabody Harrington. *Journal of California and Great Basin Anthropology*, 15(2): pp. 146-175.

Runnings and Haversat

1991 *Preliminary Cultural Resources Reconnaissance of Assessor's Parcel Number 064-184-05 Cayucos, San Luis Obispo County, California*. Prepared for David R. Einung. Prepared by Archaeological Consulting. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

San Luis Obispo County Archaeological Society

1968 *Site Surveys, San Luis Obispo County, Highway 1 from Cayucos North to Villa Creek, 1964 and 1966.* Copies available at the San Luis Obispo County Archaeological Society, San Luis Obispo.

San Luis Obispo County Tribune

2014 Charles Everard Dills. *The Tribune*. Retrieved from https://www.legacy.com/obituaries/sanluisobispo/obituary.aspx?n=charles-everard-dills&pid=169870428, on August 5, 2020.

Schinsing, Simone

2018 *Historical Resources Compliance Report Conduit Placement along Northbound State Route 1, Morro Bay/Cayucos, San Luis Obispo County,* *California*. Prepared for HP Communications. Prepared by Applied Earthworks, Inc. Copies available at the California Department of Transportation, District 5 Office.

Schinsing, Simone, Barry Price, and Erin Enright

2016 *Middle-Late Transition and Early Late Period Life at CA-SLO-2195: Data Recovery for the 61 Birch Street Development in Cayucos, San Luis Obispo County, California.* Prepared for M&R Investment One Company, Inc. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Singer, Clay

1987 *Cultural Resources Survey and Impact Assessment for the Proposed Toro Canyon Well Site and Pipeline, San Luis Obispo County, California*. C.A. Singer & Associates, Inc. Submitted to McClelland Engineers, Inc. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1989 *Cultural Resources Survey and Impact Assessment for 145 Acres at the Mouth of San Geronimo Creek, Cayucos, San Luis Obispo County, California*. C.A. Singer & Associates, Inc. Submitted to The Planning Mill, San Luis Obispo. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1992 Subject: Archaeological investigations for the proposed residential construction project at 3140 Studio Drive in Cayucos (letter report). C.A. Singer & Associates, Inc. Submitted to Mr. G.A. Gulmert. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1993 Subject: Evaluation of potential impacts to archaeological site CA-SLO-877 associated with sea wall construction at 3106 Studio Drive in Cayucos, San Luis Obispo County, California (letter report). C.A. Singer & Associates, Inc. Submitted to North Coast Engineering. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1994 Subject: Archaeological evaluation of APN 064-412-018, a property located in Cayucos, San Luis Obispo County, California (letter report). C.A. Singer & Associates, Inc. Submitted to Rodney Miles. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1995a Subject: Archaeological mitigation plan for the Aguiar project in Cayucos [APN 064-184-010]; excavation monitoring and documentation at site CA-SLO-129 (letter report). C.A. Singer & Associates, Inc. Submitted to Department of Planning and Building, County of San Luis Obispo. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1995b *Cultural Resources Survey and Impact Assessment for a Property at 360 N. Ocean Avenue in Cayucos, San Luis Obispo County, California*. C.A. Singer & Associates, Inc. Submitted to Jonathan McAlpin. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1995c *Archaeological Monitoring at CA-SLO-129: Excavations at the Adams Property on 22nd Street in Cayucos, San Luis Obispo County California*. C.A. Singer & Associates, Inc. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1996a Subject: Archaeological mitigation plan for the Wasson project at site CA-SLO-129 in Cayucos, San Luis Obispo County, California [D930187P: B] (letter report). C.A. Singer & Associates Inc. Submitted to Department of Planning and Building, County of San Luis Obispo. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1996b Subject: Archaeological monitoring near site CA-SLO-1362 for the Doherty Project on Villa Creek near Cayucos, San Luis Obispo County, California [ED95-132; B893769/1] (letter report). C.A. Singer & Associates Inc. Submitted to Department of Planning and Building, County of San Luis Obispo. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1996c *Archaeological Monitoring at CA-SLO-129: Investigations at the Aguiar Property on 23rd Street in Cayucos, San Luis Obispo County, California*. C.A. Singer & Associates Inc. Submitted to Ken Scott. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1997 *Archaeological Monitoring at CA-SLO-129: Excavations at the Wasson Property on Cass Avenue in Cayucos. San Luis Obispo County, California*. C.A. Singer & Associates Inc. Submitted to James Wasson. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

1999 Subject: Cultural resources survey and impact assessment for a residential property on Birch Avenue in Cayucos, San Luis Obispo County, California [APN 064-034-003/004/005/008] (letter report). Prepared for Kevin McClory. Prepared by C.A. Singer & Associates, Inc. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

2001a Subject Archaeological monitoring of construction excavations at 33 – 23rd Street, par of archaeological site CA-SLO-129 in the community of Cayucos, San Luis Obispo County, California [APN 064-184-008] (letter report). Prepared for Mr. Randy Orrick. Prepared by C.A. Singer & Associates, Inc. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

2001b Subject: Cultural resources survey and impact assessment for the Pierson Ranch, a 120.9-acre property at China Harbor, San Luis Obispo County, California [APN 046-151-008, APN 046-091-025, and APN 046-091-037] (letter report). Prepared for Mr. Jeffrey J. Emrick, Engineering Development Associates. Prepared by C.A. Singer & Associates, Inc. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

2002 Subject: Final report on archaeological monitoring at 33 – 23rd Street in Cayucos, a portion of site CA-SLO-129 (letter report). Prepared for Rick and Randy Orrick. Prepared by C.A. Singer & Associates, Inc. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

2003 Subject: Phase III archaeological mitigation report for 53 – 23rd Street in Cayucos, San Luis Obispo County, California [APN 064-184-011]: supplemental data from site CA-SLO-129 (letter report). Prepared for Mr. Jonathon McAlpin. Prepared by C.A. Singer & Associates, Inc. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

2005a Subject: Cultural resources survey and impact assessment for a property at 398 D Street in Cayucos, San Luis Obispo County, California [APN 064-034-011] (letter report). C.A. Singer & Associates. Submitted to Design and

Drafting Services. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

2005b Subject: Archaeological monitoring of utility trench excavation at 53- 23rd Street in Cayucos, San Luis Obispo County, California: mitigation of impacts at site CA-SLO-129 (letter report). Prepared for Mr. Stuart Selkirk. Prepared by C.A. Singer & Associates, Inc. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

2005c *Cultural Resources Survey and Impact Assessment for a Residential Property at 42 – 19th Street in Cayucos, San Luis Obispo County, California (APN 064-233-027).* Prepared by C.A. Singer & Associates, Inc. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

2005d *Cultural Resources Survey and Impact Assessment for a Residential Property at 3456 Shearer Avenue in Cayucos, San Luis Obispo County, California [APN 064-431-006/007*]. Prepared by C.A. Singer & Associates, Inc. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

2005e *Cultural Resources Survey and Impact Assessment for a Residential Property at 849 Pacific Avenue in Cayucos, San Luis Obispo County, California (APN 064-152-010*). Prepared by C.A. Singer & Associates, Inc.

Copies available at the Central Coast Information Center, University of California, Santa Barbara.

2005f *Archaeological Monitoring at Munoz-Sebastian Project at 50 – 24th Street in Cayucos, San Luis Obispo County, California*. Prepared by C.A. Singer & Associates, Inc. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

2005g *Archaeological Testing and Evaluation of Site CA-SLO-2089 on the Pierson Ranch at China Harbor, San Luis Obispo County, California*. Prepared for Mr. David Pierson. Prepared by C.A. Singer & Associates, Inc. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

2008 Subject: Cultural resources survey and impact assessment for a 103-acre ranch property at 4041 Villa Creek Road near Cayucos, San Luis Obispo County, California [APN 046-101-008]: Including supplemental information on archaeological site CA-SLO-1362 (letter report). Prepared for Ms. Pem Meyers. Prepared by C.A. Singer & Associates, Inc. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Singer, Clay and John Atwood

1991 *Cultural Resources Survey and Impact Assessment for the Rancho Bernardo Easement Road near Villa Creek in Cayucos, San Luis Obispo County, California*. C.A. Singer & Associates, Inc. Submitted to Paul Reinhardt. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Sorensen, Jerrel H.

1989 Monitoring report. Prepared for Mr. Cutright. Prepared by INFOTEC Research, Inc. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

True, D.L.

1983 Casual Artifacts in Northern San Diego County, California: The Hammergrinder. *Journal of California and Great Basin Anthropology*, 5(2).

University of California Agriculture and Natural Resources

2014 Fish Species. Pisces Database. DOI: Fish Species by Location - California Fish Website (ucdavis.edu), accessed January 19, 2021.

USDA

2019 Custom Soil Resource Report for San Luis Obispo County, California. https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurevy.aspx. 20190124.

Walgren, Michael, Jeremy Beaulieu, and Lisa Andreano n.d. *Native Flora of Estero Bay*. Morro Bay National Estuary Program. DOI: Native Flora of Estero Bay.pdf (elfin-forest.org), accessed January 18, 2021.

Webb, Jack and Terry L. Jones

2018 Further Experimental Evaluation of the Function of Pitted Stones on the Central California Coast. *Journal of California and Great Basin Anthropology*, 38(1): 131-136.

Wendel, Ryan and Erin Enright

2017 *Investigations at CA-SLO-879/H: Buried Site Testing and Evaluation for the Cayucos Sustainable Water Project, Cayucos, California*. Applied Earthworks, Inc. Submitted to Cayucos Sanitary District. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

White, David R.

1993 *Cultural Resources Survey and Evaluation for the Chevron Estero Shore Plant, Morro Bay, San Luis Obispo County, California*. Prepared for Entrix, Incorporated. Prepared by Applied Cultural Dynamics. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Whitley, David

2014 Jay von Werlhof's Trail of Dreams. *Pacific Coast Archaeological Society Quarterly*, 50(3&4): 47-60.

Wlodarski, Robert J.

2009 *A Phase I Archaeological Study for the Proposed Bechtel Wireless Telecommunications Site SBL100 (Bella Vista Mobile Lodge Colo) 350 North Ocean Avenue Cayucos, San Luis Obispo County, California 93430*. Prepared for Victoria Rojo, ATC Associates, Inc. Prepared by Cellular Archaeological Resource Evaluations. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

Woodward, Jim

1986 *Archaeological Survey Report on Cayucos State Beach. Resource Protection Division California Department of Parks and Recreation*. Submitted to Department of Parks and Recreation. Copies available at the Central Coast Information Center, University of California, Santa Barbara.

APPENDICES

APPENDIX A. ARCHAEOLOGICAL SITE SYNTHESIS

This appendix provides data for previously recorded sites in northern Estero Bay and informs the discussion and conclusions for this research. The data comes from all previously recorded sites up until 2020 and is displayed in tabular format (Tables 31-40). The structure of the appendix is generally organized by subregion (primarily by watershed), following with each archaeological site trinomial in order numerically. Data includes resource descriptions, radiocarbon dates and temporal associations, recording events, and associated reports, though not all archaeological sites have associated radiocarbon dates orreports. The sites associated with the Cayucos Bench Collection are included as their ownsubregion and not by their adjacent San Geronimo Creek and Villa Creek watersheds. Language used to describe the resources generally maintains the language used by the authors of records and reports. The radiocarbon dates come from the referenced site records and reports.

Toro Creek Sites

Trinomial	Resource Description	Chronology (dates are B.P)	Recording events	Report reference
SLO-181, (also recorded as -879, -1187, -1378, -2736)	Shell midden with faunal bone; bedrock milling features; flaked stone: projectile points, drill, biface, choppers, scrapers, cores, flaked tool, debitage; groundstone: mano/handstones, millingslabs/metates, pestle, plummet stone; hammers; bone tools; whistles; beads: steatite, olivella shell (K1, K3, G1), abalone disks; ochre; asphaltum; FAR; human burials; postcontact component	Radiocarbon dates: 4840-4540, 3370-3090, 4525-4300, 2910-2730, 2845-2700 (Early); 2675-2345, 2650-2330, 2640-2285, (Early to Middle); 2300-2250/2170-900, 1705-1505, A.D. 610-810, A.D. 610-780, 1410-1210 (Middle); A.D.1060-1320, 900-530,820-655, A.D. 1230-1450, 700-540 (MLT);A.D. 1280-1450, A.D. 1290-1460, A.D.1710-1950, A.D.1950- , 240-0 (Late-);Diagnostic artifacts:Olivella cupped shellbeads (Late)	SLO-181: Dalidio 1964; SLO-879: Dills 1979; Applied Earthworks 2004; Laurie and Cisneros 2010, Conway 2011, Mikkelsen and Berg 2016, Schinsing 2016; SLO-1187: Singer and Gibson 1987; SLO-1378: Cooley and James 1991	Gibson 1980b, 1994a; Dills 1980b; Haversat and Breschini 1981; Singer 1987, 2005d; ERCE 1991; Madrigal 1991; Parker 1991a; White 1993; Fugro-McClelland 1993; Maki 1998a, 1998b, 1999a, 1999b, 2000a, 2000b, 2001a, 2001b; Gibson 2005; Lloyd et al. 2005; County 2005; Hannahs 2008, 2015; Conway 2009, 2011; Letter et al. 2012; Denardo et al. 2012; Berg et al. 2012; Enright and Schinsing 2017b; Wendell and Enright 2017; Mikkelsen and Berg 2017; Parker 1991b; Schinsing 2018
SLO-2725	Chert quarry consisting of a partially buried boulder, associated with three pieces of shatter	N/A	Greenlee, Letter, Kirstine 2012	Letter et al. 2012; Denardo et al. 2012
SLO-2738	Shell and lithic scatter with chert core, flakes and shatter, pestle frag, and battered cobble	N/A	Greenlee, Letter, Kirstine, and Sander 2012	Letter et al. 2012; Denardo et al. 2012
SLO-2741	Shell and lithic scatter with chert cores, tool, and debitage, and	N/A	Greenlee, Letter, Kirstine, and Sander 2012	Letter et al. 2012; Denardo et al. 2012

Trinomial	Resource Description	Chronology (dates are B.P)	Recording events	Report reference
	hammerstones			
SLO-2742	Shell and lithic scatter with utilized cobble, debitage, and hammerstones	N/A	Letter, Kirstine, and Sander 2012	Letter et al. 2012; Denardo et al. 2012
SLO-2743	Shell and lithic scatter with flaked stone: leaf shaped and contracting stem projectile points, bifaces, cores, tools; hammerstones; groundstone: mortars; battered stone; possible ochre	A.D. 1330-1480, A.D. 1420-1640 (Late)	Greenlee, Letter, Kirstine, and Sander 2012	Letter et al. 2012; Denardo et al. 2012
SLO-2744	Lithic scatter with cores, biface, flakes, and flaked cobble	N/A	Greenlee, Letter, Kirstine, and Sander 2012	Letter et al. 2012; Denardo et al. 2012

Willow Creek Sites

Trinomial	Resource Description	Chronology (dates are B.P)	Recording events	Report reference
SLO-164	Shell and flaked stone material	N/A	Riddell 1960; Mikkelsen et al. 1994; Darcangelo 1999	Haversat and Breschini 1981; ERCE 1991; Mikkelsen and Berg 1994; Parker 1996
SLO-877	Shell midden with flaked stone projectile points, knives, tools, cores, and debitage, beads, faunal bone, burials reported	Radiocarbon dates: 8080, 6865 (Millingstone); 5420, 5280, 5150 (Early); Diagnostic artifacts: olivella shell beads A2 (Early-Middle), B2 (Early and Late); clam shell disks (Early)	Dills 1979; Woodward et al. 1986; Darcangelo 1999	Gibson 1980a, 1988b; 1990a, 1990b; Breschini and Haversat 1980, 1988; Hoover 1985a, 1985b; Woodward 1986; Parker 1989, 1995a, 2001; Singer 1992, 1993, 1994; Mikkelsen and Berg 1994
SLO-1157	3 chert flakes and half a dozen pieces of marine shell	N/A	Woodward, Wheeler, and Rumming 1986	
SLO-1497	Possibly redeposited soil containing marine shell fragments	N/A	Dills 1992	Singer 2005d

Whale Rock Reservoir Sites

Trinomial	Resource Description	Chronology (dates are B.P)	Recording events	Report reference
SLO-148	Small habitation site with shell	N/A	McKusick 1959	Riddell 1960; Reinman 1961
SLO-149	Small habitation site with shell	N/A	McKusick 1959	Riddell 1960; Reinman 1961
SLO-150	Series of small habitation areas with shell and human remains.	N/A	McKusick 1959	Riddell 1960; Reinman 1961
SLO-151	Bedrock mortars, shell, midden	N/A	McKusick 1959	Riddell 1960; Reinman 1961
SLO-152	Small habitation site with shell	N/A	McKusick 1959	Riddell 1960; Reinman 1961
SLO-153	BRMs	N/A	McKusick 1959	Riddell 1960; Reinman 1961
SLO-155	2 BRM each with 5-6 mortar pits, shell, and chert chips	N/A	Riddell 1960	Riddell 1960; Reinman 1961
SLO-156	Shell midden with flaked stone choppers, scrapers, knives, drills, reamers, blades, flakes, cores, pebbles, hammers, bowl, ochre, drilled whale vertebra, and human remains	N/A	Mckusick 1960	Riddell 1960; Reinman 1961
SLO-157	Shell midden with faunal bone, flaked stone artifacts: projectile points (contracting stem and lanceolate), choppers, scrapers, knives, drills, reamers, blades, cores and flakes; hammers; groundstone: bowls, pestles, pitted stones, netsinkers; whestones; incised stones; beads: steatite disk and tube beads, siltstone, Olivella (A1, A5, G), abalone, clam with blanks; abalone shell fishhook; ochre; burial features and human remains	Radiocarbon date: 1620 (Middle); Diagnostic artifacts: Class A5 - Side ground Olivella shell bead (Early or Postcontact)	Riddell 1960	Riddell 1960; Reinman 1961; Singer 1995b

Old Creek Sites

Trinomial	Resource Description	Chronology (dates are B.P.)	Recording events	report reference
SLO-129	Shell midden with lithics: projectile points, knives, bifaces, scrapers, perforators, cores, debitage; faunal bone (some burned); groundstone: manos, pestle, mortar, metate, net weight, pitted stones, incised pebble, tarring anvil; hammerstones; spire lopped olivella shell beads; bone gorge; charcoal; FAR; cinnabar; burials	Radiocarbon dates: 8020-7680 (Millingstone); 4920, 4820, 4510 (Early); 2285-2043, 1580-1280 (Middle); diagnostic artifacts: Vandenberg and contracting stem projectile points (Early-Middle)	Baumhoff 1952; Dills 1968; Sorensen 1989; Darcangelo 1999	Sorensen 1989; Breschini and Haversat 1989, 1993; Runnings and Haversat 1991; Parker 1993, 1998, 2003; Singer 1995a, 1995c, 1996a, 1996b, 1997, 2001a, 2002, 2003, 2005b, 2005c, 2005d, 2005e, 2005f; Conway 2000, 2003; Gibson 2005; Laurie 2016; Laurie et al 2017; Enright and Schinsing 2017a
SLO-154	Shell midden with two chert ppts, debitage, and FAR	N/A	Riddell 1960	Riddell 1960; Reinman 1961; Gibson 1981; 1994b
SLO-1156	Shell midden with charcoal and natural chert nodules	N/A	Woodward, Wheeler, and Rumming 1986	Woodard 1986
SLO-1478	Sparse amounts of marine shell and flaked stone, one oblique spire lopped olivella shell bead and postcontact component	Anastacio 1991; Murphy, Nicchitta, and Lowgren 2019	Anastacio 1991, 1993a; Dills 1994; Murphy et al. 2019	
SLO-2424	Sparse shell and lithic scatter with FAR	Parker 2005	Parker 2005; Kidwell and Enright 2018	
SLO-158	Shell midden with flaked stone: knife, scrapers, cores, flakes; hammer; groundstone (bowls, pestle, millingstone, whetstone); ochre; faunal bone	N/A	McKusick 1960	Riddell 1960; Reinman 1961
SLO-159	Shell midden with flaked stone: projectile point, chopper, scrapers, knife, cores;	N/A	McKusick 1960	Riddell 1960; Reinman 1961

Trinomial	Resource Description	Chronology (dates are B.P.)	Recording events	report reference
	hammer; groundstone: bowl, pestle, whetstone; human remains			
SLO-160	Shell midden with no intact subsurface deposit	N/A	McKusick 1960	Riddell 1960; Reinman 1961
SLO-161	Scattered shell and flaked stone	N/A	McKusick 1960	Riddell 1960; Reinman 1961
SLO-162	Campsite with shallow deposit of shell and chert flakes	N/A	Riddell 1960	Riddell 1960; Reinman 1961
SLO-163	Village site with shell, chert scraper and flakes	N/A	Riddell 1960	Riddell 1960; Reinman 1961
SLO-880	BRM (at least 16)	N/A	Gibson 1979	
SLO-881	4-meter-high rock outcrop with 10 rings pecked into lower area of rock for quarry of serpentine, some nodules present. Upper rock outcrop has chert flakes around it; cupule near pecked quarry rings	N/A	Gibson 1979	
SLO-1903	Franciscan chert quarry with wide range of chert flakes and tools, showing signs of fire altering; dark rust brown chert, some pieces with aquagreen streaks	N/A	Parker 1999	Parker 1999
SLO-1904	Franciscan chert quarry with abundant chert flakes, cores, one chopping tool noted; all rust-brown chert, some with aquagreen streaks	N/A	Parker 1999	Parker 1999

Little Cayucos Creek Sites

Trinomial	Resource Description	Chronology (dates are B.P)	Recording events	Report reference
SLO-1769	Possibly redeposited shell and lithic materials within parcel including historic buildings	N/A	Bertrando 1996	Bertrando and Bertrando 1996; Bertrando 1996; Singer 2005a
SLO-1914	Shell midden with flaked stone: arrow points, drill, bifaces, cores, tools, debitage; groundstone: mortar, pestle, millingslabs, handstones, anvils,netsinker; burnishing stone; battered stone; beads: (olivella, clam, mussel, abalone, stone, bone, glass); fishhooks; polished bone; and FAR	Radiocarbon dates: 390-110 (Postcontact); Diagnositc artifacts: cupped and lipped olivella shell beads (Late), abalone disks (Late), glass trade bead (postcontact)	Singer 1999	Singer 1999, 2005a; Farrell 2000b; Farrell et al. 2004;
SLO-2195	Shell midden with flaked stone: cores, flaked tools, and debitage; groundstone: pitted stones, manos, metates, mortars, pestles, tarring pebbles; beads: olivella shell beads and one steatite disk; FAR; charcoal and botanicals	Radiocarbon dates: 915, 815 (MLT), 655 (Late); Diagnostic artifacts: cupped/lipped olivella shell beads (Late period)	Bertrando 2002	Bertrando 2002; Lee 2006; Schinsing et al. 2016
SLO-2873	Battered cobble, flaked tool with postcontact material	N/A	Nicchitta and Wiggins 2019	Nicchitta et al. 2019

Cayucos Creek Sites

Trinomial	Resource Description	Recording events	Report reference
SLO-78	Shell midden with BRMs, flaked stone debris, and human burial	Walker 1948; Pilling and Baumhoff 1950-1952	Dills 1980a; Jensen 2001; Carbone 2002; Wlodarski 2009; Farrell and Simons 2015
SLO-519	Shell midden consisting of "two levels" with Franciscan and Monterey chert debitage and a spire lopped olivella shell bead	Dills 1969; Elliot and Laurie 2010	Dills 1980a
SLO-601	Petroglyph rock art site on serpentine outcrop with shell midden and reported burial	(M)ossberg and Fleshman 1971	
SLO-667	BRMs with numerous artifacts reported in nearby field	Fleshman 1973	
SLO-1000	Shell midden with stone chips and a pestle fragment	Dills n.d.	Dills 1980a
SLO-1273	Redeposited shell midden from SLO-877	Gibson 1990	
SLO-1418	Shell midden with possible flaked tool	Sawyer 1985	Conway 2001; Singer 2005a
SLO-2371	Shell and lithic scatter with faunal bone, chert biface, cores, and debitage	Berg and Laurie 2003	
Cayucos Elementary School	Multicomponent site with precontact, Mexican era, and American period features	No site record	Parker 2007

San Geronimo Creek Sites

Trinomial	Resource Description	Recording events	Report reference
SLO-1540	Scatter of stone tools and tool manufacturing debris, a few shells, and some pieces of groundstone	Parker 1993	Parker 1993c

Cayucos Bench Sites

Trinomial	Resource Description	Chronology (dates are B.P)	Recording events	Report reference
SLO-126	Shell midden with hearth feature; faunal remains; groundstone: bowls, manos, anvil stones, pestles, BRMs, metate, pitted pebbles; lithics: projectile points, blades, scrapers, tools, cores, flakes; hammers; cooking stones; FAR; human remains	Radiocarbon dates: 1640, 1550 (Middle)	Brooks 1952; Hamilton 1961; Hamilton 1964a; Singer 1989; Laurie 2002; Jackson 2021	San Luis Obispo County Archaeological Society 1968; Singer 1989; Farrell 2000a
SLO-325	Shell midden with hammerstones; lithics: projectile points, blades, choppers, cores, scraper, flakes; groundstone: BRMs, bowls, netsinker, pestle, anvil stones; FAR	N/A	Wadhams and Wadhams 1962; Hamilton 1964	San Luis Obispo County Archaeological Society 1968
SLO-348	Shell midden with groundstone: metates, manos, pestle, bowl, pitted stones; lithics: biface, tools, choppers, cores, flakes; hammerstones, hammergrinders, battered cobbles; ochre; FAR	Radiocarbon dates: 2248, 2279/2084 (Middle)	Wadhams and Hamilton 1964a; Wadhams and Wadhams 1965; Jackson 2021	San Luis Obispo County Archaeological Society 1968; Farrell 2000a
SLO-509	Shell midden with groundstone: manos and pitted stones; hammers; lithics: scraper, cores, flakes; hearth stones	N/A	Hamilton 1964c; Dills 1969; Singer 1989; Darcangelo 1999; Jackson 2021	San Luis Obispo County Archaeological Society 1968; Singer 1989; Farrell 2000a; Gibson 2002;
SLO-510	Shell midden with outcrop of BRMs, manos, blades, crystal, and FAR	N/A	Baxley and Hamilton, 1964a; Dills 1966; Singer 1989: Jackson 2021	San Luis Obispo County Archaeological Society 1968; Singer 1989; Farrell 2000a
SLO-511	Shell midden with hearth features, cooking stones, tools, core, chisel, flakes	N/A	Baxley and Hamilton 1964b; Dills 1969; Jackson 2021	San Luis Obispo County Archaeological Society 1968; Dills 1989; Farrell 2000a

Trinomial	Resource Description	Chronology (dates are B.P)	Recording events	Report reference
SLO-512	Shell midden mostly washed away	N/A	Baxley and Hamilton 1964c; Dills 1969; Jackson 2021	San Luis Obispo County Archaeological Society 1968; Dills 1989; Farrell 2000a
SLO-513	Shell midden with FAR	N/A	Baxley and Hamilton 1964d; Dills 1969; Jackson 2021	San Luis Obispo County Archaeological Society 1968; Gibson 1988a; Farrell 2000a
SLO-514	Shell midden with anvil stones, mano, hammerstones, flakes and human remains	N/A	Baxley 1964; Dills 1969; Darcangelo 1999; Jackson 2021	San Luis Obispo County Archaeological Society 1968; Gibson 1988; Farrell 2000a
SLO-515	Includes chopper, metate, mano; most of site may have washed away	N/A	Baxley and Hamilton 1964e; Dills 1969; Jackson 2021	San Luis Obispo County Archaeological Society 1968; Gibson 1988a; Farrell 2000a
SLO-516	Shell midden with groundstone: metates, pestle; anvil/hammerstone; Lithics: choppers, blades, scrapers, and flakes	N/A	Wadhams and Hamilton 1964b; Dills 1969; Jackson 2021	San Luis Obispo County Archaeological Society 1968; Farrell 2000a
SLO-1221	Shell, lithic debitage, milling slab, faunal bone	N/A	Dills and Sawyer 1988; Jackson 2021	Farrell 2000a
SLO-1222	Marine shell, lithic debitage, and groundstone	N/A	Dills and Sawyer 1988;	Farrell 2000a
SLO-1247	Concentration of shellfish	N/A	Singer 1989	Singer 1989; Farrell 2000a
SLO-1248	Shell midden with FAR and flakes	N/A	Singer 1989; Jackson 2021	Singer 1989; Farrell 2000a

Villa Creek Sites

Trinomial	Resource Description	Chronology (dates are B.P.)	Recording events	Report reference
SLO-322/171	Includes manos, pestles, other artifacts, and human remains	N/A	Wadhams and Wadhams 1962a	
SLO-323	Projectile points, mortars, pestles, and hammerstones	N/A	Wadhams and Wadhams 1962b	
SLO-324	Petroglyph cup and groove rock art site with some cross hatching	N/A	Wadhams and Wadhams 1962c; Fleshman 1970; Dills n.d.	
SLO-325	BRMs, shell, flaked stone: projectile points, blades, choppers, scrapers, cores, flakes; groundstone: bowl, pestle, anvils, netsinker; hammerstones, FAR	N/A	Wadhams and Wadhams 1962d; Hamilton 1964b	San Luis Obispo County Archaeological Society 1968
SLO-326	Includes shell; faunal bone; flaked stone: tools, flakes; groundstone: metates, pestles, mortars, dimple stones; hammer stones, FAR	N/A	Wadhams and Wadhams 1962e; Parker 1995	Parker 1995b
SLO-550	Includes possible housepits, shell, flaked stone: knives and projectile points, cores; groundstone: dimpled hammerstones, pestles, manos, mortars, stone fry pan; cooking stones	N/A	Von Werlhof 1970	
SLO-551	Shell, rubbing stones, bowls, scraper, bone, mano	N/A	Von Werlhof 1970	
SLO-552	Flaked stone: projectile points, knives, scrapers, chips; groundstone: mortars, manos; discs?	N/A	Von Werlhof 1970	
SLO-553	Shell midden with hammerstone, bowl, mano, disc.	N/A	Von Werlhof 1970	

Trinomial	Resource Description	Chronology (dates are B.P.)	Recording events	Report reference
SLO-554	Scrapers, rubbing stones, bowls, saw?, mortars, pestle, hammerstones (some with pits)	N/A	Von Werlhof 1970	
SLO-555	Shell, hammerstones, chert deb, core, mano, rubbingstones, saw	N/A	Von Werlhof 1970	
SLO-657	Petroglyph rock art site. Serptentine out crop with pit and grooves	N/A	Fleshman 1970	
SLO-745	Petroglyph rock art site consisting of three pecked holes on serpentine outcrop, with many "Indian findings" on same ranch.	N/A	Fleshman 1975	
SLO-1217	Shell midden with BRMs, and chert deb	290 (Late)	Dills 1988; Parker 1995	Breschini and Haversat 1990; Singer and Atwood 1991; Singer 1996c, 2008
SLO-1218	Shell midden	2730 (Early)	Dills and Sawyer 1988	Parker 1995b
SLO-1362	Shell midden with flakes, globular mortar, net weight, pitted stone, and FAR; historic buildings	N/A	Singer 1991	Breschini and Haversat 1990; Singer and Atwood 1991; Singer 1996c, 2008
SLO-1539	shell midden with chert cores and scrapers; Dills claimed site was redeposited material from SLO-1218 but Parker could not confirm this	N/A	Dills and Sawyer 1988; Parker 1995	Parker 1995b

China Harbor Sites

Trinomial	Resource Description	Chronology (dates are B.P)	Recording Events	Report reference
SLO-74	Shell midden with charmstones, lithics, fire-altered rock, cores, spalls, manos, and many shells, BRM	Radiocarbon Date: 770 (MLT)	Walker 1948; Dills 1988	
SLO-327	BRM, flakes, shell, broken hammerstones, bowl mortar	N/A	Wadhams and Wadhams 1962f	
SLO-1216	Shell with biface/point tips, flakes from both cherts, pitted pebbles, FAR	N/A	Gibson and Karl 1988	
SLO-2088	Shell with flaked stone: cores, flakes, knives, scrapers, bifaces, chopper, microblades; groundstone: manos, slab, pestle, pitted anvils	N/A	Lee and Singer 2001	Singer 2001b, 2005g; Greenwood and Slawson 2005
SLO-2089	Concentration of Monterey chert flakes and cores	N/A	Lee and Singer 2001	Singer 2001b, 2005g

APPENDIX B. RADIOCARBON DATES, CA-SLO-348

Report: **2129-031931-031932** 4 February 2019

Customer: 2129
Kaya Wiggins
Humboldt State University
1 Harpst St.
Arcata, CA 95521
USA

Samples submitted for radiocarbon dating have been processed and measured by AMS. The following results were obtained:

DirectAMS code	Submitter ID	Sample type	Fraction of modern		Radiocarbon age	
			pMC	1σ error	BP	1σ error
D-AMS 031931	T-10-1	Ostrea	70.35	0.23	2825	26
D-AMS 031932	T-10-2	Ostrea	71.63	0.27	2680	30

Results are presented in units of percent modern carbon (pMC) and the uncalibrated radiocarbon age before present (BP). All results have been corrected for isotopic fractionation with an unreported $\delta^{13}C$ value measured on the prepared carbon by the accelerator. The pMC reported requires no further correction for fractionation.

T-10-1

```
1
                      RADIOCARBON CALIBRATION PROGRAM*
                               CALIB REV8.2
                 Copyright 1986-2020 M Stuiver and PJ Reimer
          *To be used in conjunction with:
          Stuiver, M., and Reimer, P.J., 1993, Radiocarbon, 35, 215-230.

 Sample ID
 Lab Code
 Description
 Radiocarbon Age BP   2825 +/-   26
   Delta R =  140.0 +/-    25.0
 Calibration data set: marine20.14c                 ‡Heaton et al. 2020
   % area enclosed       cal AD age ranges              relative area under
                                                    probability distribution
   68.3 (1 sigma)     cal BC 350- 192                        1.000
   95.4 (2 sigma)     cal BC 405- 91                         1.000
   Median Probability:  -265

  References for calibration datasets:
 Heaton TJ, Köhler P, Butzin M, Bard E, Reimer RW, Austin WEN, Bronk Ramsey
C,
 Hughen KA, Kromer B, Reimer PJ, Adkins J, Burke A, Cook MS, Olsen J, Skinner
LC
 2020.
 Marine20-the marine radiocarbon age calibration curve (0-55,000 cal BP).
 Radiocarbon 62. doi: 10.1017/RDC.2020.68.



 Comments:
 * This standard deviation (error) includes a lab error multiplier.
 ** 2 sigma = 2 x square root of (sample std. dev.^2 + Delta R uncertainty
^2)
 where ^2 = quantity squared.
 [ ] = calibrated range impinges on end of calibration data set
 0* = cannot calibrate due to nuclear testing C-14.
 1955* or 1960* denote influence of nuclear testing C-14

 NOTE:  Cal ages and ranges are rounded to the nearest year which
        may be too precise in many instances.  Users are advised to
        round results to the nearest 10 yr for samples with standard
        deviation in the radiocarbon age greater than 50 yr.
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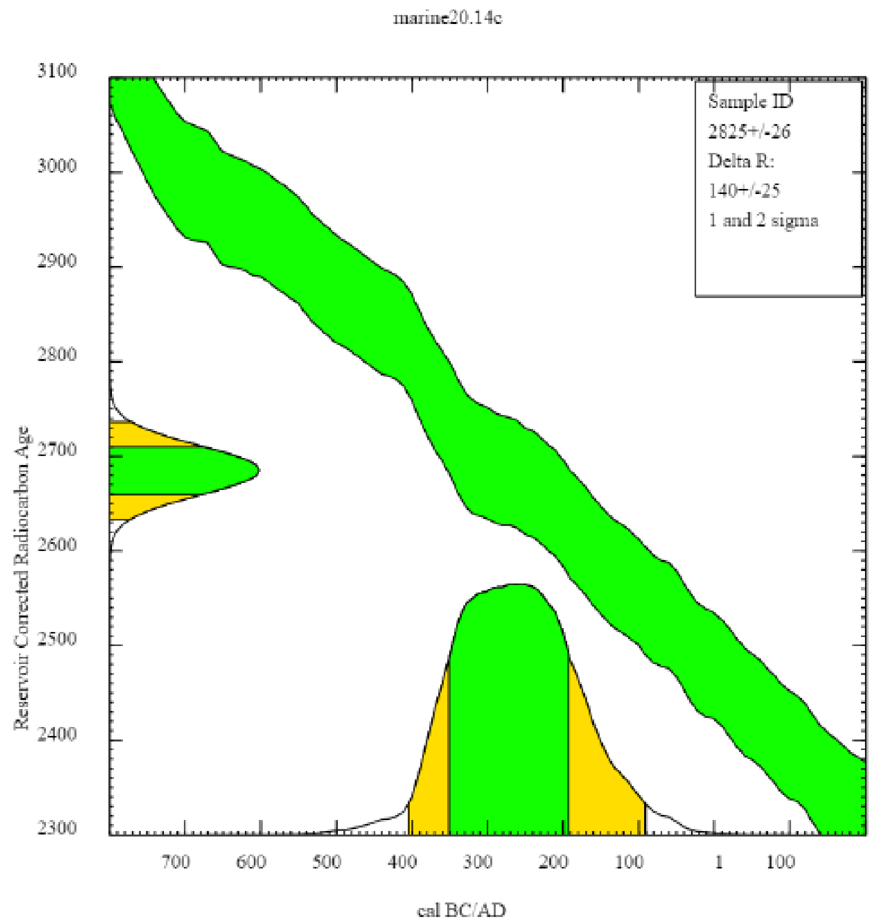


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68.3 (1 sigma)     cal BC 350- 192                    1.000
95.4 (2 sigma)     cal BC 405- 91                     1.000
```

T-10-2

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1
                         RADIOCARBON CALIBRATION PROGRAM*
                                  CALIB REV8.2
                    Copyright 1986-2020 M Stuiver and PJ Reimer
            *To be used in conjunction with:
            Stuiver, M., and Reimer, P.J., 1993, Radiocarbon, 35, 215-230.

 Sample ID
 Lab Code
 Description
 Radiocarbon Age BP   2680 +/-   30
   Delta R =  140.0 +/-    25.0
 Calibration data set: marine20.14c                    #Heaton et al. 2020
   % area enclosed       cal AD age ranges                 relative area under
                                                       probability distribution
   68.3 (1 sigma)      cal BC 167- cal AD 7                     1.000
   95.4 (2 sigma)      cal BC 281- 277                          0.002
                              270- cal AD 98                    0.998
   Median Probability:   -84

  References for calibration datasets:
 Heaton TJ, Köhler P, Butzin M, Bard E, Reimer RW, Austin WEN, Bronk Ramsey
C,
 Hughen KA, Kromer B, Reimer PJ, Adkins J, Burke A, Cook MS, Olsen J, Skinner
LC
 2020.
 Marine20-the marine radiocarbon age calibration curve (0-55,000 cal BP).
 Radiocarbon 62. doi: 10.1017/RDC.2020.68.


 Comments:
 * This standard deviation (error) includes a lab error multiplier.
 ** 2 sigma = 2 x square root of (sample std. dev.^2 + Delta R uncertainty
^2)
 where ^2 = quantity squared.
 [ ] = calibrated range impinges on end of calibration data set
 0* = cannot calibrate due to nuclear testing C-14.
 1955* or 1960* denote influence of nuclear testing C-14

 NOTE:  Cal ages and ranges are rounded to the nearest year which
        may be too precise in many instances.  Users are advised to
        round results to the nearest 10 yr for samples with standard
        deviation in the radiocarbon age greater than 50 yr.
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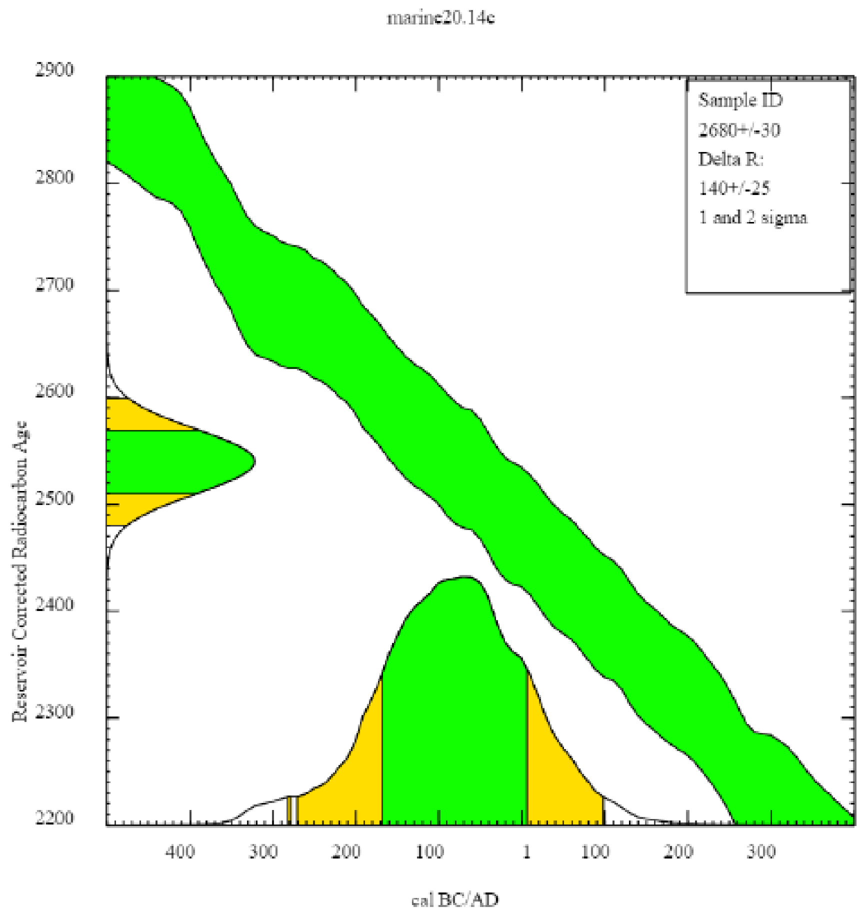

68.3 (1 sigma)	cal BC 167- cal AD 7	1.000
95.4 (2 sigma)	cal BC 281- 277	0.002
	270- cal AD 98	0.998

APPENDIX C. CAYUCOS BENCH COLLECTION CATALOGUE

GROUP

BAT	Battered Stone
FAU	Faunal
FLS	Flaked Stone
GDS	Groundstone
OTH	Other

CLASS

ANV	Anvil
BED	Bead
BIF	Biface
BON	Bone
BTC	Battered Cobble
COR	Core
DEB	Debitage
FAR	Fire Affected Rock
FKT	Flake Tool
HMG	Hammergrinder
HMS	Hammerstone
HST	Handstone
MOR	Mortar
MSC	Miscellaneous
MSL	Millingstone
MUL	Muller
NET	Net Weight
PES	Pestle
PIG	Pigment
PIT	Pitted Stone
PPT	Projectile Point
SHL	Shell

TYPE

AWL	Awl
BIF	Biface Thinning
BIM	Bimarginal
BOW	Bowl

BUL	Bulbous
COB	Cobble
CON	Conical
CSH	Core Shatter
CYL	Cylindrical
GRO	Grooved
IND	Indeterminate
LSN	Large Side-notch
NOT	Notched
PER	Percussion
SHT	Shatter
SQU	Square-stemmed
UNI	Unimarginal

MATERIAL

BON	Bone
SHL	Shell
STN	Stone

DESCRIPTION

BAS	Basalt
DAC	Dacite
FCT	Franciscan Chert
GRN	Greenstone
GRY	Greywacke
IND	Indeterminate
MCT	Monterey Chert
QTZ	Quartz
QZT	Quartzite
SHA	Shale
SCH	Schist
SLT	Siltstone
SND	Sandstone
VOL	Volcanic

Acc. No.	Cat No.	Trinomial	Group	Class	Type	Material	Count	Weight (g)	Descrption
T1-1	1	CA-SLO-126	GDS	MOR	COB	STN	1	426	SND
T1-1	2	CA-SLO-126	GDS	PES	CON	STN	1	880.6	SND
T1-1	3	CA-SLO-126	GDS	PES	CYL	STN	1	126.9	SND
T1-1	4	CA-SLO-126	BAT	PIT		STN	1	214.2	SND
T1-1	5	CA-SLO-126	BAT	PIT		STN	1	404.3	SND
T1-1	6	CA-SLO-126	BAT	PIT		STN	1	608.2	SND
T1-1	7	CA-SLO-126	BAT	PIT		STN	1	276.1	SND
T1-1	8	CA-SLO-126	BAT	PIT		STN	1	251	SND
T1-1	9	CA-SLO-126	BAT	PIT		STN	1	293.5	SND
T1-1	10	CA-SLO-126	BAT	PIT		STN	1	703.4	SND
T1-1	11	CA-SLO-126	BAT	PIT		STN	1	145.9	SND
T1-1	12	CA-SLO-126	BAT	PIT		STN	1	326.7	SND
T1-1	13	CA-SLO-126	OTH	FAR		STN	1	870.3	IND

Acc. No.	Cat No.	Trinomial	Group	Class	Type	Material	Count	Weight (g)	Description
T6-1	1	CA-SLO-513	BAT	PIT		STN	1	176.9	SND

Acc. No.	Cat No.	Trinomial	Group	Class	Type	Material	Count	Weight (g)	Description	Comments
T9-1	1	CA-SLO-516	GDS	PES	BUL	STN	1	421.5	SND	
T9-1	2	CA-SLO-516	GDS	PES	CYL	STN	1	416.1	SND	
T9-1	3	CA-SLO-516	BAT	PIT		STN	1	318.7	SND	
T9-1	4	CA-SLO-516	BAT	PIT		STN	1	205.6	SND	
T9-1	5	CA-SLO-516	FAU	SHL		SHL	1	191.4	Haliotis rufescens	
T9-1	6	CA-SLO-516	FAU	SHL		SHL	1	68.3	Saxidomus nuttallii	
T9-1	7	CA-SLO-516	FAU	SHL		SHL	1	<1	Tegula spp.	Complete shell
T9-1	8	CA-SLO-516	FAU	SHL		SHL	1	30.7	Tresus nutalli	broken into 8 fragments
T9-1	9	CA-SLO-516	FAU	BON		BON	1	<1	Indeterminate species	

Acc. No.	Cat No.	Trinomial	Sect.	Group	Class	Type	Material	Count	Weight (g)	Description
T10-1	1	CA-SLO-348	N/A	FLS	FKT	UNI	STN	1	43.4	MCT
T10-1	2	CA-SLO-348	N/A	FLS	FKT	UNI	STN	1	41.5	MCT
T10-1	3	CA-SLO-348	N/A	GDS	PES	BUL	STN	1	298.6	GRN
T10-1	4	CA-SLO-348	N/A	GDS	HMG		STN	1	434.3	SND
T10-1	5	CA-SLO-348	N/A	BAT	PIT		STN	1	472.6	SND
T10-1	6	CA-SLO-348	N/A	BAT	PIT		STN	1	266.4	SND
T10-1	7	CA-SLO-348	N/A	BAT	PIT		STN	1	593.4	SND
T10-1	8	CA-SLO-348	N/A	BAT	PIT		STN	1	482.8	SND
T10-1	9	CA-SLO-348	N/A	SHL	FAU		SHL	7	6.0	IND
T10-1	10	CA-SLO-348	N/A	BAT	ANV		STN	1	802.7	SND
T10-1	11	CA-SLO-348	1	FLS	FKT	UNI	STN	1	671.6	IND
T10-1	12	CA-SLO-348	1	FLS	FKT	UNI	STN	1	318.0	IND
T10-1	13	CA-SLO-348	1	GDS	MSL		STN	1	2862.7	SND

Acc. No.	Cat No.	Trinomial	Sect.	Group	Class	Type	Material	Count	Weight (g)	Description
T10-1	14	CA-SLO-348	1	GDS	HST		STN	1	758.6	SND
T10-1	15	CA-SLO-348	1	GDS	HST		STN	1	489.3	SND
T10-1	16	CA-SLO-348	1	GDS	HST		STN	1	614.5	SND
T10-1	17	CA-SLO-348	1	GDS	HMG		STN	1	332.3	GRY
T10-1	18	CA-SLO-348	1	GDS	HMG		STN	1	242.9	IND
T10-1	19	CA-SLO-348	1	GDS	HMG		STN	1	83.96	SCH
T10-1	20	CA-SLO-348	1	GDS	MSC		STN	1	875.5	SND
T10-1	21	CA-SLO-348	1	BAT	PIT		STN	1	336.5	SND
T10-1	22	CA-SLO-348	1	BAT	PIT		STN	1	377.3	SND
T10-1	23	CA-SLO-348	1	BAT	PIT		STN	1	184.7	SND
T10-1	24	CA-SLO-348	1	BAT	PIT		STN	1	143.9	VOL
T10-1	25	CA-SLO-348	1	BAT	PIT		STN	1	223.4	SND
T10-1	26	CA-SLO-348	1	BAT	PIT		STN	1	1345.7	SND

Acc. No.	Cat No.	Trinomial	Sect.	Group	Class	Type	Material	Count	Weight (g)	Description
T10-1	27	CA-SLO-348	1	BAT	PIT		STN	1	693.3	SND
T10-1	28	CA-SLO-348	1	BAT	PIT		STN	1	331.2	SND
T10-1	29	CA-SLO-348	1	BAT	PIT		STN	1	142.2	SHA
T10-1	30	CA-SLO-348	1	BAT	BTC		STN	1	246.6	FCT
T10-1	31	CA-SLO-348	4	FLS	FKT	UNI	STN	1	168.6	IND
T10-1	32	CA-SLO-348	4	BAT	PIT		STN	1	744.44	SND
T10-1	33	CA-SLO-348	4	BAT	PIT		STN	1	219.3	SND
T10-1	34	CA-SLO-348	8	GDS	HST		STN	1	603.6	SND
T10-1	35	CA-SLO-348	9	FLS	FKT	UNI	STN	1	109.8	MCT
T10-1	36	CA-SLO-348	9	GDS	MOR	COB	STN	1	1818.3	SND
T10-1	37	CA-SLO-348	9	GDS	HST		STN	1	983.1	SND
T10-1	38	CA-SLO-348	9	GDS	HST		STN	1	489.3	SND
T10-1	39	CA-SLO-348	9	GDS	HMG		STN	1	362.8	IND

Acc. No.	Cat No.	Trinomial	Sect.	Group	Class	Type	Material	Count	Weight (g)	Description
T10-1	40	CA-SLO-348	9	BAT	PIT		STN	1	266.9	SND
T10-1	41	CA-SLO-348	9	BAT	PIT		STN	1	727.7	SND
T10-1	42	CA-SLO-348	9	BAT	PIT		STN	1	275.4	SND
T10-1	43	CA-SLO-348	10	BAT	PIT		STN	1	265.8	SND
T10-1	44	CA-SLO-348	10	BAT	BTC		STN	1	374.8	FCT
T10-1	45	CA-SLO-348	A	FLS	BIF		STN	1	26	MCT
T10-1	46	CA-SLO-348	A	FLS	FKT	BIM	STN	1	43	FCT
T10-1	47	CA-SLO-348	A	FLS	FKT	BIM	STN	1	210	MCT
T10-1	48	CA-SLO-348	A	FLS	FKT	BIM	STN	1	31.7	MCT
T10-1	49	CA-SLO-348	A	FLS	FKT	UNI	STN	1	35.6	FCT
T10-1	50	CA-SLO-348	A	FLS	FKT	UNI	STN	1	27.4	MCT
T10-1	51	CA-SLO-348	A	FLS	FKT	UNI	STN	1	37.5	MCT
T10-1	52	CA-SLO-348	A	FLS	FKT	UNI	STN	1	364.3	MCT

Acc. No.	Cat No.	Trinomial	Sect.	Group	Class	Type	Material	Count	Weight (g)	Description
T10-1	53	CA-SLO-348	A	FLS	FKT	UNI	STN	1	73.8	MCT
T10-1	54	CA-SLO-348	A	FLS	FKT	COR	STN	1	28	MCT
T10-1	55	CA-SLO-348	A	FLS	FKT	COR	STN	1	51.4	MCT
T10-1	56	CA-SLO-348	A	FLS	FKT	COR	STN	1	94.6	MCT
T10-1	57	CA-SLO-348	A	FLS	FKT	COR	STN	1	34.8	MCT
T10-1	58	CA-SLO-348	A	FLS	FKT	COR	STN	1	46.2	MCT
T10-1	59	CA-SLO-348	A	FLS	DEB	BIF	STN	3	4.8	MCT
T10-1	60	CA-SLO-348	A	FLS	DEB	BIF	STN	2	1.5	FCT
T10-1	61	CA-SLO-348	A	FLS	DEB	BIF	STN	1	0.7	SHA
T10-1	62	CA-SLO-348	A	FLS	DEB	PER	STN	33	657.4	MCT
T10-1	63	CA-SLO-348	A	FLS	DEB	PER	STN	1	1.6	FCT
T10-1	64	CA-SLO-348	A	GDS	MSC		STN	1	171.2	SND
T10-1	65	CA-SLO-348	A	BAT	PIT		STN	1	715.2	SND

Acc. No.	Cat No.	Trinomial	Sect.	Group	Class	Type	Material	Count	Weight (g)	Description
T10-1	66	CA-SLO-348	A	BAT	PIT		STN	1	792.1	SND
T10-1	67	CA-SLO-348	A	FAU	SHL		SHL	6	8	Balanus spp.
T10-1	68	CA-SLO-348	A	FAU	SHL		SHL	8	6.1	Chlorostoma spp.
T10-1	69	CA-SLO-348	A	FAU	SHL		SHL	1	8.7	Clinocardium nuttallii
T10-1	70	CA-SLO-348	A	FAU	SHL		SHL	6	3.1	Crepidula spp.
T10-1	71	CA-SLO-348	A	FAU	SHL		SHL	4	10.2	Cryptochiton stelleri
T10-1	72	CA-SLO-348	A	FAU	SHL		SHL	2	46.8	Haliotis rufescens
T10-1	73	CA-SLO-348	A	FAU	SHL		SHL	15	18.3	Leukoma staminea
T10-1	74	CA-SLO-348	A	FAU	SHL		SHL	1	0.9	Lottia spp.
T10-1	75	CA-SLO-348	A	FAU	SHL		SHL	17	13.6	Macoma nasuta
T10-1	76	CA-SLO-348	A	FAU	SHL		SHL	<80	54.2	Mytilus californianus
T10-1	77	CA-SLO-348	A	FAU	SHL		SHL	>150	127.6	Ostrea lurida
T10-1	78	CA-SLO-348	A	FAU	SHL		SHL	1	0.2	Pollicipes polymerus

Acc. No.	Cat No.	Trinomial	Sect.	Group	Class	Type	Material	Count	Weight (g)	Description
T10-1	79	CA-SLO-348	A	FAU	SHL		SHL	5	14.7	Saxidomus nuttallii
T10-1	80	CA-SLO-348	A	FAU	SHL		SHL	3	1.5	Siliqua patula
T10-1	81	CA-SLO-348	A	FAU	SHL		SHL	1	0.1	Strongylocentrotus
T10-1	82	CA-SLO-348	A	FAU	SHL		SHL	18	27.1	Tivela stultorum
T10-1	83	CA-SLO-348	A	FAU	SHL		SHL	15	44.4	Tresus nuttallii
T10-1	84	CA-SLO-348	A	FAU	SHL		SHL	18	13	IND
T10-1	85	CA-SLO-348	A	FAU	BON		BON	1	1	IND mammal
T10-1	86	CA-SLO-348	A	FAU	BON		BON	1	<1	IND Bony fish
T10-1	87	CA-SLO-348	B	GDS	HMG		STN	1	1732.7	SND
T10-1	88	CA-SLO-348	B	BAT	PIT		STN	1	305.4	SND
T10-1	89	CA-SLO-348	B	BAT	PIT		STN	2	246.6	SND
T10-1	90	CA-SLO-348	B	FAU	SHL		SHL	1	28.2	Tivela stultorum
T10-1	91	CA-SLO-348	C	BAT	PIT		STN	1	558.8	SND

Acc. No.	Cat No.	Trinomial	Sect.	Group	Class	Type	Material	Count	Weight (g)	Description
T10-1	92	CA-SLO-348	C	BAT	PIT		STN	1	500.9	SND

Acc. No.	Cat No.	Trinomial	Group	Class	Type	Material	Count	Weight (g)	Description
T11-1	1	CA-SLO-325	FLS	PPT	LSN	STN	1	8.7	MNT
T11-1	2	CA-SLO-325	GDS	MOR	BOW	STN	1	523.3	SND
T11-1	3	CA-SLO-325	GDS	NET	GRO	STN	1	450.9	SND
T11-1	4	CA-SLO-325	BAT	PIT		STN	1	485.1	SND
T11-1	5	CA-SLO-325	BAT	PIT		STN	1	344.8	SND
T11-1	6	CA-SLO-325	BAT	PIT		STN	1	171.6	SND
T11-1	7	CA-SLO-325	BAT	PIT		STN	1	158.7	SND
T11-1	8	CA-SLO-325	BAT	PIT		STN	1	448.3	SND
T11-1	9	CA-SLO-325	BAT	PIT		STN	1	244.3	SND
T11-1	10	CA-SLO-325	FAU	SHL		SHL	1	209.3	Haliotis rufescens
T11-1	11	CA-SLO-325	FAU	SHL		SHL	1	68.1	Saxidomus nuttallii

Acc. No.	Cat No.	Trinomial	Group	Class	Type	Material	Count	Weight (g)	Description	Comments
CB-1	1	N/A	FLS	PPT	IND	STN	1	0.6	MCT	Indeterminate
CB-1	2	N/A	FLS	PPT	SQU	STN	1	2.8	MCT	Rossi
CB-1	3	N/A	FLS	FKT	BIF	STN	1	33.8	FCT	
CB-1	4	N/A	FLS	FKT	BIF	STN	1	15.8	FCT	
CB-1	5	N/A	FLS	FKT	BIF	STN	1	15.8	FCT	
CB-1	6	N/A	FLS	FKT	BIF	STN	1	10	FCT	
CB-1	7	N/A	FLS	FKT	BIF	STN	1	10.3	MCT	
CB-1	8	N/A	FLS	FKT	BIF	STN	1	2.5	MCT	
CB-1	9	N/A	FLS	FKT	BIF	STN	1	17.8	MCT	
CB-1	10	N/A	FLS	FKT	BIF	STN	1	12.8	MCT	
CB-1	11	N/A	FLS	FKT	BIF	STN	1	72.5	MCT	
CB-1	12	N/A	FLS	FKT	BIF	STN	1	3.9	MCT	
CB-1	13	N/A	FLS	FKT	AWL	STN	1	19.6	MCT	
CB-1	14	N/A	FLS	FKT	BIM	STN	1	10.2	FCT	
CB-1	15	N/A	FLS	FKT	BIM	STN	1	9.4	FCT	
CB-1	16	N/A	FLS	FKT	BIM	STN	1	13.3	FCT	
CB-1	17	N/A	FLS	FKT	BIM	STN	1	82.7	FCT	
CB-1	18	N/A	FLS	FKT	BIM	STN	1	5.4	FCT	
CB-1	19	N/A	FLS	FKT	BIM	STN	1	11.3	MCT	
CB-1	20	N/A	FLS	FKT	BIM	STN	1	8.5	MCT	
CB-1	21	N/A	FLS	FKT	BIM	STN	1	30	MCT	
CB-1	22	N/A	FLS	FKT	BIM	STN	1	7.8	MCT	
CB-1	23	N/A	FLS	FKT	BIM	STN	1	43.1	MCT	
CB-1	24	N/A	FLS	FKT	BIM	STN	1	14.8	MCT	
CB-1	25	N/A	FLS	FKT	UNI	STN	1	32.2	FCT	

Acc. No.	Cat No.	Trinomial	Group	Class	Type	Material	Count	Weight (g)	Description	Comments
CB-1	26	N/A	FLS	FKT	UNI	STN	1	43	FCT	
CB-1	27	N/A	FLS	FKT	UNI	STN	1	26.7	FCT	
CB-1	28	N/A	FLS	FKT	UNI	STN	1	17.6	FCT	
CB-1	29	N/A	FLS	FKT	UNI	STN	1	30.7	FCT	
CB-1	30	N/A	FLS	FKT	UNI	STN	1	6.1	FCT	
CB-1	31	N/A	FLS	FKT	UNI	STN	1	6.9	FCT	
CB-1	32	N/A	FLS	FKT	UNI	STN	1	26.7	FCT	
CB-1	33	N/A	FLS	FKT	UNI	STN	1	20.1	FCT	
CB-1	34	N/A	FLS	FKT	UNI	STN	1	15.7	FCT	
CB-1	35	N/A	FLS	FKT	UNI	STN	1	17.7	FCT	
CB-1	36	N/A	FLS	FKT	UNI	STN	1	20.3	FCT	
CB-1	37	N/A	FLS	FKT	UNI	STN	1	5.1	MCT	
CB-1	38	N/A	FLS	FKT	UNI	STN	1	4.9	MCT	
CB-1	39	N/A	FLS	FKT	UNI	STN	1	2.7	MCT	
CB-1	40	N/A	FLS	FKT	UNI	STN	1	3.6	MCT	
CB-1	41	N/A	FLS	FKT	UNI	STN	1	9.6	MCT	
CB-1	42	N/A	FLS	FKT	UNI	STN	1	4.2	MCT	
CB-1	43	N/A	FLS	FKT	UNI	STN	1	3.6	MCT	
CB-1	44	N/A	FLS	FKT	UNI	STN	1	3.3	MCT	
CB-1	45	N/A	FLS	FKT	UNI	STN	1	16	MCT	
CB-1	46	N/A	FLS	FKT	UNI	STN	1	3.6	MCT	
CB-1	47	N/A	FLS	FKT	UNI	STN	1	11.6	MCT	
CB-1	48	N/A	FLS	FKT	UNI	STN	1	3.8	MCT	
CB-1	49	N/A	FLS	FKT	UNI	STN	1	19	MCT	
CB-1	50	N/A	FLS	FKT	UNI	STN	1	29.5	MCT	

Acc. No.	Cat No.	Trinomial	Group	Class	Type	Material	Count	Weight (g)	Description	Comments
CB-1	51	N/A	FLS	FKT	UNI	STN	1	28.6	MCT	
CB-1	52	N/A	FLS	FKT	UNI	STN	1	8	MCT	
CB-1	53	N/A	FLS	FKT	UNI	STN	1	7.2	MCT	
CB-1	54	N/A	FLS	FKT	UNI	STN	1	21.4	MCT	
CB-1	55	N/A	FLS	FKT	UNI	STN	1	22.5	MCT	
CB-1	56	N/A	FLS	FKT	UNI	STN	1	24.2	MCT	
CB-1	57	N/A	FLS	FKT	UNI	STN	1	86.3	MCT	
CB-1	58	N/A	FLS	FKT	UNI	STN	1	17.9	MCT	
CB-1	59	N/A	FLS	FKT	UNI	STN	1	10	MCT	
CB-1	60	N/A	FLS	FKT	UNI	STN	1	7.9	MCT	
CB-1	61	N/A	FLS	FKT	UNI	STN	1	14.6	MCT	
CB-1	62	N/A	FLS	FKT	UNI	STN	1	4.9	MCT	
CB-1	63	N/A	FLS	FKT	UNI	STN	1	6.6	MCT	
CB-1	64	N/A	FLS	FKT	UNI	STN	1	13.5	MCT	
CB-1	65	N/A	FLS	FKT	UNI	STN	1	19	MCT	
CB-1	66	N/A	FLS	FKT	UNI	STN	1	26	MCT	
CB-1	67	N/A	FLS	FKT	UNI	STN	1	15.5	MCT	
CB-1	68	N/A	FLS	FKT	UNI	STN	1	20.9	MCT	
CB-1	69	N/A	FLS	FKT	UNI	STN	1	134.5	MCT	
CB-1	70	N/A	FLS	FKT	UNI	STN	1	39.8	QZT	
CB-1	71	N/A	FLS	COR		STN	1	266.1	FCT	core tool
CB-1	72	N/A	FLS	COR		STN	1	41.9	FCT	
CB-1	73	N/A	FLS	COR		STN	1	44.7	FCT	
CB-1	74	N/A	FLS	COR		STN	1	53.6	FCT	
CB-1	75	N/A	FLS	COR		STN	1	228.2	FCT	core tool

Acc. No.	Cat No.	Trinomial	Group	Class	Type	Material	Count	Weight (g)	Description	Comments
CB-1	76	N/A	FLS	COR		STN	1	138.9	MCT	
CB-1	77	N/A	FLS	COR		STN	1	125.8	MCT	core tool
CB-1	78	N/A	FLS	COR		STN	1	24.2	MCT	
CB-1	79	N/A	FLS	COR		STN	1	259.3	MCT	
CB-1	80	N/A	FLS	COR		STN	1	135.6	SLT	core tool
CB-1	81	N/A	FLS	DEB	BIF	STN	9	29.9	MCT	
CB-1	82	N/A	FLS	DEB	PER	STN	72	680.7	FCT	
CB-1	83	N/A	FLS	DEB	PER	STN	174	1087.9	MCT	
CB-1	84	N/A	FLS	DEB	PER	STN	5	51.7	IND	
CB-1	85	N/A	FLS	DEB	CSH	STN	1	6.7	FCT	
CB-1	86	N/A	FLS	DEB	SHT	STN	1	1.6	BAS	
CB-1	87	N/A	FLS	DEB	SHT	STN	12	261.8	FCT	
CB-1	88	N/A	FLS	DEB	SHT	STN	1	16.4	QTZ	
CB-1	89	N/A	GDS	MOR	BOW	STN	1	153	SND	
CB-1	90	N/A	GDS	MSL		STN	1	740.2	SND	
CB-1	91	N/A	GDS	HST		STN	1	541.1	SND	
CB-1	92	N/A	GDS	HST		STN	1	403.4	SND	
CB-1	93	N/A	GDS	HST		STN	1	766.4	SND	
CB-1	94	N/A	GDS	HST		STN	1	536	SND	
CB-1	95	N/A	GDS	HST		STN	1	686.5	SND	
CB-1	96	N/A	GDS	MUL		STN	1	2230.1	SND	
CB-1	97	N/A	GDS	NET		STN	1	60.9	SND	
CB-1	98	N/A	GDS	HMG		STN	1	231.6	QZT	
CB-1	99	N/A	GDS	HMG		STN	1	612.2	GRN	
CB-1	100	N/A	GDS	HMG		STN	1	621.8	SLT	

Acc. No.	Cat No.	Trinomial	Group	Class	Type	Material	Count	Weight (g)	Description	Comments
CB-1	101	N/A	GDS	HMG		STN	1	1485.6	SCH	
CB-1	102	N/A	GDS	HMG		STN	1	288.9	IND	
CB-1	103	N/A	BAT	PIT		STN	1	280.5	SND	
CB-1	104	N/A	BAT	PIT		STN	1	375.5	SND	
CB-1	105	N/A	BAT	PIT		STN	1	486.1	SND	
CB-1	106	N/A	BAT	PIT		STN	1	567.6	SND	
CB-1	107	N/A	BAT	PIT		STN	1	115.8	SND	
CB-1	108	N/A	BAT	PIT		STN	1	311	SND	
CB-1	109	N/A	BAT	PIT		STN	1	350.3	SND	
CB-1	110	N/A	BAT	PIT		STN	1	316.9	SND	
CB-1	111	N/A	BAT	PIT		STN	1	268.7	SND	
CB-1	112	N/A	BAT	PIT		STN	1	534	SND	
CB-1	113	N/A	BAT	PIT		STN	1	645.6	SND	
CB-1	114	N/A	BAT	PIT		STN	1	331	SND	
CB-1	115	N/A	BAT	PIT		STN	1	265.8	SND	
CB-1	116	N/A	BAT	PIT		STN	1	234.8	SND	
CB-1	117	N/A	BAT	PIT		STN	1	241.6	SND	
CB-1	118	N/A	BAT	PIT		STN	1	216.5	SND	
CB-1	119	N/A	BAT	PIT		STN	1	228.5	SND	
CB-1	120	N/A	BAT	PIT		STN	1	414.6	SND	
CB-1	121	N/A	BAT	PIT		STN	1	233.8	SND	
CB-1	122	N/A	BAT	PIT		STN	1	152.7	SND	
CB-1	123	N/A	BAT	PIT		STN	1	351.1	SND	
CB-1	124	N/A	BAT	PIT		STN	1	249.4	SND	
CB-1	125	N/A	BAT	PIT		STN	1	179.9	SND	

Acc. No.	Cat No.	Trinomial	Group	Class	Type	Material	Count	Weight (g)	Description	Comments
CB-1	126	N/A	BAT	PIT		STN	1	555.8	SND	
CB-1	127	N/A	BAT	PIT		STN	1	139.4	SND	
CB-1	128	N/A	BAT	PIT		STN	1	276.8	SND	
CB-1	129	N/A	BAT	PIT		STN	1	233.9	SND	
CB-1	130	N/A	BAT	PIT		STN	1	246.6	SND	
CB-1	131	N/A	BAT	PIT		STN	1	266.3	SND	
CB-1	312	N/A	BAT	PIT		STN	1	247.6	SND	
CB-1	133	N/A	BAT	PIT		STN	1	565.5	SND	
CB-1	134	N/A	BAT	PIT		STN	1	145.4	SND	
CB-1	135	N/A	BAT	PIT		STN	1	195	SND	
CB-1	136	N/A	BAT	PIT		STN	1	263.5	DAC	
CB-1	137	N/A	BAT	PIT		STN	1	211.4	GRN	
CB-1	138	N/A	BAT	BTC		STN	1	298	FCT	
CB-1	139	N/A	BAT	BTC		STN	1	328.6	MCT	
CB-1	140	N/A	BAT	HMS		STN	1	108	FCT	
CB-1	141	N/A	BAT	HMS		STN	1	34	BAS	
CB-1	142	N/A	SHL	BED	A1c	SHL	1	1.5	Olivella	
CB-1	143	N/A	OTH	FAR		STN	1	197.9	IND	
CB-1	144	N/A	OTH	PIG		STN	1	38.1	IND	
CB-1	145	N/A	FAU	SHL		SHL		0.9	Acmaea mitra	whitecap limpet
CB-1	146	N/A	FAU	SHL		SHL		19	Balanus spp.	barnacle
CB-1	147	N/A	FAU	SHL		SHL		14.7	Callianax biplicata	Purple olive snail

Acc. No.	Cat No.	Trinomial	Group	Class	Type	Material	Count	Weight (g)	Description	Comments
CB-1	148	N/A	FAU	SHL		SHL		4.3	Chione undatella	Wavy chione
CB-1	149	N/A	FAU	SHL		SHL		15.8	Chlorostoma spp.	Turban Snail
CB-1	150	N/A	FAU	SHL		SHL		0.9	Cancer	Crab
CB-1	151	N/A	FAU	SHL		SHL		3.8	Crepidula spp.	Slipper shell
CB-1	152	N/A	FAU	SHL		SHL		17.5	Cryptochiton stelleri	Gumboot Chiton
CB-1	153	N/A	FAU	SHL		SHL		10.6	Haliotis cracherodii	Black Abalone
CB-1	154	N/A	FAU	SHL		SHL		29.4	Haliotis rufescens	Red abalone
CB-1	155	N/A	FAU	SHL		SHL		35.2	Leukoma staminea	Pacific Littleneck Clam
CB-1	156	N/A	FAU	SHL		SHL		6.9	Lottia spp.	Limpet
CB-1	157	N/A	FAU	SHL		SHL		24.9	Macoma	
CB-1	158	N/A	FAU	SHL		SHL		112.5	Mytilus californianus	California Mussel
CB-1	159	N/A	FAU	SHL		SHL		11.4	Neverita lewisii	Lewis' moon snail
CB-1	160	N/A	FAU	SHL		SHL		14.5	Nucella spp.	Dogwinkle, Rock snail
CB-1	161	N/A	FAU	SHL		SHL		324.8	Ostrea	oyster
CB-1	162	N/A	FAU	SHL		SHL		9.5	Saxidomus nuttallii	Washington Clam

Acc. No.	Cat No.	Trinomial	Group	Class	Type	Material	Count	Weight (g)	Description	Comments
CB-1	163	N/A	FAU	SHL		SHL		0.8	Tagelus californianus	California Jacknife clam
CB-1	164	N/A	FAU	SHL		SHL		7.5	Tegula funebralis	Tagelus funebralis
CB-1	165	N/A	FAU	SHL		SHL		36.9	Tivela stultorum	Pismo Clam
CB-1	166	N/A	FAU	SHL		SHL		47.2	Tresus nuttallii	Pacific Gaper Clam
CB-1	167	N/A	FAU	BON		BON	1	<1	mammalian	non-human
CB-1	168	N/A	FAU	BON		BON	2	<1	IND	

APPENDIX D. ARTIFACT GLOSSARY

Projectile Point: bifacially reduced for hafting, to be used as dart tips (atlatl or spear), arrow points, or knives. Broken projectile points are also included in this class.

Biface: shows flake reduction on two opposing surfaces, forming to meet at a single edge.

Awl: Characterized by a tapered point, that is used for puncturing. These can be made from stone, bone, or metal.

Flaked tool: Intentionally modified detached pieces from an objective piece, exhibiting a utilitarian edge. These may or may not show evidence for use wear.

Core: Objective pieces that exhibit flake removal from surfaces. Some cores are cores tools; these show evidence for retouching or usewear.

Debitage: any unused/discarded flakes that have been removed from an objective piece (a core or tool). The types of debitage includes biface thinning flakes, percussion flakes, pressure flakes, and shatter. Percussion flakes, those being reduced from an objective piece, with a percussor (a hammerstone). Biface thinning flakes are those that have been removed from a biface for the purposes of thinning or trimming. General characteristics seen on debitage flakes include a striking platform, bulb of force, and flake scarring. Shatter consists of irregular detached pieces of all sizes that lack general characteristics of other debitage flakes, due to their unintentional production, during which an objective piece is struck with too much force or irregularities in the stone caused fracturing in an unpredictable pattern.

Handstone: Also referred to as manos (Adams 2014:148), are defined as “hand-held implements used to grind substances on hard nether surfaces (millingstones)” (Mikkelsen 1989: 101). These often biscuit-shaped artifacts exhibit characteristics related to the grinding/processing of food materials on millingstones. Handstones are commonly associated with the Millingstone Period (10,000-5,500 B.P.) on the Central Coast, though millingstone technology has been found in association with later dated contexts as well (Jones et al. 2007). Shaping is evident by seemingly intentional battering, pecking, and/or grinding to improve symmetry. The number of worn surfaces is identified as unifacial, bifacial, trifacial, or complete (4 or more surfaces showing use). For worn surface shape, I include flat, convex, or twisted. Twisted shapes are those with one side of the end raised and on the opposing end, the opposite side raised; this is like what you would see when wringing out a sponge. Interpreting this shape is unclear.

Pestle: Pestles are defined as “implements, usually cylindrical, used to pound or crush resources on a hard surface (mortars)” (Mikkelsen 1989: 101). Pestle design varies by size, shape, and investment (Adams 2014: 143-144). In fact, some pestles are quite large, elaborate, and manufactured to include finger holds or represent objects/symbols. Others may consist of a rounded cobble, selected for a single use. Pestles are often associated with mortar technology and therefore, commonly within Late Period (750-200 B.P.) contexts, during which acorns became a staple in the precontact diet (Jones et al. 2007). These are classified as either cylindrical, conical, bulbous, or lenticular. Cylindrical pestles have straight sides that do not taper or flare. Conical pestles have one end that tapers. Bulbous pestles have a flared-out end. Lenticular pestles taper on both ends.

Muller: Mullers are defined as "tools that show both hand stone and pestle forms of wear but lack the optimal attributes of either and may have been used for grinding and pounding on concave milling slabs… Both kinds of processing must have been of nearly equal importance, such that a dual-use tool, less than ideal for each purpose, was selected" (Noble 2012: 40). These, often loaf-shaped artifacts, exhibit characteristics for high investment manufacturing. Mullers are found in archaeological contexts post-dating 1200 B.P. (the Middle Period) (Noble 2012: 43).

Mortar: These are as having "surfaces typically with circular depressions, upon which substances are pounded or pulverized" (Mikkelsen 1989: 101). These artifacts are used as bowls/receptacles, commonly associated with the processing of acorns. (Adams, 2014: 132). Mortars, especially bedrock mortars, are common during the Late Period (750-200 B.P) (Jones et al. 2007). Design of mortars varies between low-investment (the only modification is the basin) to high investment (completely shaped) and for this research includes hopper, bowl, and cobble. Hopper mortars have mortar depths that are too shallow to allow for the processing of materials on their own. During use, they would have had an open-bottom basket fixed to the top in order to serve as a vessel and for processing materials. Hopper mortars can be shaped and unshaped. Bowls are broadly defined as vessels that have shaped well-defined rims and deep mortar depths. Bowl mortars are shaped; there are no unshaped bowls (Fitzgerald 1993). Bowl sub-types include globular (globe shaped with well-defined rims) or flowerpot forms (elaborately modified and finished mortars exhibiting flat bottoms, straight walls, and flat rims). Cobble mortars are river cobbles that have been shaped or unshaped.

Millingstones: Also referred to as metates and grinding slabs (Adams, 2014), millingstones are often tabular- or slab-shaped artifacts related to the grinding/processing of food materials with handstones/manos. Millingstones are either shaped or unshaped and may have multiple surfaces that were used. Many millingstones show evidence for higher investment manufacturing, including those that have been shaped to have softer edges. These artifacts are generally less portable than mortars and thought to be associated with a more sedentary lifestyle (Adams 2014: 150). Millingstones are generally associated with the Millingstone Period (10,000-5,500 B.P.), becoming less frequent in the archaeological record over time and replaced by mortar and pestle technology (Jones and Codding 2019: 64).

Net weights: These can be organized into notched or grooved types. Grooved net weights are defined by Jones and Waugh (1995) as “beach or stream cobbles unmodified save for a groove ground and/or pecked around the circumference of the cobble” (p. 94). However, this type of net weight frequently appears as a recycled tool being previously used as a handstone, hammerstone, or later used as a pitted stone. Notched net weights are defined by Mikkelsen (1989:102) as "cobbles or spalls with flaked/battered notches on opposing margins, typically near the midpoint of the long axis." These artifacts were manufactured in order to secure some kind of cordage, belonging to a casting net, which would be weighting down, or sunk, by the tool. Adams (2014) considers net weights to be expedient tools, not requiring much investment, however, both types can be shaped, and grooved types appear to have higher costs associated with manufacture, requiring more precise eye-hand coordination effort. Grooves tend to be linear and symmetrical on net weights, produced by pecking and sometimes grinding. Notched stones can seemingly be produced by quickly flaking or pecking smaller areas. Attempts at identifying temporal patterns to distinguish these types have been made and are summarized in Jones and Waugh (1995). Greenwood (1972) suggested that grooved types were older and were used for a longer period of time and may have been used for purposes other than as net weights, at Diablo Canyon. Additionally, larger grooved stones occurred at lower depths. Notched stones were found in shallower contexts. Pohorecky (1976) also noticed grooved types occurring in lower midden depths than notched types, at two sites near Willow Creek (CA-MNT-281 and -282). At Little Pico, smaller net weights were found in higher frequencies closer to the surface, though there was no significant distribution pattern with larger net sinkers (Jones and Waugh 1995).

Hammergrinders: Characteristics of hammergrinders include evidence of "pounding or light batter on one or more edges, and some evidence of rubbing or grinding wear on one or more surfaces…In many cases there is a well-developed “heel” on one or more edges of a planar-like surfaces…” (True 1983: 208). The forms of these artifacts are irregular and not clearly defined. The surfaces are uneven from battering and ridges or edges – the facets – are rubbed smooth. True (1983) indicates that metamorphic stone is often used to manufacture hammergrinders, especially those that are abrasive in texture and not ideal for controlled flaking. True suggests that because the facets are dull, and lack evidence for clear flaking, these artifacts may be ignored as hammergrinders or even cultural. His 1983 study included Southern California however, he noted the existence of hammergrinders at several sites in the northwest of Arizona. With this in mind, it’s possible that the distribution of hammergrinders extends to a much larger area, given a general lack of understanding of the artifact type and its potential to be overlooked in the field. Within the vicinity of San Diego, hammergrinders appear to be important during the Early Millingstone Period as well as possibly during the Late Period. While True did not determine the function of hammergrinder he does suggest that food or fiber was probably being processed by these tools. This is based on his assumption that the processed material was compressible and not made of stone because the rubbed surfaces generally appearing flat or convex. Furthermore, the established heels found on hammer grinders could be the result of processing on a curved metate.

Miscellaneous Groundstone: Defined by Mikkelsen (in Basgall and Hildebrandt 1989: 101) as “unclassifiable…” and “...and almost certainly represents handstone and millingstone margins or body fragments.” Fitzgerald (1993) supports the notion that miscellaneous groundstone tend to be fragmented milling equipment. However, both researchers place all unclassified groundstone objects in the miscellaneous category and the same has been done here, regardless of whether a specimen resembles milling equipment.

Hammerstone: Hammerstones are stone masses that have been modified through battering action and by definition, should not exhibit other modifications or use-wear.

Anvil: Fitzgerald notes that "the sole function of these tools was to receive blows during the processing of resources or the manufacture of other stone tools" (Fitzgerald 1993:69). These artifacts generally lack distinctive morphological attributes beyond usewear; thus, no subtypes have been formulated. It is assumed, based on Fitzgerald's definition, that specimens have been battered in a discrete area on one or more surfaces. Evidence for use as an anvil should be exclusively battering, with no polishing or grinding.

Pitted stones: Also referred to as anvil stones, dimple stones, etc., are defined generically here as hand-held stone implements exhibiting pitting on one or more surfaces (Cook et al. 2017). The function of this artifact class has eluded researchers however, recent experimental research has attributed the function of this artifact class to the extraction of mussel (*Mytilus californianus*) and turban (*Tegula sp*.) snail meat, at least on the Central Coast (Cook et al. 2017; Webb and Jones 2018; Jones and Codding 2019). Essentially a pitted stone received its pit intentionally through pecking or as a result of being an anvil stone (the object in which the shell was pounded on) or a hammerstone (the object in which the shell was pounded with) (Jones and Codding 2019). These tools indicate expedient use and were often repurposed from fragmented artifacts of other classes, like handstones and mortars. It is worth mentioning that the pitted stones in the collection are distinguished from other anvil stone types, which have much larger pits and were likely used for purposes other than just extracting the meat from mussels (*Mytilus califonianus*) and turban snails (*Tegula sp*.). For the purposes of this research, I have focused on two variables that Fitzgerald (1993) looked at for pitted stones: 1) number of pitted surfaces and 2) number of pits. The number of pits counted are from the surface with the highest number of pits per surface.

Battered Cobbles: The term battered cobble is generic and can be used almost synonymously with battered stone. A battered cobble implies a rock of cobble size, with battering on it. However, the artifacts organized into this class are similar in size and morphology and are made from the same material. They are chert cobbles, that have been completely shaped by light battering with some evidence for grinding. Battered cobbles have oval plan views and globular forms, with longer lengths (72.48-81.08mm) than widths (53.12-67.02mm), and slightly reduced thickness (43.75-57.18mm). Their weights range between 246.6 and 374.8 grams, with an average weight of 312 grams. The function of this artifact is unknown.