The Colonial Process in Bronze and Iron Age Sardinia: Foodways and Daily Practices

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Abstract

This dissertation examines the foodways of indigenous Nuragic peoples living at the site of Bingia ‘e Monti in Late Bronze Age Sardinia (LBA, c. 1300-1150 BC). Beginning in the late-LBA, Phoenician traders intensify relations with Sardinians and settle permanently on the coast. Sardinia and the wider Mediterranean experienced varying degrees of ‘colonial’ presence (contact, trade, colonization with or without colonies, imperialism), during the LBA and Early Iron Age (EIA). The colonial nature of these situations has been greatly debated, and scholars have struggled to find a framework that allows for comparison within the region. Colonial groups are associated with various levels of domination over indigenous inhabitants. In Sardinia, Phoenicians are generally viewed as traders who did little to interrupt indigenous society while subsequent settlers, Carthaginians and Romans, had a reputation for absolute control that extended inland. I rely on faunal remains from Bingia ‘e Monti, a single household inland site, to demonstrate how a focus on foodways can lead to understanding the intricacies of cultural transitions in interior Bronze and Iron Age Sardinia, and why this approach is especially applicable in colonial situations.

I carry out my studies within the context of anthropological understandings of foodways and colonialism. Food and drink are more than substances necessary for survival; they are also rich in meaning and are consistently used to create and maintain social relationships and boundaries. Through the daily practice of producing, processing, and consuming meals, foodways are tightly bound to identity. Postcolonial approaches in archaeology mobilize daily practices such as foodways to better understand colonial situations and determine the nature of exchanges taking place. These approaches view colonial situations as processes of cultural entanglement that can be viewed through the consumption of objects and ideas. Using faunal

remains to gauge local versus Phoenician influences in LBA/EIA Sardinia draws on and contributes to both foodways and postcolonial archaeology.

I consider data on foodways on three scales: at Bingia ‘e Monti and neighboring sites, at coastal sites in Sardinia, and at Phoenician sites elsewhere in the western Mediterranean. By comparison it is possible to determine broader patterns and conclude whether changes in LBA/EIA foodways are due to local developments such as the environment, technology, social reorganization, and economic reorganization, or developments caused by Phoenician influence. Sardinia is seen today as a product of millennia of colonialism the lasting effects of which still impact one’s experience of the island and social and political identity of the current population. An examination of past indigenous-colonial interactions may lead to changes in the island’s overall historical narrative.

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Chapter 1

Adding a focus on foodways to archaeological studies of colonialism

In this dissertation I assess the possibilities for using foodways to better understand colonial processes on the island of Sardinia and in the wider Mediterranean during the first millennium BC. To accomplish this, I rely on postcolonial approaches, the intimate link between food and self, and faunal remains from the site of Bingia ‘e Monti in Sardinia. Changes in foodways and material culture resulting from colonialism often involve changing identities and concepts of selfhood. I examine the faunal assemblage looking for changes in diet that may be explained by colonial influences (in this case, Phoenician), technological changes, environmental alterations, economic reorganization, or social reorganization. Because of the connection between foodways and self, foodways offer a nuanced way to study the colonial process at Bingia ‘e Monti and the local reactions to Phoenician presence in Sardinia.

I begin this chapter with my own story from Sardinia, emphasizing the importance of food in creating and crossing boundaries. That is followed by a broad sketch of the island of Sardinia today as well as in the first millennium BC. Contemporary Sardinia shows the lasting impact of colonialism on population distribution and the social and political identity of the people living there. Next I briefly describe the site of Bingia ‘e Monti and its surroundings. As a single-family homestead in the interior of the island, it has great potential to add to our understandings of Phoenician settlement of Sardinia through the lens of the people who experienced it. Finally, I outline my questions and methods before giving short synopses of each chapter.

1.1 A wild lunch in Siddi, Sardinia, 2009

After a morning of excavation, we sat down for lunch at the dig house, just like any other afternoon. However, this lunch promised to be very different. Instead of the typical three-course lunch of salad and bread, pasta, meat, that we usually picked up from the elementary school on our way back from site, this lunch was prepared by a local man and consisted of entirely wild foods.

We filled up the entire kitchen: five foreigners and three people from the local community. The foreigners were all female undergraduate or graduate students, one being the co-director of our project, Emily Holt. The local people were all middle-aged Sardinian men. One was the co-director of our project and director of the museum in Villanovaforru, Mauro Perra. Another was our neighbor and draftsman, Mario. The third was a friend of Mauro's who had visited us on site a few times with his hunting dogs. He had insisted on cooking a meal for us made of foods he had gathered or hunted, on and around the plateau where the site was located.

As a group my female colleagues and I had spent many weekends and evenings exploring local Sardinian cuisine, tasting snail and horse high on Siddi Plateau, and cuttlefish and *pasta alla bottarga* on the beach near Cagliari. We were lucky to live in the small village of Siddi where people were quick to share food and drink. Next door there was a small sweet shop run by two women, who would not let us students make a purchase without first tasting a few local cookies or sweet breads. Neighbors brought us homemade wine and *grappa*, or leftover whole roasted pig, and the mayor's family even invited us over to have a lovely dinner of roasted goat and homemade *limoncello*. This lunch of wild foods, however, was another level of local food experience, something special and unexpected.

The first course was simple enough: pickled wild mushrooms and artichokes with crusty bread and lots of olive oil. Mario brought his homemade red wine. The meat course was the most challenging for those of us who had not grown up in Sardinia or in a place where people frequently or even occasionally kill and prepare their own animals. He brought out two large metal pots, one with a stew made from quail breasts and the other with a stew of whole pigeons. The quail breast posed no challenge, but when served an entire pigeon (though headless), we hesitated and looked to our Sardinian colleagues for guidance. They explained to us that eating the pigeon was simple; all parts of it were edible, not just the muscle tissue. Even the bones could be eaten because they are thin and hollow.

Without a second thought and with the curiosity of a faunal analyst, I took apart my pigeon and proceeded to eat it, bones and all. Mario sat across the table watching with a big smile on his face and exclaimed at my enthusiasm. He proudly told me that my eating the pigeon made me an honorary Sardinian, and added a diminutive Sardinian suffix to my name, calling me Susanedda. Again and again I come back to that moment, in June 2009, as the moment I first realized the power of food. The food that you embody through the act of eating has the ability to create, maintain, or cross over, social boundaries.

In many ways I found that every act of eating or conversation about eating, is connected to Sardinian-ness or being Sardinian. Each meal and trip to the grocery store was a lesson in what it meant to be part of the *comune*, the Campidano region, the larger island. The distinctive flatbread *pane carasau*, small rolled *malloreddus* pasta, fresh *pecorino sardo* sheep cheese, and rich *cannonau* red wine were not saved for special occasions; these Sardinian specialties were in every kitchen and set out for every meal. It seemed impossible to escape them. This food was not only good to eat, but also "good to think" as Levi-Strauss famously said (1963:89).

1.2 Setting the scene

Along with the food and hospitality, part of what drew me to Sardinia was its reputation as an ancient and mysterious place. Historians, ethnographers, and novelists have built up this romanticized image of the island over the past two centuries. They emphasize a narrative of resistance, a wild magical island uncaptured despite millennia of domination, and peopled by traditional shepherds. D. H. Lawrence (1921:11) famously immortalized Sardinia as an island never subdued, never civilized, even from his vantage point on a visit in the 1920s. He claimed that it did not belong in Europe because it was uninhabited, strange, wild, and magic. While that fictional version of Sardinia quickly dissolves in the face of reality, there is still an obvious visible connection to the deep past on the island that is interwoven into daily life like no other place I have been to.

Sardinia is an autonomous region in Italy, and the second largest island in the Mediterranean: about 24,000 km^2, 280 km long, and 160 km wide, approximately the size of Vermont. It is situated just south of Corsica, 200 km from the west coast of Italy, and 200 km north of Tunisia (Fig. 1.1). About two-thirds of the landscape is covered in hills, with mountains concentrated on the eastern side. These hilly areas are interspersed with rocky plateaus situated in flat alluvial valleys, the Campidano being the largest valley. There are three major rivers and only one natural lake, but springs are quite common. The island enjoys a typical Mediterranean climate: dry and hot during summer, cool and moderately wet the rest of the year.

Figure 1.1. Map of Sardinia (lower left) in relation to mainland Italy. From Google Maps.

Today Sardinia has a population of about 1.66 million people, many of whom speak both Italian and one of three major dialects of Sardu (Logudorese, Campidanese, and Nuorese). Most of these people live in the southern capital city, Cagliari, or the northern city of Sassari (Fig. 1.2). The rest of the population is spread out in small towns and villages containing fewer than 1000 people on average, who depend on income from small shops, agriculture, or sheep/goat herding. Villanovaforru, the town where I did my fieldwork, is located in the Medio Campidano and has a population of fewer than 700 people. The town's major attraction is the Civico Museo Archeologico Genna Maria, a museum dedicated to findings from the *nuraghe* (discussed below) Genna Maria excavated by Dr. Mauro Perra, who is also the museum's director.

Figure 1.2. The island of Sardinia with major cities.

Sardinia has long been characterized by a divide between the interior of the island and the coast. This dichotomy has its roots in colonial settlement patterns dating from the Late Bronze Age (LBA, c. 1300-850 BC), when Phoenicians established urban ports along the coast while the interior remained under control of the indigenous Nuragic people. According to the grand narrative of colonialism in the Mediterranean, later groups, in particular the Romans, controlled the island in such a way that they penetrated the interior and turned it into a major grain source for Rome.

This dichotomy between the coast and interior means that the type of interaction between indigenous and colonial groups at a particular site is often dictated by that site's location. The indigenous Nuragic civilization, which flourished on Sardinia for almost a millennium from the mid-Middle Bronze Age (MBA c. 1600 BC) into the Roman period (starting c. 238 BC), experienced three major colonial incursions: Phoenician, Carthaginian or Punic, and Roman. Sardinia presents an excellent case study in which to explore colonial processes comparatively taking place in the Mediterranean during the first millennium BC, particularly on its islands.

1.3 Bingia 'e Monti

The settlement of Bingia 'e Monti in west-central Sardinia, in the interior, is the location of my study, and is an ideal place to examine the interactions between colonial powers and a settlement located away from the coastal zone of greater interaction. The archaeological assemblage comes from six seasons of excavation at Bingia 'e Monti during two periods, 1983 to 1985 and 1988 to 1990. Dr. Enrico Atzeni led the team during the first two field seasons, and Dr. Alessandro Usai led the team thereafter. All excavated materials were sorted by type, carefully labeled with the date, context, and identification number, and the eight crates of faunal material were stored in the Laboratorio di Restauro Archeologico in Villanovaforru, Medio Campidano, Sardinia until my analysis in 2015. This laboratory is associated with the Museo Civico Archeologico Genna Maria, also in Villanovaforru, and supervised by Dr. Mauro Perra, the museum's director. The faunal material comes from contexts from the Copper Age (Monte Claro), Middle and Late Bronze Age (MBA and LBA), and late Roman period. Overall the state of preservation of this material is excellent, and thanks to meticulous record-keeping on the part of Dr. Usai, all of the individual bags of faunal material can be traced to their specific contexts even three decades later.

Bingia ‘e Monti is one of thousands of settlements associated with the Nuragic people. This culture consisted of stratified agro-pastoral societies grouped around *nuraghi* (plur., Italian). The *nuraghe* (sing.) is a conical megalithic stone tower that served both domestic and defensive purposes, and over 8000 are still visible on the landscape (Fig. 1.3). The earliest use of the term ‘*nuraghe*’, in this case the term ‘nurac’, comes from a Latin inscription in a lintel at *nuraghe* Aidu Entos in Bortigali dated to the first century AD (Webster 2015:2-3). Most of the *nuraghi* are single towers, but some developed into multi-towered structures surrounded with villages that seem to be local centers. Nuragic peoples also produced *bronzetti*, elaborate bronze figurines of people, animals, and model *nuraghi*, practiced rituals centered around sacred wells, built large “giants’ tombs” for communal burial, and traded widely within the Mediterranean (see Chapter Two for a detailed history of Sardinia).

Figure 1.3. Nuraghe Santu Antine at Torralba, an example of a single-tower *nuraghe*.

Bingia ‘e Monti (Figs. 1.4 and 1.5) is perfectly situated to answer questions about indigenous-colonizer interactions in Sardinia. This small-scale settlement is located within a resource-rich and geographically diverse region, specifically the territory of Gonnostramatza near the border of the Oristano and Medio Campidano provinces in west-central Sardinia. It is positioned about 35 km from the west coast and just east of the Campidano valley in the smaller Rio Mògoro valley. It is also about 8 km southeast of Monte Arci, a major source of obsidian, and 2 km west of the Giara di Siddi (Siddi Plateau), a large basalt plateau containing 16 *nuraghi*, a communal megalithic “giants’ tomb”, and a spring. This plateau, along with a string of smaller plateaus to the southwest and a spur of Monte Arci extending south of the mountain, forms a

protective ring around Bingia ‘e Monti. The *nuraghi* was excavated in 1983-1985 and 1988-1990, by a Sardinian team led by Alessandro Usai, and the excavated materials were stored in a laboratory in nearby Villanovaforru.

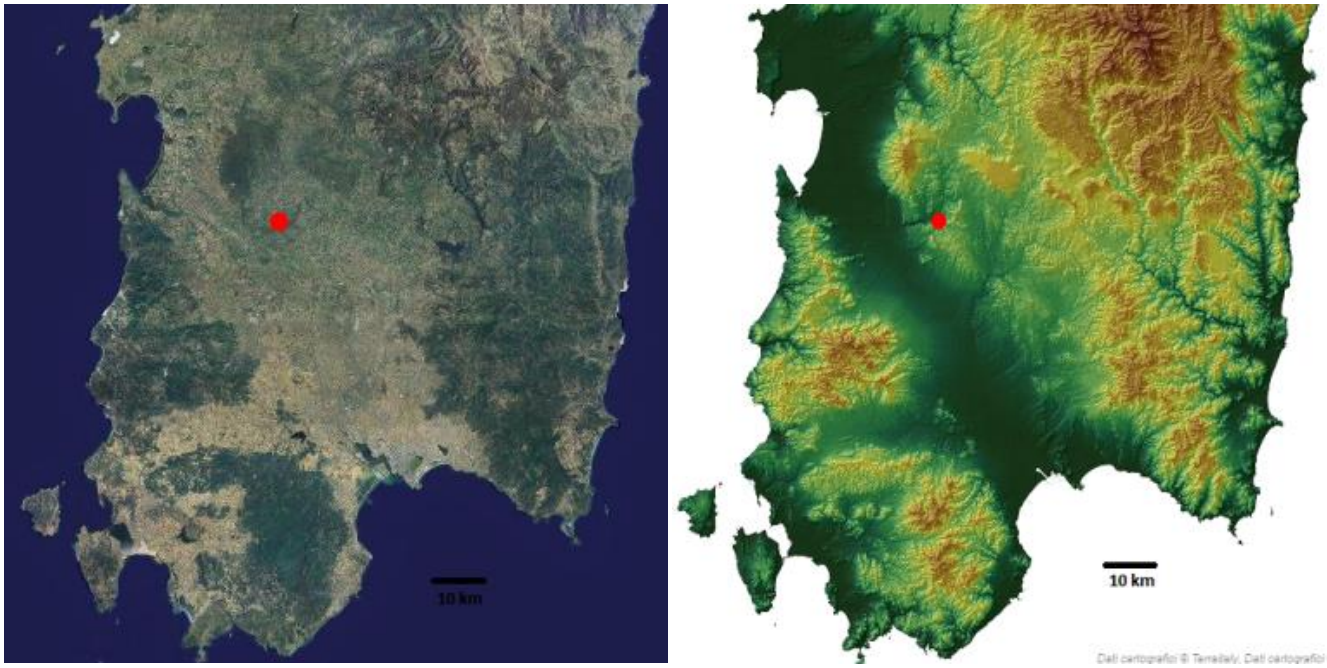

Figure 1.4. The location of Bingia ‘e Monti (red dot), west-central Sardinia.

Figure 1.5. A closer look at the location of Bingia ‘e Monti (red dot).

It is important to situate my results within the context of indigenous inland sites. A site’s particular location determines the resources available- land for raising animals, forests for hunting, rich or poor soils, and potential redistribution or sharing of resources through larger Nuragic networks. For example, Bingia ‘e Monti is not far from Su Nuraxi, which was likely the center of the larger southern inland region during the Nuragic period and certainly engaged in trade with the Phoenicians, having had residents that were members of colonial groups. For this reason, Bingia ‘e Monti may have had more and earlier contact with colonizers than other small inland sites.

Nuragic settlement patterns show that sites are arranged in groups of 20 to 100 allied sites likely representing regional political divisions (Webster 1991). Bingia ‘e Monti was likely part of a network that included a few dozen *nuraghi* on the surrounding plateaus. Large surveys of west-central Sardinia have added to a fuller picture of social and political organization,

subsistence methods, and distribution of material culture associated with indigenous and non-indigenous groups. Van Dommelen's (2006) survey northwest of Bingia 'e Monti near Terrabla added to knowledge of Carthaginian colonial developments by excavating eight rural sites. Castangia's (2012) Capo Mannu survey cataloged sites and recorded human-environmental interactions near the west coast with a focus on salt harvesting. Systematic excavation of *nuraghe* Sa Conca sa Cresia on Siddi Plateau (Holt 2013) as well as a survey of the plateau carried out by Holt in 2012-2014 have traced the development of social organization during the MBA. Excavations carried out at inland Nuragic sites north of Bingia 'e Monti, such as Duos Nuraghes, Nuraghe Urpes, and Nuraghe Toscono (Michels and Webster 1987; Webster 2001), reveal absence of direct evidence of foreign inhabitants until 8th-7th c. BC, indicating that Nuragic settlements around Bingia 'e Monti and the adjacent Siddi Plateau may show a similar pattern.

Occupation of Bingia 'e Monti, though intermittent, spans many centuries from the late Copper Age, or Monte Claro culture (c. 2700-2200 BC), to the Byzantine period (Eastern Roman Empire, c. 7th century AD), therefore making it an excellent location for observing change over a long period of indigenous and colonial presence. The site contains a Copper Age settlement and a communal tomb, the latter in use from the later Copper Age to the Early Bronze Age (EBA) c. 2700-1800 BC. The communal tomb was excavated in 1991 by Enrico Atzeni, resulting in publications on the ceramics and human remains (Atzeni 1996; Lai 2008; Floris et al. 2011). The tomb is of a type that falls between a rock-cut tomb and a megalithic tomb. It housed collective burials beginning in the late 3rd millennium BC in the rock-cut portion. The burials from this period were placed in three stone compartments along the walls and later stacked in free spaces around and on top of the early burials. Ornaments and ceramics were found with the

bodies including the only gold necklace on the island. This is one of the few tombs on Sardinia that has been left intact for archaeologists. A layer of collapse separates the early burials from the burials during the Early Bronze Age and Bonnanaro culture (late 3rd to early 2nd millennium BC). This last group partially reconstructed the tomb and then placed in it about 50 adult skulls with their grave goods.

While initial interest in the site of Bingia ‘e Monti was because of the tomb, it also has the potential to shed light on two important transitional periods in Sardinian history: the MBA to LBA (c. 1300 BC) and LBA to Early Iron Age (EIA, c.1150 BC). Few excavations of Bronze and Iron Age sites in Sardinia have provided the opportunity to piece together and elucidate interactions between Nuragic peoples and foreign groups at a small inland site.

1.4 Research design: An argument for studying old bones

Articulating with archaeologies of colonialism

In an effort to be more critical and self-reflexive, anthropology and archaeology have brought focus to studies of colonialism using a collection of postcolonial approaches. The postcolonial approach generally dismisses the assumption of superior colonial culture, as anthropological archaeologists have long done so (see below), and newly embraces local agency to explain the highly selective adoption of foreign goods and practices, and breaks down problematic dichotomies. These changes came partly from the realization that colonialism is not something that disappears when colonizers do, but rather a process that leaves a significant impact on world history, in particular scholarly disciplines like archaeology which themselves have colonial roots (Cooper 2005; Dietler 2010). It is clear that “colonial situations cannot be bounded in either time or place, that they are fundamental to any history in the present” (Cooper 2005:34). Sardinia is a place where this is especially clear.

Archaeologists are in the process of reexamining and redefining key terms describing colonialism. They have questioned the necessity of colonies for colonialism and asked how they can be identified in the archaeological record (Boardman 2001; Gosden 2004; Stein 2005; Knappett and Nikolakopoulou 2008). They have created typologies for different forms of colonialism and highlighted the differences between contact, trade, colonization, and imperialism (Given 2004; Gosden 2004; Silliman 2005). Some have emphasized the processual nature of colonialism by using the more active term 'colonization' (Cholcto 2009). Presently there are multiple frameworks employed by archaeologists who study colonial encounters.

Over the last couple of decades in Sardinia, archaeologists have concentrated on explaining the extensive and previously unimaginable amount of variation in intercultural relationships there, and have introduced new postcolonial frameworks such as entanglement and hybridization that offer great promise for further restructuring our view of Nuragic and Sardinian interactions with colonizers (van Dommelen 1998; Dietler 2010). Dietler emphasizes the two-way exchange between groups in a colonial situation, the fact that this transforms both groups. He also stresses the value of studying these transformations through daily consumption practices. Van Dommelen describes the hybridization of such daily practices, their reflection in material culture, and the fluidity of identity in colonial situations. In that spirit I want to promote a narrative that pays close attention to the historical context and that embraces both indigenous and colonial agency. I recognize that neither the Nuragic population nor the Phoenician settlers on Sardinia came from homogenous cultural groups. My project seeks to contribute to this relatively new turn in the archaeology of colonialism that highlights the significance of material culture for embodying and constructing practice. Doing so will advance understanding of long term cultural change in prehistoric and early historic Sardinia.

An archaeology of foodways

This project is situated within the broader archaeological literatures of foodways and identity, which intersect in the ways that identity is both reflected in and created by food practices. Foodways have the capability to reveal a range of societal processes from the intimate to the broad (Sutton 2001; Mintz and Du Bois 2002; Counihan and Van Esterick 2008). Food creates the individual as well as the group through the daily practices of eating, as understood in Bourdieu's theory of *habitus* (Atalay and Hastorf 2006; Smith 2006). Over time, food rules are embedded in the body and the group, linking food, memory, and identity. In fact, "the act of consuming food may represent the ultimate basic locus of identity" (Smith 2006:480). But neither food rules nor identity are static, and changes in preference often indicate changes in identity (Appadurai 1981; Hastorf 1999). With increased awareness of the central place of foodways in cultural systems, archaeologists have been developing new methodologies for constructing and interpreting the significance of ancient foodways.

While much of the theoretical foundation has been drawn from sociocultural anthropology, the archaeological record provides a unique context for studying these topics. An archaeology of food looks at production in terms of the socially meaningful transformation of food, and makes consumption the focus because that is the point when food is integrated into the body. The paradigm of embodiment is an excellent lens for studying consumption because it restores people to the archaeological record, and focuses on why people produced certain goods and substances (Hamilakis 1990:40). Archaeology can illuminate consumption in the creation of cultural categories, aesthetics and taste, the body and embodied experience, and how food reflects symbolism and thought structures (Gosden 1999). However, the often indirect nature of archaeological evidence requires careful methodology.

Foodways offer great potential for studying cultural transitions, such as colonialism, in that they often travel with people, and food is intimately related to the nourishment and construction of social bodies. The majority of studies of colonialism in Sardinia have relied mainly on materials that are displayed rather than ingested: e.g., ceramics, glass, metal ornaments and tools, and architectural elements.

This project seeks to understand the process of changing foodways in the interior of the island of Sardinia from the mid-Middle Bronze Age (MBA) to the LBA/EIA c. 1600-850 BC. It articulates with the emerging interest in tracing and understanding foodways in Sardinia over time. Carenti and Wilkens (2006) and Campanella (2008) provide an overview of Phoenician and Punic foodways on Sardinia based on textual and ceramic data, work that represents a valuable starting point for further research. I hope to add to their work a focus on the process of colonial entanglement and explanations for changing trends in foodways. Further research is needed to explain how colonial foodways impacted indigenous ones and vice versa, particularly in inland Sardinia during the LBA and Roman period. My work will make it possible to then explore the meanings of changes in foodways in a broader, and dynamic, social and political context. The investigation of food and identity in colonial periods will build on this literature and add valuable dimensions of explanation and comparison, by situating both within a postcolonial context.

The primary archaeological evidence will be drawn from the analysis of faunal remains from Bingia ‘e Monti. The faunal assemblage from the *nuraghe* and surrounding area at Bingia ‘e Monti includes material from the Monte Claro culture (Copper Age), the Nuragic period, and the period of late Roman occupation. The Monte Claro layers have been uncovered in multiple places outside of the tower and courtyard as well as beneath Nuragic walls. The Nuragic-period

finds come from within the main tower of the *nuraghe* as well as the stairway inside the tower wall, the circular courtyard outside the tower, and two rooms that connect to the courtyard. The Roman addition covers the eastern portion of the site outside of the *nuraghe*. This long period of occupation, though not continuous, provides a unique opportunity to analyze changes in foodways over centuries of use. For comparison, food remains from other sites in Sardinia and from Phoenician sites in the western Mediterranean are brought together to situate Bingia ‘e Monti.

I use a combination of postcolonial approaches and faunal analysis to address the following research questions:

1. In what way does the study of past foodways contribute to an understanding of colonial processes and cultural transitions on Sardinia, and how does the insight gained through a study of foodways differ from such studies of other material evidence?

2. What does Phoenician contact and settlement in the Mediterranean look like in the LBA/EIA, especially in Sardinia? Is it appropriate to label this interaction as colonialism?

3. Comparing coastal to interior sites in Sardinia, what patterns of Phoenician-Nuragic interaction emerge? Did interaction with Phoenician peoples result in changes in both the interior and coastal areas, or did uneven interactions cause divergent patterns of development? What do the patterns of change reveal about both the local cultures and the nature of their cross-cultural interactions?

4. How and why did foodways at Bingia ‘e Monti change in the LBA and EIA? What does this tell us about the culture of the people living at Bingia ‘e Monti and their openness to cultural interactions?

1.5 Overview of dissertation

This dissertation uses faunal remains from a small inland site and regional comparisons to approach the question of social transformations in LBA and EIA Sardinia resulting from local and colonial processes. The study of locally contextualized indigenous food choices during

periods of culture contact and colonial influence has great potential to add to our current much more detailed knowledge of colonizer foodways on Sardinia.

In Chapter Two I give a brief history of Sardinia as an island that has been dominated by foreign powers for millennia. The loss of indigenous control following intensified Phoenician settlement in the 8th century BC began a pattern that continues to this day. In fact, during the 1950's, the excavation of Su Nuraxi in Barumini by Giovanni Lilliu led to the entanglement of Bronze Age Nuragic culture with the contemporary Sardinian autonomy movement. Current Sardinians romanticize the perceived freedom and prosperity of Nuragic peoples.

This chapter also lays the groundwork for later situating faunal trends at Bingia 'e Monti by discussing patterns in Nuragic and Phoenician foodways. This comparison is vital in determining the reason for dietary changes at Bingia 'e Monti. Within Sardinia I look at sites neighboring Bingia 'e Monti and along the coast to assess whether patterns in faunal and botanical assemblages are better explained by environment, socio-economic status, or ties to Phoenician settlers. The current divisions between coast and interior in Sardinia are usually explained by the high concentration of colonial settlements on the coast and relative rarity of large colonial settlements in the interior of the island. I hope to address that conventional view along with the typical colonial narrative on the island.

Chapter Two also covers the history of archaeological investigations on the island. The earliest excavations concentrated on *nuraghi* and the material culture of Nuragic peoples. However, many reports attributed technological, architectural, and artistic accomplishments to outside cultures, often those from the eastern Mediterranean such as the Mycenaeans. Lilliu's excavation at Su Nuraxi linked Nuragic culture and the Sardinian autonomy movement. Within the past couple of decades, there has been a shift from a culture-history approach to a processual

and post-colonial approach in Sardinian archaeology. This includes an emphasis on local indigenous agency and internal social transformations as a way to explain changes in indigenous culture. It is in this theoretical context that I situate my study of Bingia ‘e Monti.

I use Chapter Three to outline my theoretical approach in regard to the archaeology of colonialism, specifically in the Mediterranean. The Mediterranean, although problematic as a coherent region, has experienced a great variety of colonial situations and is therefore an ideal place in which to study them. The first millennium BC includes region-wide domination of the East and West Mediterranean by groups such as the Phoenicians, Carthaginians, Romans, and Greeks. Levels of interaction with local peoples range from contact and trade to complete absorption into massive empires.

The postcolonial approach, outlined in this chapter, dismisses the assumption of superior colonial culture, embraces local agency to explain the highly selective adoption of foreign goods and practices, and breaks down problematic dichotomies. The process of entanglement, the mixing of cultural practices and worldviews, emphasizes the two-way exchange between groups in a colonial situation (Dietler 2010). This transforms all groups involved and can be studied through daily consumption practices like producing, processing, consuming, and disposing of food and drink. Remains of daily meals at Bingia ‘e Monti allow us to better understand relationships between Nuragic peoples and Phoenicians.

Chapter Four details the chronology of Bingia ‘e Monti, reconstructing the different periods of occupation with a focus on the *nuraghe*. Like many archaeological sites on Sardinia, Bingia ‘e Monti’s chronology is based mainly on a combination of stratigraphy and ceramic typologies. Using radiocarbon dating on bone samples from Nuragic occupation layers, I was

able to add five calendar dates to the timeline. I evaluate their ability to represent the five contexts from which they come. Four Nuragic subphases are also identified and discussed.

In addition, this chapter looks at the site's architecture, outlining structures from each of the three major periods. Small circular dwellings and a two-chamber burial represent the Copper Age, followed by the conical megalithic *nuraghe* built on top of the Copper Age dwellings, and a much later rectangular Roman structure added to the east wall of the *nuraghe*. As a site with a single tower *nuraghe*, Bingia 'e Monti is situated within the traditional Nuragic structural typology, which will be carefully examined as a dating scheme.

In Chapter Five I present the faunal data from Bingia 'e Monti. I begin by laying out my methodology and discussing some of the choices I made in gathering, analyzing, and presenting the faunal data. The bulk of the chapter contains tables and figures comparing various aspects of the assemblage (species ratios, skeletal elements, age at death, butchery marks, etc.) over different phases of the site. All periods are dominated by domestic ungulates (sheep/goat, pig, and cattle) with Bronze Age levels showing an increase in wild animals. Secondary products like milk and wool were desirable, while there is little overall evidence of marine resource use.

Again special emphasis is placed on assemblages from Nuragic period contexts, especially those near the end of Bronze Age occupation. I examine patterns and significant changes over time, both across the three major periods and within the four Bronze Age phases. I propose some possible interpretations for those changes. For instance, the increase in deer remains, mainly antlers, in the Nuragic period may reflect the importance of deer as a culturally significant or sacred animal. The dominance of sheep/goat during all periods is likely due to their acclimation to the hills and plateaus in the Rio Mògoro valley, as well as relatively little resource investment.

I conclude this dissertation by coming back to the original question about a framework for studying colonial situations in Sardinia and the contribution of foodways to that endeavor. Based on the faunal remains at Bingia ‘e Monti in the LBA and other sites in Sardinia from the same period, there seems to be a distinct difference between coastal and inland sites, and local cultural and environmental developments seem to have a greater impact on inland sites than Phoenician influences during the period of early Phoenician trade and settlement.

Chapter 2

Understanding the history of Sardinia and Sardinian archaeology

2.1 Introduction

This chapter provides an overview of Sardinian history from the Paleolithic to the present day, focusing particularly on indigenous societies and colonial interactions during the MBA to EIA period. As part of this historical overview, I will give a brief description of each of the three outside groups (Phoenicians, Carthaginians, and Romans) who attempted to influence Sardinia to varying degrees in the first millennium BC. In later chapters I focus on the Phoenicians in more detail. Today archaeologists in Sardinia are focused on understanding major island-wide social transformations that took place at the end of the Bronze Age and beginning of the Iron Age. There are continuing debates on topics such as LBA Nuragic social organization and subsistence to which my research will contribute. This historical background sets the stage for my analysis of faunal materials from the site of Bingia ‘e Monti, which had three phases of occupation: first during the Monte Claro period (c. 2700-2200 BC), then by the Nuragic peoples from the mid-MBA until the late-LBA (1800-1150 BC), and finally during the late Roman period (c. 6th c. AD).

The second part of this chapter reflects on the history of archaeology in Sardinia, discussing major excavations and charting changing theoretical perspectives. Past archaeological research in Sardinia has not only shaped the way that Bronze Age sites such as Bingia ‘e Monti are understood now, but also the way that current residents of Sardinia view themselves. In the 1950s, archaeological finds at the site of Su Nuraxi, the largest Nuragic site

on the island, and contemporary Sardinian identity became entangled in a way that is still evident in Sardinian society today, and had a significant impact on how archaeologists working on the island view Sardinian prehistory. This point is important when thinking reflexively about an archaeology of colonialism in Sardinia and the wider Mediterranean region.

2.2 Early Prehistory

Table 2.1 gives a chronology for periods and events in Sardinia from the Monte Claro period to the present day including occupation periods from Bingia ‘e Monti (see Chapter Four for a detailed site chronology). Below the table, these periods along with the Paleolithic and Neolithic are elaborated on in more detail.

Chronological periods	Key events
c. 2700-2200 BC: Monte Claro	c. 2700-2200 BC Monte Claro settlement at Bingia ‘e Monti
c. 2200-1900 BC: Early Bronze Age/Bonnanaro A	c. 2700-1800 BC communal tomb in use at Bingia ‘e Monti
c. 1900-1300 BC: Middle Bronze Age/Bonnanaro B	c. 1613-1491 BC *nuraghe* built at Bingia ‘e Monti
c. 1300-1150 BC: Late Bronze Age	after 1283 BC *nuraghe* goes out of use
c. 1150-850 BC: Final Bronze Age	12th c. Phoenicians begin to trade in Sardinia
c. 850-510 BC: Early Iron Age urban Phoenician settlement on the coast including ports at Nora, Tharros, Bithia, and Karalis	Early 6th century Phoenicians battle with Greeks at sea

510-238 BC: Late Iron Age I Punic (western Phoenician) occupation	
238 BC-476 AD: Late Iron Age II Roman occupation	
476-534 AD: Vandal occupation	
534-c. 8th century AD: Byzantine rule	c. 7th century AD Byzantine occupation at Bingia ‘e Monti
8th-11th centuries AD: Saracen raids with intervention from Genoa and Pisa	
Mid-11th century-1295 AD: time of the Giudicati	Medieval period Double burial in courtyard of the *nuraghe* at Bingia ‘e Monti
1295-1714 AD: ruled by Aragon	
1714-1718 AD: ruled by Austria	
1718-1847 AD: ruled by the House of Savoy	
1847-1861 AD: Kingdom of Sardinia and Piedmont	
1861 AD-present Sardinia is a region of Italy	1948 Sardinia becomes an autonomous region of Italy 1950s Giovanni Lilliu’s excavation at Su Nuraxi

Table 2.1. Chronology of Sardinia.

Peopling of Sardinia: Paleolithic and Neolithic

The earliest peopling of Sardinia likely occurred in two stages. Around 170,000 years ago, land bridges connected Sardinia to Corsica and allowed easy access for early humans, likely *Homo erectus*, to travel from mainland Europe to the islands (Dyson and Rowland 2007:17). Archaeological evidence shows a second wave of migration to Sardinia, but this time it was *Homo sapiens* in the Upper Paleolithic (c. 18,000 BC). One of their settlements was at Corbeddu Cave in eastern Sardinia, which yielded stone tools, human remains, and modified animal bones that point to its continued use in the Upper Paleolithic and Mesolithic (Dyson and Rowland 2007:22).

DNA samples from multiple ancient and modern humans provide another way of dating human presence in Sardinia. Genetic studies based on mitochondrial DNA support a pre-Neolithic arrival of *Homo sapiens* to the island. Ancient bone samples containing Sardinian-specific haplogroups likely represent Mesolithic arrivals, and modern Sardinians continue to carry some of the same genes that pre-Neolithic Sardinians did (Olivieri et al. 2017). Sardinians currently living in the Gennargentu region in mountainous east central Sardinia were found to carry more genes found in pre-Neolithic populations than populations in less isolated regions on the island (Matisoo-Smith et al. 2018:14).

Cave sites reveal obsidian trade during the Neolithic (c. 6000 to c. 3200 BC) both within the island itself, and with outside groups. Obsidian from Monte Arci in west-central Sardinia has been found in late Mesolithic and early Neolithic sites in Corsica and Liguria respectively (Dyson and Rowland 2007:24). On Sardinia, four cultural groups are distinguished during the Neolithic based on ceramic styles: Su Carroppu, Filiestru, Bonu Ighinu, and Ozieri. Ozieri was the first island-wide culture, and was characterized by high quality polished ceramic vessels with

intricate geometric decoration, finely chipped and polished stone tools, and elaborate multi-chamber rock-cut tombs called *domus de janas*, or witches' houses.

Copper Age/Monte Claro (3200-2200 BC)

The Copper Age is characterized by the Monte Claro culture, which is continuous with the sub-Ozieri culture present at the end of the Neolithic. During this period people gathered together into larger sites, about 90 of which have been identified (60-65% of these are in the Campidano) (Webster 1996:52). Settlements consisted of multiple small houses with foundations made of small stones, or that were semi-subterranean with wooden walls, sometimes surrounded with large stone perimeter walls. The island was divided into four archaeological regions based on pottery designs: Campidano (south), Oristanese (west), Nuorese (east), Sassarese (north). Pottery throughout the island was well-made and ornately decorated. Burials have been found in rock-cut tombs reused from the Neolithic as well as in newer oven-shaped tombs, and many of the burials contained small feminine stone statues. Bell Beaker materials such as copper daggers, and cup-like ceramics (beakers) with comb-impressed horizontal lines seen throughout large swathes of Europe at this time, were common in tombs, and demonstrate intensified contact with the continent (Webster 1996; Rowland 2001). Subsistence strategies consisted of hoe-agriculture and animal husbandry (sheep/goat, cattle, pig) supplemented by hunting.

Bonnanaro/Early Bronze Age (2200-1900 BC)

Following the Copper Age there is an island-wide reduction in organizational scale and complexity. Sites which had been used continuously for centuries were abandoned, and people instead built widely scattered farmsteads associated with megalithic communal tombs. Rather than continuing to live in the rich agricultural lowlands, people moved to the rocky uplands to

quarry stones and raise sheep (Webster et al. 1996). Extra-insular trade with other regions such as Greece and Cyprus diminished. Pottery was coarser and plainer, and the four regional styles were no longer distinguishable. Little is known about subsistence, but ceramic forms suggest a move from soup-making to bread-making and the emergence of cheese production: all suggesting a shift from primary to secondary animal products (Webster 1996). Although this period is included within the Bronze Age in the Sardinian chronology, there was little use or production of bronze artifacts. There are over 100 tomb sites from this period that show a wide variety of burial techniques (caves, open-air, rock-cut tombs, megalithic communal tombs). There are three types of EBA settlements: open-air, cave, and proto-*nuraghi*. The term 'proto-*nuraghi*' or 'proto-Nuragic' above is traditionally used in Sardinian archaeological studies as a way of linking EBA developments to MBA Nuragic cultures, however it is a problematic way of describing EBA cultures because of its evolutionary implications. I will instead call these corridor *nuraghi*, a term that is interchangeable.

Corridor *nuraghi* are the most common of the three and are found mainly in west-central Sardinia (the region I am focusing on); however, only a couple have been carefully excavated (Webster 1996). Corridor *nuraghi* consist of a platform of dry-laid basalt masonry about 8 m high and in various shapes, almost like an artificial plateau, with interior corridors and storage rooms and access to the top of the platform. These structures were likely inhabited by single families, and there is no evidence of site hierarchy.

2.3 Nuragic Period

Middle Bronze Age (1900-1300 BC)

The MBA shows a continuation of patterns begun in the EBA: population fragmentation and localization, fairly coarse pottery, and use of corridor-*nuraghi*. The most distinctive marker of the MBA is the single-tower or tholos *nuraghe*, which is the type that can be seen at Bingia ‘e Monti and thousands of other Nuragic sites on the island. These towers are constructed of large, usually basalt, blocks without mortar. They are typically about 12 m wide and 15 m tall with 3-6 m thick walls and 35-50 m^2 of interior space (Webster 1996). They are entered through a narrow south-facing corridor and often have a small second floor, reachable only by a narrow steep staircase inside the wall. When entering a *nuraghe* or climbing up the stairs, one would have to crouch even if one were short.

Archaeologists have long debated the function of *nuraghi*, and many concluded that they likely fulfilled multiple functions including residence, barn, safe-hold, territorial marker, and watchtower (Webster 1996:96; Rowland 2001). Like the corridor-*nuraghi*, it is likely these *nuraghi* provided shelter for one family and their livestock. Variation in *nuraghi* construction suggests little socio-political complexity; perhaps clans consisting of multiple households that donated their labor to build *nuraghi* for other clan members (Webster 1996:95-96; Webster et al. 1996). There continues to be little evidence for extra-island trade or native metallurgy in the MBA; mainly lithic tools were used.

Burials took place in megalithic communal tombs, today known as giants’ tombs because of their size. Frequently giants’ tombs are associated with a *nuraghe* or group of *nuraghi* (Blake 2001). For example, the tomb atop Siddi Plateau sits in the middle of a plateau containing 16 *nuraghi*. These tombs consist of a long rectangular room with a semi-circular façade, and a large central stone pierced with a small opening which could be entered by crouching or crawling. Some, like the tomb Domu ‘e S’Orku-Siddi, have large stone basins near the entrance, presumed

to be for libations at funerals. Others, such as the tombs at Barnavu Mannu-Santadi and Madau-Fonni, had hearths out front (Dyson and Rowland 2007:82). These forecourts show evidence of cooking and eating while visiting the dead (Blake 2001:147). The tombs would have been buried under large earthen mounds.

Archaeologists have variously described MBA Nuragic society as uncentralized and non-hierarchical (Webster 2015) or hierarchical with established elites (Perra 2009; Holt 2013). No true centers have been identified in this period, but site types are incredibly diverse which could point to emerging status differences (Webster 2015:81).

Late Bronze Age (1300-850 BC)

The LBA is commonly regarded as the high point of Nuragic civilization. Many of the tholos *nuraghi* were enlarged into complex *nuraghi* in these centuries, and groups of small stone buildings were built around their bases to form villages. Complex *nuraghi* had multiple towers, bastions, and surrounding walls and storage buildings. Very few new *nuraghi* were built after the MBA, but many of the single tower type continued to be occupied. Plow agriculture and bronze production became common. Trade with the rest of the Mediterranean increased, especially contact with Cyprus and the Aegean. The Phoenicians began trading in the Western Mediterranean around the 12th c. BC, although permanent year-round settlements on Sardinia do not appear until closer to the 8th c. BC. Ceramics reflected regional differences again like in the Copper Age, but in some regions it is still difficult to distinguish MBA and LBA ceramics. Burials continued in giants' tombs and showed evidence of social differentiation. Settlements also show hierarchy, with networks of *nuraghi* grouped by region and sharing a regional center.

Villages first appear near the end of the MBA and beginning of the LBA, pointing to the possible emergence of a new hierarchized landscape. Villages grew up both around *nuraghi* and

in the countryside in their absence, however little is known about the latter. At least 400 villages without nuraghi have been identified but few have been excavated (Webster 2015:107). Perhaps the most well-known example of a village excavation comes from that around *nuraghe* Su Nuraxi at Barumini. Most villages consisted of round one-room houses with stone lower walls, some 1-4 m high, that would have been capped with wooden roofs (Dyson and Rowland 2007:69). Most houses have interior diameters of 5-8 m, one hearth in the center or along the perimeter, and niches in the walls. Some are connected and built around a shared courtyard, maybe for an extended family (Michels and Webster 1987; Webster 2001; Dyson and Rowland 2007). There is also evidence for some mud brick construction in the villages, but unfortunately these structures have been largely ignored by archaeologists in favor of stone buildings. Villages often also had special ceremonial meeting buildings (*cappane delle riunioni*) that look like larger versions of the circular houses, but with benches built into the outer wall and a hearth in the center or near the wall. Sometimes these buildings contain small model *nuraghi* or votive swords on podiums in the center, suggesting ritual use. It is difficult to determine who was using these spaces, but they may suggest a village headman or council (Dyson and Rowland 2007:70; Campus 2014).

Sacred wells, temples, and some *nuraghi* became sites of ritual during this period, which has been used by some as evidence for elite control of society through organized religion (Lilliu 1988). Overall, by the LBA, most archaeologists agree that settlement patterns, large multi-tower *nuraghi*, burials, ritual sites, elite trade goods such as bronze items, and centralized grain storage point to established hierarchy (Webster 2015:110).

Early Iron Age (850-510 BC)

The EIA began around 850 BC and was a period of great change and social transition on Sardinia. The early EIA has been described as a time of either hierarchical breakdown or increased elite power (Holt 2013:241). This LBA/Iron Age transition still needs some explanation, because in many studies contact with outside cultures has been stressed at the expense of local processes; emerging hierarchy was potentially the result of more than trade relationships or colonial presence (Webster 2001:153). The construction of *nuraghi* and their associated tombs ended, although some continued to be used and reused until the medieval period. Some *nuraghi* were built with large circuit walls and interior wells or cisterns. Village life largely replaced *nuraghi*-centered homesteads. *Nuraghi* became centers of religious activities and votive deposits, and small-scale models of the towers were created and housed inside of them. Many of the physical towers became sites of ancestral memory and some were used by colonizers to legitimize themselves in the eyes of the local population (Blake 2001). Others are examples of colonial entanglements, frozen in time. For example, during the Roman Imperial period (c. first century AD), a lintel at Nuraghe Aidu Entos-Bortigali was engraved with a Latin inscription (*Ili iur. in nurac Sessar m.c.*) that claimed it was the property of a local Sard tribe (Blake 1998:63; Mastino 1993:500).

2.4 Colonial Occupations

During the second half of the LBA (1100-900 BC) and Iron Age (900 BC-AD 476), three cultural groups – the Phoenicians, Carthaginians, and Romans – greatly impacted both Sardinia and the wider Mediterranean region. In Sardinia these groups are traditionally divided into two categories: those that had relatively little power over the Nuragic population (Phoenicians), and those that asserted significant control (Carthaginians and Romans) (Webster et al. 1996; Dyson

and Rowland 2007). This dichotomy derives mainly from textual evidence and does not account for geographic or historical context, yet it is widely applied to sites throughout the Mediterranean.

These vastly different levels of domination fit nicely within common types of colonial interactions described in the Mediterranean: contact, trade, colonialism, and imperialism. Unfortunately these types of colonial situations can be difficult to define or identify in the archaeological record, pointing to the need for approaches that can account for the varying colonial situations found in the Mediterranean. New archaeological evidence combined with postcolonial perspectives have only just begun to restructure the narrative of Sardinian history and question the extent of colonial power on the island (Rowland 2001; Dyson and Rowland 2007). A framework based on a detailed explanation of changing foodways will be able to trace context-specific changes in group identity that allows archaeologists to more precisely gauge the nature of the interactions taking place.

Phoenician presence (12th c. – 510 BC)

Thus far I have discussed Phoenicians as if they were a coherent homogenous cultural group, however, as a people trading and settling widely in the Mediterranean, they cannot be ultimately treated as such. In Chapters Three and Four, I develop this statement further. Similarly, other colonial settlers and even the indigenous Nuragic population cannot be assumed to be culturally homogenous groups.

The name 'Phoenician' is Greek in origin and first appears in Greek texts around the 9th century BC, though Phoenicians called themselves *can'ani* or Canaanites (Aubet 1987:5). Phoenicians stem from a population of people who, due to political upheaval circa 1200 BC, found themselves forced to live on a strip of land between the Mediterranean and Mount

Lebanon in present-day Lebanon. This region, referred to as Phoenicia, with a high population but little agricultural land, was the launching point for migration and trade within the eastern Mediterranean. Phoenicians established coastal settlements from Cyprus to North Africa and as far as the Iberian Peninsula (Fig. 2.1).

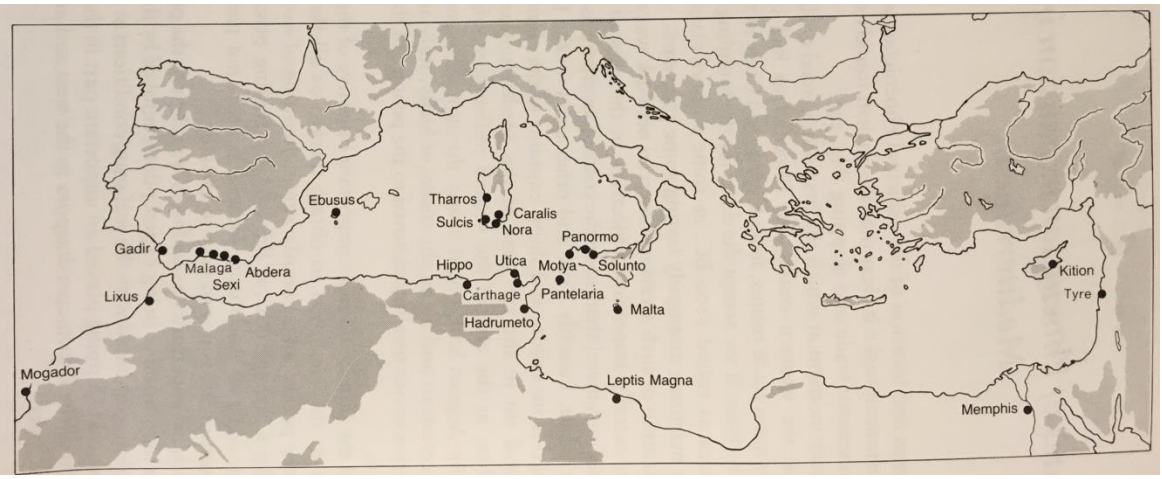

Figure 2.1. Phoenician expansion into the western Mediterranean. After Aubet 1987:134).

However, even within Phoenicia, Phoenicians never formed a unified political state or ethnic group (Aubet 1987:16). Written sources in the late 9th c. BC indicate the formation of the first non-commercial colonies in Cyprus and North Africa due to a combination of political, social, and environmental stresses in and around the Phoenician capital of Tyre (Aubet 1987:53). These settlements were not merely trading posts as before but settlements meant to extract food and metals.

After centuries of trade relations with Sardinians beginning in the 12th century BC, Phoenicians began to establish permanent settlements along the coast in the 8th century BC and incorporated Sardinia into a trade route extending from the Levant to Iberia. So far, eight coastal Phoenician settlements have been excavated that began as trading posts before the 8th century and grew into cities. Trade in eastern goods may have led to social stratification and internal competition in Late Bronze Age Sardinia. On Sardinia there were undisputed Phoenician

colonies including those at Nora, Tharros, Sulci, Karali, Bitia, Neapolis, Othoca, and Monte Sirai, identified as such by their characteristic Phoenician architecture, religious buildings, and burials. Both at Tharros and Monte Sirai these colonies were built on top of Nuragic villages, but there are only signs of force at Monte Sirai.

In the Mediterranean a general assumption has prevailed that the Phoenician presence was initially for trade, and later became colonial in nature, even though it appears they exerted little formal control over local populations. Testing this assumption is a key question in this dissertation. Aubet (1987:205) suggests that Phoenician settlement patterns show intent to control the hinterland. The earliest Phoenician settlement near Bingia 'e Monti was the city of Tharros, founded in the 8th century BC on the west coast near Oristano. Excavations below Phoenicio-Punic levels at Tharros show two Nuragic settlements that may have coexisted with or been displaced by the Phoenicians (Webster 2001:157). A Nuragic site 15 km north of Tharros, S'Urachi in San Vero Milis, shows evidence of trade relations with Phoenicians at Tharros (Stiglitz et al. 2015). In the early 6th century BC Greek attempts to settle in Sardinia and Corsica resulted in naval battles, and the Phoenicians in Sardinia and Etruscans in Corsica won, though no evidence from before the fifth century BC has been found there is some possibility that Olbia was a Greek settlement (Boardman 1999:212, 215).

Carthaginian (Punic) presence (c. 510-238 BC)

The term Carthaginian, or Punic (Latin translation of Greek root for Phoenician), peoples refers to the western Phoenicians whose capital shifted from Tyre to Carthage in present-day Tunisia. Although part of the same population, 'Carthaginian' or 'Punic' is used by most historians to describe Phoenicians in the western Mediterranean from the 6th c. BC onwards.

In the mid-6th century BC, Carthage used force to conquer Sardinia and take control of the Phoenician trade network. Unlike the Phoenicians, Carthaginian settlers exerted directed political and administrative control, often using military force with a mostly mercenary army. They overtook major Phoenician coastal settlements and spread throughout the interior of the island as well; both Phoenician and Nuragic sites show signs of destruction. Piero Bartoloni (2009c:33), an Italian archaeologist who has dedicated his career to studying Phoenician and Punic activities at and around Sulcis, claims that Punic rule was a "true political imperialism". Lilliu (1975:116-117) also identifies the Carthaginians as the first real colonizers and describes them as "an incurable wound" in Sardinian identity. Su Nuraxi shows evidence of sacking before Punic occupation. Punic farmsteads in the interior, especially the Campidano, were used as agricultural centers producing crops for export. Other archaeologists view Punic colonization in a less violent light. Rowland (2001) and Dyson and Rowland (2007) argue that in many cases Carthaginians lived peacefully alongside the Nuragic people. Van Dommelen (1998) cautions that while many inland fortified sites seemed to belong to Carthaginians, they may have been inhabited by Nuragic groups that consumed Punic goods.

Roman presence (238 BC-AD 476)

Shortly after the Romans defeated the Carthaginians in the First Punic War, they took possession of Sardinia. Like the Carthaginians, the Romans were interested in Sardinia's potential to produce grain and tithes for its mainland cities, in particular Rome (Horden and Purcell 2000:202). Initially the Romans occupied coastal cities and then moved inland in search of agricultural land. The Second Punic War began in 218 BC, with native Sardinians supporting the Carthaginians hoping to end Roman rule (Rowland 2001). The Romans attempted to subdue the interior by constructing military garrisons and roads, building additions to *nuraghi*, and using

ritual centers as their own (Dyson and Rowland 2007). Roman colonial and imperial presence lasted for almost 700 years and was followed by a series of occupations by other groups: Vandal, Byzantine (eastern Roman Empire), Pisan, Aragonese, Spanish, Austrian, Savoyard, Piedmontese, and finally the Italian nation. Sardinia became part of Italy in 1861.

2.5 Foodways in Bronze and Iron Age Sardinia

Below I look at evidence of foodways from MBA, LBA, and EIA sites in Sardinia in order to later compare these larger patterns to faunal data from Bingia ‘e Monti presented in Chapter Five. In Sardinia, Nuragic culture has commonly been associated with hunted foods and sheep/goat products (Carenti and Wilkens 2006). Phoenician groups have been tied to increased production of cereals, olive oil, and grapes for wine, leading to expansion of agricultural land, as well as reliance on domestic ungulates. Punic and Roman inhabitants are known for their reliance on pigs as well as intensive cereal and vegetable cultivation (Fois 1991).

A note on botanical remains

Unfortunately, no botanical remains were recovered at Bingia ‘e Monti. A few nearby sites produced botanical data which I synthesize (Genna Maria, Arrubiu, Sa Osa, Duos Nuraghes, Cuccurada, Sa Conca Sa Cresia), but in general agricultural practices in Bronze Age Sardinia have not been studied in a systematic way. Genna Maria, the potential LBA center for Bingia ‘e Monti, showed evidence of cereal, grape, rice, bean, and lentil production (Campus and Derudas 2014:39). About 4 km west of Bingia ‘e Monti, complex *nuraghe* Cuccurada has barley remains from the LBA (Ucchesu et al. 2014). Excavations at LBA site Duos Nuraghes (Borore) revealed cereals (*H. vulgare, T. dicoccum, T. aestivum/durum*) and a legume (*V. faba*). A LBA well at Sa Osa in Cabras (Oristano) contained large amounts of grape pips and fig seeds

(Ucchesu et al. 2014:1-2; Sabato et al. 2015). Sa Conca Sa Cresia, a Bronze Age site on nearby Siddi Plateau, also shows evidence of wheat, barley, legumes, and some grapes and olives (Holt 2013:213). We can assume that inhabitants of Bingia ‘e Monti had a similar plant diet based on cereals and legumes. The small sample of LBA and MBA sites show little change in plant cultivation during the Nuragic period. These sites all pointed to reliance on naked and hulled *Hordeum*, *T. aestivum*, and *T. durum*, and three legumes, *V. faba*, *L. culinaris*, and *P. sativum*, and a variety of fruits (Ucchesu et al. 2014:11).

Nuragic foodways

Again, based on colonial settlement patterns, Sardinia is commonly viewed as an island divided between the urban coast and the rural interior. For the most part, this dichotomy is a modern invention reflected back onto the past, but in some ways there are significant differences between coast and interior. For example, based on the distribution of written inscriptions, Mastino (1993:515) hypothesizes that coastal areas and the Campidano valley were more open to outside innovations like writing, while hilly and mountainous areas were hostile to newcomers. Bingia ‘e Monti is on the border between the Campidano and Marmilla, so this openness may well apply there. As will be discussed below, foodways reflect these coastal/inland divisions. While divergent foodways are sometimes explained by environmental variables, they have also been interpreted as a result of internal cultural transitions within coastal or interior societies or stemming from variable interactions with foreign populations.

As detailed knowledge of the broader picture of foodways is lacking for Bronze and Iron Age Sardinia, a careful study of faunal and ceramic materials from Nuragic and post-Nuragic sites will prove valuable. Faunal studies in Sardinia have been mainly descriptive rather than explanatory (Michels and Webster 1987) and focus mainly on environmental changes (Fonzo

1987, 2003, 2008), and colonial studies involving foodways have focused mainly on non-comestibles (Lightfoot 1995; Campanella 2008; Dietler 2010). While faunal studies in Sardinia (Carenti and Wilkens 2006; Perra 2003; Campanella and Zamora 2010; Wilkens 2012) have begun tracing the larger island-wide patterns of Nuragic and colonial foodways, they have yet to answer questions about why these specific patterns occur and what they can tell us about the larger process of colonial entanglement on the island. These reports tend to focus on foodways in coastal colonies, rely heavily on ceramics, trace imports such as wine and olive oil, present only botanical data, or use data from sites where dating is unclear and the Bronze and Iron Ages are confused. Therefore it is important to add to this body of data from well-dated Nuragic sites, sites in the interior, and explanations of changing foodways, especially during periods of cultural transition, and then synthesize these multiple lines of evidence.

As a way of summarizing recent studies of foodways on Sardinia, I will split them into two categories: Nuragic (MBA and LBA), and colonial period (c. 8th century BC and after). As mentioned above, the Nuragic people grew grains such as farro, orzo, and wheat, with an increase in wheat in the Bronze Age. Olives have been found at MBA levels at Duos Nuraghes, Sa Osa, and Arrubiu (Perra 2003:60); however, olive oil production was not common until centuries later. The Aegean world introduced grape cultivation in the 14th century BC, and some *nuraghi* produced wine in the LBA/IA. Multiple *nuraghi* show sheep/goat as the primary domesticate (Perra 2018:52). Fishing seems to be limited to just a few Nuragic sites along the coast, while inland sites depended on cereals and pastoralism (Carenti and Wilkens 2006:181). Small amounts of marine shell have been found at late-LBA Arrubiu and Palmavera, the latter being a coastal site in the northwest (Perra 2018:52). Fonzo (2008) found that at Arrubiu domestic animals were more important than hunted animals, with sheep/goat as most important

followed by pig and cattle. Pigs increased as boars' forest habitat declined and as they became important for waste disposal. In the LBA cattle became more important for secondary products, and pigs and hunted animals increased greatly (particularly small animals such as *P. sardus*), though cattle and deer decrease into the Iron Age.

Most Nuragic settlements have cattle as work animals until the first part of the 10th c. BC when new technologies made them less useful (Wilkens 2003:185). Across the island sheep/goat dominate the subsistence economy, but in some places cattle were more prevalent and cattle, pig, and sheep/goat were of more equal importance. Sheep/goat remains are found with a large range of ages at death indicating that they were used for secondary products as well as meat, although some sites stand out For example, at S. Antionio di Siligio sheep/goat were consistently killed at an early age (Wilkens 2003:186).

One of few coastal Nuragic sites studied, Sa Osa at Cabras reveals a fish-based economy in LBA and FBA unlike other coastal sites where fishing was secondary to agriculture. The focus on fish at the end of the Bronze Age has been attributed to changes in cultural preference as well as economic developments (Depalmas et al. 2015:9). Faunal remains consist of mainly domestic ungulates with young cattle dominating, pig and sheep/goat of all ages, and deer and boar (Depalmas et al. 2015). Apart from cereals, the Sa Osa community made use of both wild and cultivated fruits (figs, grapes, olives, melon, elderberry, myrtle, sloe, lentils, etc.). One of the most interesting finds is represented by the melon seeds which are the most ancient examples of this species in the Mediterranean Basin (Sabato et al. 2015).

Phoenician foodways on Sardinia

Phoenicians introduced favas, lentils, onions, garlic, spinach, cabbage, turnip, leek, and chicory to Sardinia (Fois 1991). Emphasis on these and other plants led to intense agricultural

production around coastal sites with a later expansion inland. They also brought chicken, hare, weasel, mongoose, edible dormouse, donkey, and horse (Carenti and Wilkens 2006). Overall the reliance on domesticated animals relative to hunted animals increased with Phoenician presence, especially cattle and horses (Wilkens 2012). Fonzo (2008) found a decrease in pigs and sheep/goats and an increase in cattle at Nuraghe Arrubiu during the EIA. The appearance of Phoenicians was closely connected to the increase in wine and olive oil consumption and production, and Phoenician amphorae used for wine and olive oil were imitated by the Nuragic population in the Iron Age (Bafico and Garibaldi 1998:388-389). Although texts from the Middle East record a pig taboo, there is no taboo apparent at Phoenician sites on Sardinia, but sheep/goat and cattle do seem to be more important than pigs (Campanella and Zamora 2010).

One of the larger Phoenician settlements on the west coast was the city of Tharros, founded in the 8th century BC near present-day Oristano and about 45 km away from Bingia ‘e Monti. Excavations below Phoenicio-Punic levels at Tharros show two Nuragic settlements, Su Muru Mannu and Baboa Cabitza, that may have coexisted with or been displaced by the Phoenicians (Webster 1996:157). Before the founding of Tharros, Nuragic groups in that area relied on cereals, grapes, and livestock. At that time grapes were not grown for wine production. Phoenician arrival corresponded with, but did not necessarily cause, the abandonment of Nuragic sites island-wide (Webster 2015:148) and the intensification of grape production (De Rita and Melis 2013). During Phoenician occupation there is also evidence of a diet high in marine mollusks, cattle, sheep, and preserved fish (Wilkens 2003:189). Salt was also a major Phoenician export from Sardinia and ingredient in fish preservation.

A Nuragic site 15 km north of Tharros, S’Urachi (San Vero Milis), shows evidence of trade relations with the Phoenicians at Tharros. Trade with Phoenician ports was conducted

regularly for over a century (Webster 2015:149). S'Urachi, a *nuraghe* founded in the late LBA or early EIA was occupied throughout the first millennium BC. During its long occupation, the usual domesticates (cattle, pig, sheep/goat) were present as well as dog, deer, and bird. In one of the Phoenicio-Punic areas of the site, cattle make up a high percentage of faunal remains, which is commonly seen in Phoenician contexts (Stiglitz et al. 2015:207).

Monte Sirai in southwestern Sardinia has a faunal assemblage that is different from many Nuragic and Phoenician assemblages in that it has a very limited amount of sheep bones, but a high number of pig, cattle, and deer remains. Bartoloni (2009c:24) posits that during the 8th and 7th centuries BC, at Monte Sirai and other Phoenician sites, sheep's wool was a valuable product and sheep were kept alive as long as they produced quality wool. Therefore they would not have been killed seasonally for meat.

Deer as a special case

During the Nuragic period, deer was never the most common animal found in faunal remains. At sites from this period deer remains are usually 2-25% of the faunal assemblage (Carenti 2012:2946). This suggests that the exploitation of deer may have been used to show control of a territory and elite status (2012:2945). They also appear in some ritual and funerary contexts. Tarsals and astragali have been found at a tomb at Monte Sirai and a small structure at Nuraghe Sirai (Carenti 2012:2947). Deer increased in importance in the interior at Monte Sirai and at Sulci with the arrival of Phoenicians (Wilkens 2003; Carenti and Wilkens 2006; Carenti 2012). Inland sites produced meat and hides while ports showed evidence of antler working (Wilkens 2008:252-234).

Foodways at Nuragic sites near Bingia 'e Monti

The following examples of Nuragic foodways come from inland sites around Bingia ‘e Monti. Faunal remains at Sa Conca Sa Cresia (Siddi), only about 5 km away on Siddi Plateau, show evidence of both hunted and domestic animals. Deer, *P. sardus*, and marine shell were present in the diet (Holt 2013:214). Presence of marine shell is interesting given the lack of it in Nuragic contexts at Bingia ‘e Monti, though fish are absent at both sites. Access to the coast was clearly not a problem, but perhaps differences in socio-economic status or identity influenced access to marine resources. A sample of the faunal remains from Sa Conca Sa Cresia shows that sheep/goat were the most common followed by pig and then cattle, though pig increases in importance over time (Holt 2013:183), again in the same relative frequencies as domesticates at Bingia ‘e Monti.

Genna Maria (Villanovaforru), a complex *nuraghe* about 5 km southeast of Bingia ‘e Monti and likely a local center, relied on almost equal numbers of pig, deer, and cattle in the LBA/EIA with a lesser emphasis on sheep/goat and evidence of *P. sardus* consumption in small amounts (Wilkens 2003:189). This contrasts with typical Nuragic reliance on sheep/goat relative to pig and cattle. Perhaps cattle had economic significance in allowing residents to work agricultural fields.

Nuraghe Arribiu (Orroli), a large complex *nuraghe* about 35 km east of Bingia ‘e Monti, continued to be occupied throughout the EIA until c. 9th c. BC. The decrease in cattle and deer remains and increase in sheep/goat and pig in the LBA/EIA is explained as a result of the drier environment and deforestation due to cereal production (Fonzo 2008:33-34). Similar environmental changes likely impacted Bingia ‘e Monti and influenced the inhabitants’ sheep/goat population as well.

Phoenician sites in the wider Mediterranean

As discussed earlier, there was no truly homogenous Phoenician group that landed on Mediterranean coasts. In fact, 'phoenicity' is in many ways a modern invention (Dietler and López-Ruiz 2009:6; Bondì 2014:59). Although Phoenicians in the Levant and abroad shared many core practices, they did not associate themselves with a larger empire or colonial process. There is also a stark contrast between Phoenicians within the eastern Mediterranean and Phoenician communities in the west. From the 8th to the first half of the 6th c. BC, pottery, language, craft goods, and architecture showed continuity with the Levant (Bondì 2014:60). This was likely true for foodways as well, and sites founded during this period could have brought Phoenician foodways to foreign ports. Later on Phoenician and Punic identities became more localized. Below I will discuss a sample of studies that cover the geographical range of Phoenician settlers in the Mediterranean in order to compare them to those on Sardinia.

While many Phoenician sites share a focus on wine and olive oil production, cereals (wheat and barley) were a staple food in their homeland and the colonies as textual and archaeological evidence shows (Spanò 2005; Campanella 2008; Buxó 2009; Delgado and Ferrer 2011). As a staple food, cereals and cereal-based products would have been consumed by people of all socio-economic classes, genders, and ages. While creating new identities in their colonies, Phoenicians continued to prepare bread and porridge using cookware of the same shape found in Tyre and Sidon (Delgado and Ferrer 2011:189), therefore recreating memories and familial and cultural ties to the eastern Mediterranean (Sutton 2001). These daily practices were complemented by the central role of cereal-based cakes in ritual offerings. In Punic Sardinia, clay bread stamps decorated with birds and flowers decorated bread for deities (Delgado and Ferrer 2011:197). Fish was also used in ritual, specifically funeral and mourning rituals, in Phoenician cities (Campanella 2008:76).

Van Dommelen (2005) compares three regions in the Mediterranean (Andalusia, Sardinia, and Ibiza) and finds many variations and similarities that reveal a non-homogenous Phoenician colonization. The most striking overall pattern is characterized initially by minimal interaction with the local populations with later expansion into rural areas. In Sardinia, Punic colonizers set up farmsteads throughout the Campidano Plain. Many of the rural inhabitants were indigenous people who had adopted Punic daily practices such as farm layouts and ceramic forms yet retained local ritual practices and relationship with the Nuragic landscape (van Dommelen 2005:134). The common process in all three regions was the creation of new values and identities through hybridization of daily practices.

Dietler and López-Ruiz (2009) use sites in the Iberian Peninsula as a case study for colonial situations in the western Mediterranean. Many of these sites were along coasts and on rivers and produced trade goods from local resources as well as importing goods from the east. These sites show a variety of kinds of interaction between Phoenicians and indigenous groups beginning in the 8th c. BC, all dependent on and shaped by local contexts. Phoenician settlements in southern Spain and northern Morocco produced specialized commodities like oil and wine in locally made amphorae (Sanmartí 2009:55). Buxó (2009:158) also emphasizes wine production, in particular using domesticated grapes, as a common characteristic of Phoenician colonization throughout the Mediterranean. Native cereals (barley, wheat, emmer) and legumes (peas, lentils, beans) in Iberia had to make room for vineyards and olive orchards (Buxó 2009:155).

2.6 Recent History and the Autonomy Movement

Historical narratives are inevitably incomplete. The current view of Sardinian history as centered on colonialism, oppression, and resistance is by no means the only one. This is a common narrative in the Mediterranean, where history is often seen as "an endless series of impositions and injustices, a long succession of cruelties that all but amount to a collective trauma" (Sorge 2015:267). Sardinians inevitably views history on a large scale, possibly because it is almost impossible for them, particularly those living outside of coastal cities, to go about their everyday lives without encountering a physical reminder of people who lived there thousands of years ago. While working in rural Sardinia, it struck me that while archaeologists aim to preserve sites in Sardinia and freeze them in time, local people living next to these sites were most interested in using them as a vital resource around which to shape and make sense of their own identities as modern Sardinians.

As noted, Sardinia became incorporated into the Italian state in 1861, having previously been part of the Kingdom of Piedmont. During the Piedmontese occupation in the 1700s Sardinia was imagined as a remote and useless island rampant with malaria and bandits. Since unification, there has been a deep political, social, and economic division between northern and southern Italy, with southern Italy comprised of the southernmost six mainland regions plus Sicily and Sardinia. The modernization agenda instigated and supported by northern Italy after unification blamed feudalism and pastoral societies for problems in the South. Gramsci's *The Southern Question* (1926) describes structural inequalities in Italy and contextualizes them within two very different historical narratives, that of the North being more similar to the rest of western Europe.

Stereotypes about the South persist even today and include social and economic delinquency, organized crime, and political corruption (Davis 1996:53). On Sardinia

modernization was enforced in the form of increased agricultural production by private landowners (Berger 1986). It has little fertile agricultural land and the population is best characterized as a social structure established within a transhumant pastoral society. Herders were accustomed to moving their flocks over long distances across communally owned pastures (Mientjes 2004). In the 1820s, land was transferred to private farmers who in turn gave it back to pastoralists due to the bourgeois landowners' lack of agricultural experience. This failed attempt at modernization caused riots, murders, and increased banditry led by pastoralists in rural areas (Clark 1996:83). This "resistance" attracted mainland attention in the 1880s, and the first anthropological studies of Sardinia recorded it as a degenerate culture (Niceforo 1897; Sergi 1907). Within Sardinia the bandit figure became romanticized as a symbol of tradition, pushing back against bourgeois conformity.

Paired with the story of modernization in Sardinia is the story of the island's autonomy. According to Clark (1996:84-85), Sardinia went through three stages that reflected three different meanings of the word 'autonomy'. These are: 1) the restoration of the local/known, with shepherds as anti-modernization rioters and a localistic idea of autonomy; 2) in the 1840s, modernization was mitigated to protect pastoral life and Sardinian interests; and 3) liberal modernization was welcomed under Sardinian control and for Sardinian benefit. The autonomy movement coalesced into a political party after Sardinians banded together during World War I in a distinguished group called the Sassari Brigade. They were rewarded by the state and after the war became a political group called Partito Sardo d'Azione, or Psd'Az (Sardinian Action Party), whose members fought for increased Sardinian bureaucratic and legislative independence (Clark 1996:89). On January 31, 1948 Sardinia gained recognition as an autonomous region within Italy. As one of five such Italian region, it is meant to have more latitude in implementing

EU decisions than other regions. However, a number of factors led to the creation of a weak regional constitution, meaning that Sardinia's autonomous status is mainly symbolic (Onnis et al. 2009).

In the 1960s, a new nationalist type of autonomy developed for the first time, and Sardinians voiced strong feelings about the importance of passing on and preserving their own language and culture while gaining economic and political independence from Italy (Clark 1996: 97). Sardinian or *Sardu* is an island-wide language quite different from Italian and likely the closest descendent of Latin. For the oldest generation, this is their first and only language; even today young people speak *Sardu* as well as Italian. Along with a movement to protect Sardinia's unique culture, history, and environment, political parties like Psd'Az promoted nationalist ideologies, calling for the separation of Sardinia from Italy. A direct reaction to industrialization initiatives from the mainland in the 1960s and '70s, the separatist agenda led to decades of violence and terrorism, particularly in eastern Sardinia.

Today, although the Sardinian nationalist movement is no longer politically unified, there remains a deep undercurrent of regionalism and localism. The majority of those born in Sardinia see themselves first and foremost as Sardinian rather than Italian or European.

Entanglement of Bronze Age archaeology and modern Sardinian identity

The above discussion of Sardinian history and the recent movement for Sardinian autonomy becomes particularly interesting when viewed within the context of archaeological investigations on the island. Just two years after Sardinia was granted its autonomous status in 1948, Sardinian archaeologist Giovanni Lilliu, often called the father of Sardinian archaeology, began excavations at Su Nuraxi in Barumini. The name 'Su Nuraxi' means 'the *nuraghe'* in *Sardu*. In just seven years, from 1950 to 1957, Lilliu uncovered the largest Nuragic site on the

island: a complex *nuraghe* and an extensive village, with and occupation spanning from the 17th to 1st c. BC. Lilliu's widely publicized findings showed a prosperous indigenous settlement with a kind of dynamism and appeal unlike that of any other Bronze Age site on the island. This window into Nuragic society became caught up and entangled with the ongoing autonomy movement and led contemporary Sardinians to claim Nuragic descent. Fitting with the dominant narrative of oppression and resistance, Sardinians often point to the Bronze Age immediately before Phoenician colonization as the last time that the island was free.

For those living outside of major coastal cities, there is also the daily reminder of Bronze Age remains. Over 8000 *nuraghi* and giants' tombs are still visible on the landscape, sites that play a role in an ongoing process of identity formation (Blake 1998). Additionally, Nuragic artifacts are not only on the landscape, but also in many people's homes and gardens. I frequently observed bits of ancient pottery and stone tools on mantels, or heavy stone querns for grinding wheat outside front doors. One of Sorge's (2015:268-269) informants in Orgosolo explained why he collects these items: "this shows that we were able to stay free of Roman dominion". I cannot assume that my neighbors in Siddi or Villanovaforru kept Nuragic artifacts for the same reason, though it is entirely possible.

Nuragic symbols and artifacts have also been used in the branding of food, drink, and towns. As an archaeologist studying food remains, I see it as highly significant that substances made for consumption are associated with a Bronze Age culture. Terrantica, a company that produces snack food such as potato chips and popcorn, has had two mascots, the first a cartoon *bronzetto* (a bronze figurine produced by Nuragic peoples in the LBA found in sacred contexts), and later a cartoon of a stone statue from Monte Prama. Their current ad even ties the uniqueness of their snacks to the uniqueness of Sardinian culture (Fig. 2.2).

Figure 2.2. Advertisement for Terrantica potato chips from www.terrantica.com.

Figure 2.3. Label with *bronzetto* from Jerzu's 2013 Cannonau.

The wine cooperative Antichi Poderi Jerzu also uses a *bronzetto* on its labels (Fig. 2.3). Their website praises the wine for its authenticity and the members for their strong communal

ties. Lastly, numerous towns incorporate *nuraghi* into their local identities by using images of them in their town crests (Nurachi, Torralba, Nuoro, Serri, Barumini, etc.) (Fig. 2.4). Through representing their town to other communities in Sardinia, they tie themselves to the island's deep past.

Figure 2.4. Town crests from Barumini (left) and Pompu (right).

2.7 History of archaeology in Sardinia

Early excavations

Like many of the first large scale excavations in mainland Italy, the earliest archaeological investigations on Sardinia focused on assembling a timeline for the island, particularly for periods without textual records. Before Italy became a nation, 19th-century Sardinian priest, linguist, and prolific archaeologist Giovanni Spano set out to study the *nuraghi* and place them within the recently developed Three Age System. Spano unified Sardinian archaeologists by publishing the *Bulletino Archeologico Sardo* in 1855 and contributing over 400 articles to his journal (Dyson and Rowland 2007:10). Spano and his contemporaries also dedicated their time to studying Nuragic technological and artistic accomplishments like *bronzetti*. Unfortunately, in the 19th century it was common for archaeologists to attribute

Nuragic structures and artifacts to Phoenician settlers (Webster 1996:16). Although numerous Nuragic sites were excavated in the early 1900s, the lack of careful stratigraphic excavations prevented local archaeologists from convincingly dispelling this myth for decades. The only materials that could be placed within a well-dated typology were remains from later colonizers.

Lilliu and Su Nuraxi

Sardinian archaeologist Giovanni Lilliu (discussed above), was the first to argue the importance of controlled stratigraphic excavations on the island. His life's work of comparing and organizing Nuragic and pre-Nuragic sites into an island-wide chronology earned him the title "father of modern Sardinian archaeology." His first excavation at Su Nuraxi (Fig. 2.5) in the 1950s, a complex *nuraghe* with a long occupation, allowed him to distinguish key phases and create a Nuragic artifactual and architectural typology still in use today. In Chapter Four I discuss the Sardinian chronology in detail.

Figure 2.5. Nuraghe Su Nuraxi in Barumini, partially reconstructed.

Lilliu and his contemporaries were heavily influenced by the Sardinian nationalist movements of post-World War II Sardinia. As stated above, the detailed excavations of Nuragic sites at the time interwove modern formulations of Sardinian identity with the island's indigenous Bronze Age inhabitants. While this benefited excavations, it often kept the focus of many Sardinian archaeologists within the island itself and led to a uniquely Sardinian chronological approach that does not connect with other Mediterranean sites and developments (Webster 1996:18). Also, Lilliu and others maintained a culture history approach intent on description of architecture, ceramics, and bronze items, with the hope of tracing the origin of these in other cultural groups.

Theoretical Approaches

This section gives a brief overview of where Sardinian archaeology is situated theoretically today. One issue with classics-focused archaeological studies in Italy (at least from an anthropological point of view) is that they sometimes lack a human-centered approach. While I see evidence of a continued culture history approach on Sardinia, it is largely confined to the earlier archaeological literature (Ridgway 1979-1980; Balmuth 1992). As Webster (1996:18) observed, there is now a movement toward processual and post-processual archaeology along with an emphasis on gathering absolute dates.

Sardinian archaeology has been insular, carried out by and shared with archaeologists working exclusively in Sardinia. Ridgway points out that during the 1980s Sardinian archaeology was largely unknown to archaeologists in the rest of the world, and it was not until the early 2000s that it became more accessible. Describing and dating sites on the island is still important, but Bronze Age developments such as metallurgy and the *nuraghi* are no longer simply attributed to influences from other cultural groups in the Mediterranean (Mycenaeans, Etruscans, Cypriots, Phoenicians) (Ridgway 1988-1989; Acconcia and Milletti 2009; Milletti 2008). Now that a solid chronology has been established for Sardinia, and diffusion and migration are no longer the only explanations for cultural change, there has been a movement towards collecting and analyzing more quantitative data (ceramic, faunal, lithic, skeletal, environmental, etc.) and asking more anthropological questions. These have addressed topics such as kinship (Hayden 1999; Webster 2001), economy (Michels and Webster 1987; Muscuso and Pompianu 2010; Castangia 2010), ritual and burial practices (Webster 2001; Castangia 2010; Castangia and Mulargia 2012; Pompianu 2012; Bartoloni 2006; Guirguis 2011; Soro 2012), social hierarchy (Perra 2009), foodways (Campanella 2008; Campanella and Zamora 2010; Carenti and Wilkens 2006; van Dommelen 2008), and identity (Campanella and Zamora 2010;

Soro 2012; Blake 2001). Archaeologists are also beginning to question historical texts as reliable sources particularly during the Punic and Roman periods (Bartoloni 2006; Dyson and Rowland 1992; van Dommelen 2008). I will summarize a couple new archaeological focuses below as they pertain to my project.

Foodways

Foodways is a topic that archaeologists, both in Sardinia and elsewhere, have brought into a more central position. Rowland (1987) is an early supporter of faunal analysis and points out the lack of understanding archaeologists had of foodways on Sardinia in the late 1980s. Although faunal data may have been included in site reports it was the bare minimum, usually a mention that these remains were found or sometimes a list of species percentages. There was no thought about why the remains were there or what implications they might have for identity, ritual practices, socio-economic status, etc. Rowland also brings attention to the fact that microfauna are usually underrepresented. Thirty years later his call for a synthesis of information on Sardinian foodways is still a valid concern.

Michels and Webster (1987), in the same volume as Rowland, take a step forward by reporting raw faunal data and analyzing it for species ratios, kill patterns, and butchery patterns. They also look at plant remains and connect them to the presence of colonial groups. Campanella (2008) is a good overview of Phoenician and Punic foodways on Sardinia. She uses textual, ceramic, and faunal/floral remains to look at how foodways change over centuries of foreign presence on the island. Campanella and Zamora (2010) provide an analysis of Phoenician and Punic consumption of pig that relies on both textual and archaeological evidence and also provides a survey of their consumption of pig at other sites around the Mediterranean. Carenti and Wilkens (2006) deal with the impact of Phoenician and Punic foodways on Sardinia.

They focus on species present, hunted vs. domestic species, kill patterns, and secondary uses for these animals as described in ancient texts. What seems to be lacking is an explanation of how these new foodways impact indigenous foodways and what changes mean in a broader social and political context. Overall progress is being made in the study of foodways on Sardinia, but in many site reports the importance of food remains is still not fully recognized.

Comparisons

Briefly I want to note the apparent lack of comparative work on Sardinia. While there are many comparisons between colonial sites on the island and other sites in the Mediterranean, there is little consideration of the big picture outside of the site or region. Many of the site reports are clustered around sites such as Monte Sirai (Guirguis 2011; Carenti 2005; Piga et al. 2010) and regions such as Sulcis (Campanella 2008; Muscuso and Pompianu 2010; Carenti and Wilkens 2006; Unali 2011; Botto et al. 2010), Barbagia (Delussu 2009b, 2009c), or Oristano (Michels and Webster 1987; Sebis and Pau 2012). There seems to be a division between coastal and rural areas in the literature, connected to both geographical/ecological factors and the dichotomy between coastal colonial settlements and interior indigenous territory. I see this division breaking down somewhat as archaeologists find evidence of Punic and Roman presence in the interior of the island.

Relationships in the Mediterranean region

Connections between Sardinia and other regions or groups in the Mediterranean Sea have always been emphasized in archaeological reports on the island and continue to be a common theme in discussions of trade, technology, ritual, and colonialism. Foreign influence or presence on the island is no longer an explanation for social or cultural development. Instead a postcolonial view has resulted in the discussion of how Sardinia was in no way a passive receiver

of outside knowledge and culture, but rather an active player that influenced supposedly more "advanced" groups in the region. According to Acconcia and Milletti (2009), Nuragic metallurgy greatly influenced Etruscan culture in the 7th c. BC, and bronze technology on Sardinia was not the result of knowledge brought from mainland Italy. Also colonial-indigenous relations did not result in acculturation, but rather unique cultural developments that were specific to the island. These include: unique funerary practices at Sulcis (Guirguis and Unali 2010), continuity of Sardinian rural life during the Roman period with Roman farmsteads and indigenous settlements coexisting on the landscape (Dyson and Rowland 1992; Delussu 2009b), and reuse of the *nuraghi* as Roman cult spaces (Angiolillo 2006).

Transitional Periods

Many of the authors targeted time periods on Sardinia that are considered transitional or transformative in terms of social, political, or cultural development. In particular the Middle Bronze Age and the Late Bronze Age or Early Iron Age have been the focus. The former was the period when the Nuragic culture and later hierarchical societies emerged, and the latter periods witnessed colonial interactions. Perra (2009) summarizes theories from nine archaeologists about social and political developments during the Nuragic period, showing how difficult it is to offer a single interpretation of this transitional period on Sardinia. An examination of foodways would add another valuable line of evidence to this discussion of social and political organization.

To address transformations that took place during Phoenician, Punic, and Roman colonization, many authors have focused on changes in ritual and funerary practices. Both temples and tombs show signs of religious syncretism, in some cases linking together aspects of two or three different cultural practices (Pompianu 2010; Muscuso and Pompianu 2010; Guirguis

and Unali 2010 Guirguis 2011; Unali 2011; Piga et al. 2010; Angiolillo 2006; Botto et al. 2010; Boninu et al. 2012; Ialongo 2010; Roppa 2012). Along with changing foodways (mentioned above) these newly combined ritual practices provide evidence for cultural, political, economic, and social entanglement on Sardinia as a result of the colonial process.

2.8 Conclusion

The above overview of Sardinian history serves to situate the site of Bingia ‘e Monti in Copper, Bronze, and Iron Age Sardinia. As a single tower *nuraghe* situated in the island’s interior, it is one of thousands of homesteads that went out of use in the early EIA, a period of internal societal transformation and sustained presence of foreign settlers. At its founding it was part of a group of seemingly non-stratified sites, and by its abandonment new elite centers were emerging. Phoenicians and subsequent outside groups became entangled with Nuragic peoples and gained increasing control of the island beginning on the coast and trading with inland settlements. As the modern narrative goes, colonization has continued until today with Sardinia as part of the Italian state. Struggles for autonomy have constructed Sardinian identity based on the Bronze Age Nuragic culture and their supposed independence and then resistance of foreign groups. Today Sardinian nationalism revolves around the population’s unique indigenous “ancestors,” language, and unique environment and foodways.

The history of archaeology in Sardinia also revolves around the elevation of the Nuragic culture. Unfortunately the lack of controlled stratigraphic excavations has led to an island-wide chronology based on relative dates. Recent and ongoing excavations are working to provide absolute dates to better understand and explain smaller-scale changes within the MBA and LBA. There is also a recent focus on foodways, the development of hierarchy in the LBA, and the need

for comparisons between sites on the island and in the wider Mediterranean. A postcolonial approach and study of foodways at a smaller site like Bingia ‘e Monti fit within this trend.

Chapter 3

Theorizing colonialism within the Mediterranean: Adding a focus on foodways

3.1 Introduction

This chapter introduces the two main bodies of theory that situate my research and to which I hope to contribute. First I discuss postcolonial approaches by problematizing early studies of colonialism in anthropology and archaeology, and complicating the process of colonialism itself. Part of this is looking at the broader study region, the Mediterranean, and commenting on cultural essentialisms and boundaries. I will lay out the framework for my main research question, which asks whether we are able to observe colonial processes in the interior of Sardinia using a foodways-based approach.

Later in this chapter I examine foodways as a potential lens for studying interactions in first-millennium BC Sardinia. Subsistence is about much more than survival; it can reveal a rich world of symbolism, history, social relationships, and identities. Because of food and drink's intimate connection with the human body, these substances are vital in shaping who we are. What one eats, how one grows and prepares food, and who one eats with determine membership in a society. Where people from different cultures are coming into contact in increasingly intensified encounters, the daily practices of preparing and eating meals is likely to be influenced (Lightfoot 1995; Ben-Shlomo et al. 2008; Dietler 2010; MacKinnon 2010). I will examine selected archaeological examples studying changing foodways and use them to build a framework in which to approach colonial situations in Sardinia.

3.2 Defining the Mediterranean

I begin my discussion of the archaeology of colonialism in the Mediterranean by interrogating the Mediterranean as a region in archaeological and anthropological literature. It is frequently used as a frame of reference and comparison, but is it appropriate to treat it as a region, and is it useful to do so? The Mediterranean as a geographical, ecological, or cultural region is a greatly contested issue in the disciplines of anthropology and history but much less so in archaeology. Defining the Mediterranean as a region has been a challenge due to time depth and cultural variability. In anthropology this area is viewed as a socially constructed 'Other', much like Said's discussion of the West's construction of the Orient (Said 1978; Herzfeld 1984; Pina-Cabral 1989). Most approaches define it as an area of interaction or one of shared ecology (Horden and Purcell 2000:10).

Seemingly the easiest way to define any region under study is to pull out a map and draw boundaries based on physical geographical features. Physically the Mediterranean Sea is an enclosed sea that functions as a bridge resulting in common experiences such as trading, seafaring, and migration. It quickly becomes apparent that any boundary researchers draw, whether between the sea and inland rivers, or coastal and inland areas, is arbitrary rather than obvious or entirely meaningful.

Common climate and ecological conditions are reasons often given for describing the Mediterranean as a cohesive region. Braudel (1972:236) argues that a homogenous climate resulted in a shared set of crops and identical rural economy throughout the Mediterranean. Blake and Knapp (2005) suggest that for archaeology the distribution of plant life may be a relevant way to view the Mediterranean area. The olive tree in particular has become a Mediterranean symbol and key feature of landscapes, lifeways, and experience. Unfortunately

many of these arguments tend toward environmental determinism, asserting that shared climate and topography make for similar adaptations in cultivation and settlement.

Mediterraneanism, like Orientalism, posits that cultures belonging to the larger cultural region share essential characteristics. Gilmore (1982:178-179) lists numerous common sociocultural traits in the Mediterranean, including: a strong urban orientation, disdain for peasant life, sharp social, geographical, and economic stratification, political instability, and a history of weak states. Cultural contradictions and dualisms are common. A synthesis of decades of anthropological research in the area led Davis (1977) to conclude that due to over five millennia of interaction, common institutions exist that are visible in modern Mediterranean cultures. Regardless of the amount of data collected, essentializing a region is problematic and often reveals more about the cultural perspective of the researchers. The cultures labeled 'Mediterranean' are too diverse and dynamic to be described in so few words.

Despite attempts to define the Mediterranean as a geographically, ecologically, or culturally unified region, the goal of definition itself is futile. Defining the Mediterranean as a cultural area is not helpful for archaeologists or anthropologists. It is only useful for distancing Anglo-American scholars from the populations that they study (Pina-Cabral 1989). It is possible that ambiguity about European identity has led to the creation of the Mediterranean region as the 'Other'. Europe's identity has been shaped greatly by the nearby sea, but this understanding is usually restricted to contributions made by the Greeks and Romans. Phoenician and Punic influence is not often considered in the history of Europe and that rest of the the western world (Ortega 2013). Reasons for uniting the Mediterranean do not take into account contacts with people outside the region (Pina-Cabral 1989:401). Groups living in and around the Mediterranean Sea are in no way isolated. Common Mediterranean concepts like the "honor-

and-shame syndrome" and "Mediterranean culture-area complex" are also not useful for comparison, but rather only for legitimizing academic authority. The best way to construct a regional comparison is to use indigenous categories situated in the appropriate historical context, study each group and object in its context, and build up subregional comparisons to create bigger categories (Pina-Cabral 1989:404).

As an anthropologist who has studied issues of cultural cohesion in Europe as a whole, but also construction of national identity in Italy and Greece, Herzfeld (1984) believes that scholars should avoid generalizing about the culture or identity in a particular region. The Mediterranean has only recently become a distinctive area that is seen as united by more than its geographical characteristics. The issue is not whether or not the Mediterranean is a cohesive cultural area, but rather whether referring to it as such is harmful. An assumption of homogeneity in a region results in stereotypes that then themselves come to represent the region (Herzfeld 1984:443). This circularity is rarely productive.

The Mediterranean as a concrete and unified geographical and cultural area falls apart under closer inspection, as anthropologists have pointed out. The Mediterranean imagined as a unified scientific category is the result of long and complex developments that did nothing to reconcile the fragmented identities in the region (Cañete 2010). The scholarly paradox stems from the Mediterranean being "out there and universal; but at the same time our knowledge of it is mediated by the particularities of the relations and networks of humans and non-humans in which that knowledge is generated" (Cañete 2010:32).

The Mediterranean Sea, without doubt, facilitates the movement of people, ideas, ideologies, technologies, and objects. The classical Mediterranean world is often seen as the defining moment in Mediterranean history since it represents a time of circum-Mediterranean

colonization, but even then integration was the exception. Numerous autonomous regions have always been common in the Mediterranean, and one could say that cultural plurality is without doubt one of its defining characteristics (Blake and Knapp 2005). In archaeology it has been viewed as a coherent subject, but with the rapid accumulation of new archaeological data, the region is becoming too large to handle properly as an entity. This has led to a trend toward localized studies. Blake and Knapp suggest looking beyond modern borders of the Mediterranean, Europe, Africa, and Asia and instead focusing on common social identities, interactions, and materials.

Bounded cultures with distinct identities are less common in the Mediterranean than originally thought (Knapp and van Dommelen 2010). Arbitrary boundaries of modern nation-states are recent developments and impose the expectation of national identities. The Mediterranean as a region is a recent concept and needs to be viewed as a product of a long history of interactions (Broodbank 2013:53). Cultural identities are multidimensional and fluid, overlapping, and changing depending on the context. The material record is vital for recognizing identities created through shared practices both at the group and individual levels. Islands in the Mediterranean are not isolated, but rather connected by broad spheres of interaction.

Defining the Mediterranean is exceedingly difficult and unproductive. On some levels, it has commonalities but on others it is an assemblage of oppositions. For an archaeology of colonialism there, we must acknowledge the diversity and contradictions, while being clear about the specifics of the area we choose to study. Common themes in Mediterranean archaeology such as insularity, maritime interaction, interconnectedness, change, identity, colonialism without colonies, and unity and diversity are key for studying the area in which Sardinia is situated. Perhaps the best way to describe Bronze Age Sardinia and its neighbors is as part of a

landscape of “dense fragmentation complemented by striving towards control of communications” (Horden and Purcell 2000:25).

3.3 What is colonialism?

Colonialism and the history of archaeology

Much of the discussion of colonialism by archaeologists begins with a reminder of archaeology’s own colonial past and the role it has played in more recent Western colonizations. Archaeology has never had a “precolonized” form. It was born in colonization and is an instrument and product of colonialism that can never be wholly decolonized (Dietler 2010:3). To make an even more dramatic statement, “archaeology arises solely out of the colonial structure” (Miller 1980:710). Early on in the discipline, archaeologists typically represented the colonizer while field laborers and local peoples represented the colonized, reproducing colonial hierarchies in the field.

Today many archaeologists take a step back and examine the embeddedness of colonialism in the discipline of archaeology, part of anthropology’s four-decade concern with the reflexivity of the researcher. In particular there is a complex recursive relationship between ancient Mediterranean colonialism and contemporary European colonialism and culture. The first millennium of ancient colonial archaeology in the Mediterranean is relevant for understanding the foundations of European colonialism. This ancient colonialism was used as a model for later colonialisms due to connections made to the Greco-Roman world during the Renaissance. Archaeology itself has been colonized (along with other academic disciplines) by the colonial powers of Greece and Rome (Dietler 2005; Dietler 2010; van Dommelen 1998). This circular colonial presence within the discipline makes careful reflection on the topic of

colonialism necessary. By studying ancient Mediterranean colonialism without recognizing this point we are in danger of colonizing the area a second time (Dietler 2005). Due to this now widely recognized entanglement, the impact of modern colonialism on ancient colonialism and on the discipline of archaeology needs to be assessed.

Popular approaches to the archaeology of colonialism before the postcolonial movement have for the most part been carefully critiqued and either adjusted or abandoned. These approaches include world-systems theory, analogies from modern colonialism, and the closely related models of acculturation, Hellenization, and Romanization in the Mediterranean. These ways of viewing colonial interactions are not necessarily obsolete, but should not be the go-to models for all cases. While these approaches have added to the debate in the past, they are generally considered no longer universally applicable today (Gosden 2004; Dietler 2005, 2010; Lightfoot 1995; Stein 2005; van Dommelen 1998). Dietler critiques the Hellenization (acculturation) and world-systems approaches that continue to dominate studies of colonialism in the Mediterranean. The former approach carries assumptions of the civilizing nature of superior colonizing groups, and the inevitable absorption or imitation of that group's culture by the indigenous people. Apart from these assumptions this approach is problematic because the archaeological evidence reflects a highly selective adoption of foreign goods and practices. The world-systems model has been extensively critiqued in archaeology since it assumes control of the core over processes in the periphery, while leaving little room for local culture or agency. The world-systems approach is often homogenizing, does not always provide theories that deal with material culture, and adopts modern economic terms that do not fit well with ancient colonial situations (Gosden 2004). This approach makes assumptions about the nature of relations between two areas, for example that the core is exploiting the periphery, that are not

necessarily demonstrated or supported by the material culture evidence. It often directs attention away from local culture and agency to wider systems.

Woolf (1997) demonstrates that like acculturation and Hellenization, studies of Romanization reflect traces of modern debates on imperialism and colonialism, especially the postcolonial critique of dualisms such as colonizer and colonized. Romanization has been a frequently used term in Mediterranean archaeology that refers to a seemingly uniform pattern of cultural change thought to occur with Roman expansion. Through acculturation Roman goods and practices replace their inferior native counterparts, with the goal of advancing and civilizing local peoples. This model of colonialism, however, seems to be influenced by patterns of more recent 16th to 19th century European colonization of foreign lands that have been used as a model for ancient colonialism. But we must be careful not to replace old biases with modern ones (Boardman 2001). The past approaches discussed above are being replaced with a focus on practice, pluralism, agency, dynamic social identities, variation in colonial situations, the active role of material cultures, and assembling a comparative framework for colonial encounters around the world.

Colonialism, colonies, or colonization?

Despite this reexamination of colonialism in archaeology, there is not yet an agreed upon definition or model within the discipline. Archaeologists and anthropologists do not hold a consensus on many aspects of colonial encounters such as the definition of colonies, colonization, and colonialism, how colonies function, and how colonial encounters shape identity (Stein 2005). Gosden spends time disentangling the meanings of ‘colony’ and ‘colonialism’. A colony is a group of people who went to a distant and culturally different area, and in the archaeological record a settlement can be identified as a colony if its layout, material culture, and

burial customs differ from those of nearby cultures and can be linked to a foreign center (Gosden 2004). Van Dommelen defines colonialism as the presence of groups of foreign people in a region distant from their origin as well as the existence of asymmetrical socio-economic relationships (van Dommelen 1997). In an effort to detach his work from modern ideas of colonialism, Given's definition of colonialism and colonizers is a great deal broader than that of other archaeologists. Colonizers are simply alien and external to the subjects from whom they extract food and labor, and this process as a whole is colonialism (Given 2004). This definition offers another way to discuss possible colonial situations which are rarely clear-cut to begin with. Like Given, Stein supports a less restrictive definition of colony in order to include more examples. For him a colony is a spatially and socially distinguishable long-term settlement established by one society in foreign territory (Stein 2005:10-11). The most common motive for establishing colonies is exchange and/or resource extraction. This seems to be especially true for colonies in the Mediterranean where trading outposts grew into colonies. One might expect distinctive settlement plan, architecture, and foreign material assemblages, especially in areas of domestic and ritual activity. However, it is often not that straightforward, and we cannot jump to the conclusion that foreign objects are indicative of foreign people, let alone colonizers, since cultures routinely borrow foreign styles and import or imitate foreign goods. Boardman does not see much use for the term 'colony' because it is such a diverse phenomenon, and it is difficult to distinguish between colonies, trading posts, and other settlements (Boardman 2001:39).

Dietler compares the term 'colonialism' to the term 'culture' in anthropology because both are used freely without having clear definitions. He does not support prepackaged terms and concepts, but rather feels more flexible concepts allow for better questions. Colonialism cannot be explained on an abstract level. It is "an active, historically contingent process of

creative appropriation, manipulation, and transformation played out by individuals and social groups with a variety of competing interests and strategies of action embedded in local political relations, cultural perceptions, and cosmologies" (Dietler 2010:10).

The use of the active term 'colonization' has been favored over the term 'colonialism' in the Mediterranean and other regions in an attempt to separate ancient colonial situations in the Mediterranean from modern Western cases of colonialism. Van Dommelen (1998:6), who specializes in Mediterranean archaeology, defines colonialism as "the process of establishing and maintaining a colonizing group and their dominant or exploitative relationships with the colonized region and its inhabitants." Colonialism is not an "abstract entity which has set foot ashore in several places and which might somehow be captured by one single 'model'" (van Dommelen 1998:23). Cholteo works in the Mediterranean and also draws a line between colonization and colonialism. Colonization is a process whereby foreign people migrate and settle away from home while still connected to their center of origin, while colonialism entails dominance over local people (Cholteo 2009). For Gosden the colony does not define colonialism, and in many cases of ancient colonialism, such as that in the Mediterranean, colonialism occurred without the presence of colonies. He defines colonialism as "a particular grip that material culture gets on the bodies and minds of people, moving them across space and attaching them to new values" (Gosden 2004:3). He also addresses two other terms often associated with colonialism: 'imperialism', a special case of colonialism that implies a unifying political and ideological structure, and 'culture contact', an inevitable everyday occurrence in most places that usually does not assume differences in power. Simply raising the question of terminology reveals the complexities of the archaeology of colonialism and the continuing

relationship between ancient and modern colonialism. Since it is impossible to avoid these terms, we must use them with caution and clarify their meanings in each specific context.

Silliman points out the common confusion of 'contact' and 'colonialism' in archaeology. Using the term contact when colonialism is the appropriate term emphasizes short-term encounters over long-term entanglement, downplays the intensity and potential negative impact of the interaction, and privileges predefined cultural traits over mixed products (Silliman 2005:55). Although contact is an ambiguous term, it does have potential value in that it allows as a general comparative framework for multi-group interactions, especially in cases where archaeologists are unsure if the process of colonization took place. The kind of modern colonialism he discusses may not apply to ancient colonialism because ancient colonialism does not always involve colonization, colonies, geographic expansion, or capitalism. Silliman recommends a balanced approach that highlights creativity, practices, the resiliency of indigenous people, and the severity of colonial rule (Silliman 2005).

Many authors try to avoid common modern connotations of colonialism by using terms such as 'colonial encounters' (Stein 2005) and colonial situation (van Dommelen 1998; Dietler 2010). Shifting the focus from colonialism to a broader term removes the implied power relations. The term 'colonial situation' is an improvement on 'colony' or 'colonialism'. It is versatile and can be used for contexts that range from large numbers of migrants settling in the colonized region, and initiating an exploitative relationship with the land and its people, to those situations where colonial presence is limited to a small trading post and relationships are almost entirely economic (van Dommelen 1998). A term like this allows archaeologists to address the variability in the archaeological record.

The above questioning and redefinitions of key terms and concepts in the archaeology of colonialism inform my rejection of the assumptions they typically carry. The process of colonialism varies from one situation to the next and must be understood within its specific cultural and historical context. Colonialism must be used as a broader term describing two different but not homogeneous cultures interacting and sharing practices with degrees of domination on a continuum. As a process of entanglement, we gain a more flexible model for understanding past interactions. In the interior of Sardinia at sites such as Bingia ‘e Monti, this approach is especially crucial to observe cross-cultural interactions in an area not usually seen as engaged in the colonial process until centuries later.

Postcolonial theory in archaeologies of colonialism

The above discussion of the discipline’s origins and terms used in colonialism studies stems not only from the motivation to categorize types of interaction, but also from relatively new postcolonial approaches in archaeology that aim to reveal the complexities of interactions across cultures. An interest in the agency of local peoples, role of local elites, and economic strategies involved, as well as an acknowledgement of the limitations of colonial and imperial power, has transformed the way many archaeologists study the archaeology of colonialism. Also of central value in this recent focus on colonial studies is questioning the position of the observer, recognizing social biases, and the ways that western understanding of knowledge and the idea of change are shaped by a colonial past. It can be argued that “colonial situations cannot be bounded in either time or place, that they are fundamental to any history in the present” (Cooper 2005:34). Western dualisms such as domination and resistance, and colonizer and colonized, limit our understanding of the dynamic and complex nature of colonialism (Given 2004; van Dommelen 1998).

3.4 A material culture approach to colonial situations in the archaeological record

Archaeology as a discipline is designed to tackle questions about the past by analyzing material remains, so it should be no surprise that it centers on how to study social interactions in colonial situations based on the distribution, diversity, meaning, and everyday use of objects. A generally agreed-upon framework for studying colonial situations in the archaeological record does not really exist, though there are some shared approaches that highlight the central importance of material culture. Gosden (2004) emphasizes two themes in the archaeology of colonialism: colonialism is about material culture, and colonialism has a cultural effect on all groups involved. Drawing on Bourdieu's (1977) idea of *habitus*, Gosden states that "values are created and carried through our bodily relations to material culture, so that our unconscious and habitual acts in the material world are vital, especially through patterns of consumption" (Gosden 2004:5). Like Gosden, Silliman views material culture as an active participant in constructing culture, rather than a reflection of it. Gosden critiques both the world-systems and postcolonial approaches that are commonly used in the archaeology of colonialism. However, he does agree with many aspects of postcolonial thought. But while he finds a postcolonial approach useful, he points out that it could be improved by a comparative framework and greater focus on the material world.

Gosden (2004) stresses that colonialism around the world is similar enough to be placed in a comparative framework but at the same time contains deep variation. His model of colonialism consists of a typology with three categories that are not fixed or evolutionary and are only meant to provide an organizing framework for the data. The categories are as follows, arranged in increasing order of colonizer domination: colonialism within a shared cultural

milieu, middle ground, and *terra nullius*. He believes that a person's agency is passed from their body to the objects that they use and produce. He makes a distinction between objects of quality, which have fixed social value that they tent to lose under true colonialism, and objects of quantity, which have abstract values and are not socially embedded.

Stein (2005) also stresses the need to form a general theoretical framework for the archaeology of colonial encounters by synthesizing the numerous examples in the archaeological record. He sees Gosden's (2004) comparative model with a focus on objects as a complement to his focus on identity. The key to building a theoretical framework for the archaeology of colonialism is maintaining a comparative perspective that brings out common mechanisms and processes while recognizing variation. As Stein (2005) points out, foreign materials may be the result of trade or emulation, rather than the result of colonial presence. Entanglement is an increasingly common way to refer to the complex relations and identities of people involved in colonial encounters. This is a multidirectional process, not unidirectional as in an acculturation model.

Given (2004) enters the study of colonialism in archaeology through a consideration of the landscape, in particular the landscape as experienced by the colonized. Unlike other authors, he avoids categorization of various types of interactions. This allows him to include a wider range of examples, many of which would have never otherwise been identified as colonial. He recognizes the bias that has developed toward the colonizers, especially the Greeks and Romans in the Mediterranean, and responds by strongly arguing for an archaeology of the underrepresented non-elite colonized. His examples of colonialism follow the themes of resistance, agency, landscape, and narrative. One issue Given is especially concerned with in the treatment of colonialism is the emphasis on the resistance of the colonized at the expense of their

negotiation and exploitation of the colonial system. While resistance often occurs in many ways, it is not and should not be considered the main force shaping colonial society (Given 2004). If this broad definition of resistance is used, then it seems as though all activities of the colonized would be resistance. However the interesting point is not the fact that resistance took place, but rather understanding how and why. The colonized are not a unified group, but rather included diverse social and ethnic groups that reacted to colonization in many ways. To observe these different levels of resistance and the agency of the colonized he proposes a focus on non-elite private structures that are areas of daily practice (Given 2004). Bingia ‘e Monti is an example of such a site, and with the resistance of the interior as a main theme in Sardinian archaeology, it is an ideal place to observe the colonial situation.

Lightfoot (1995) brings the importance of pluralism to the fore in the archaeology of colonialism. Archaeologists must move past early colonization studies that utilized an acculturation model which assumes passivity and unidirectionality and the involvement of only two groups. Calculating the ratio of foreign to local objects found in an assemblage is not a valid way to assess the complexity of multi-group interactions. A diachronic contextual approach is necessary that looks at changing ideological structures and changes in the built environment that can, in turn, reveal changing practices such as gender segregation, food processing, and waste deposition (Lightfoot 1995:207).

Woolf prefers approaches that look at the creation of new cultures out of foreign and local cultures instead of looking at conflict between two incommensurable groups (Woolf 1997). He proposes the idea of unity in diversity. Its key components in Iron Age cultures are a common cultural vocabulary and a local subset chosen from it (Woolf 1997:343). This could easily be applied to colonial encounters in Sardinia during the Bronze and Iron Ages. In the

latter case archaeologists do not find the replacement of diversity with uniformity in Roman territory, but rather the replacement of locally generated diversity with diversity mandated by Rome. While he observes this in Roman Gaul, I disagree that all imperial situations result in social practices directed by the empire without local input. However, in any colonial situation we can expect that the identities and social structure of all people involved - foreigners and locals – will become reconfigured (Woolf 1997).

Woolf's proposed approach is much like the postcolonial idea of hybridity (Bhabha 1994) that has permeated many archaeological studies. This term has recently been replaced by the term hybridization, which focuses on the process of creating new objects, practices, and identities out of those involved in a colonial situation (van Dommelen and Rowlands 2012). This process varies by degree based on the different values of colonial society. For example, ritual practices and landscape use may be less flexible than burial so burial is more hybridized. Dietler uses entanglement as a more general term.

At Bingia 'e Monti, my approach incorporating foodways aims to tap into this focus on material culture in colonialism studies. Bingia 'e Monti is a local site that may not have had contact with a physical colony, making a flexible definition best suited to this study. I hope to reveal indigenous agency in the way that daily food practices change or continue, whether that indicates acceptance of new Phoenician foods or cooking methods or resistance to Phoenician practices, both results of hybridization or entanglement.

3.5 Colonial situations in the Mediterranean region

Even though there is neither a clear definition of the Mediterranean as a culture area nor a comprehensive concept of colonialism for the Mediterranean, these facts have not prevented archaeologists from discussing and comparing Mediterranean colonial situations. Lack of

coherence in the archaeology of colonialism in the Mediterranean can be explained by the divided character of colonial studies in the region, with focus placed on disparate sites and types of colonial interactions instead of comparisons across time or space.

The following paragraphs will set the stage for colonial situations in first-millennium BC Mediterranean. The period of cultural and economic decline that caused a major demographic movement in the Mediterranean around 1200 BC affected not only the Phoenicians but also the Minoans and Aegean peoples. Permanent and intentional colonization began to take place around the 7th millennium BC with the exceptions being Cyprus (9th millennium) and Sardinia (11th millennium). By the Early Bronze Age (around 3000 BC) all of the islands in the Mediterranean had been settled for about 10,000 years. Trading and commerce in the Mediterranean grew from geographic and resource diversity as well as the connectivity of the sea. According to Knapp "mechanisms of island colonizations, constraints, and contacts are conditioned by regional and local factors and must be examined in specific contexts" (Knapp 1992:56).

Archaic Greek sites have been the defining examples of colonialism in the Mediterranean until recently. Other colonial movements in the ancient Mediterranean include the Phoenician colonization of the entire region, the subsequent Carthaginian domination in the western Mediterranean, the Hellenistic conquest of western Asia, and the occupations of the Roman Republic and later empire. The Phoenician period is often not labeled as truly colonial because Phoenician interactions with local populations were believed to be limited. But this period is still extremely significant for colonialism in the Mediterranean since it laid the foundations for later Carthaginian and Roman domination. The pre-colonial structure of the Phoenician period resulted from the entanglement of Phoenician and indigenous peoples and materials which

remade the region (van Dommelen 1998). In the Roman Republican period, material culture for the most part retained continuity with the previous period of Punic presence in order allow for transition to the new situation. In an attempt to study multiple episodes of cross-cultural interaction, islands like Sardinia have come to the fore in Mediterranean archaeology. Like many islands in the Mediterranean, Sardinia has been described as being at once isolated and central.

Van Dommelen (1998) identifies two fundamental themes in archaeological studies of ancient Mediterranean colonialism: 'colonialist representations', or learning about and glorifying ancient colonialism, and 'dualist conceptions', or the assumption of the colonizer and colonized as two fundamentally different groups. These themes are rapidly changing as postcolonial perspectives begin to take hold in Mediterranean archaeology. Bourdieu's (1977) practice theory has also been adopted since it is well suited for understanding colonial power and exploitation in addition to the way social actors construct and reproduce colonial society (van Dommelen 1997:309). In recent decades attention to complexity and lack of clarity in colonialism studies is growing.

Rowlands (2010) stresses the need to rethink colonialism in the Mediterranean and link these new narratives and postcolonial approaches. Regional specialization has made looking at the movement of people and goods throughout the area more difficult. Rowlands points out that in archaeology the focus on identity may just be replacing the focus on cultures. Both are isolating concepts, and require a complete reconsideration beyond their use in the archaeology of colonialism. The process of hybridization allows one to concentrate on how identities are shaped through human and material interactions instead of imagining the clashing of separate presupposed ethnic identities (Rowlands 2010:236). Cosmopolitanism is a characteristic of

Mediterranean identities. Additionally, "ethnicity as a fixed and purified category is not a particularly helpful concept" in the Mediterranean and elsewhere (Rowlands 2010:241). In prehistory the Mediterranean was made up of "'areas' of more or less interaction and shared material connections that constitute 'fields' in which local '*habituses*' form and transform over time" (Rowlands 2010:244). He does not see the region as unified culturally. The Mediterranean contains "entities of shared essences and experiences" (Rowlands 2010:245).

Clearly within the Mediterranean, colonial situations need to be situated on a continuum of domination to influence. Looking at individual contexts, there is little evidence in most cases to form such a black and white picture of colonial situations. Colonizers are not homogenous groups and local populations are not without agency.

A focus on consumption

Within the Mediterranean, a focus on the consumption of material culture, whether it be ceramics or wine, has become a common approach for archaeologists attempting to understand the great range of colonial situations.

Dietler's (2005, 2010) work on colonialism in the Mediterranean focuses on consumption in order to step back from modern colonial situations. He carefully considers the definitions of terms like colony and colonialism because they reveal the problematic relationship between modern and ancient situations. Dietler (2005:54) defines colonialism as "the projects and practices of control marshaled in interactions between societies linked in asymmetrical relations of power, and the processes of social and cultural transformation resulting from those practices." In the study of Mediterranean colonialism he calls for examination of initial colonial encounters because they have the power to reveal the creation of "structures of colonial dependency and domination" that were later reproduced (Dietler 2005:61). This process can be most clearly seen

in consumption by studying and understanding which practices and goods were either incorporated into everyday lives or rejected and why. People construct culture through the assemblage of objects they create, and both culture and assemblage are dynamic and continually being created.

Dietler's (1998, 2005, 2010) research concentrates on early Greek colonies in the western Mediterranean. He focuses on two regions connected by the Rhône River valley, the eastern coast of Mediterranean France and the Hallstatt region. First (c. 700 BC) Etruscan traders and later (c. 600 BC) Greek colonists connected indigenous France to the rest of the Mediterranean through the wine trade. Greeks from Phocaea founded the settlement of Massalia in the seventh century BC on the coast of France and first imported wine but later began to produce their own wine and associated ceramics. These goods were taken up the Rhône valley and traded to inhabitants of the Hallstatt region. Although both regions participated in the wine trade, the material record at each differs greatly. Fewer but more elaborate wine vessels were found in the north, while near Massalia numerous vessels ranging greatly in quality were found (Dietler 1998). This evidence clearly disproves any kind of acculturation or world-systems models since practices and objects are being adopted in different ways in each location, and the Hallstatt region is not dependent in any way on a Mediterranean center. This example of similar practices with different social implications and meanings serves as a possible example for interpreting Phoenician influences that show up in foodways at Bingia 'e Monti. What most needs to be understood is why certain practices and goods were absorbed by a region while others were not.

Knappett and Nikolakopoulou (2008) consider the common Mediterranean situation of studying colonialism without colonies, focusing on Bronze Age Thera on the island of Akrotiri. There has long been a debate over the nature of Crete's influence on nearby islands, whether

Minoan colonization took place or Minoan material culture was emulated by local elites. Giving a more active social role to artifacts allows archaeologists to make more complex models of emulation, acculturation, etc. (Gosden 2004; Knappett and Nikolakopoulou 2008). The introduction of Cretan material culture seems to have stimulated a "colonialist space" for new practices and values (Knappett and Nikolakopoulou 2008:4). Minoan influence at Thera is a case of colonialism without colonies. The process is very gradual and in ceramics can be seen as the slow emergence of Minoan stylistic influences on local pottery rather than an increase in the number of ceramics imported from Crete. The authors compare Minoan colonization with Greek colonization during the first millennium BC, both were of a decentralized and material nature. Early Phoenician presence on Sardinia is much like the above situation since they did not set up formal colonies until a couple centuries after they began trading there, so we may expect to see a more gradual and nuanced Phoenician influence, especially inland.

The concept of identity is common when discussing colonialism in the Mediterranean. Gosden claims that identities became more fixed over the course of the first millennium BC, mainly due to more fixed territories. However, one does not need to assume that identities were fixed before increased interaction in order to trace the changes that take place during the time of heightened entanglement. We can see a dramatic change even if identities were fluid to begin with. Consumption of food, drink, and noncomestible material culture changes over time in a way that often reflects the flexibility of identity. This is what I expect to observe by applying a foodways approach at Bingia 'e Monti.

3.6 The contribution of foodways

Why study food in the colonial context? This is the question that sparked anthropological interest in foodways a few decades ago, and the answers have generated significant insights into human practices and culture. Few things are more fundamental in our lives than food. Food is integral to human existence. Therefore, the analysis of foodways has the capability to illuminate broad societal processes (Counihan and Van Esterick 2008; Mintz and Du Bois 2002; Sutton 2001). The intimate relation between food and the body gives rise to the phrase "you are what you eat." This is true in both a literal sense and in a more symbolic sense where people are defined by what they eat and what they do not eat. In this way food has the ability to create and express boundaries between groups in a way that is tangible. In other words, food itself physically expresses cultural boundaries and the ingestion of food shapes the people that eat it. For instance, Carsten (1995) describes how kinship relationships in Malaysia are formed through sharing rice cooked on the same hearth. Those who do not eat in the same way as others in a group may be viewed or classified as the "Other". Social relationships are constantly in flux, and foodways both reflect these changes and help constitute them. With increased awareness of the central place of foodways in cultural systems, archaeologists have been developing a series of new methodologies for constructing and interpreting the significance of ancient foodways.

According to Hamilakis (1999) a theoretically informed archaeology of food looks at production in terms of the socially meaningful transformation of food and makes consumption central because that is when food is integrated into the body. The paradigm of embodiment is the best lens for studying consumption because it restores people to the archaeological record and focuses on why people needed to produce certain items and substances (Hamilakis 1999:40). In sociocultural anthropology food is a cultural category that provides raw material for systems of thought and reflects social divisions, but archaeology can reveal how those foodways change

over time and why (Gosden 1999). All of human life can be understood in food: landscape, consumption in the creation of cultural categories, aesthetics and taste, body and embodied experience, food reflecting symbolism and thought structures; archaeology can illuminate all of this (Gosden 1999:7). However, the often indirect nature of our evidence requires careful methodology that brings together the technical and social, humanistic and scientific lines of inquiry.

Food and identity

Foodways grow out of repeated interactions structured by people's identities and history. Culture provides a template of rules for foodways, but actual consumption is usually determined by individual intention and agency (Anderson 2005:69). Food has an active social role and is involved in constant group negotiation, constraint, and change (feasting and daily meals are both important and effective arenas for observing this). Food creates the individual as well as the group through the daily practices of eating, as understood using Bourdieu's theory of *habitus* (Atalay and Hastorf 2006:283; Smith 2006). Over time food rules are embedded in the body and the group, linking food, memory, and identity. Food can construct relations based on equality, intimacy, or solidarity or sustain relations based on rank, distance, or segmentation (Appadurai 1981:496).

Food is excellent for marking social differences, boundaries, bonds, and enacting identity through its embodiment. It is useful for displaying distinctions like gender, age, race, ethnicity, socio-economic status, and rank. As Mintz (1985:3) says, "people who eat strikingly different foods or similar foods in different ways are thought to be strikingly different, sometimes even less human." Smith (2006:480) agrees that "the act of consuming food may represent the ultimate basic locus of identity." But at the same time identity is a dynamic and situationally

specific phenomenon. Social identity is bound to food preference and changes in preference indicate changes in identity (Appadurai 1981, Hastorf 1999). Therefore, looking at foodways in Sardinia will arguably provide a window into changing identities in the context of Phoenician-Nuragic interaction.

How do we see differentiation by looking at food in the archaeological record? Archaeologists need to know the meanings of foods to locate their strategic use in creating social bonds and/or differentiation. For example, Hastorf and Johannessen (1993) examine maize in the Andes and note that when maize changed from a boiled dish to a symbolic food made into beer (*chicha*) between AD 500 and 1500, the consumption of maize by women decreased significantly. This shift in maize use reflected and structured new political dynamics. These authors recommend the following methods to discover a food's meaning: examine changing contexts of food use, the stages food goes through and who participates, associations with other materials in context, and multiple data sets within a long temporal framework. Once we better understand the possible meanings of foods within a society we need to ask who used them and how to get at differentiation.

My goal is that through analyzing changes in animal species, skeletal elements, animal ages at death, butchery patterns, and other variables over time from meal remains at a typical Nuragic homestead, I will be able to build a picture of the MBA and LBA Nuragic diet. It is also possible that looking at patterns of foodways at Bingia 'e Monti and at other Sardinian and Mediterranean sites dating to the end of the Bronze Age will enable me to make a statement about the identity of the people living at those sites. Changing foodways may point to local cultural transformations that we see in the LBA and EIA with emerging hierarchy (see Chapter Two), growing villages, new burial practices, and the end of *nuraghe* construction. In some

regions these changes may reveal colonial processes and entanglements between Nuragic peoples and Phoenician settlers.

3.7 Conclusion

The above review of issues in the archaeology of colonialism in the Mediterranean is far from comprehensive, and a great deal of research must be done to create the possibility for a comparative framework within the region. Not only do the above studies add to Mediterranean archaeology, they also add to a subset of pre-Columbian colonization that has been significantly less well understood than modern Western colonialism. Many colonial situations, upon closer examination, turned out to not be colonialism in the modern European sense. Most of the recent Mediterranean colonial studies have been reframed by a postcolonial perspective. This has led to literature that diligently questions colonialism, embraces entanglement and fluid identities, focuses on consumption, and incorporates *habitus* and practice theory.

Mediterranean colonial archaeology today is at a point where connectivity among local populations is emphasized as an equal complement to regional specialization. Postcolonial perspectives have now firmly reached the study of colonial situations in the western Mediterranean. The study of colonialism in the Mediterranean has added a more subtle layer of inquiry to the wider study of the archaeology of colonialism. More general concepts of colonialism and colonizer allow archaeologists to include a greater number of situations to the archaeology of colonialism.

Due to the relative newness of a comparative postcolonial archaeology of colonialism in the Mediterranean there are numerous future directions to explore. These include a wider survey of sites that includes more case studies in the hope of revealing patterns and putting together a

more well-rounded comparative framework for the archaeology of colonialism. Although I focus only on LBA/EIA Sardinia and other Phoenician examples, we must tie in cases from either end of this period in order to better understand the roots of colonialism and its unexpected long-term consequences.

A focus on consumption, particularly on foodways is a somewhat new and valuable approach for study cultural transformations and entanglements in colonial situations. This requires a knowledge of general foodways in the cultural groups involved. I am hoping that Bingia ‘e Monti will add to our understanding of Nuragic foodways as a baseline for indigenous practices and also show changes in the LBA/EIA that can be linked to local cultural and/or climate transitions or colonial entanglements.

Chapter 4

Bingia ‘e Monti: Chronology and site architecture

This chapter begins with an overview of the location of Bingia ‘e Monti, situating it within the landscape of west-central Sardinia, specifically the Marmilla region. It continues with a description of the site with a focus on the *nuraghe*, the Bronze Age structure that is the site’s most noticeable feature today. The site is further broken down into its stratigraphic units which are diagrammed and described, with particular attention to those that contain material of interest for dating developments that took place during the Bronze Age. These stratigraphic relationships are especially important when sketching out rough phases for the site’s construction, modification, and abandonment. Much of the current understanding of Bingia ‘e Monti’s timeline comes from relative dates based on ceramic and stratigraphy. The chapter concludes with a plan for obtaining absolute dates for certain strata based on carbon dates from carefully selected faunal remains.

4.1 Location of site

Sardinia is the second largest island in the Mediterranean (c. 24,000 km^2, 280 km long, and 160 km wide), situated just south of Corsica, 200 km from the west coast of Italy, and 200 km north of Tunisia. About two-thirds of the landscape is covered in hills with mountains concentrated on the eastern side. These hilly areas are interspersed with rocky plateaus situated in flat alluvial valleys, the Campidano being the largest valley. There are three major rivers and

only one natural lake, but springs are quite common. The island enjoys a typical Mediterranean climate: dry and hot during the summer, and cool and moderately wet the rest of the year.

Bingia ‘e Monti is located in west-central Sardinia in the Marmilla subregion. This small-scale settlement (roughly two hectares) comprised of a Copper Age tomb and settlement, *nuraghe*, and other unexcavated areas on the hill top is situated within a resource-rich and geographically diverse landscape, specifically within the territory of the *comune* Gonnostramatza near the border of the Oristano and Medio Campidano provinces in west-central Sardinia (39°40'7" N, 8°48'58" E). The Marmilla is a region of large basalt plateaus interspersed with areas of flat land with seasonal rivers and numerous hills. The soils in the low-lying areas of the Marmilla would have been fairly productive for agriculture while those on the plateaus are thin and easily eroded (Holt 2013:26). The hills and plateaus provide basalt and high vantage points. To the west and south it is bordered by the Campidano plain, a fertile agricultural valley that stretches diagonally from the Gulf of Oristano on the west side of the island to Cagliari on the south coast. However, the Campidano plain has only recently become arable land thanks to the availability of more intensive farming methods; in the past this area may have been used primarily as pasture (van Dommelen 1998:52). The Riu Mannu, a seasonably variable river running northwest, flows along the eastern border of the Marmilla. Water is a scare resource in much of Sardinia, and this seasonal river with forks running near Bingia ‘e Monti as well as springs near Siddi Plateau would have been valuable. The Campidano plain extends slightly into the Marmilla by way of the Riu Mògoro valley (slightly northwest of the site) which contains another smaller river running northwest. About 86% of the island is a hilly landscape much like the Marmilla, while 13% of it is truly mountainous (van Dommelen 1998:37) (Fig. 4.1). To the

north, the Marmilla is bordered by the Giara di Gesturi, a large plateau about 550 m high containing 23 *nuraghi*.

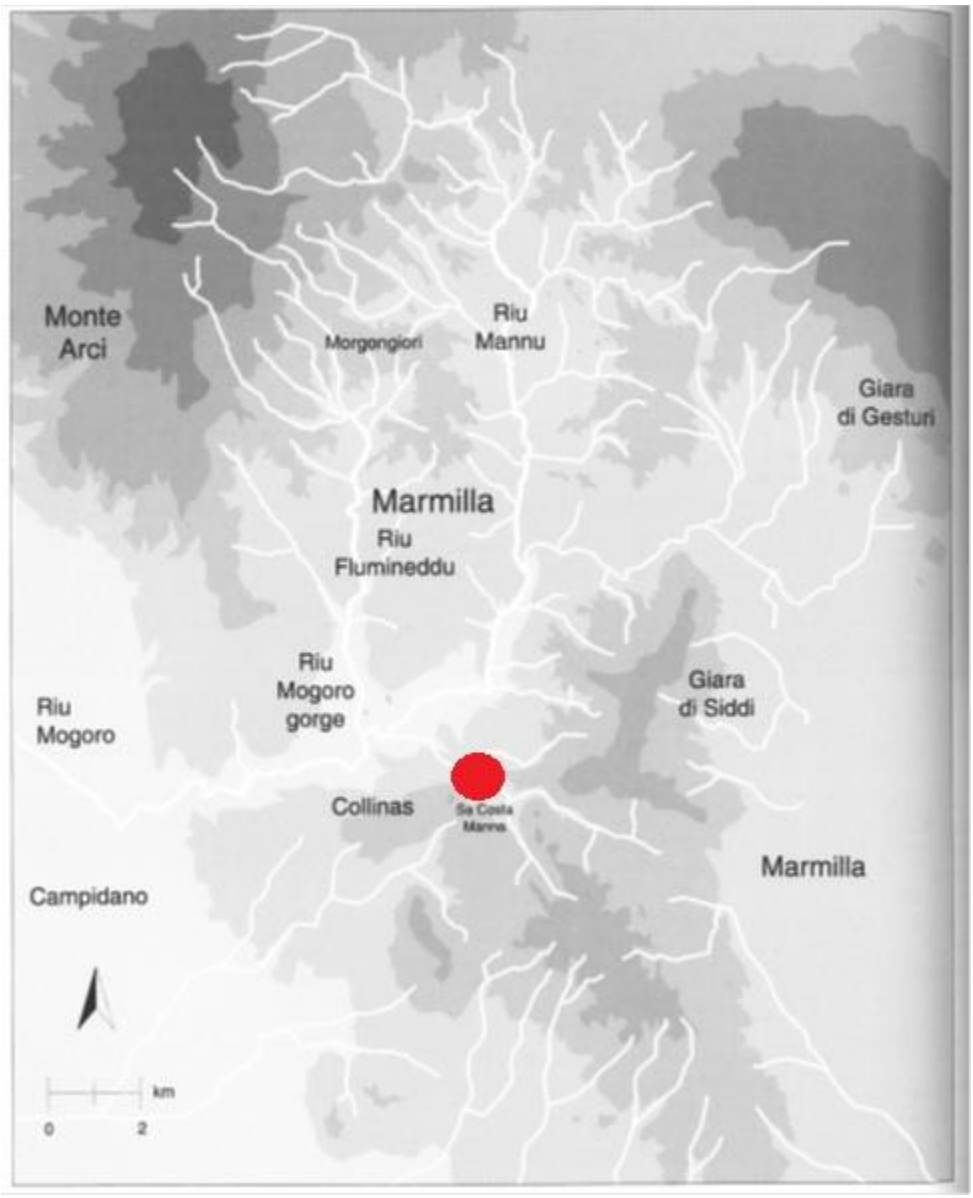

Figure 4.1. Relief map of the Marmilla region with Bingia ‘e Monti in red (from van Dommelen 1998:50).

When translated from the local Sardo dialect (Campidenese), the site name, Bingia ‘e Monti or Sa Bingia Montis, means ‘vineyard of the mountain’. However, it is neither located on or near a mountain nor vineyard. The site is positioned on a low rise (about 119 m above sea

level) with an unobstructed view to the north, east, and west and the Pranu Mannu blocking off the view to the south (Fig. 4.2).

Figure 4.2. Satellite view of the Marmilla region with Bingia ‘e Monti in red.

The site is about 2 km west of the Pran’e Siddi or Giara di Siddi (Siddi Plateau), a large basalt plateau containing 16 *nuraghi*, a communal “giants’ tomb”, and a spring. It is about 500 m north of the Giara di Collinas or Pranu Mannu (translates as ‘hand plateau’), which contains six *nuraghi*. Two of these are quite close to the edge of the plateau, and are visible a couple of hundred meters above Bingia ‘e Monti. The *nuraghi* on these plateaus as well as others would have been neighbors of Bingia ‘e Monti, though their occupation periods were slightly different (Fig. 4.3). These plateaus are made of mudstone and capped with basalt, making them excellent sources of the basalt blocks used to construct *nuraghi*. The island’s primary obsidian source, the extinct volcano Monte Arci, is slightly less than 15 km to the northwest at its closest point and

would have been no more than one to two days' walk from Bingia 'e Monti. A study of obsidian from Copper Age layers shows that obsidian was taken mainly from two sources on Monte Arci and then reduced at Bingia 'e Monti (Freund 2014). The western coast, specifically the Bay of Oristano, is about 35 km west of Bingia 'e Monti. Connections between the site and the coast can be seen in the marine shell remains brought back to the *nuraghe.*

Figure 4.3. Map of Rio Mògoro valley with Bingia 'e Monti in yellow. After tharros.info.

4.2 How and why *nuraghi* were built

Today Sardinia is home to between 7,000 and 8,000 *nuraghi* and may have contained as many as 13,000 at the height of the Nuragic period (Dyson and Rowland 2007:54). These multi-function (see below) megalithic towers are typically single tower *nuraghi* about 12 meters wide and 15 meters tall with 3 to 6 meter thick walls and 35-50 m^2 of interior space. A classic example of a single tower *nuraghe* is Santa Sarbana at Silanus (Fig. 4.4). They are entered

through a south-facing corridor and often have a small second floor reached by a staircase inside the main tower wall. The main tower room is often, has a ceiling height of six to eight meters (assuming there is a second floor), and contains one to three niches that in some cases are so large they can serve as small side rooms. The entrance corridor usually contains what has been labeled a 'guard's niche', a small oval-shaped room located within the thickness of the wall. Most *nuraghi* on the island have only one 'guard's niche' (Scintu 2003:60). Small *nuraghi* like

the one at Bingia ‘e Monti likely housed no more than one family of at most 10 people (Webster 1996:92).

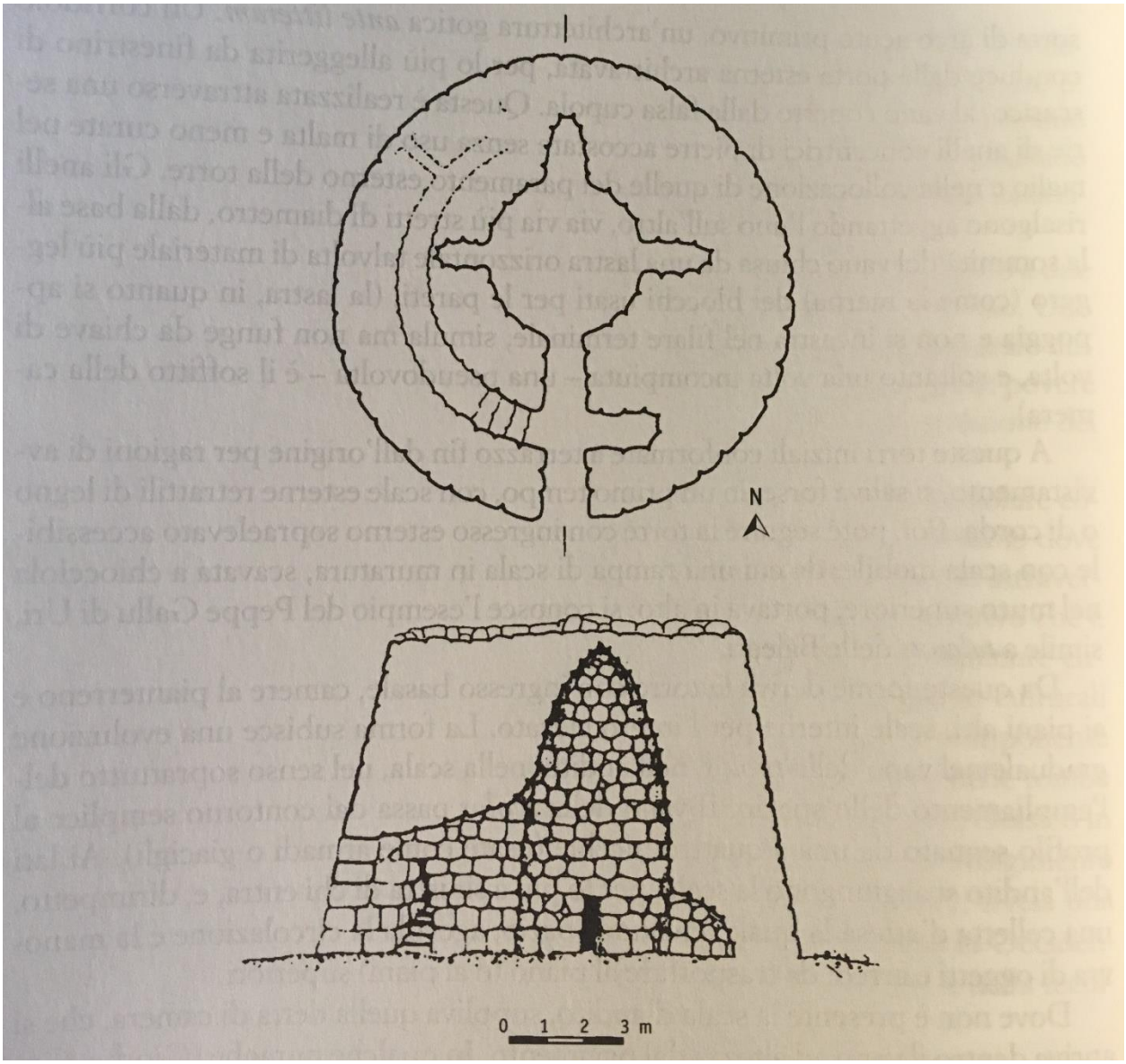

Figure 4.4. Interior and cross section of Santa Sarbana at Silanus. After Lilliu 2003:572.

Nuraghi are traditionally grouped into four main categories based on their complexity (Fig. 4.5). This evolutionary typology imagines that over time the most 'primitive' of these types eventually evolved into the most 'complex' and that each could be associated with a certain level of social organization. The first category consists of corridor *nuraghi*, flat stone platforms about 10 m high with rooms and tunnels running throughout the platform, sometimes with small wood-roofed structures on top. These were followed by single tower *nuraghi* with two or three stories which can be found at about half of all *nuraghe*-centered sites (Scintu 2003:39). This is followed by multi-tower *nuraghi* which have a main tower surrounded by one to four smaller towers joined by thick walls. The final category is complex multi-tower *nuraghi* which are like multi-tower *nuraghi* but have an additional surrounding wall linking more towers and containing some smaller stone buildings. Though this typology remains in use in Sardinian archaeology today, it has come under scrutiny as excavation and dating methods have improved and is no longer seen as an evolutionary typology. Instead, it is likely that multiple types of tholos style *nuraghi* were in use at the same time

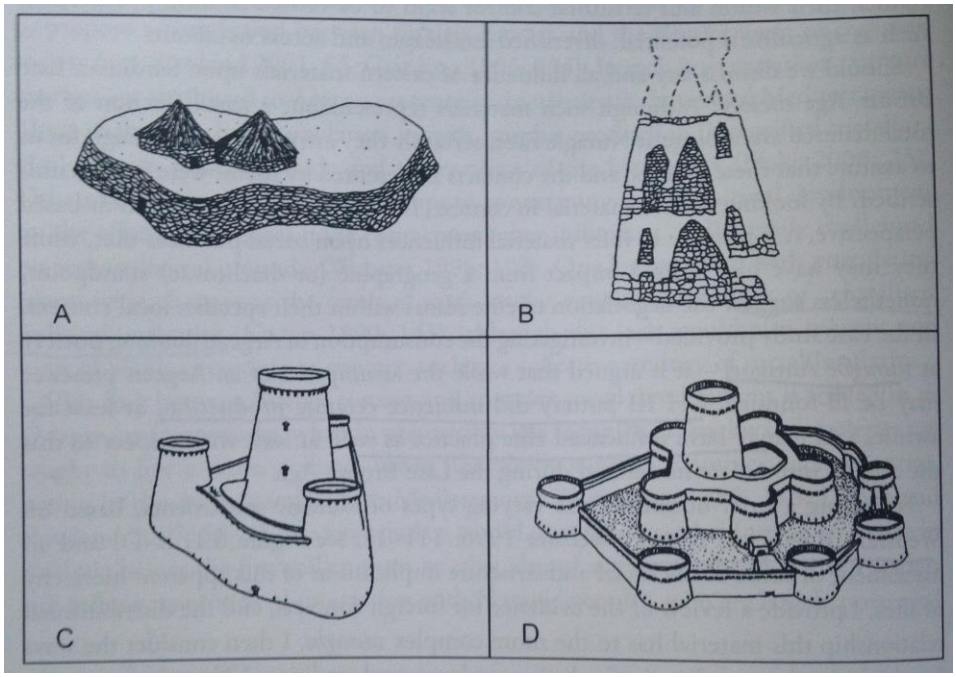

Figure 4.5. *Nuraghe* typology. A: corridor *nuraghe*; B: single tower *nuraghe*; C: multi-tower *nuraghe*; D: complex multi-tower *nuraghe*. After Russell 2010:108.

The *nuraghe* at Bingia ‘e Monti falls within the category of single tower *nuraghi* since it has only one tower and an attached courtyard. However, it is possible that at one time it was or was meant to be a multi-tower *nuraghe*. It appears as though a second tower or room was in the process of being built or was built and then removed (area D on the west side).

Building *nuraghi* would have required a good deal of time and effort. Stones had to be quarried, transported, shaped, and stacked. In many cases it seems that *nuraghi* were purposefully located near a source of stone (Webster et al. 1996). Builders would have used wood and stone tools to cut and shape blocks. A classic single tower *nuraghe* like Bingia ‘e Monti would have taken about 3600 person-days to build, perhaps with 10 people for 40 days a year for 10 years, as suggested by Webster (2015:59). Those participating in construction may have been inhabitants of nearby *nuraghi* who shared kin ties and exchanged labor obligations as new generations set up their own homesteads.

The purpose of *nuraghi* has long been debated. They likely had multiple functions during the Bronze Age and were “intended to offer defense against attack, while at the same time serving as home, barn, and silo for the residents” (Holloway 2001:1). Suggested functions include domestic houses, defensive structures, public refuges, temples, territorial markers, watchtowers, signal towers, or elite symbols of power and prestige. One popular argument is that *nuraghi* functioned as defensive structures. The *nuraghi* were mostly built in areas that were easy to defend, provided good views of the surrounding landscape, and had easy access to resources such as copper ore and fertile farmland (Lilliu 1982). Complex *nuraghi* in particular were built with extra walls and towers which likely had defensive functions like citadels or castles. Lilliu states that all *nuraghi* were intended for use as military structures and the word

‘*nuraghe’* is synonymous with fortress. However, while *nuraghi* may be well suited for defensive purposes, there is substantial evidence that points to defense as only one component of their use. Very little evidence of violence or warfare have been found in Bronze Age Sardinia, and while bronze weapons have been found, archaeologists determined that they were displayed in sanctuaries or used as votive offerings (Campus 2014:28; Gonzalez 2014:150). In many cases the *nuraghi*’s defensive nature may simply be part of domestic security meant only to protect their inhabitants from small raiding groups or perceived threats from other lineages.

With increasing attention to excavation methods and record keeping, abstract speculation about the function of the *nuraghi* has lessened. Excavations at *nuraghi* in the Borore group, a groups of *nuraghi* 50 km north of Bingia ‘e Monti, have made the complexity and variability of their functions much clearer. The Borore group contains a range of *nuraghe* types that seem to show a relationship based on the way they are clustered. Webster argues that at the site called Duos Nuraghes, evidence shows that the towers were used primarily as domestic structures likely housing a small group, but they may have also served secondary purposes (Webster 2001). A Nuragic settlement near Duos Nuraghes, called *nuraghe* Toscono shows no evidence of domestic activities within the tower, with only the surrounding huts containing living surfaces, suggesting that at this site the *nuraghe* itself did not serve a residential function (Michels and Webster 1987). Defense does not appear to be a primary or even secondary function. In this case as in others, the monumentality of the *nuraghi* is more likely a result of the material, labor, and technology available and not a product of class competition or feuding (Webster 2001). Based on these nearby sites, it is likely that *nuraghi* were built and used for varying purposes and many served multiple functions. The arrangement of the *nuraghi*, their strategic positions and intervisibility, suggests both simultaneous autonomy of each settlement and participation in a

larger network (Blake 1998). Sites do not seem to be randomly distributed but rather occur in clusters of 12-50 *nuraghi*, and may be centers for kinship units (Rowland 2001:39). Bingia ‘e Monti is surrounded by dozens of single tower and complex *nuraghi* that were likely part of a network in the Marmilla.

4.3 Bingia ‘e Monti layout and architectural elements

The main focus of this dissertation is the Bronze Age settlement, the *nuraghe,* at Bingia ‘e Monti, but I will first briefly describe the earlier and later periods at the site. Occupation of Bingia ‘e Monti, though intermittent, spans many centuries from the late Copper Age, or Monte Claro, (c. 2700-2200 BC) to the Byzantine period (Eastern Roman Empire c. 7th century AD). The earliest settlement phase is documented by a large quantity of ceramic and lithic material (maces and obsidian) of the Monte Claro type (Eneolithic or Copper Age: c. 2700-2200 BC), found both inside the later *nuraghe* whose construction disturbed the Monte Claro layers to the north and west (unpublished excavation records, Usai). The most well-preserved remains from this phase are concentrated in the northern part of the site and include wall segments and associated deposits that were later covered by the founding of the *nuraghe* and therefore were sealed and undisturbed. In the northern section two circular wall segments were uncovered that seem to be part of two elliptical *capanne* (sing. *capanna*, the Italian word for hut, but I will refer to it as a circular domestic structure). The site also contains a communal tomb in use from the later Copper Age to the Early Bronze Age (EIA c. 2700-1800 BC). The communal tomb is located 180 m northwest of the site, built into the side of the hill that the site rests on; it may have been visible from the second story of the *nuraghe*.

A Roman/Byzantine period building was added to the east wall of the *nuraghe*, which had collapsed by that time, and consists of four linear walls (SUs 16, 66, 68, 69) likely constructed from stones from the collapsed *nuraghe*. The Roman structure is rectangular with two rooms containing materials attesting to an intense frequentation especially in the late imperial period. The north-south wall was not completely excavated and likely extends to other rooms from this period.

The *nuraghe* at Bingia ‘e Monti (Fig. 4.6 and 4.7) is very much like the simple tholos *nuraghi* described by Webster above. The single tower *nuraghe* located atop a low hill with a relatively flat but sloping top. The structure is built on a north-south axis with the entrance facing north, unlike typical south or southeast-facing entrances (Webster 2015:55). This is possibly because to the south Pranu Mannu was so close to the *nuraghe*, and the most expansive view of the surrounding landscape was to the north. The courtyard entrance is slightly east of the entrance to the main tower, meaning that from outside one would not be able to see what was happening inside the main tower. The *nuraghe* is constructed completely out of uncut basalt slabs which range from boulder-sized pieces almost a meter long and half a meter high at the base to fist-sized rocks at what would have been the pointed tholos top. Like other *nuraghi*, the walls do not contain any mortar. The tower is linked by a short passage to a small somewhat circular courtyard which also has a north-facing entrance. Altogether, the distance from the outer wall of the courtyard to the outer wall of the tower room is about 20 meters north to south. Ceramics, stone maces, and obsidian debitage found on the ground around the *nuraghe* may evidence for the existence of a small MBA Nuragic settlement or outdoor activity space associated with the *nuraghe* (unpublished excavation records, Usai). If so, any architecture was subsequently destroyed by plowing, as there are no traces were picked up in excavation.

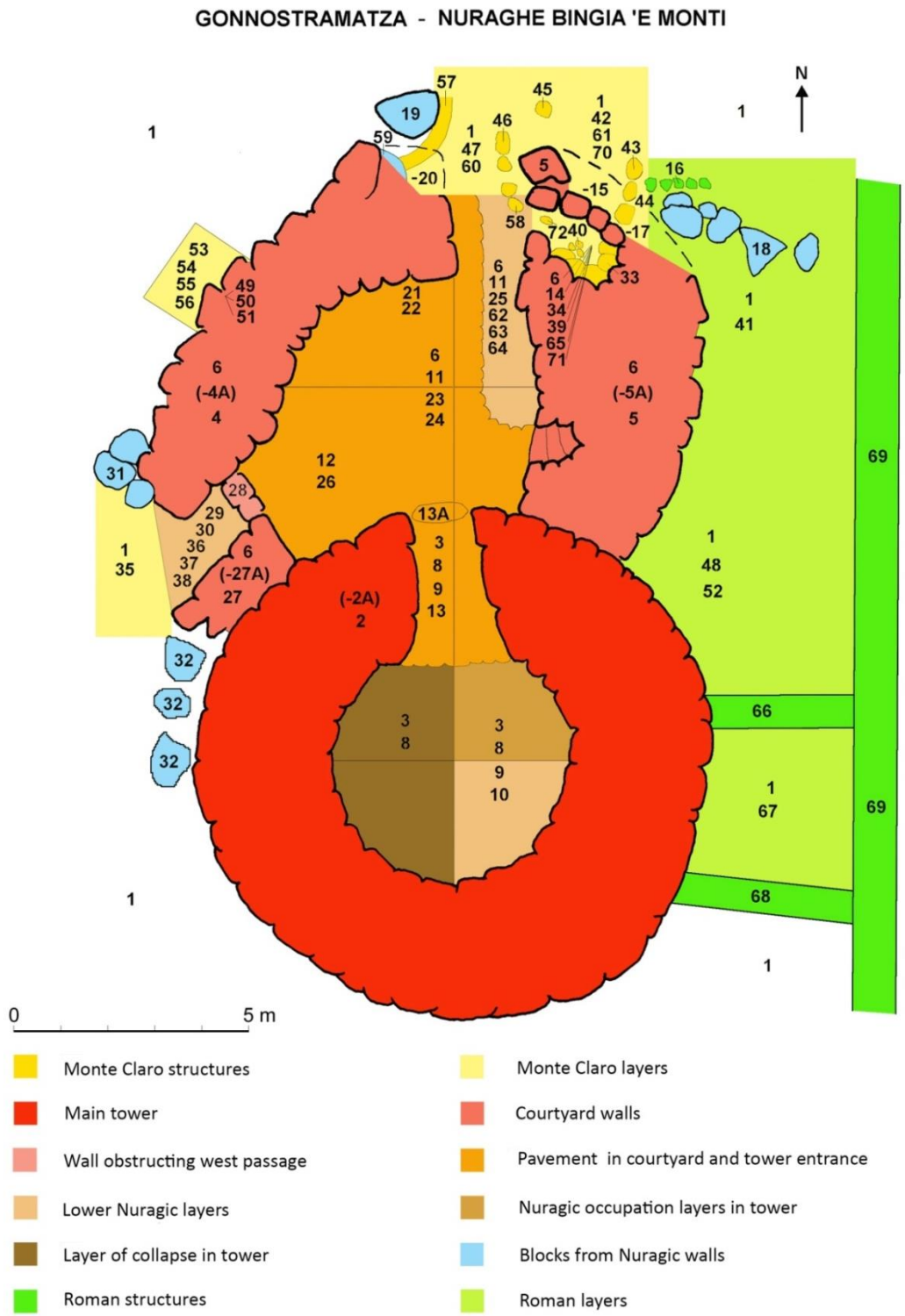

Figure 4.6. Plan of Bingia ‘e Monti (by Alessandro Usai). Shows location of SUs.

Figure 4.7. A view of Bingia ‘e Monti from the west. To the right (south) is the lower wall of the tower and to the left (north) is the courtyard.

The main tower room has a diameter of about five meters with walls about two and a half to three meters thick. The tower entrance is about one and a half meters wide and three meters long. Today about three courses remain of the walls standing no more than about two meters high, but when the tower was in use it would have had a height of approximately 10 to 15 meters. This room has no niches or side chambers. It potentially had a small circular room or platform on the second floor that would have been accessed externally through stairs inside the courtyard wall.

The courtyard is not a perfectly round space and consists of three separate walls. Today these walls are about half a meter to one meter tall (one to two courses). The eastern half of the wall (wall 5) is curved and about three and a half meters thick with a less than one meter wide staircase running inside the southern portion of that wall (close to where it abuts the tower). This staircase would have led to the top of the courtyard wall where one could have walked from one

side of the wall to the other surveying the countryside. Based on the presence of ash and charcoal in the faunal material from SUs 23, 39, 42, 60, and 65 there seems to have been a hearth in the middle of the Nuragic courtyard and multiple hearths or burn events in the Monte Claro period in the north end of the site.

There is a small oval-shaped room within this wall segment that opens to the east of the courtyard entrance (about two meters long and one and a half meters wide). This room has been called a *celletta*, a small cell, by the excavators and is the room that archaeologists often call the 'guard's niche', though there is no evidence that it served that function at Bingia 'e Monti. The slightly curved section of the wall (wall 4) to the northwest varies in thickness from two to three meters. The west side of the courtyard is interrupted by a small passage about one meter wide near the tower wall with the remaining section of wall (wall 27) (about one and a half meters wide) abutting the tower. The courtyard entrance is about one and a half meters wide and slightly offset to the east of the tower entrance so that looking into the courtyard from the outside one would not be able to see directly into the tower room. This entrance is also about three meters long. Overall the courtyard is about six meters wide at the widest part (near the tower) and four meters wide at the narrowest part (near the entrance). Large pieces of burnt daub with imprints of sticks or reeds and a post hole (in SU 12) found in the western part of the courtyard indicate a roofed structure, possibly used as a storage area or covered work area as evidenced by a large collection of broken vessels and a few spindle whorls and loom weights. The pavement (SU 24) throughout the courtyard was made of large flat basalt stones and may have replaced an earlier dirt floor.

4.4 Brief outline of Sardinian chronologies

The indigenous Nuragic civilization (Nuragic being the term used to describe the people and period during which *nuraghi* were built and used) flourished on Sardinia for almost a millennium from the mid-Middle Bronze Age (c. 1600 BC) into the Roman period (c. 238 BC). Bingia ‘e Monti is one of thousands of settlements associated with the Nuragic people. This culture consisted of stratified agro-pastoral societies grouped around *nuraghi* (plur. Italian, sing. *nuraghe*), conical megalithic towers. Nuragic peoples also produced *bronzetti*, elaborate bronze figurines of people, animals, and model *nuraghi*, practiced rituals centered around sacred wells, built large “giants’ tombs” for communal burial, and traded widely within the Mediterranean. See Chapter Two for brief summaries of the EBA, MBA, and LBA on Sardinia.

Sardinian prehistory follows a slightly different timeline than mainland Italy and includes multiple overlapping and parallel chronologies (Table 4.1, also see Table 2.1). These periods are named for specific sites or ceramic types, the standard Copper, Bronze, and Iron Ages, and conventional classical periods, or art-historical periods. The first truly Sardinian chronology based on a stratigraphic excavation came from Giovanni Lilliu’s 1951-1956 excavation at Su Nuraxi in Barumini. Lilliu distinguished five different occupation phases starting with a single tower *nuraghe* and culminating in a complex *nuraghe* surrounded by a large village. Although dates have been adjusted over the years, these five phases have served as the backbone for Nuragic chronology on Sardinia (Webster 1996:17). Lilliu’s Nuragic phases are commonly associated with changes in settlement patterns and site architecture. Nuragic I includes corridor *nuraghi*: megalithic platform structures with corridors running through them. Nuragic II includes single tower tholos *nuraghi*. Nuragic III sees the expansion of single tower *nuraghi* into complex multi-tower *nuraghi* with villages. Nuragic IV represents a second phase of multi-tower *nuraghi* after structural changes have been made. Nuragic V includes the final stages of

occupation at *nuraghi* into the Punic and Roman periods. Since this chronology is evolutionary and based on the architectural typology discussed above, it is no longer widely used.

Upper Paleolithic	Lower	Clactonian?		>150,000 BC
	Middle			
	Upper	Grotta Corbeddu		15,000-11,000 BC
Mesolithic				11,000-6000 BC
Neolithic	Early	Su Carroppu		6000?-5300 BC
		Filiestru-Grotta Verde		5300-4700 BC
	Middle	Bonu Ighinu		4700-4000 BC
	Late	Ozieri		4000-3200? BC
Eneolithic (Copper Age)	Initial	Sub-Ozieri Filigosa Abealzu		3200?-2700? BC
	Full	Monte Claro	Beaker A	2700?-2200? BC
	Final		Beaker B	2200-1900 BC
Bronze Age	Early	Bonnanaro A		
	Middle	Bonnanaro B		1900-1600 BC
		Nuragic I		1600-1300 BC
	Late	Nuragic II		1300-1150 BC
	Final	Nuragic III		1150-850 BC
Early Iron Age	Geometric	Phoenician	Nuragic IV	850-730 BC
	Orientalizing			730-580 BC
	Archaic			580-510 BC
Late Iron Age	Punic		Nuragic V	510-238 BC
	Roman	Republican		238-1 BC
		Imperial		1 AD-476 AD

Table 4.1. Chronology of Sardinian archaeology (based on Dyson and Rowland 2007:19).

Starting in the 1970s, C14 and obsidian hydration dates became available at many Nuragic sites and allowed archaeologists to discuss the chronology in terms of absolute rather than primarily relative dates. About 80 radiocarbon dates from 25 sites are available (Webster 2015:xv). Lilliu's chronology, especially the Nuragic I and Nuragic V periods, has been questioned by the most recent generation of archaeologists working on Sardinia. New carbon dates suggest that corridor *nuraghi* were built for the first time in the early MBA rather than the EBA (Depalmas 2009). Complex *nuraghi* have commonly been associated with the Late and

Final Bronze Ages, mainly based on Lilliu's observation of the transformation of Su Nuraxi from a single tower to a multi-tower *nuraghe*. However, many complex *nuraghi* show evidence of being built all at once and can be dated to the mid-MBA (Holt 2013:121), placing them earlier in the Nuragic sequence than was previously thought according to the architectural chronology.

4.5 Known site chronology at Bingia 'e Monti

The current chronology for Bingia 'e Monti relies on relative dating methods based on architectural analysis and Nuragic typologies as well as ceramic finds. In broadest terms the site was in use during three distinct periods: the Copper Age, Bronze Age, and Roman period. Focusing on the Bronze Age, and based on conversations with Dr. Usai and his rough dating of ceramics found during excavation, I have identified four rough architectural phases at Bingia 'e Monti:

Phase I: construction of main tower (mid- or late-MBA, c. 1600-1200 BC)

Phase II: first phase of courtyard construction (SUs 62, 63, 64), possibly construction of room D (LBA)

Phase III: second phase of courtyard construction (SUs 11, 12, 23, 25), pavement added (SU 24), and room D either removed or abandoned (LBA/FBA)

Phase IV: *nuraghe* abandonment and collapse (FBA/EIA, c. 1100-800 BC)

Below in section 1.6, I give another version of these phases based on radiocarbon dates.

The site of Bingia 'e Monti is divided up into seven main areas labeled by letters: A- main tower, B- courtyard, stairs, and courtyard entrance, C- *celletta* in courtyard wall, D- passageway branching off the southwestern side of the courtyard, E- the Roman period remains

east of the *nuraghe*, W- trenches placed outside the western wall of the *nuraghe*, and N- excavation north of the *nuraghe* that contains mostly Copper Age remains. These areas are then broken down into numbered stratigraphic units (SUs) that are defined based on cultural changes and/or depth. These units are then made up of multiple subunits that may denote cardinal location within the SU, excavation depth, or the date of excavation (in the case of subunits that only differ by date, I have combined them for the faunal analysis).

Appendix B gives a full list of the SUs and their descriptions divided by the lettered areas in the above paragraph. The SUs are numbered 1 through 72 and include Copper Age, Bronze Age, and Roman period deposits as well as a later post-Roman double burial in the courtyard (SUs 21 and 22). Two SUs from a 1993 excavation, 73 and 74, are not included in the table. Along with a section of SU 64, we know that they were located in the center of the courtyard, but detailed excavation records were not kept.

Appendix A contains two Harris matrices for Bingia ‘e Monti. The first matrix shows areas A, B, C, and D, and the second shows areas W, N, and E. Structural elements and negative SUs are indicated. These matrices were created using a program called Harris Matrix Composer using the SU descriptions and relationships provided by Dr. Usai.

4.6 ^{14}C dating and results

Like most archaeological sites on Sardinia, Bingia ‘e Monti’s overall chronology is based on stratigraphic relationships and ceramic typologies. Because the current chronology for Bingia ‘e Monti is based on relative dating techniques, it is difficult to study events and changes at the site on a smaller time scale and place them within a larger regional chronology. Also, precise dates for the extensive ceramic assemblage will be unavailable until funding is found for a complete restoration and study. In order to better understand the site’s Nuragic occupation, five

samples of animal bone were selected to assign absolute dates to occupation levels (Table 4.2). Occupation layers were found on a floor surface or pavement in most cases and have items like ceramics, small finds, and animal bones that are less fragmented and appear to be in their primary positions. The five samples were chosen for their context as well as their potential to contain well preserved collagen for analysis (i.e. fragments of cortical bone from limb bones or mandibles that weigh more than two grams). The bones were sent to Beta Analytic for collagen extraction with alkali followed by ^{14}C dating using accelerated mass spectroscopy (AMS) and carbon and nitrogen stable isotope analysis (see Chapter Five for isotope results).

Find ID	Context	Bone description	Conventional age	Probability and calendar calibration
(O)/A/9/2	Occupation level in the tower and tower entrance, NE quadrant	Cattle rib fragment	3110 ± 30 BP	(95.4%) 1437-1288 BC
(O)B/23/15	Occupation level in courtyard, SW quadrant, NW section	Proximal sheep/goat metacarpal fragment	3100 ± 30 BP	(95.4%) 1431-1283 BC
(O)B/25/11	Layer in SE courtyard entrance where pavement is not present, abuts the pavement, NE section	Pig astragalus	3100 ± 30 BP	(95.4%) 1431-1283 BC
(O)C/34/2	Nuragic occupation layer in *celletta*	Distal sheep/goat metacarpal fragment	3250 ± 30 BP	(80.5%) 1613-1491 BC (14.9%) 1485-1451
(O)D/37/1	Nuragic occupation layer in west side passage	Unidentified medium mammal limb bone fragment	3160 ± 30 BP	(92.8%) 1501-1391 BC (2.6%) 1336-1323 BC

Table 4.2. ^{14}C dates and sample descriptions.

Although these are secure archaeological contexts, it is always possible that some of the bones from these assemblages are intrusive, so the acceptance or rejection of the absolute dates depends on consideration of the overall stratigraphy. Ideally I would send in at least a dozen

samples of more than one class of material for dating to be more certain that each item is representative of the context that it came from. Unfortunately radiocarbon dating is prohibitively expensive and the dating of more samples will have to wait for a future project.

Using Bayesian analysis of radiocarbon dates, the samples have all been assigned dates at the 95.4% probability level. In some cases this is broken down into two possible date ranges, as with SUs 34 and 37. For each sample, dates are also given at the 68.2% probability level. At this lower level there are two to four possible ranges given for each sample that fall within the larger date range given at 95.4% probability. The chart below for sample C/34/2 displays these probabilities (Fig. 4.8).

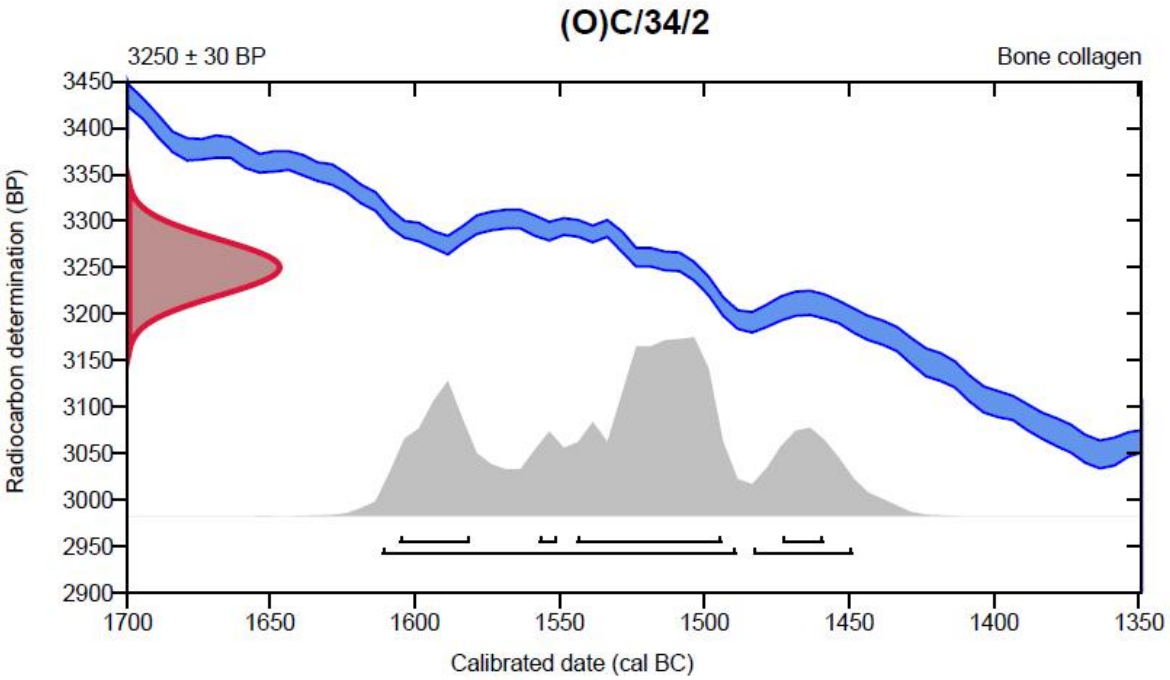

Figure 4.8. Calibration graph produced by Beta Analytic showing multiple probability ranges for sample (O)C/34/2.

According to the above radiocarbon dates, the oldest SU of the five is 34, with an 80.5% chance of dating from 1613 to1491 BC and a 14.9% chance of dating between 1485 and 1451

BC. Within its possible overall range of 1613 to 1451 BC, there is a 42.8% chance that it dates from 1546 to 1496 BC. The Nuragic period is thought to start in the mid-MBA, c. 1600 BC, so it may be that the *nuraghe* at Bingia ‘e Monti is one of the earlier *nuraghi* constructed on the island. The site had been used in the Monte Claro period as a settlement and into the EBA as a burial location, so although there seems to be a gap in occupation between the Monte Claro and MBA, it is likely that it was a known and desirable site. This SU also abuts wall 5, the eastern courtyard wall, which means that this wall may have also been constructed early in the site’s Nuragic occupation if this bone is representative of the SU. The order in which the two segments of the courtyard wall were built is unclear, so I cannot say that the entire courtyard space is as early as SU 34.

SU 34 is a Nuragic occupation level within the *celletta* in the courtyard entrance, area C. This space is fairly common in *nuraghi* and sometimes there is a cell on either side of the entrance. This *celletta* contained several large coarse ceramic containers that were broken but otherwise largely intact. It seems likely that this was being used as a storage space. Excavators noted in the SU descriptions that 34 is the same level as SU 25 based on stratigraphy. Since a bone sample from B/25/11 was dated to 1431-1283 BC with a 35.5% chance of dating between 1346 and 1304 BC and a 32.7% chance of dating between 1416 and 1376 BC, either these SUs are not contemporary or one or both of the samples are not representative of those SUs. Without a detailed ceramic study or dating of more samples, I am hesitant to decide one way or the other.

The second oldest sample comes from SU 37 which has a 92.8% chance of dating between 1501 and 1391 BC and a 2.6% chance of dating between 1336 and 1323 BC. Within that range there is a 55.6% probability that it dates between 1455 and 1411 BC. This is about 100-150 years later than the sample from the *celletta*. SU 37 comes from a Nuragic occupation

level in the west side passage, area D. Without further excavation west of the *nuraghe*, it is not immediately obvious whether this passage was planned and then cut off at the time of abandonment or led to another chamber in the *nuraghe* that had been put out of use much earlier. Wall 28, which appears to block off access to this passage, is later than SU 37, so this SU comes from a point when the passage was either in use or under the initial phases of construction. The earlier date of this context compared to those in the courtyard (B/23 and B/25) indicates that it was put out of use during or before a major phase of construction, when the majority of the courtyard was paved.

The remaining three samples, from A/9/2, B/23/15, and B/25/11, came back with very similar radiocarbon dates. SU 9 has been dated between 1437 and 1288 BC with 95.4% probability, between 1425 and 1381 BC with 39% probability, and between 1342 and 1307 BC with 29.2% probability. Slightly later than SU 9, SUs 23 and 25 were assigned the same dates and probabilities: between 1431 and 1283 BC at 95.4%, between 1346 and 1304 BC at 35.5%, and between 1416 and 1376 at 32.7%. SU 9 represents an occupation level in the main tower and tower entrance beneath a thick layer of collapse. SU 23 is an occupation level in the southwest part of the courtyard, above the pavement. SU 25 abuts the pavement and is part of a trench in the northeast portion of the courtyard where the pavement is absent. Because 23 and 25 were assigned the same date range, it is likely that the pavement was removed in the northeast corner before being filled in with SU 25 to bring the courtyard to the level of SU 23. Overall these three contexts are roughly 20 to 60 years later than the previous phase. Below are three potential phases based on the radiocarbon dates:

Phase I: SU 34, maybe east courtyard wall and tower, c. 1613-1491 BC or with a lower probability 1485-1451 BC

Phase II: SU 37, earlier than or coinciding with major changes in the courtyard- SU 24 pavement, c. 1501-1391 BC with a 55.6% chance of being between 1455 and 1411 BC, before wall 28 was put up and passage D was cut off

Phase III: SU 9, 23, 25, after paving of the courtyard, passage D cut off, c. 1437-1283 BC

Unfortunately the radiocarbon dates do not reveal anything about the chronological relationship between the tower and courtyard construction. It seems likely that at least the east section of the courtyard was an early addition, though we cannot be completely sure. It is also unclear whether the tower, courtyard, and *celletta* of the *nuraghe* were abandoned at approximately the same time and when that may have been.

4.7 Conclusion

Bingia ‘e Monti is a site that provides an excellent opportunity for studying a small single tower *nuraghe*, the most common type of Nuragic structure that is often ignored in favor of grander multi-towered *nuraghi*. The size of the tower room and courtyard point to a building that was occupied by a small group, likely a single family, with the possibility that more people lived in small non-permanent structures also situated on the hill. Further excavation is necessary to determine what other domestic structures and activity areas were associated with the *nuraghe*. Ceramic typologies suggest a range of occupation from the mid- to late-MBA to the FBA/EIA, and radiocarbon dates range from 1613 to 1283 BC, though these are not the earliest or most recent contexts at Bingia ‘e Monti. It is certainly possible that the *nuraghe* was occupied into the

12th century. That is at least 330 years of Nuragic occupation assuming that the samples dated are representative of their contexts. These samples also outline three phases of construction during that time.

Chapter 5

What the bones tell us: Faunal analysis at Bingia ‘e Monti

This chapter presents data collected from the faunal material recovered at Bingia ‘e Monti. As discussed in Chapter Three, a study of foodways can contribute greatly to the archaeological analysis and framing of colonial situations in the Mediterranean and beyond. Because meal preparation and consumption is a daily practice through which people create and maintain social boundaries and also social bonds, it is of particular interest when examining social transformations in LBA/EIA Sardinia. This chapter covers the methodology used during faunal analysis, and reflects on why certain categories of data are recorded and how they can be interpreted from an anthropological perspective. I discuss and interpret patterns that emerge when species, skeletal elements, ages at death, wild versus domestic animals, and butchery and burn marks are compared in looking at the different phases of occupation at Bingia ‘e Monti.

During excavation 1429 identifiable and 5933 unidentifiable bones were recovered and studied (7362 total), revealing the remains of over a dozen different species. It is critical to note that while counts (NISP, MNI), percentages, ratios, tables, and graphs are central to faunal analysis, it is also the job of the analyst to go beyond quantitative data and consider what the numbers and categories might have represented to the people who had relationships with these animals. And like the reflexive approach employed in anthropology, faunal analysts must keep in mind how questions and methods structure interpretation of the data.

Changes in foodways can be seen by looking for patterns that indicate differences in the types of animals or plants being eaten and the way they are processed, combined, cooked, and discarded. To gauge the changes in foodways that social transitions in LBA/EIA Sardinia, including the Nuragic-Phoenician entanglement, may bring I will use the collected data to focus on 1) proportions of species present, 2) animal husbandry and kill patterns, and 3) butchery and cooking practices. In the case of butchery and cooking I will look at preparation and consumption practices and the types of food eaten, to determine if there are old practices for new foods, new practices for old foods, new practices for new foods, or old practices for old foods.

The following questions will be key: How do species ratios change over time? Is a preference for wild animals replaced by a preference for domestic animals? How are secondary products used? Are new ingredients incorporated while certain foods remain unchanged?

5.1 About the assemblage

Records show use of a 1 cm screen for all material, and upon inspection the faunal remains appear well preserved and carefully stored and organized. The recovery of multiple bones from small birds and mammals and small fragments of bone from larger mammals reveals remarkable care taken by the excavators regarding a class of materials so often overlooked at that time and easy to miss during sifting. That said, I anticipated that the majority of microfauna (such as *Prolagus sardus*, rodents, and songbirds) and small and fetal skeletal elements might be underrepresented overall at Bingia ‘e Monti. Despite the favorable preservation conditions, small and fetal/juvenile bones are easily carried away by other animals and will degrade more quickly than larger thicker bones, even under the best conditions. Another reason these bones are likely underrepresented is that flotation is a much better technique than hand collection for

recovering small bones. Flotation may have also provided us with insect and botanical remains, of which there are none from Bingia ‘e Monti. Since questions about diet and environmental reconstruction were not often asked in Sardinia until recently, methods like flotation were uncommon when Bingia ‘e Monti was excavated. Flotation would add significantly to our understanding of foodways at the site.

The state of preservation can also be roughly gauged by looking at the amount of identifiable versus unidentifiable bone (Table 5.1). The percentage of bones that are identifiable for each of the three major periods is between 15% and 25%, with those coming from the Nuragic levels containing the highest percentage of identifiable bone. Given the collection methods, it is unusual to have such a high percentage of unidentifiable bone from each period, since hand collection and large mesh sizes often inflate the number of identifiable bones (Badenhorst and Plug 2011:89). The lower percentages of identifiable bone in the Monte Claro (Copper Age) and Roman periods may have been impacted by age and deposition (collapse of the *nuraghe*) respectively.

In terms of total counts, we can see that the majority of bones come from the Nuragic period (43.0%), about twice as much as from the Monte Claro (27.3%) and Roman (29.6%) levels. However in looking at the number of contexts excavated from each period, this difference is likely because more Bronze Age contexts were excavated, not because more animals were consumed.

	Number of contexts	**Total count**	**Identifiable**	**Unidentifiable**
Monte Claro	45	2010	338 (16.8%)	1672 (83.2%)
Nuragic	160	3163	724 (22.9%)	2439 (77.1%)
Roman	28	2180	346	1834

			(15.9%)	(84.1%)

Table 5.1. Quantity of bones for each time period at Bingia ‘e Monti broken down into identified and unidentified. Does not include shell remains.

Excavations began in the main tower of the *nuraghe*, dividing it into four quadrants and removing multiple layers of collapse. From there, excavators expanded into the courtyard and entrance. Only the *celletta* (C), west side passage (D), and eastern half of the tower (A) were excavated completely, mainly due to difficulties removing the collapse layer. Later excavations focused on lower Copper Age layers below the *nuraghe* and the late Roman addition. A third phase of excavation was undertaken by Remo Foresu in 1993, but due to lack of information on proveniences, I will not be including those materials. The faunal remains numbered about 200 and came mainly from Bronze Age contexts in the *nuraghe's* courtyard. None of the contexts contained unusual species or skeletal elements.

Archival records for the excavations at Bingia ‘e Monti contain an inventory of artifact categories from each context, excavation journals, excavation drawings, and a short description of the site. The most valuable records for faunal material, however, were the tags sealed in each bag of bones. These show the SU number, find ID, context location, soil depth, and date of excavation (Fig. 5.1).

Figure 5.1. An example of one of the contexts from Bingia ‘e Monti, (O)A/9/5.

Other classes of material (lithics, ceramics, daub, metals, charcoal, small finds) are recorded in the inventory, and although I can see whether they were present in each of the contexts, there is no descriptive or quantitative information. When I put together my research proposal I had hoped to study the ceramics as well, but found that I could not get permission to study them without hiring a ceramic restoration specialist. For this dissertation my knowledge of the ceramic assemblage comes from a brief visit to the ceramic storage rooms and some descriptions and preliminary dates from the excavation journals. With over 40 crates of ceramic material, a detailed analysis would be a daunting task, so I chose not to undertake this in the current project. On other fronts, a sample of the lithic material from Copper Age contexts was studied a few years ago by Freund (2014).

5.2 Methodology

Data recorded

Like all other anthropological and archaeological endeavors, faunal analysis requires collection of both quantitative and qualitative data. I spent four months in Villanovaforru carrying out identifications and recording primary data. For each bone I noted quantity, weight, species, element type, side of body, sex, age at death, and any evidence of butchering, marrow extraction, burning, pathology, canine or rodent gnawing, or working. For some bones I also included measurements because of their potential use in commenting on the size of the animal,

particularly when size would be useful in determining if a bone came from a wild or domestic animal. For each bone or set of fragments, I made an entry in my database. I used FileMaker, which allowed me to design a database that could be carefully tailored to my recording needs.

I briefly comment on each of the categories of information recorded. The SU, find ID, and recovery date came from the excavation records. The find ID is the only unique identifier for each find, and in cases where contexts sharing a find ID were excavated on two different dates, I combined them for analysis. I also combined SUs 1/4, 1/5 and 1/6 from the Roman building because I found broken bones that fit together but were in separate contexts. It is highly likely that there are other contexts with different find IDs but the same SU that will not be caught during faunal analysis but should also be combined.

Under the Taxon category, I determined on what level I could identify the bones. Bones were sorted into two categories: identified and unidentified. As has been noted, 'unidentified' is not the same as 'unidentifiable', and relies on the information available to the analyst at the time of analysis (O'Connor 2000:42). I tried to be conservative in my identifications, so if I was uncertain after checking the comparative collection and diagrams, I labeled the bones as unidentified. In most cases bones that I considered identifiable could be narrowed to species, though some I identified to genus or order. Those bones that were not identified further than their class were sorted by the animal's size (large, medium/large, medium, small/medium, and small mammals), counted, weighed, and used to comment on butchery methods and taphonomy. I consider large mammals to be about cattle-sized, medium to be about sheep/goat-sized, and small to be rabbit-sized or smaller.

For unidentified bones I also divided them by element type when possible. I used five categories: L (limb), R (ribs, vertebra, and girdle), C (cranium), F (foot), and other (did not fit in

any of the first four categories) (I also labeled identified bones using these categories). In most cases I was not able to categorize unidentified bones by a specific skeletal element, but for identified bones I recorded the element, and if it was not whole, the part of the element, i.e. 'proximal humerus'. For that element I also noted side of the body and the proportion of the element (proximal or distal followed by a percentage or complete).

To determine age of the animal, I recorded fusion and tooth eruption/wear data. These were mainly qualitative data, though for tooth eruption/wear I used Grant's (1982) alphabetized categories. Sex was mostly impossible to identify except in animal remains that showed sexual dimorphism, such as deer antlers or pig canines. Lastly, for qualitative categories, I recorded whether or not there was evidence of marrow processing, bleaching, burning, cuts, bite marks, and any other signs of modification.

Only three categories record quantitative data. The first, quantity, gives the number of bone pieces recorded for each entry (see below for discussion of NISP and MNI). If the bone was broken and I was able to refit the pieces, then I recorded that as one piece but noted how many fragments there were. The majority, if not all, of those cases were modern breaks that happened during excavation or storage. The second quantitative category is measurements in mm. I did not measure every bone, and I took very few measurements for unidentified bone, only in cases where I thought that might help me to identify bones later. The final quantitative category records the weight of each bone or group of bones. I used an Ohaus CL5000 scale and recorded the weight in grams. Unfortunately this scale rounds to the gram, so for smaller bones or bone fragments I was unable to get a reading more specific than 'less than one gram'.

Taxonomy/classification

For identified animals, I followed the Linnaean taxonomic system, attempting to identify the animal to species when possible. Overall I recognized five classes of animal: Aves, Reptilia, Mammalia, Bivalvia, and Gastropoda. Less than 2% of the faunal remains came from classes other than Mammalia. This could be the result of collection or preservation bias, but at the same time suggests a heavy reliance on mammalian food sources at the site over time. To further classify faunal remains I used the comparative collection in Villanovaforru and diagrams from Schmid 1972, Cohen and Serjeantson 1996, Hillson 2005 and 2009, and Barone 2010. The comparative collection was immensely helpful because it contains both a diversity of species and many that are unique to Sardinia. The collection includes the typical large domesticates (cattle, horse, pig, sheep, and goat) as well as small domesticates like dog, cat, and chicken. For most species there is more than one example, and often these multiples represent various age ranges, particularly those with crania. Wild animals make up a large portion of the collection. There are many varieties of wild birds as well as mammals such as red deer, wild boar, wild sheep (mouflon), hare, hedgehog, rodents, and *Prolagus sardus*, the Sardinian pika (a rabbit-like animal), now extinct. Sheep and goat were grouped together for the most part (see below for further discussion) because of the difficulty differentiating between their bones.

Though I am a zooarchaeologist and therefore specialize in animal bones, I identified several human bones in Bingia ‘e Monti’s bone assemblage. The majority of human remains come from SU 22, the double burial in the courtyard. This was likely a much later burial, perhaps after the site was abandoned in the Byzantine period. The human bones in Nuragic contexts (SUs 11 and 6-22) are likely intrusive bones from this burial, except for one molar with a cavity found in the west passage (SU 36). However, there were a number of human bones in

contexts from the Monte Claro (SUs 42, 47, and 61) and Roman periods (SU 67) that are not easily explained.

Quantification: NISP versus MNI

There are two ways to count the number of animals present at a site based on faunal remains: the number of identified specimens (NISP) and the minimum number of individuals (MNI). NISP counts each bone as one individual while MNI determines the minimum number of individuals necessary to account for the bones within a context. Faunal specialists have thoroughly debated which strategy is best (see O'Connor 2000 or Reitz and Wing 2008), and I will briefly summarize some of the advantages and disadvantages of both. Perhaps the biggest advantage of NISP is that it is not manipulated by the researcher and therefore represents the raw or primary data. When other scholars read a report, NISP allows them to view the raw data and interpret it in their own way; they can translate those numbers into MNI counts if they choose. Although some argue that NISP will cause an overestimation of the number of individuals when dealing with very old sites or sites with poor preservation, the probability that any two bones came from the same individual is low (Gautier 1984). NISP may also cause overestimation of animals that have a greater number of identifiable bones than others. Butchery practices will impact NISP as well, introducing issues when comparing wild and domestic animals. An animal butchered on-site will have a higher NISP than one that it not, and an animal butchered off-site will be underrepresented due to the 'schlepp effect' (leaving most of the skeleton behind because it is too heavy to carry home). NISP is difficult to use in statistical tests because many assume independence of each piece of data. It also causes difficulties when trying to determine exploitation of certain species because percentages only allow for comparisons between species,

not between time periods. With careful excavation records this can be solved by comparing densities of bone from each species.

MNI is one step removed from the raw data and therefore more dependent on the skill of the researcher. Unless NISP is given alongside MNI in a report, it is impossible to know how many bones were actually found from each species. Determining MNI can be a long and difficult process because fusion and tooth wear has to be taken into account as well as proximal versus distal ends of bones. Although NISP can overestimate the number of animals present, MNI can make it appear that some species are more prevalent than they actually were because only one bone is needed to represent an entire individual. There is also a problem when all of the bones from the entire site are added together. If contextual information such as date or phase is not considered, then the number of individuals will appear lower than it really is.

For this dissertation, I chose to use NISP because the majority of bones I analyze are over 2000 years old, meaning that multiple bones do not likely come from the same individual, and also I prefer not to introduce another level of data manipulation.

Ageing

Age of an animal at death can be determined by examining either the status of bone fusion or the state of eruption and/or wear of mandibular teeth. As an animal grows, certain bones, such as the ends of long bones and cranial plates, remain separate to allow for growth. As an animal gets older and growth stops, these bones start to fuse together. By studying modern animals, faunal specialists have put together tables of age ranges for fusion events that allow researchers to estimate the age of the animal based on whether the bone is fused, unfused, or in the process of fusing (Silver 1963). For long bones I made sure to carefully record the fusion status of the proximal and distal ends for aging. Of course not all animals have bones that fuse

over time. For instance, fish bones grow incrementally, in layers like tree rings that can be counted to determine age.

Mandibular tooth eruption and wear also allows for aging and works especially well if there are multiple teeth and they are still in their sockets. All mammals have two sets of teeth: deciduous teeth that emerge soon after birth, and permanent teeth which replace them before adulthood. Like bone fusion, we can estimate when teeth emerge and are lost (Silver 1963:264). Once teeth erupt, they begin to wear as the animal eats. Tooth wear stages can be difficult to assign to an age because wear is affected by the animal's diet and health (Reitz and Wing 2008:174). When recording tooth wear I used the wear stages developed by Grant (1982:92-94) for pig, cattle, and sheep/goat.

Butchery and other modifications

While identifying bones, I also recorded any modifications to the bones including cuts, breakage from marrow processing, bleaching, burning, canine or rodent gnawing, and pathologies. Cuts made during the butchery process range from small, barely visible slices to clean chops through the middle of thick long bones. Below I will note the apparent variations in butchering strategies and tools used. Butchery patterns can be culturally specific and useful in looking at cultural transitions (Outram et al. 2005). Fractures made in fresh limb bones indicate marrow extraction for consumption or grease production (Outram 2001). Burn marks usually come from accidental contact with fire during roasting, and therefore indicate cooking method. Overall I encountered very few instances of pathology, but will briefly comment on it below. Both bleaching and animal gnawing can indicate conditions bones were subjected to once they were discarded. Gnawing shows presence of dogs or rodents on site, both which depend on humans for food and shelter. Bleaching happens when bones have been exposed to the sun for

long periods before burial, and results in bright white bones often with surface flaking (Dupras and Schultz 2013). Bleached bones were either discarded in an open area and only covered much later, or were buried and uncovered later by humans, animals, or erosion.

5.3 Primary data and general patterns

Species differences

In this section I discuss general patterns that emerge from the faunal remains at Bingia ‘e Monti, beginning with an examination of changes in species quantity over time. We cannot assume that because an animal occurs more frequently it was more important or more desirable to past peoples. Importance and value can be based on rarity or may be indicated by the absence of an animal in food remains. Below is a table (Table 5.2) comparing species over the three major periods at Bingia ‘e Monti, mostly domestic animals. The ‘Other’ category includes animals like dogs and rodents that were represented by 10 bones or fewer total across the time periods and were unlikely to have been used as food. For a full list of species present see Appendix C.

	Sheep/Goat	Pig	Cattle	Marine shell	Deer	Land snail	Bird	Sardinian pika	Other
Monte Claro	263 (65.6%)	52 (13.0%)	16 (4.0%)	62 (15.5%)	1 (0.3%)	1 (0.3%)	2 (0.5%)	1 (0.3%)	3 (0.8%)
Nuragic	504 (65.8%)	88 (11.5%)	48 (6.3%)	9 (1.2%)	39 (5.1%)	33 (4.3%)	9 (1.2%)	25 (3.3%)	11 (1.4%)
Roman	179 (50.0%)	85 (23.7%)	61 (17.04%)	4 (1.1%)	3 (0.8%)	8 (2.2%)	12 (3.4%)	1 (0.3%)	5 (1.4%)

Table 5.2. Comparison of species over time based on NISP. Only identified bones and shells were taken into account, and any matching fragments were counted as one bone.

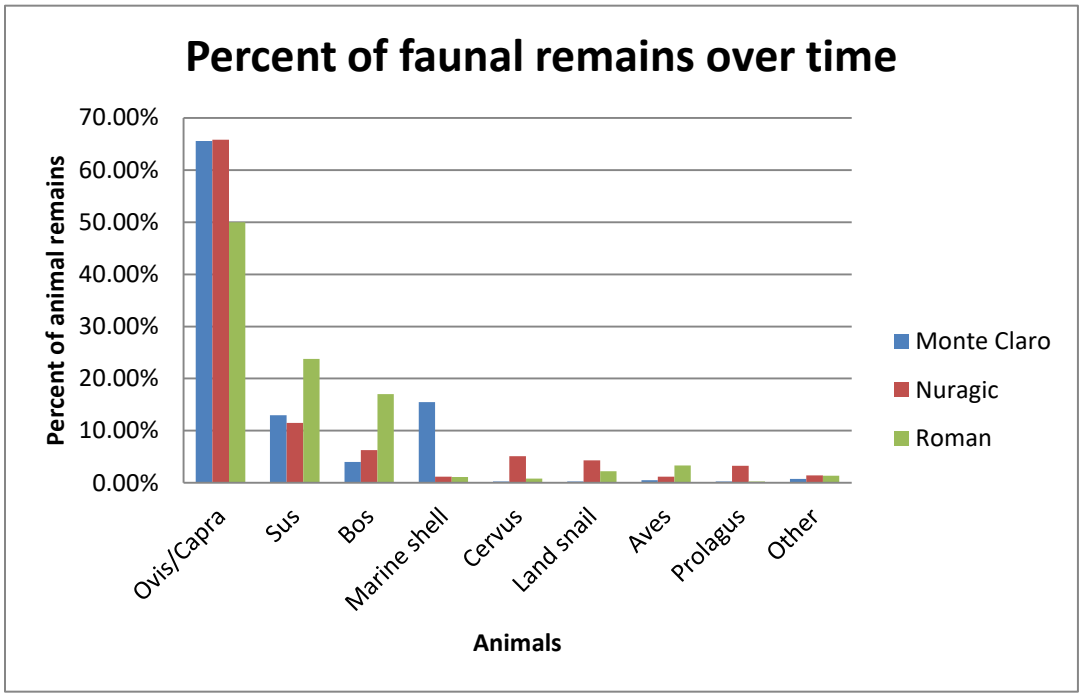

Figure 5.2. Chart representing percentages from Table 5.2.

Both Table 5.2 and Fig. 5.2 are ordered roughly from high to low in terms of quantity of remains. We can see that for all three time periods, sheep/goat was the most common animal, though it decreases relative to other species in the Roman period. Why is there a preference for sheep/goat across the centuries? It may have more to do with the landscape and available resources than the preference of each group. Sheep and goats are well-suited to the hilly land and plateaus in the Campidano. Even today sheep are the most common animal raised on the island. They are also desirable because of their secondary products.

There is a sharp drop-off with pig as the next most represented animal. Though pigs do not produce milk or fibers, they are easy to feed with scraps from human meals and can live either within human settlements or in forested areas. Cattle were the next most common animal. They may have been more difficult to raise in the Sardinian terrain, but they can also provide a source of milk and labor. Even at low numbers cattle can produce a large amount of meat. For the remaining animal categories, with the exception of marine shell in the Monte Claro period,

representation was five percent or below, meaning that they did not contribute significantly to human diet during any period of time at Bingia ‘e Monti. I include land snail, birds, and the multiple animals in the ‘Other’ category but cannot assume that these animals were consumed by humans (except for the chicken bones in Roman levels), though it is likely that the birds were hunted. In fact, the land snails, though they are large (about one inch in diameter), could be invasive.

Looking one period at a time, sheep/goat make up the majority of faunal remains (65.6%) in the Monte Claro period. That is followed by marine shell, which is unexpected since Bingia ‘e Monti is located about 35 km from the coast. Some of these may have been brought from remains of meals on the coast or collected as an item that held symbolic value. Pig bones are the second most common mammal remains followed by a small amount of cattle bones and very minimal (<1%) remains from any other animal. In terms of animal remains, it seems that inhabitants of Bingia ‘e Monti in the Copper Age relied heavily on sheep/goat, with a possible emphasis on sheep (21 sheep identified versus only 3 goats).

Like the previous period, sheep/goat comprised the majority (65.8%) of faunal remains in the Nuragic period. Pig bones are the second most common followed by cattle and deer bones in almost equal amount. Compared to the periods before and after, deer remains play a significant role during this period ($\chi^2 = 63.96$, $p = 0.05$, $df = 2$), and although 37 of the 39 deer bones are antler fragments, it is likely that since they were wild animals, they were butchered at the hunting site and the bones were left there. *Prolagus sardus* is also more common in Nuragic contexts than Monte Claro or Roman contexts. They would have also been hunted, and provided very little meat. Though the exact time of extinction for P. sardus in uncertain, it seems to have been

in the late Roman period and likely resulted from intensive agricultural practices and the introduction of competitors to the island (Vigne et al. 1997).

The Roman period differs greatly in proportions of domesticated animal remains. Sheep/goat were still the majority, though about 15% lower than in previous periods. Pig remains doubled from previous periods, and cattle remains tripled. Chicken and donkey appear for the first time. These differences are so dramatic that they point to underlying cultural differences. Bird remains were slightly higher, though only one of those was from chicken, and other bird remains may not have been from meals. Unlike the Nuragic period, Roman period inhabitants left almost no deer or *P. sardus* remains at the site.

It is interesting to note that not a single fish bone was found in any contexts from any period. This could be a result of poor preservation or collection. Marine shells at Bingia ‘e Monti show a connection with the coast, and fish could well have been preserved and brought inland, so their absence is surprising. Perhaps all kinds of seafood were consumed at the location where caught, and some shells were brought back as ornaments. Other inland sites show a similar lack of marine remains. It is also possible that there was a taboo relating to fish consumption due to location, subsistence method, kinship, or other aspects of identity. Taboos on fish species, methods of fishing, timing of fishing, fishing in sacred areas, and one’s physical condition when fishing have been documented in ethnographic studies in East Africa, for example (Shalli 2017).

Below is a breakdown of species by Nuragic phase. Table 5.3 shows the phases based on radiocarbon dates of five bone samples (see Chapter Four). Unfortunately, it was difficult to assign SUs to Phases I and II based on the absolute dates and stratigraphy.

	C14 date at 95.4% probability	**Events**	**SUs**
Phase I	1613 – 1491 BC	Tower, courtyard, and west	34*, 38, 62

		passage/chamber built	
Phase II	1501 – 1391 BC	Paving of courtyard	24, 37*
Phase III	1437 – 1283 BC	West passage/chamber walled off, eventual abandonment	3, 6, 8, 9*, 11, 12, 12B, 4, 23*, 25*, 26, 29, 30, 36

Table 5.3. Three Nuragic phases based on C14 dates. * indicates SUs with C14 dates.

Since most of the Nuragic period SUs ended up in Phase III, the last phase before abandonment, there are major differences in sample size between the phases (Table 5.4). This makes it difficult to compare the phases and look at change over time. What we can see is that in Phase III, which may have remains that date to the end of the Bronze Age, sheep/goat is the largest category followed by pig and then cattle. Deer, *P. sardus*, dog, and rodents also appear in this phase and are almost completely absent in other Nuragic phases.

Nuragic	Sheep/Goat	Pig	Cattle	Deer	Bird	Sardinian pika	Other
Phase I	51 (76.1%)	10 (14.9%)	4 (6.0%)	0	0	2 (3.0%)	0
Phase II	11 (73.3%)	4 (2.7%)	0	0	0	0	0
Phase III	429 (68.6%)	77 (12.3%)	40 (6.4%)	39 (6.2%)	9 (1.4%)	20 (3.2%)	11 (1.7%)

Table 5.4. Species by Nuragic phase. Identified bones only.

Skeletal elements

Changing patterns in skeletal elements used in meals can point to broader cultural transitions. They can reveal preferred cuts of meat (often interpreted as cultural preference), socio-economic status, types of dishes prepared, and amount of meat consumed. Below in Table 5.5 and Fig. 5.3, I have broken skeletal elements down into five categories and arranged them generally in order from most common to least common for the three occupation periods. The idea of preference or 'good' or 'bad' cuts of meat is deeply cultural and so it can be difficult to determine based solely on faunal remains (Sykes 2014). Low meat-bearing bones such as the skull and feet are often assumed to be undesirable because they do not provide as much protein

as ribs or limb bones, however there are many cultural groups in which those parts of the animal hold special status.

	Other	Limb	Cranium	Rib, vertebra, girdle	Foot	Mollusk
Monte Claro	577 (27.8%)	701 (33.8%)	388 (18.7%)	272 (13.1%)	73 (3.5%)	63 (3.0%)
Nuragic	759 (23.7%)	753 (23.5%)	651 (20.3%)	808 (25.2%)	192 (6.0%)	42 (1.3%)
Roman	747 (34.1%)	735 (33.5%)	419 (19.1%)	210 (9.6%)	69 (3.2%)	12 (0.6%)

Table 5.5. Breakdown of skeletal elements from both identified and unidentified bones. The mollusk category includes marine and terrestrial shell.

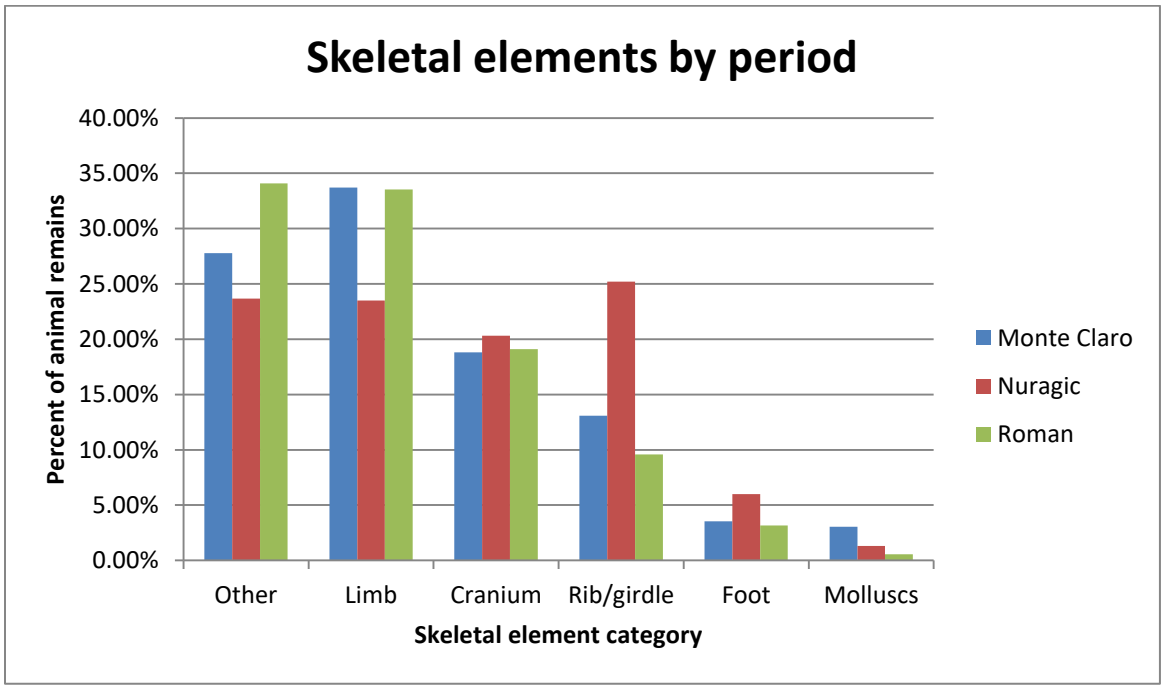

Figure 5.3. Bar chart representing percentages from Table 5.4.

In the Nuragic and Roman periods, we can see that the 'Other' category has the highest number of bones. This can mostly, if not entirely, be explained by my methods and the large number of bone fragments that I labeled unidentified. For this category I was unable to identify the bones confidently to either species or skeletal element due to high fragmentation. Most of these fragments likely come from the rib or vertebra categories and from medium or large mammals since, when broken, those larger bones are more likely to become unrecognizable. For

all three periods it is evident that there was a similar amount of fragmentation, both before burial and due to taphonomic processes.

The quantity of bones in the 'Limb' category is almost identical to the 'Other' category in the Nuragic and Roman periods, and slightly higher in the Monte Claro period. For the Monte Claro and Roman periods, this category was the largest of the categories with bones that could be identified to skeletal element. Limb bones are not only high meat-bearing bones, but also contain bone marrow, an important source of fat and grease. Because of their large size they are easier to roast whole over a fire than cook in a pot (at least for cattle and deer).

For Monte Claro ($\chi^2 = 987.19$, $p = 0.05$, $df = 5$) and Roman ($\chi^2 = 1428.82$, $p = 0.05$, $df = 5$) periods, cranial bones are similar in quantity and significantly less common than limb or other bones. Interestingly in the Nuragic period, other, limb, cranium, and rib/vertebra/girdle bones are almost equal. All periods have very similar percentages of cranial bones, about 20%. The majority of cranial bones identified were teeth, which brings up the issue that some of these categories, specifically cranium and foot, will appear more numerous in the archaeological record because they occur more frequently in the skeleton than limb or girdle bones. For instance, cattle each have eight first phalanges but only two humeri. Another complicating factor is that teeth preserve better because of their enamel coating, so they will be more common in the assemblage. Skulls are commonly incorporated in stews, though they can be roasted as well, and in the modern period in Sardinia roasting whole pigs or goats is traditional. There are four examples of burnt cranial remains from sheep/goat: three from the Nuragic period and one from the Monte Claro period.

The ribs, vertebra, and girdle bones (pelvis, scapula, clavicle) are the next largest category, except in the Nuragic period where they are similar to other categories. Like limb

bones, this category represents high meat-bearing bones and was likely an important source of protein.

Foot bones are the least common in all three periods, making up just 6% of Nuragic faunal remains and half that for Monte Claro and Roman contexts. This is unexpected, since foot bones occur in frequently in animal skeletons and tend to preserve well because of their density. In all periods they do not seem to be preferred in meals, perhaps due to the small amount of meat they carry. If the foot bones are not incorporated in domestic waste, then they must be disposed of elsewhere on the site during the butchery process.

A closer look at each species in the Nuragic period

Breaking down the types of skeletal elements by species for the major faunal categories at Bingia ‘e Monti (sheep/goat, pig, cattle), makes it easier to understand what the animals might have been used for (Figs. 5.4-6). To have a large enough sample size, I have not further divided them up into Nuragic phases. The sample size for cattle and pig is small, and I am therefore cautious in my interpretations. Because some skeletal elements occur more frequently in the body, I have adjusted the counts by treating every bone as if it were complete and dividing it by the number of that type of bone in the body. For example, cattle only have 2 femurs but 20 phalanges. Of course the adjusted counts are also problematic because many of these elements are fragments. Assuming that one skull fragment represents an entire cranium makes that category particularly high.

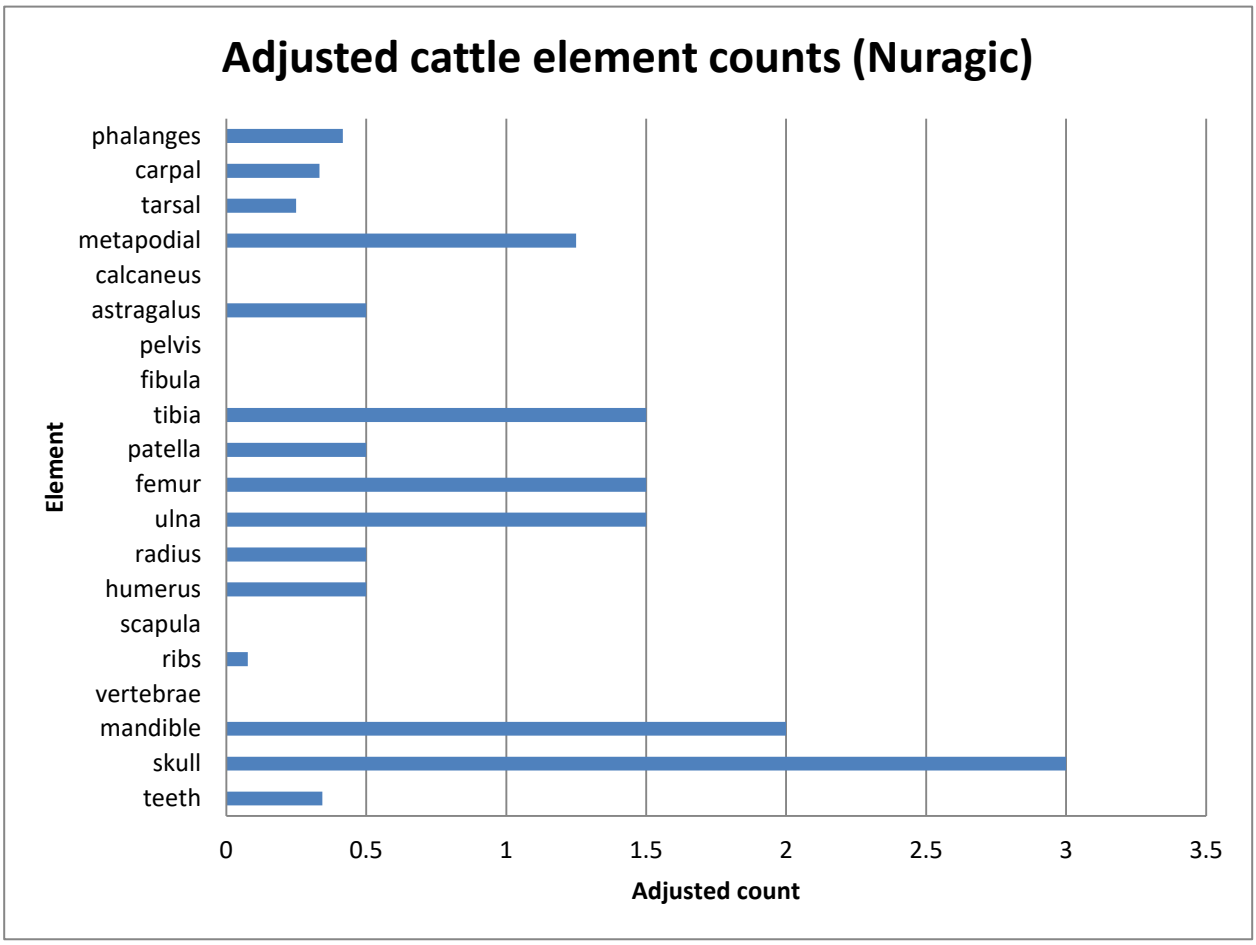

Figure 5.4. Cattle bones by element in the Nuragic period, adjusted.

The quantity of cattle bones from Nuragic contexts is fairly small, only 48 total. Other than cattle crania and mandibles, high meat-bearing limb bones are well represented. There are very few foot bones, suggesting that cattle were either not butchered nearby or those parts were not eaten and perhaps discarded elsewhere. However, the occurrence of some carpals, tarsals, and phalanges, suggests that some cattle were butchered there, pointing instead to a sample size issue.

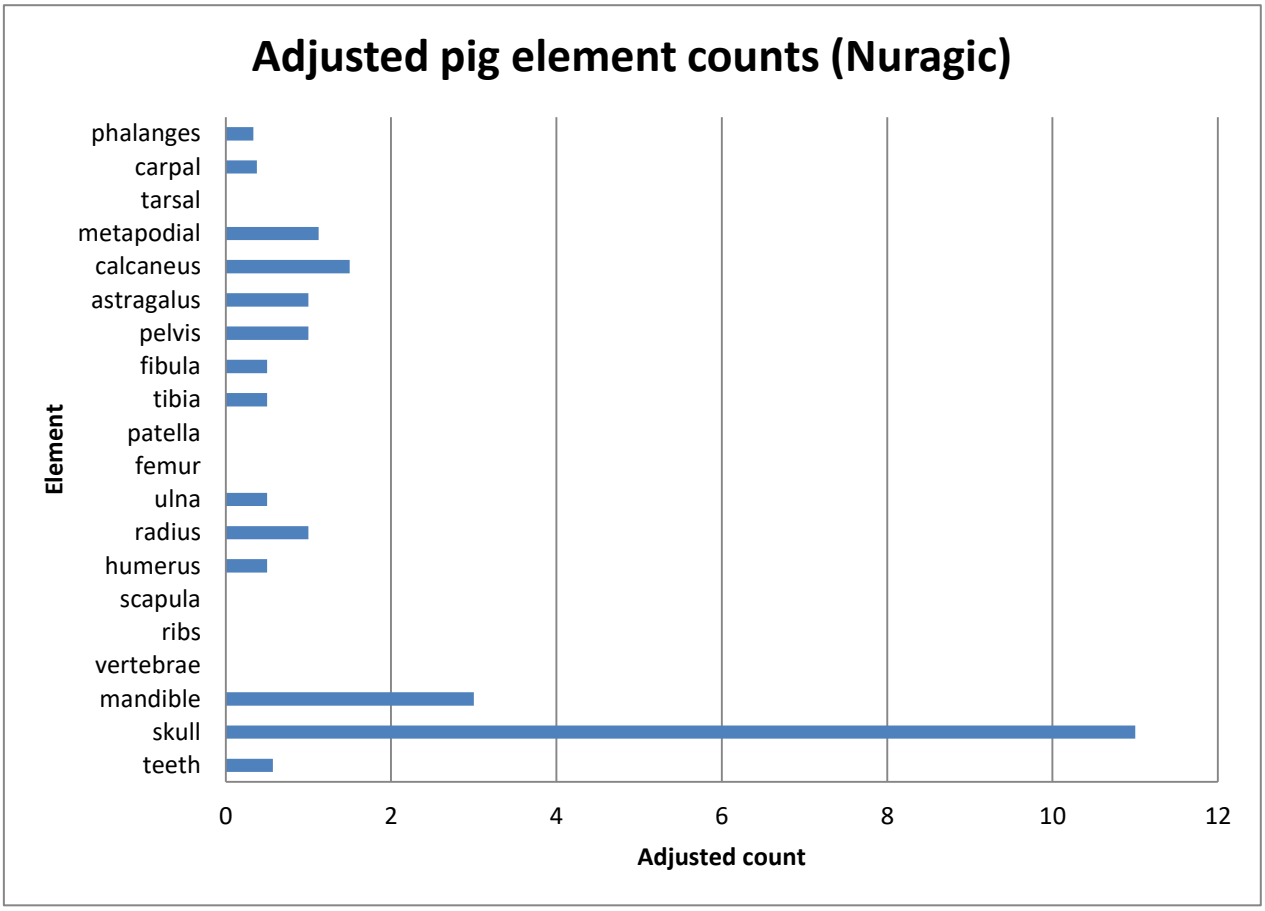

Figure 5.5. Pig bones by element in the Nuragic period, adjusted.

Like cattle, pig remains contain a large number of crania and mandibles. Again, pigs were either not butchered in the excavated area or the sample size is too small to be representative. Ribs and other limb bones are also not common.

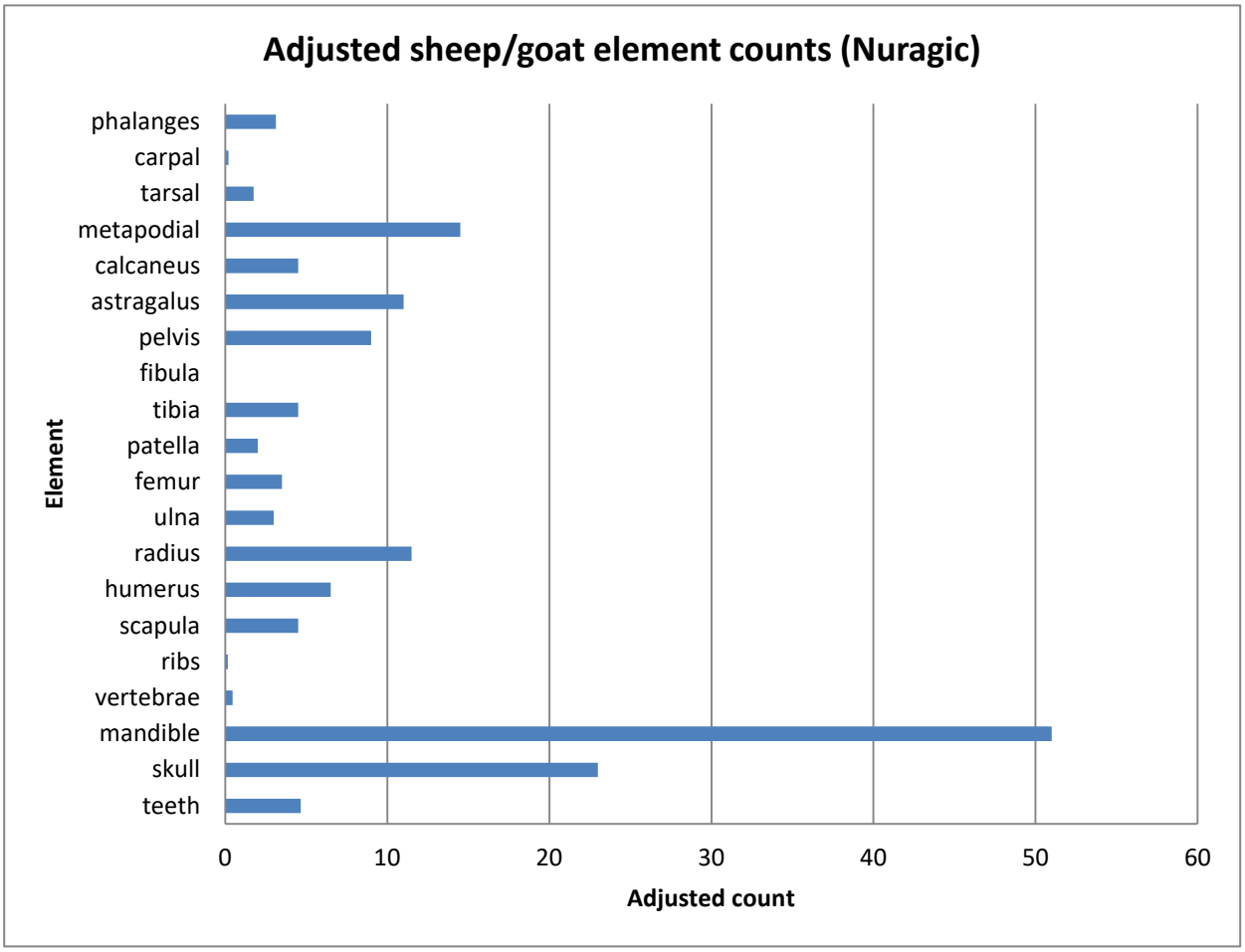

Figure 5.6. Sheep/goat bones by element in the Nuragic period, adjusted.

With sheep/goat, a much larger sample (504), crania and mandibles are also the most common category. Radii, metapodials, and astragali follow. These are lower leg and foot bones, low meat-bearing bones but with marrow available in the metapodials. Other foot bones are not very common, even though they preserve well. This could be a result of collection bias, canine chewing, or feet not being a preferred part of the animal.

Domestic versus wild

The below table (Table 5.6) shows the amount of domestic versus wild animals found at Bingia ‘e Monti. Wild animals are mainly deer and *P. sardus*, and again most of the deer remains are antler fragments. While it is possible to determine the difference between wild and domesticated sheep and pigs, I did not attempt to do that for two reasons. First, bones that are

usually used to differentiate between the two are third molars in pigs and horn cores in sheep (Davis 1995:134-135; Albarella et al. 2009), and there were very few examples of these elements from Bingia ‘e Monti. Those molars and horn cores that were found at the site seemed unlikely to come from wild animals based on size and curvature respectively. Second, it is likely that modern wild sheep or mouflon and wild boar are not wild but rather feral domestic animals introduced to Sardinia in the Paleolithic or Neolithic (Wilkens 2003:183; Albarella et al. 2009:114). This would make metric analyses used to differentiate wild and domestic species unreliable for determining whether the remains of hunted feral animals were present in the assemblage. Instead kill-off patterns can be used to discuss hunting practices (see below).

It is apparent that wild animals play a larger role in the Nuragic period than any other and that if deer meat was consumed on site, deer were butchered at the kill site, and bones did not come back to the living quarters. Antlers seem to be an exception and may have held special meaning. Male deer are also commonly represented in bronze figurines, or bronzetti, from the LBA (Fig. 5.7).

	Domestic	**Wild**
Monte Claro	333 (98.5%)	5 (1.5%)
Nuragic	646 (89.2%)	78 (10.8%)
Roman	329 (95.1%)	17 (4.9%)

Table 5.6. Animal bone at Bingia ‘e Monti by period and whether domestic or wild, based on identified bones only. Does not include shell.

Figure 5.7. *Bronzetto* from Bultei.

Terrestrial versus marine resources

As stated above, marine resources make up a very small portion of the faunal remains at Bingia ‘e Monti despite it being only 35 km from the coast. Marine bivalves and gastropods do not make up the majority of the diet in any period, and fish, sea urchin, cephalopods, and marine mammals are completely absent (Table 5.7).

	Terrestrial	**Marine**
Monte Claro	2000 (97.0%)	62 (3.0%)
Nuragic	3196 (99.7%)	9 (0.3%)
Roman	2188 (99.8%)	4 (0.2%)

Table 5.7. Animal bone and shell at Bingia ‘e Monti by period and whether terrestrial or marine.

Modifications and taphonomy

Table 5.8 shows any modifications made to bones or shells after the animals' death. Butchery marks, evidence of marrow use, and burning reveal the way in which the animals were cooked. Gnawing and bleaching gives clues as to where the bones were deposited after meals. I made diagrams (Figs. 5.8-11) of burn and cut mark locations on the bones, but there do not seem to be any strong patterns; this is likely an issue of sample size. However, bones from Bronze Age animals showed more instances of burning and less marrow use.

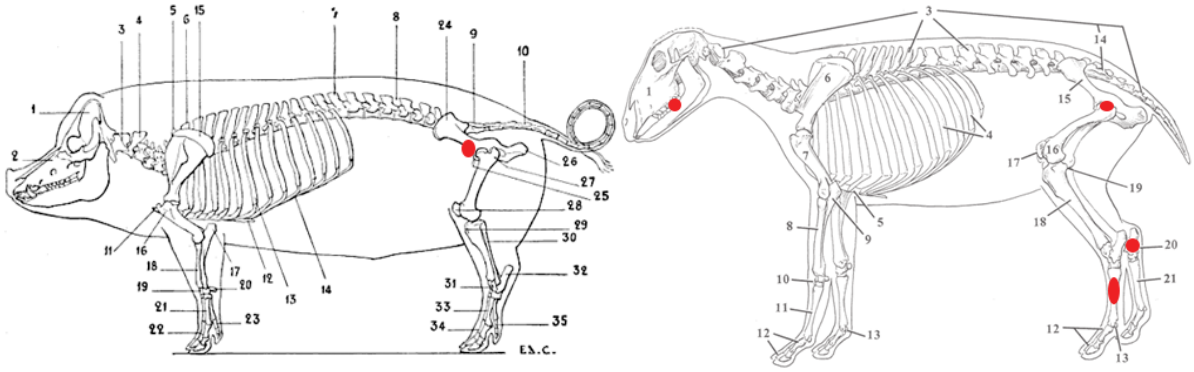

Figure 5.8. Burn marks on pig and sheep/goat bones from the Monte Claro period at Bingia 'e Monti.

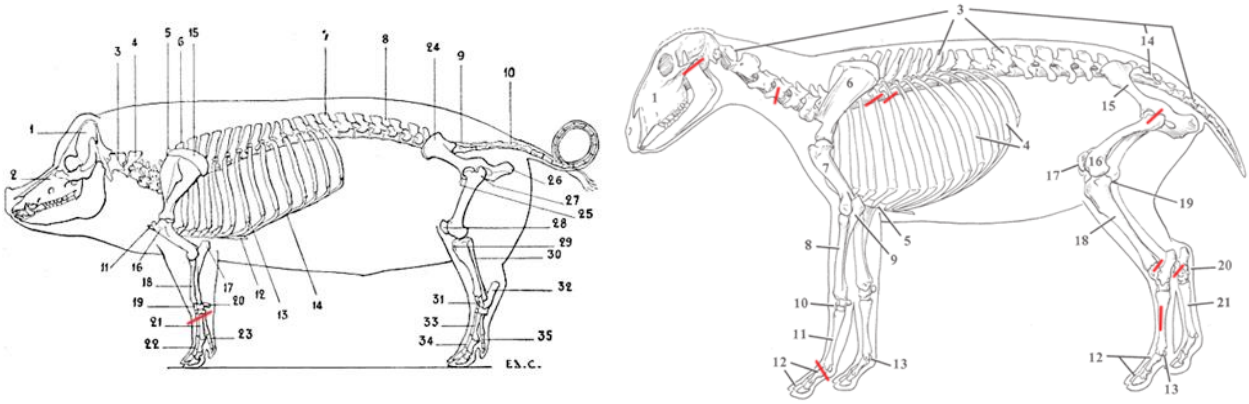

Figure 5.9. Cut marks on pig and sheep/goat bones from the Nuragic period at Bingia ‘e Monti.

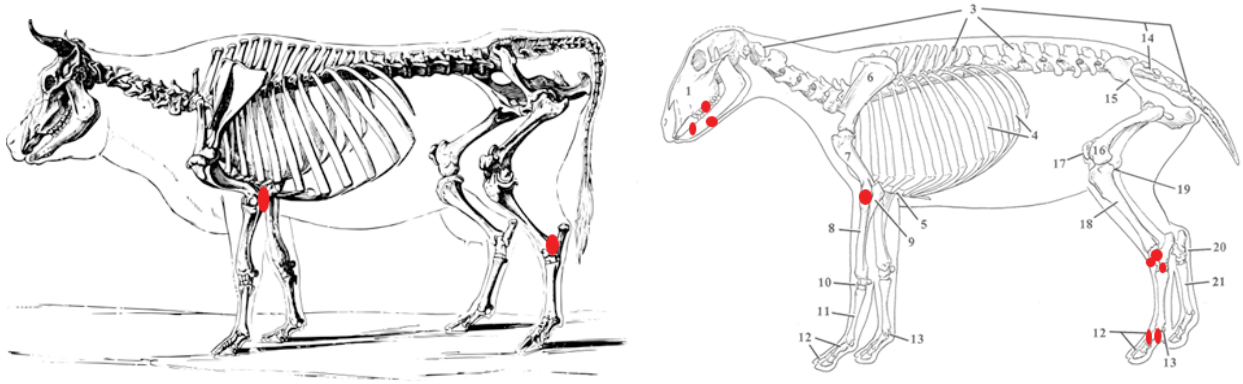

Figure 5.10. Burn marks on cattle and sheep/goat bones from the Nuragic period at Bingia ‘e Monti.

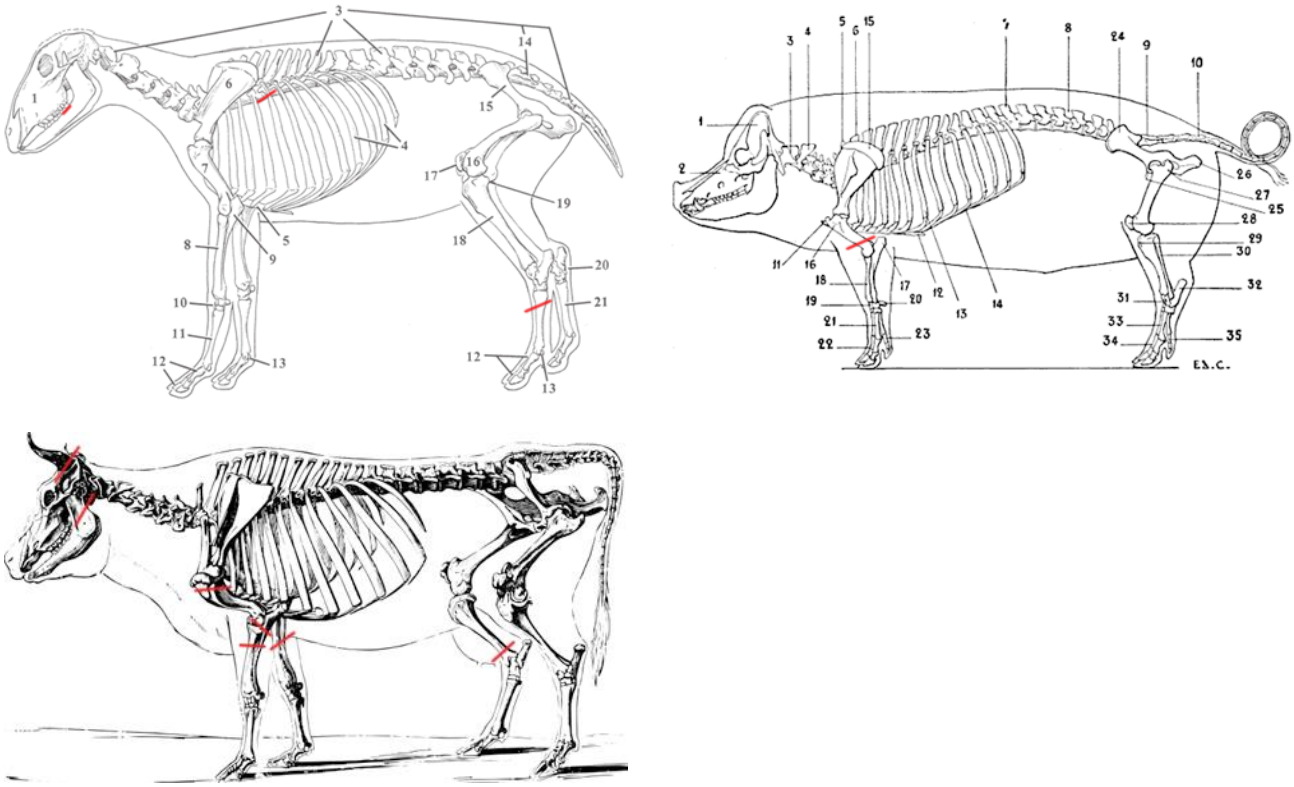

Figure 5.11. Cut marks on cattle, pig, and sheep/goat bones from the Roman period at Bingia ‘e Monti.

Butchery marks include any cuts or saw marks on the bones. Cuts may be from either stone tools, which were commonly used for butchering well into the Bronze and Iron Ages, or

metal tools, which did not replace stone tools until the Iron Age (Balmuth 1984; Greenfield 1998). I did not examine each bone with a microscope during my study, but rather noted cuts and scrapes that were visible to the naked eye. All of these were then photographed using a Dino-Lite microscope (AM3111), which did not allow enough magnification to determine the tool that made the mark (Fig. 5.12). Metal knives leave v-shaped or rectangular marks in bone while stone tools leave irregular cuts (Greenfield 1998:803). Skilled butchers will disarticulate animals in the easiest way, by making cuts at joints and points of muscle attachment (Lyman 1994:298).

Figure 5.12. Cut marks on a vertebra from (O)B/11/10.

A large number of bones I studied showed signs of marrow extraction. Bones that were used for marrow share three characteristics: helical peri-mortem fractures, fractures that are angled in relation to the cortical surface, and smooth fracture surfaces (Karr et al. 2010:216). The amount of bone fragments with these characteristics is higher in the Monte Claro and Roman periods even though significantly more bones were excavated from Nuragic levels.

Bones that were counted as 'burnt' were exposed to a range of temperatures, and ranged in colors from black to purple to white. For those identified bones, the majority of the burns were on the proximal or distal ends of long bones, indicating roasting. While identifying bones I noticed that material from SUs 23, 39, 42, 60, and 65 were covered in ash with bits of charcoal. This points to association with a possible hearth in the middle of the Nuragic courtyard and multiple hearths or burn events in the Monte Claro period in the north end of the site.

	Butchery marks/cuts	**Marrow use**	**Burnt**	**Canine/rodent gnawing or digestion**	**Bleaching**
Monte Claro	1	329	36	5	20
Nuragic	31	250	126*	18	11
Roman	36	378	5	48	19

Table 5.8. Bone modifications and taphonomy patterns of identified and unidentified bones at Bingia 'e Monti, by period. *includes 3 marine bivalves

Neither bleaching nor canine/rodent gnawing seems to be particularly common. Very few bones were left in the sun long enough to bleach, meaning that those excavated in and around the *nuraghe* were covered fairly quickly. Animal gnawing was more common in the Roman period, which could indicate a difference in food waste disposal and/or an increase in commensal animals living at the site. Overall, the low number of bones showing prolonged exposure after disposal could mean that waste was deposited elsewhere on the site.

Sheep/goat identification

Sheep/goat bones have a very similar morphology, and it can be difficult to distinguish between them. I was confident in identifying 13.5% of the sheep/goat from Bingia ‘e Monti as either sheep or goat. To do this I used guidelines laid out by Zeder and Lapham (2010) for the distal humerus, proximal and distal radius, distal tibia, distal metapodials, astragalus, calcaneus, and the first and second phalanx. For each of these elements, two to four morphological criteria were used to distinguish between sheep and goat. As we can see in Table 5.9, the Monte Claro period had more identified sheep than goat, the Nuragic period had a similar number of identified sheep and goat, and the Roman period overall had very few of either but more identified sheep. I had expected to see more sheep than goats, since sheep produce wool as well as milk and meat, and goats produce milk, meat, and rough fibers.

	Sheep	**Goat**
Monte Claro	21	3
Nuragic	48	44
Roman	10	2

Table 5.9. Bones that could be identified as sheep or goat from Bingia ‘e Monti, by period.

Isotope results

Isotope analysis is a relatively recent technique, developed after residue and trace element analyses became more common. Isotope analysis measures the ratios of the isotopes of various chemical elements such as carbon (C), nitrogen (N), and oxygen (O). These elements occur in bone, muscle, and sometimes fat and hair, and are found in greater concentrations higher in the food chain. Before performing isotope analysis one must know the distribution of isotopes in the food web and make sure that the samples are not contaminated. Carbon isotopes are the most commonly analyzed isotopes and can be used to determine diet and landscape use (Sealy 2001). The $^{13}C/^{12}C$ ratio is determined by the photosynthetic process in C3 plants such as trees and temperate grasses versus C4 plants such as maize and sugarcane. It can be measured in

bone, muscle, and fat and is particularly useful for tracking the spread of maize. The $^{15}N/^{14}N$ ratio can be measured in proteins found in bone, muscle, and hair. It is a good indicator of whether people have a diet based mainly on plants or on animals and whether these foods are marine or terrestrial (Sealy 2001). By combining analyses of the above elements archaeologists can obtain information on an individual's diet.

Context	Bone description	δ13C (‰)	δ15N (‰)
(O)A/9/2	cattle rib fragment	-18.1	+9.5
(O)B/23/15	proximal sheep/goat metacarpal fragment	-20.5	+6.1
(O)B/25/11	pig astragalus	-20.0	+7.5
(O)C/34/2	distal sheep/goat metacarpal fragment	-20.8	+7.8
(O)D/37/1	unidentified medium mammal limb fragment	-18.8	+7.3

Table 5.10. C13 and N15 isotopes from five bone samples from Bingia 'e Monti. Values are given in ‰, or parts per million.

The values given in Table 5.10 indicate the amount of C13 and N15 isotopes from each bone sample. Animals eating mainly subtropical C4 grasses typically have a δ13C bone collagen value of about -7.5‰, while those eating C3 plants (trees, shrubs, and temperate grasses) have a δ13C of about -21.5‰; those eating a mix of C4 and C3 plants will have a value somewhere in between (Tykot 2004:435). The bones above all come from Nuragic contexts and all have a δ13C between -18 and -21‰, indicating a diet based mainly on C3 plants. For the N15 isotopes, those ranging from 6-10‰ indicate a terrestrial diet while values ranging from 15-20‰ indicate a diet based on marine foods (Tykot 2004:436). It is not surprising to learn that at an inland site with very little evidence of marine food that animals have a terrestrial based diet as the 6-10‰ δ15N values above show. This supports the lack of marine food remains at the site, since pigs would have been likely to eat items like fish bones.

Age at death

By determining the ages of individual animals at death it is possible to examine animal husbandry or hunting practices at the site by reconstructing the kill-off pattern. Approximate age at death was assigned to each bone based on fusion data from Silver 1969 and mandibular tooth wear data from Grant 1982. Not all of the bones identified to species were able to provide information on age. Roughly 30-40% of the identified bones cannot be used for ageing due to fragmentation, or were skeletal elements that are fused at birth. Since my focus in this dissertation is on Bronze Age events, I did not analyze age data for the Monte Claro or Roman periods.

Age Category	Number of Individuals	Percent Surviving
0 – 6 months	166	100
6 months – 1 year	166	100
1 – 1.5 years	142	85.5
1.5 – 2 years	127	76.5
2 – 2.5 years	125	75.3
2.5 – 3 years	119	71.7
3 – 3.5 years	111	66.9
> 3.5 years	111	66.9

Table 5.11. Sheep/goat age at death in Nuragic period based on fusion.

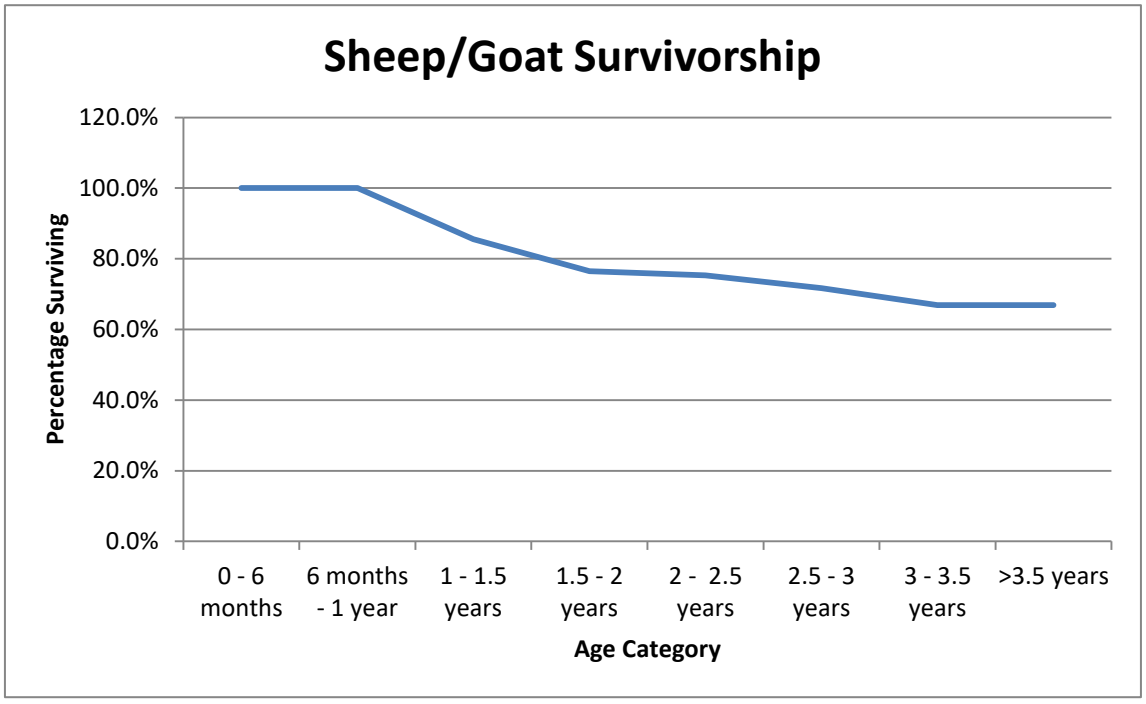

Figure 5.13. Chart showing sheep/goat survivorship in the Nuragic period based on fusion.

Age Category	Number of Individuals	Percent Surviving
fetal	34	100
0 – 6 months	33	97.1
6 months – 1 year	33	97.1
1 – 1.5 years	30	88.2
1.5 – 2 years	30	88.2
2 – 2.5 years	12	35.3
2.5 – 3 years	12	35.3
3 – 3.5 years	11	32.4
> 3.5 years	10	29.4

Table 5.12. Pig age at death in Nuragic period based on fusion.

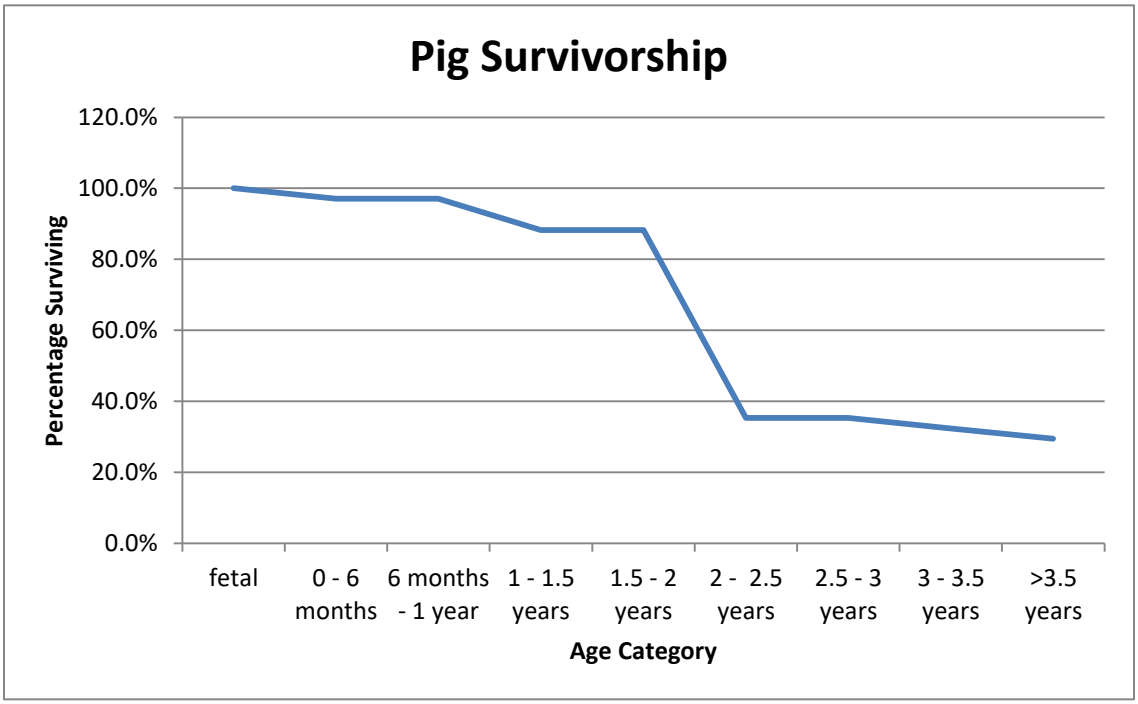

Figure 5.14. Chart showing pig survivorship in the Nuragic period based on fusion.

Age Category	Number of Individuals	Percent Surviving
0 – 6 months	16	100
6 months – 1 year	16	100
1 – 1.5 years	15	93.8
1.5 – 2 years	15	93.8
2 – 2.5 years	11	68.8
2.5 – 3 years	11	68.8

3 – 3.5 years	11	68.8
> 3.5 years	9	56.3

Table 5.13. Cattle age at death in Nuragic period based on fusion.

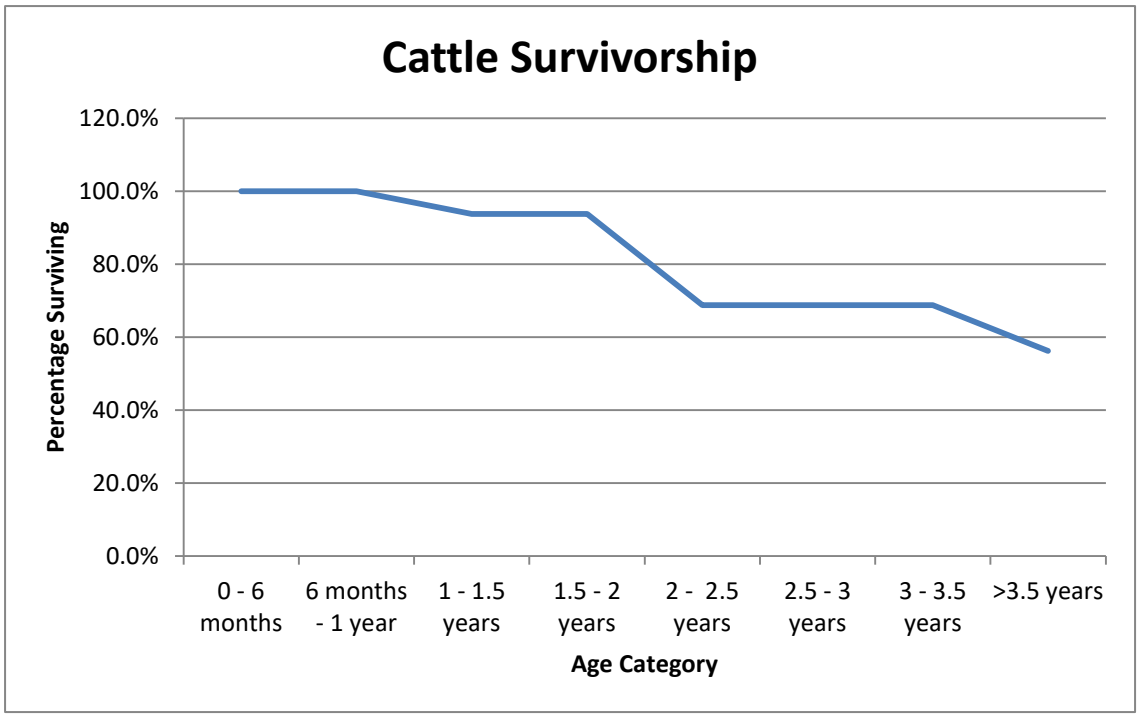

Figure 5.15. Chart showing cattle survivorship in the Nuragic period based on fusion.

The above tables and charts (Tables 5.11-13, Figs. 5.13-15) show survivorship for sheep/goat, pig, and cattle based on the fusion of limb bones from Nuragic period contexts. The results are not surprising. For animals that produce secondary products, sheep/goat and cattle, there is a higher rate of survivorship into adulthood and a more gradual decline in numbers as they age. Sheep/goat show the largest drop (14.5%) at one year of age, but at three and a half years and older 66.9% of them are still alive. That drop at one year old may be due to the slaughtering of male individuals. Cattle show a slightly larger drop at two years of age (25%), and 56.3% of them survive more than three and a half years. For pigs, which only produce meat, there is a sharp decline in population at two years of age, from 88.2% to 35.3%, a 52.9% drop.

According to Payne 1973 the best time to kill sheep/goats for meat is between 18 and 30 months (1.5 and 2.5 years), at least for most males. However, factors could complicate the

expected kill-off pattern. Sheep and goats were often raised for products other than meat, such as wool or milk. This would cause their owners to keep them past the age when their meat is most desirable. Males especially might have been killed when young, to make the herd more manageable and because they do not produce milk. Had I been able to determine the sex of these animals, we might have seen that it was mostly males that were killed around one year old and females that survived longer. Unfortunately, unlike tooth wear, fusion data does not enable us to observe survivorship after 3.5 years.

About 25% of sheep/goat were killed before reaching one year of age, and their bones stayed at Bingia ‘e Monti, indicating that very few young sheep/goat were being sent to a nearby center like Genna Maria as a tithe or tribute. Pigs show a similar pattern with about 20% killed and consumed at Bingia ‘e Monti under one year of age. Young cattle were much less common at less than 10% being killed before age one. Survivorship curves of domesticates do not suggest that Bingia ‘e Monti was a subsidiary site, though it is possible that tithes were made using another product like grain.

Pig remains are likely to be mostly juvenile because they do not produce milk or fibers. Once they reach the point where the food invested is greater than the meat produced, they are usually slaughtered. We see a similar pattern for cattle since females produce milk long past the age at which they peak in terms of muscle mass. Cattle can also be put to work in the fields or in hauling basalt slabs for *nuraghe* construction well into adulthood.

The age data gathered from fusion of limb bones was compared with mandibular tooth data. Unfortunately there were too few samples to cross-check for cattle and pig; most of the teeth from those animals were maxillary or not molars. Table 5.14 shows mandibular tooth data

from sheep/goat. Tooth eruption and wear was recorded using Grant's (1982) system and converted into absolute age using Greenfield and Arnold (2008).

Age Category	Number of Individuals	Percent Surviving
0 – 2 months	70	100
2 – 6 months	65	92.9
6 – 12 months	51	72.9
12 – 16 months	46	65.7
16 – 22 months	33	47.1
22 – 24 months	30	42.9
2 – 3 years	22	31.4
3 – 4 years	21	30
4 – 6 years	13	18.6
6 – 8 years	10	14.3
>8 years	9	12.9

Table 5.14. Sheep/goat age at death in Nuragic period based on mandibular teeth.

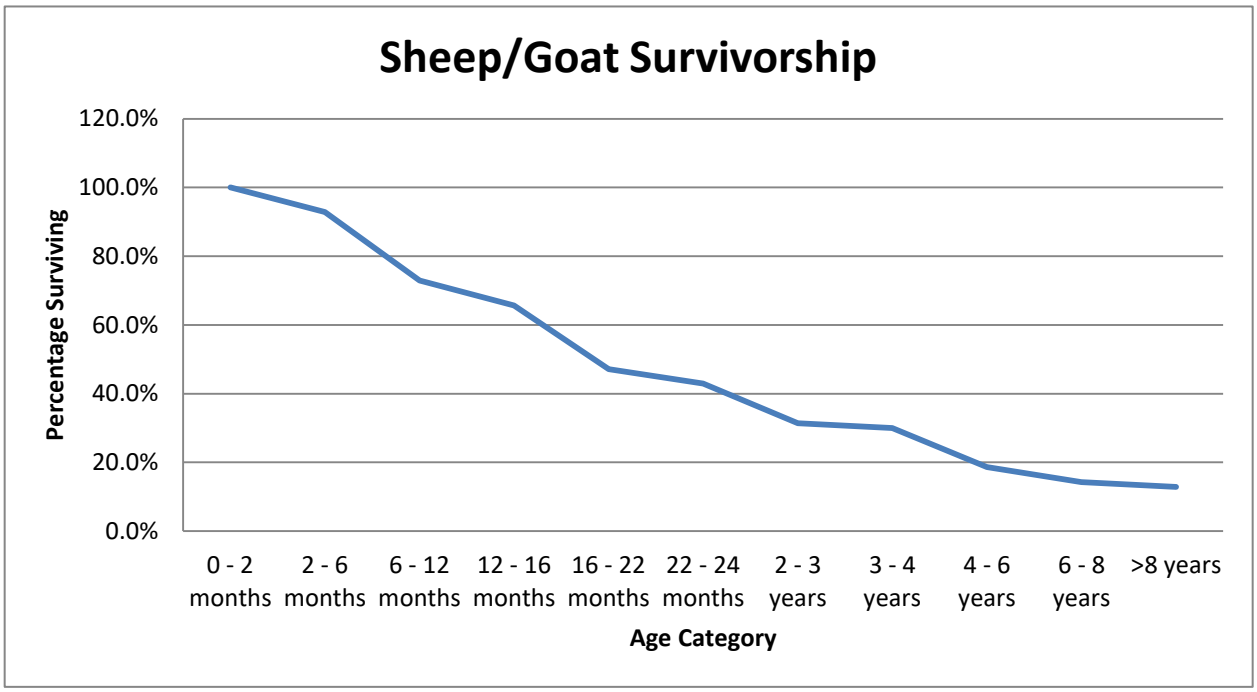

Figure 5.16. Chart showing sheep/goat survivorship in the Nuragic period based on mandibular teeth.

The above table and graph (Table 5.14 and Fig. 5.16) based on mandibular teeth tell a slightly different story than the fusion data. They show a major drop at 12 months (20%) like the fusion data, but they show another major drop (18.6%) at 22 months. The fusion data also shows

that 66.9% of sheep/goat survived over 3.5 years while the tooth data shows that only 30% survived over 3 years.

5.4 Discussion of results: Change over time

To summarize the above data, Table 5.15 shows major trends in foodways over time at Bingia ‘e Monti.

Time period	Dietary characteristics
Monte Claro	• Primary dependence on sheep/goat, possibly with emphasis on sheep • Large presence of marine shell relative to other periods • Marrow use common • Little evidence for roasting • Almost no evidence of butchery marks • Significant number of limb bones and few foot bones
Nuragic	• Primary dependence on sheep/goat, with no obvious bias toward either • Higher occurrence of deer and *P. sardus* remains • Potential importance of deer antler • Slightly less marrow use • Significant evidence for roasting • Almost equal occurrence of limb, cranial, and rib/vertebra/girdle bones and few foot bones • Relatively fewer limb bones than other periods
Roman	• Primary dependence on sheep/goat, but less so than previous periods • Increased dependence on pig and cattle • Marrow use common • Little evidence for roasting • Increased evidence for commensal animals • Slightly increased prevalence of bird, first chicken • Significant number of limb bones and few foot bones

Table 5.15. Major characteristics of the faunal remains for each period at Bingia ‘e Monti.

There are numerous similarities over the centuries of Bingia ‘e Monti’s occupation. Sheep/goat remains the most prevalent animal for all periods. The site seems to have been particularly suited to sheep/goat husbandry, and their production of secondary products likely also increased their popularity. In fact, even today the land on which Bingia ‘e Monti sits is used as a sheep pasture. Bone marrow use is common in all periods, though slightly less so in the Nuragic period. Obvious butchery marks are not numerous in any period, which could point to skilled butchers. Foot bones are uncommon throughout, perhaps reflective of amount of meat, preference, or socio-economic status. Overall there is a complete absence of fish bones, sea urchins, cephalopods, and marine mammals.

In many ways the Nuragic period stands out in terms of unique faunal assemblages compared to Monte Claro and Roman periods. Wild animals and evidence of roasting is more common. Skeletal elements of all species represented have similar frequencies apart from foot bones. There is a decrease in the frequency of limb bones and marrow use.

The Monte Claro period stands out for its marine shell remains. The Roman period shows increased use of pig and cattle and the first instance of chicken.

5.5 Interpretation: What was going on at LBA/EIA Bingia ‘e Monti?

The main question now is how can the above patterns be interpreted? Are the differences between time periods cultural, socio-economic, environmental, or some combination of these? Can these changes be attributed to interactions with Phoenicians traders? Can something be said about identity and food choice? In this section I consider mostly changes within the local context, and in Chapter Six I address these larger questions using comparisons from other Sardinian and Mediterranean sites, especially coastal colonial sites and other Phoenician, Punic,

and Roman sites. For example, increased pig consumption has been observed with the arrival of Carthaginians and Romans at other sites on the island, though most of these sites are coastal. Also, in Sardinia Nuragic culture has commonly been associated with hunted foods and sheep/goat products. My findings at Bingia ‘e Monti fit both of these broader patterns. Comparisons are particularly useful for narrowing interpretations at such a small house site.

The Nuragic period is marked by reliance on sheep/goat as the main source of meat, remains of hunted animals like deer and *P. sardus*, a relatively small number of pig and cattle remains, and very little evidence of marine resources. Across identified and unidentified animals, all parts of the animal are well-represented except for foot bones, though for sheep/goat hind foot bones were not uncommon. Kill-off patterns show sheep/goat and cattle were used for secondary products and killed later in life than pigs.

Sheep/goat would have been easy to care for and feed in the hilly environment around Bingia ‘e Monti. Depending on the season, they would have had to travel up to a few kilometers from site to find water. Pigs and cattle may have been more difficult to feed and water. Cattle require a large investment of resources, especially in colder months. Low cattle population at Bingia ‘e Monti could be explained by socio-economic status. Pigs are easy to take care of and grow and reproduce quickly, so a lower socio-economic status would not have prevented residents from raising them. Pigs were more common both before and after the Nuragic period at Bingia ‘e Monti, pointing to other reasons for their decrease, perhaps a focus on wool and milk production. The kill-off patterns for sheep/goat reinforce that possibility. Also, there is little evidence of industrial production at Bingia ‘e Monti; no metal or ceramic production. However, the courtyard contained spindle whorls and loom weights pointing to small-scale textile production.

Hunted animals do not seem to have added much to the Nuragic diet, since remains from only a few deer were found on site and *P. sardus* provided very little meat. As mentioned above, deer, particularly their antlers, seem to have held symbolic importance for the Nuragic culture. Perhaps the act of hunting and then collecting antlers was a seasonal event.

5.6 Conclusion

The site sits in a hilly fertile landscape between two large plateaus, close to neighboring complex and single tower *nuraghi*. Like other Nuragic sites in the region, it relied on an agro-pastoral economy supplemented by hunted animals such as deer and *P. sardus* to feed the single family homestead. Sheep/goat would have been ideally suited to that environment, not needing level land or significant food or water input like cattle and pigs. The site's inhabitants enjoyed fairly good cuts of meat, with an equal frequency of limb, cranial, rib/vertebra/girdle, and other (likely mostly limb and cranial fragments) bones. Low meat-bearing foot bones do not seem to play a major role in their diet. While their protein diet may not have been as diverse as in the Monte Claro or Roman periods, their socio-economic status is not low.

The presence of deer antler fragments may indicate the importance of hunted deer meat, even though other skeletal elements were not brought to the site. However, it is also possible that antlers were scavenged rather than taken from hunted animals. Antler seems to hold special cultural significance during the Nuragic period that we do not see before or after. This is also reflected in LBA male deer *bronzetti* left at abandoned *nuraghi* and sacred wells as offerings. Absence of marine resources may be linked to the inland location, but the presence of marine shell in Monte Claro contexts points to a cultural rather than environmental explanation.

We can see that overall there are differences between food remains during the three major periods of occupation at Bingia ‘e Monti. Many of these differences seem to be culturally based, and include different preferences in species, cuts of meat, or cooking methods. Similarities, the most obvious being the prevalence of sheep/goat, seem to be products of environmental restrictions. During the Roman period a decreased reliance on sheep/goat is balanced by an increased reliance on pig and cattle. In all periods the three domesticates show the same order of prevalence: sheep/goat is most common, followed by pig and then cattle.

Unfortunately, the sample size makes it difficult to compare the three Nuragic phases. The final phase does show that at the end of the Bronze Age sheep/goat is the most common followed by pig and then cattle. Deer, *P. sardus*, dog, and rodents also appear in this phase and are almost completely absent in other Nuragic phases. The importance of hunted animals seems to have developed later in Bingia ‘e Monti’s occupation.

Future work

To better understand the site of Bingia ‘e Monti, future excavations should be designed to target occupational levels both in and around the *nuraghe*. Specifically, debris from the *nuraghe’s* collapse could be removed in the western half of the tower interior in order to reach the occupational levels that were found on the eastern side of the tower. Since no hearth has been recovered within the tower, it is possible that it is located beneath this debris and may yield valuable information about Nuragic social structure and foodways as well as domestic functions of the *nuraghi*. Excavation beneath the collapse layer in the Roman building against the eastern exterior *nuraghe* wall would also be necessary, to uncover occupation levels from the Roman period. Currently all of the Roman material from Bingia ‘e Monti comes from superficial and collapse layers and therefore is informative only in the most general way.

Along with a search for occupational layers, the use of flotation would add an additional level of richness to studies of foodways at Bingia ‘e Monti. Flotation has the ability to recover microfauna as well as botanical remains, and could be used to answer questions about food production and consumption and ancient local ecologies. Soil samples could be taken from occupational layers within the *nuraghe* and Roman structure and also from shovel-test pits arranged around these buildings on top of the hill on which they are positioned.

Survey of the landscape around the *nuraghe* may point to other activity areas such as a waste disposal area or other Bronze Age structures. There could also be evidence for continued occupation after the abandonment of the *nuraghe* in the LBA, perhaps in a nearby village.

Chapter 6

Conclusion: Foodways and resistance in Nuragic Sardinia

This chapter serves as a synthesis of theoretical frameworks and descriptive data presented in this dissertation as well as an argument for Phoenician-Nuragic interactions at Bingia ‘e Monti. The faunal data are used to address the process of local and colonial cultural transformations through the lens of a foodways-based approach. Specific choices in animal husbandry and hunting are used to comment on the openness of Bingia ‘e Monti’s residents to their Phoenician neighbors on the coast. Lastly, I consider possibilities for future applications of food studies in colonial situations.

In the previous chapter, faunal analysis at Bingia ‘e Monti pointed to several characteristics of foodways that seem to be unique to the Nuragic culture, and patterns linked to cultural transitions taking place at the end of the Bronze Age. This chapter takes those patterns from a single *nuraghe* site and situates them within Sardinia and the LBA/EIA Phoenician world. Sardinia has long been characterized by a divide between the interior of the island and the coast (Sorge 2008). This dichotomy has its roots in colonial settlement patterns established during the LBA, when Phoenicians established urban ports along the coast, while the interior remained under control of the indigenous Nuragic people. According to the grand narrative of colonialism in the Mediterranean, later groups, in particular the Romans, controlled the island in such a way that they penetrated the interior and turned it into a major grain source for Rome. In Sardinia and the Mediterranean more generally, these colonizing groups are traditionally divided into two

categories: those who sought to establish informal relations or forge reciprocal relations (Phoenicians), and those who sought to dominate the local society (Carthaginians and Romans) (Webster et al. 1996; Dyson and Rowland 2007). This dichotomy derives mainly from textual evidence and does not account for known variation depending on geographic or historical contexts. These contrasting levels of domination fit nicely within common types of colonial interactions described in the Mediterranean: contact, trade, colonialism, and imperialism. With Phoenician presence the term 'precolonization' is sometimes used, indicating a time when Phoenician traders set up semi-permanent coastal sites and eventually expand inland (Sommer 2007:100; Bartoloni 2009a).

6.1 The importance of Bingia 'e Monti

Overall it is difficult to discuss smaller scale changes at Bingia 'e Monti during the Nuragic period due to a lack of samples from each subperiod within this long time frame. In the *nuraghe's* 330-plus years of occupation (c. 1613-1283 BC), relative stratigraphic and ceramic dates combined with radiocarbon dates from five bone samples seem to indicate that most of the contexts excavated come from the last phase of Nuragic habitation. The focus, then, is on taking a careful look at Bingia 'e Monti as an example of daily practice at an LBA inland Nuragic site, and using it and other LBA inland and coastal sites as baselines for cultural transitions that were just beginning to take place. These include local societal and economic transformations as well as those initiated by increasing contact with Phoenician traders and settlers.

Bingia 'e Monti is valuable for its contribution to our knowledge of LBA single-tower *nuraghi*. Although they make up the majority of identified Nuragic sites, these smaller sites are often understudied relative to their more complex multi-tower neighbors. During the MBA Bingia 'e Monti was one of many small sites within a largely non-hierarchical landscape (see

Chapter Two) that later became a subsidiary site in the LBA, potentially with Genna Maria as the local center. The small site of Bingia ‘e Monti provides a glimpse into the daily life of non-elites in the Rio Mògoro valley, one of the more highly populated areas during the LBA (Dyson and Rowland 2007). Like other Nuragic sites, inhabitants at Bingia ‘e Monti relied on animal husbandry and agriculture for most of their subsistence needs. The majority of faunal remains came from sheep/goat, a pattern observed at many inland sites during the first millennium BC (Carenti and Wilkens 2006). Sheep/goat would have done well in the hilly, generally dry terrain around the site, and may have travelled seasonally to other regions. Up until the 19th century, it was not uncommon for shepherds to move their herds great distances for seasonal grazing and stay with them for months at a time (Mientjes 2004). Based on age at death, some sheep/goat at the site were killed at a young age for meat, while the majority were kept well into adulthood to produce milk and wool. Loom weights and spindle whorls in the courtyard indicate that people living at Bingia ‘e Monti participated in small-scale yarn and textile production, presumably using wool from their own sheep and fibers from their own goats.

Bingia ‘e Monti residents would have also kept a small number of pigs and an even smaller number of cattle, perhaps one or two at a time. Pigs might have lived near the *nuraghe*, feeding on the remains of meals and turning those scraps into meat rather efficiently. Cattle would have taken more resources to raise, but in return provided milk and muscle for plowing the fields and moving large stones during building projects.

Hunted animals appear to have played a secondary role relative to domestic ungulates. Together red deer and *Prolagus sardus* made up less than 10% of faunal remains at Bingia ‘e Monti. Of the 39 deer bones recovered, 37 were cranial fragments, mostly from antlers. These came from eight different contexts in the tower and courtyard, which points to multiple hunting

events. The lack of post-cranial bones indicates that deer were either butchered at another location, and their meat and crania were brought back to the site, or the antlers were scavenged. The importance of male deer in particular, their representation in bronze, and their inclusion in burial contexts in LBA Sardinia suggests their cultural and symbolic significance to Nuragic peoples (Carenti 2012). This is reinforced by their relative absence in Monte Claro and late Roman period deposits at Bingia ‘e Monti. However, some coastal Phoenician sites like Sulci also had a large number of deer remains, especially worked antler. This seems to be the result of Phoenician-driven trade between the interior and coast, though Phoenicians, while valuing antlers as a raw material, apparently did not value the same dietary or symbolic aspects of deer as the Nuragic peoples (Carenti 2012:2950).

Along with animal husbandry, secondary products, and hunting, Bingia ‘e Monti residents would have used stone and wood tools during the LBA. There is no evidence of metal tools or metal production at the site, though nearby sites like Sa Conca Sa Cresia show bronze production in the mid- to late -MBA (Holt 2013:156-157). Obsidian from nearby Monte Arci was the raw material of choice for tool-making (Freund 2014), though bone and antler tools were also common.

As discussed in Chapter Two, although there is no botanical evidence from Bingia ‘e Monti, the people at the settlement would have likely practiced grain agriculture in the low-lying areas surrounding them. Like other interior sites, inhabitants of Bingia ‘e Monti probably relied on cereals, legumes, and fruits (Ucchesu et al. 2014:11). The only indirect evidence of farming comes from multiple large storage containers from the courtyard and *celletta*.

During the LBA, Bingia ‘e Monti was likely a secondary site in the LBA that supported a larger center. The largest Nuragic site at the time, Su Nuraxi, was about 10 km away, but the

much closer multi-tower *nuraghe* of Genna Maria would have more likely been the primary center, simply because of its proximity. *Nuraghi* on Siddi Plateau seem to have been going out of use by the late -MBA or early -LBA (Holt 2013:139), though they might have been part of Bingia ‘e Monti’s network early in its use. This network also likely entailed shared kin relations with nearby sites, based on settlement analysis and ethnographic analogy (Hayden 1999; Rowland 2001:39; Webster 2015:59). Based on food remains (only 9 marine mollusks), it does not seem that residents of Bingia ‘e Monti obtained food from, or travelled to the coast frequently in the LBA, or if they did, they rarely brought seafood back to the site. In addition, no Phoenician-style ceramics or other small finds that are common at sites with a Phoenician presence were reported during excavation, leading me to believe that the site’s connection to the interior was much stronger than its connection to the coast.

6.2 Gauging interactions at Bingia ‘e Monti

Though there is much work to be done in gathering faunal assemblages from all over Sardinia and the wider Mediterranean into a comparative framework, some larger patterns have come into focus (see Chapter Two for discussion of foodways at specific sites). Below Table 6.1 summarizes some key characteristics of Nuragic and Phoenician foodways on the coast and interior of Sardinia. These characteristics allow me to situate Bingia ‘e Monti and comment on interactions between its residents and Phoenicians.

	Inland Nuragic foodways	**Coastal Nuragic foodways**	**Phoenician foodways in Sardinia**
Sheep/goat	Make up the majority of the faunal remains, used for secondary products	Domestic ungulates important	Large amount of sheep/goat remains
Pig	Moderate to high amounts, usually more common than cattle remains	Domestic ungulates important	Less prevalent than sheep/goat

Cattle	Moderate amount, usually the lowest percentage of domestic remains, kept into old age for labor and milk	Domestic ungulates important	Large amount of cattle remains relative to most Nuragic sites
Deer	Important part of diet but fewer remains than domestic animals, decrease in late LBA	Fewer hunted animals	Antler working, decreased reliance on hunted animals compared to Nuragic sites
Marine resources	Minimal, some mollusks	Fishing and fish preservation, mollusks and other seafood, but fishing is often secondary to agriculture	Salt and fish sauce production on the coast, mollusks
Plants	Cereals, legumes, fruits, grapes and olives in small amounts	Cereals, legumes, and grapes, but agricultural fields limited	New plants introduced, intensification of cereal, wine and olive oil production

Table 6.1. Patterns in Nuragic and Phoenician foodways.

Inland Nuragic sites show some variation in foodways based on location or socio-economic status, but in general, Bingia ‘e Monti has a faunal assemblage similar to other sites in its region during the MBA and LBA. Though I cannot comment on crop production, the importance of sheep/goat as a meat, wool, and milk source and the presence of deer and P. sardus are common staples of Nuragic foodways. Coastal sites rely on significantly different food groups than sites inland.

Pigs are easy to take care of and grow and reproduce quickly, so a lower socio-economic status would not have prevented residents from raising them. Pigs were more common both before and after the Nuragic period at Bingia ‘e Monti, pointing to other reasons for their decrease, perhaps a focus on wool and milk production. The kill-off patterns for sheep/goat reinforce that possibility.

The percent of pig and cattle in Phase III compared to Phase I at Bingia ‘e Monti shows no significant changes. Bingia ‘e Monti share a similar environment with sites just a few

kilometers away, yet the amount of pig remains at those sites increases in the late LBA. The lower number of pig and cattle relative to sheep/goat could be resistance to animals favored by the Phoenicians.

At this and other sites, deer seem to hold special cultural significance during the Nuragic period that we do not see before or after. This is also reflected in LBA male deer *bronzetti* left at abandoned *nuraghi* and sacred wells as offerings. Another possible explanation for the late increase in deer antler at Bingia ‘e Monti is trade with coastal Phoenician sites. Deer increased in importance at interior as well as coastal sites with the arrival of Phoenicians. Inland sites produced meat and hides while ports showed evidence of commercial antler working.

Although we cannot unequivocally correlate the specific occupational strata at Bingia ‘e Monti with intensified Phoenician settlement in Sardinia using radiocarbon dates, it is possible that the site remained occupied long enough into the LBA that it experienced what is often described as the pre-colonial period, when Phoenicians were trading regularly at Sardinian ports but not settled permanently on the coast (Sommer 2007:100). Evidence of contact or colonial presence is often sought archaeologically in non-comestibles such as ceramic assemblages, architecture, infrastructure, art, and ritual objects (Lightfoot 1995; Campanella 2008; Dietler 2010). However, daily meals are powerful loci for the expression of social relations, kin ties, symbolism, and identity. Food is consumed and embodied in a way that non-comestibles cannot be. It is also consumed in a social setting. The intimate relationship between food, drink, and the body makes them ideal for tracking cultural transformations, in particular those entanglements that take place between indigenous Nuragic peoples and outsiders such as the Phoenicians. Social entanglements such as inter-marriage or other types of positive interactions (hospitality and food gifts for example) may lead to the adoption of some foreign food practices

by local populations. The remains of foodways, in this case faunal remains, have been tested as indicators of colonial interactions in the archaeological record.

In looking for changes in the faunal assemblage at Bingia ‘e Monti, there are two main ways of interpreting them: as the result of local developments or the result of interaction with Phoenician settlers. Of course it is possible that both were taking place. Below I outline these two possibilities and the evidence to support them.

Changes caused by Phoenician interaction

If Bingia ‘e Monti reveals Phoenician influence similar to coastal sites, then we would expect to see foodways change when Phoenicians establish trading relationships on Sardinia in the LBA/EIA. If occupants of Bingia ‘e Monti engaged in significant interaction with the Phoenician colonizers, I would expect to see either the direct appropriation of some core Phoenician food and drink practices or the selective appropriation of Phoenician practices and their incorporation into Nuragic cultural practices. Because foodways are conservative and Phoenician ingredients and processing/cooking equipment were not readily available on Sardinia, full-scale adoption of Phoenician foodways is unlikely. Such dramatic change might only take place in special circumstances, such as local attempts at elite aggrandizement through foreign trade or imitation, or in the case of Phoenician force. Selective appropriation of Phoenician foodways is what I expect to see at Bingia ‘e Monti. In the case of the faunal remains this would entail:

1) the appearance of new kinds of animals (chicken, hare, weasel, mongoose, edible dormouse, donkey, or horse)

2) a change in the ratios of animals already consumed by the Nuragic peoples (such as an increase in deer, pig, or cattle consumption or an increase in the use of marine resources)

3) use of new practices for old foods, or old practices for new foods (for example, changes in cooking techniques, food combinations, or butchery during the time of Phoenician presence).

In the case of ceramics I would expect an increase in Phoenician amphorae used to store wine and olive oil. There may also be Nuragic imitations of Phoenician amphorae, drinking cups for wine, or small vials that held ointments or perfumes made with olive oil.

As discussed, it is difficult to see change between MBA and LBA periods at Bingia ‘e Monti because the number of contexts attributed to the last phase greatly outweighs the number of earlier contexts. However, looking at the nearby Nuragic sites in Chapter Two, and comparing those to the last phase at Bingia ‘e Monti, we can observe some patterns.

The following animals were introduced to Sardinia during the Iron Age: chicken, hare, weasel, mongoose, edible dormouse, donkey, and horse. These species appear first at coastal sites like Sulci, and many have not been found interior sites until much later (Carenti and Wilkens 2006). In the case of Bingia ‘e Monti, chicken, hare, and donkey appear for the first time in the Roman period. This could indicate infrequent contact with Phoenician traders or initial resistance on the part of Nuragic inhabitants. The majority of Nuragic sites throughout the MBA and LBA show an emphasis on sheep/goat, with less reliance on cattle, pig, and hunted animals. Phoenician sites in the western Mediterranean consistently show a similar reliance on domestic animals but the remains of hunted animals are rare (Campanella 2008:24). LBA/EIA Nuragic sites show a decrease in occurrence of deer, *P. sardus*, and wild birds, likely due to a drying climate and loss of forests. At Bingia ‘e Monti we see an increase in deer in the latest Nuragic phase, indicating that hunting was still taking place.

Ceramic and botanical data as well as more contexts with absolute dates would better reveal information on cooking techniques and ingredient combinations. The few cut-marks and burns that I observed on bones at Bingia ‘e Monti are not enough to make claims about larger patterns of Nuragic butchery or roasting. About twice as many bones show evidence of fracturing for marrow extraction and/or stews as show burning, which might indicate more meat was boiled than roasted. Coastal sites and later interior sites like Arrubiu show an intensification of wine production with Phoenician presence. Nuragic sites had grapes and olives but did not commonly process them into wine or oil. Wine, olive oil, and fish sauce were all products that used ingredients already found in Sardinia, but in a different way.

Changes caused by local developments

If local changes impacted foodways at Bingia ‘e Monti to a greater degree than the arrival of Phoenician colonists on the coast, we expect to see the results of:

1) Technological changes: Plow agriculture is well-documented for the first time in the LBA, and would result in cattle being kept alive longer. Kill off patterns should indicate that a shift from slaughtering cattle for meat at a relatively young age to a higher proportion of cattle culled in middle or old age. Bronze tools are also in regular use for the first time during the LBA, and metallurgy intensified on the island. This means that metal tools may have replaced stone or obsidian tools in the butchering process, and therefore butchery patterns may have changed (for instance, people may have cut through the middle of bones, instead of detaching them at the joints by cutting connective tissue).

2) Environmental changes: Increasing the size of agricultural plots, made possible with plow agriculture and necessitated by growing populations, led to a decrease in forests around the *nuraghi* (Fonzo 2008). Additionally, an increase in the number of domesticated animals for

those populations may have also required deforestation to create grazing land. At some sites it is possible that during the LBA and later, meat from hunted animals decreased as woodland was turned into agricultural land. The meat of wild animals might have then been replaced by meat from domesticates. For example, pigs may have been consumed instead of boars. Also, it is likely that larger wild animals no longer lived near *nuraghi*, inhabitants may have hunted smaller animals like *Prolagus sardus* instead (Fonzo 2008). There is also evidence that animals decreased in size due to warmer drier climates in the MBA.

3) Economic reorganization: Either Phoenician presence or the organization of Nuragic centers and trade networks for down-the-line trade may have resulted in surplus production for trade and/or exchange. This could have included:

a) an increase in deer hunting to export antlers to Phoenician sites (Carenti and Wilkens 2006). This is a combination of local and Phoenician-influenced change.

b) an increase in grain production due to local population increase and therefore cattle for plowing the fields. This could have also led to a decrease in beef consumption if they were keeping some males alive later for plowing.

c) As discussed below, if social inequalities increased, this may have contributed to economic changes such as specialized production of prestige goods.

4) Social reorganization: As I mentioned previously, the emergence of hierarchy or stratified societies on Sardinia has been greatly debated by archaeologists, with the consensus being that hierarchy developed during the LBA and EIA when complex *nuraghi* and villages appeared and burials showed social differentiation. One possibility is that Phoenician arrival either instigated or supported stratification in Nuragic society, as certain Nuragic centers gained authority and prestige through trade with Phoenician sites (Russell 2010). Differences in social

status can be seen by studying foodways. According to Curet and Pestle (2010:416-417), high-status foods are scarce, overly abundant, diverse, labor intensive in acquisition or preparation, periodically occurring, of exotic origin, tasty, or symbolically potent. Faunal data most likely to reflect socio-economic status are the cuts of meat (as indicated by body part frequencies) and the range and proportions of species consumed (Crabtree 1990). I expect that elite foodways at Bingia ‘e Monti would be marked by marine shells, young domesticates, bones with a large amount of meat (ribs, limb bones, vertebrae), foods newly introduced by the Phoenicians, and large numbers of hunted animals, especially those that are harder to capture such as boar. Survivorship curves do not suggest that Bingia ‘e Monti was a subsidiary site sending young domesticates to a center, though it is possible that tithes were made using another product like grain.

Although there is no evidence of bronze tools at Bingia ‘e Monti, plow agriculture increased at many sites in the LBA. Not all Nuragic sites follow the pattern, but at most of them cattle decrease in importance. It seems that in this case the new technology does not have a great impact on the faunal remains found. Coastal Phoenician sites show an increase in cattle which could be tied to agricultural intensification rather than cultural preferences. The Roman period at Bingia ‘e Monti shows a significant increase in cattle compared to LBA periods, but collection strategies could also bias the retrieval of bones from larger animals over bones from smaller animals.

The decrease in deer, and somewhat later decrease in *P. sardus*, at Nuragic sites points to environmental changes. The drying climate followed by expanding agricultural intensification (especially as colonial sites expand inland) negatively impacted their forest habitat. I did not

identify any wild pigs or sheep, which could indicate a decrease in wild varieties as observed at Arrubiu (Fonzo 2008).

Though it is possible that the deer antlers at Bingia ‘e Monti were collected for trade with Phoenician sites on the coast, the presence of bones reveals that there is substantial evidence to show that deer was an important part of Nuragic diet. Potentially the saving of antlers from the butchery site was a new development. There seem to be a low number of cattle at Bingia ‘e Monti for intensified grain production, and other LBA/EIA Nuragic sites show a decrease in cattle. While craft production evidence may be found through further analysis of artifacts, spinning and weaving items are the only evidence thus far for craft production

Bingia ‘e Monti shows very few of the markings of elite status in its faunal assemblage. Bones from LBA show almost identical percentages of limb, cranium, and rib/vertebra/girdle bones with a much lower percentage of foot bones. Deer, *P. sardus*, and marine mollusks are present but in low numbers. Young animals were common in the diet, but overall kill-off patterns show an emphasis on secondary products.

6.3 Concluding thoughts

In areas where we observe cross-cultural interactions in foodways, we can have a discussion of agency, of both outsiders and indigenous groups. Overall we do not see adoption of typical Phoenician foodways at Bingia ‘e Monti. Nuragic-Phoenician interaction at this site reflected in changes such as increased deer antler collection and lack of increase in pig and cattle compared to nearby sites indicates participation in a new economic enterprise but at the same time resistance of Phoenician preferences for domesticated species. The lack of increase in pig and cattle may also point to a focus on wool and milk production. With botanical evidence we

could also see if Phoenician presence led to intensification in cereal, grape, or olive production. This nuanced view of agency in a colonial situation proves the value of a foodways-based approach.

At least for the early stages of Phoenician trade and settlement in Sardinia, we do not see evidence of a dominating colonial power in the west-central interior. Instead foodways show cross-cultural interactions that occurred on more equal footing, bringing into question whether this can be labeled colonialism. Residents at Bingia ‘e Monti and other contemporary Nuragic sites in the region were not displaced or forced to alter their daily practices. In addition, no Phoenician-style ceramics or other small finds were found, leading me to believe that the site’s connection to the interior was much stronger than its connection to the coast. Without studying food remains at Bingia ‘e Monti it would be difficult to comment on cross-cultural interactions in detail. Early Phoenician traders in Sardinia seem to have had little, if any influence on inland sites before permanent settlement necessitated trade relations.

In comparison, coastal sites like Tharros, Neapolis, and Sulci show clear Phoenician preferences for domesticates, especially pig and cattle, and intense production of cereals, olive oil, and wine. Wild animals play a much less central role. Many of the coastal Nuragic settlements were abandoned with Phoenician arrival. We can see that uneven cross-cultural interactions on the coast versus interior caused divergent patterns of development and can imagine that these interactions in Sardinia led to the development of different local identities during the Late Bronze and Early Iron Ages. The interior was conservative with respect to foodways, and Phoenician interaction with the interior during occupation at Bingia ‘e Monti was not a colonial encounter. Changes in foodways were instead likely due to economic and social reorganization and increasing populations at the end of the LBA.

The above approach can be applied not only to inland LBA/EIA Sardinian sites, but also to food and drink remains from any site in any colonial situation. Unlike past approaches to archaeological studies of colonialism that explained all changes in terms of colonial influence, these questions emphasize the importance of local change and indigenous agency. In looking at Phoenician settlement on Sardinia, it is obvious that it is not colonialism in the modern European sense. Colonial situations in the Mediterranean during the 1st millennium BC vary from contact to imperialism, which requires a flexible framework that can encompass a range of situations.

Due to the relative newness of the archaeology of colonialism and postcolonial approaches in the Mediterranean, there are numerous future directions to explore. These include a wider survey of sites that includes more case studies, in the hope of revealing patterns and putting together a more inclusive comparative framework for the archaeology of colonialism. Although I focused on the LBA, we must tie in cases from either end of this period in order to better understand the roots of colonialism and its unexpected long-term consequences. Is there a common colonial process in Phoenician expansion the Mediterranean? How do these colonial situations impact contemporary cultures?

Bingia ‘e Monti adds another Nuragic example to the much more thorough understanding of Phoenician, Punic, and Roman foodways and of coastal sites, expanding our view of the colonial process through a study of daily practices. Faunal data from this site provide valuable comparative data for other Nuragic sites, allowing other archaeologists working in Sardinia to situate their projects within a more complete picture of Nuragic foodways, and how these indigenous foodways change during the LBA. Addressing questions about the impact of the colonial process on foodways will also potentially provide insight into other realms of the

ancient culture such as kinship, marriage patterns, and economy, and political organization within the context of colonial entanglements.

Appendix A: Bingia ‘e Monti Harris matrix

For both figures, round SUs represent surfaces, SUs with ‘-‘ on either side of the number represent architectural features, and SUs with * represent negative space.

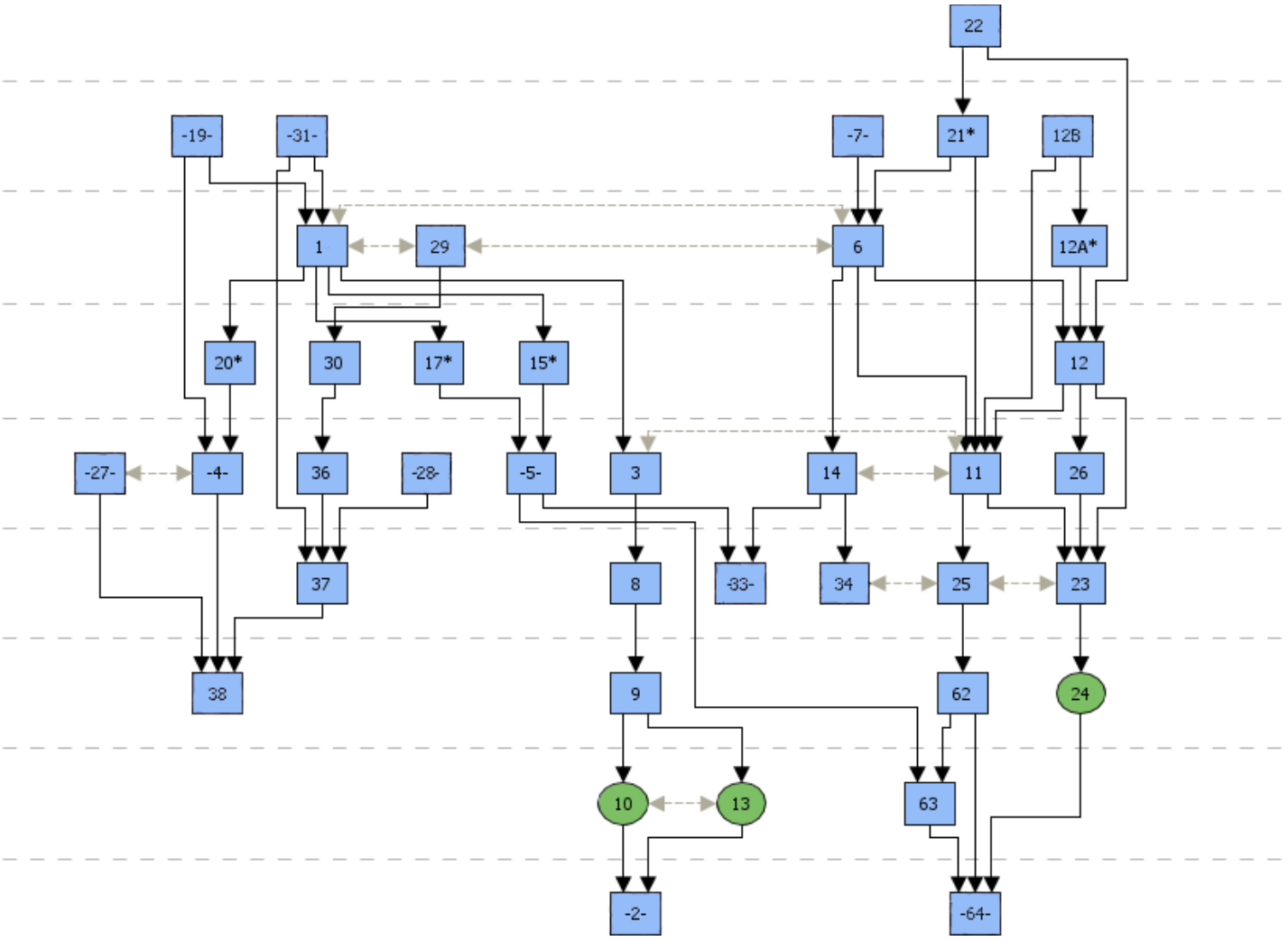

Figure A.1. Harris matrix for SUs from areas A, B, C, and D at Bingia ‘e Monti.

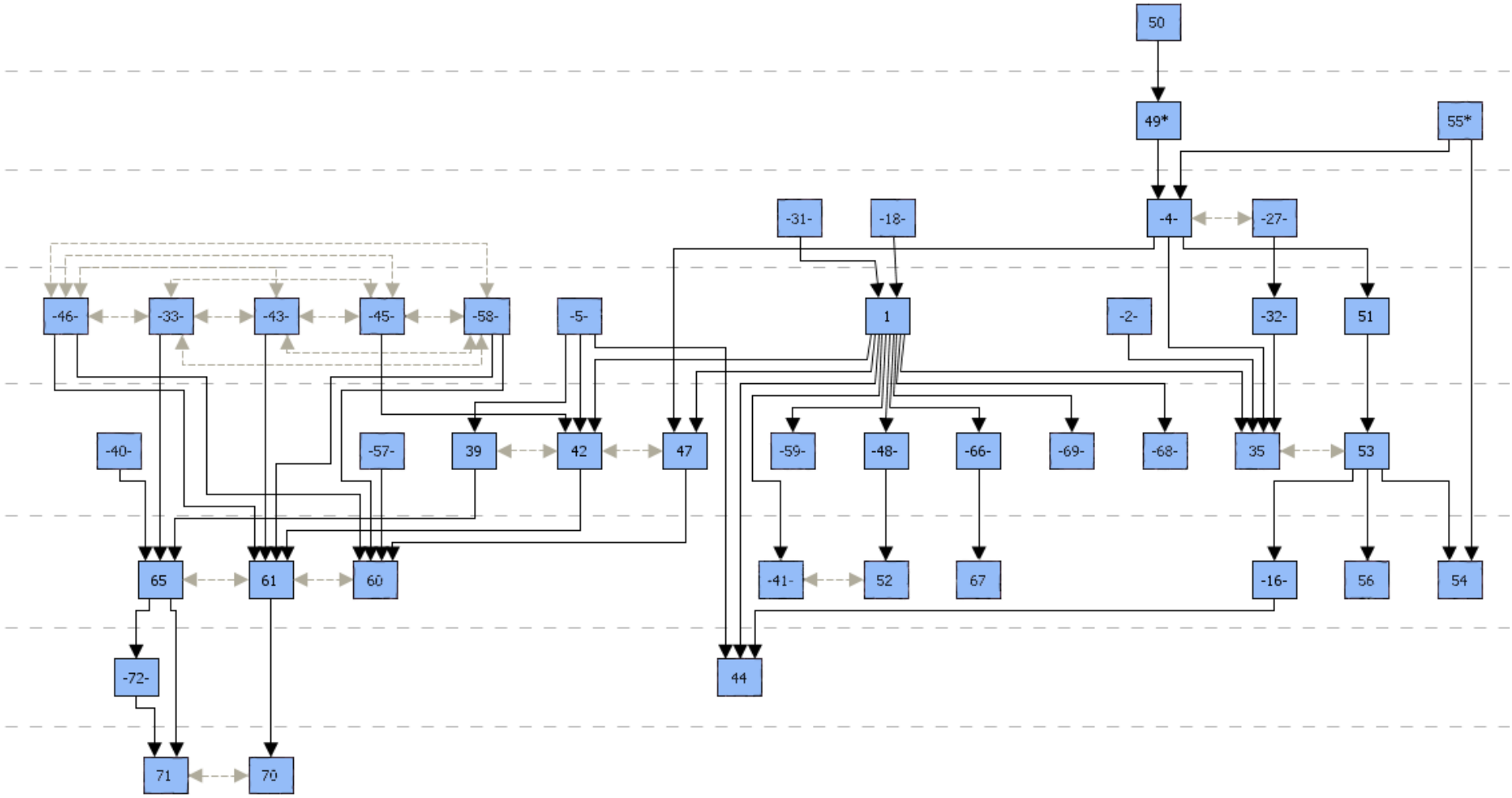

Figure A.2. Harris matrix for SUs from the west, east, and north sections at Bingia ‘e Monti.

Appendix B: Bingia ‘e Monti SU descriptions

Area of site	SU	Description
	1	superficial layer covering all excavated areas
Main tower (A)	2	main tower wall
	3	upper layer of collapse in the tower and tower entrance
	8	lower layer of collapse in the tower and tower entrance
	9*	occupation level in the tower and tower entrance, only in SE quadrant were there 3 distinct levels: upper level 9A, 9B, and lower level 9C
	10	floor of the main tower
	13	floor of the tower entrance
Courtyard, stairs, courtyard entrance (B)	4	west wall of the courtyard, same as wall 27
	5	east wall of the courtyard
	6	upper level in courtyard, stairs, *celletta*, and courtyard entrance
	11	layer of collapse in the courtyard, stairs, and entrance
	12	layer in SW quadrant of courtyard, poor in rocks and rich in lumps of cooked clay
	12B	fill of hole 12A in SW quadrant of courtyard, contained a complete pot
	15	space where blocks were removed from wall 5
	17	space where block were removed from wall 5, southeast of 15
	19	large block likely taken from SU 20
	20	hole created when large block was removed from wall 4
	21	cavity excavated for the burial
	22	double burial
	23*	occupation level in courtyard, under collapse of SUs 11-12 and above the

		pavement (SU 24)
	24	pavement in courtyard, courtyard entrance, and tower entrance
	25*	layer present in the east of the courtyard entrance in the NE and SE quadrants where pavement is not present
	26	potential structure in the SW courtyard
	27	wall southeast of passage D, same as wall 4
	28	wall separating courtyard from passage D
	62	lower layer east of the courtyard entrance and in the NE and SE quadrants
	63	layer of pebbles and basalt flakes under wall 5
	64	series of large blocks covered by SU 62 and SU 24
***Celletta* (C)**	7	blocks accumulated in the *celletta*
	14	collapse layer in *celletta*
	34*	Nuragic occupation layer in *celletta*
West side passage (D)	29	superficial layer above the collapse in passage D
	30	collapse layer in passage D
	36	layer of small rocks under collapse in west side entrance
	37*	Nuragic occupation layer in west side entrance
	38	layer with Monte Claro ceramics, same as SUs 35 and 53
West face and layers under the courtyard wall and under the side entrance (W)	1	superficial layer
	31	series of blocks west of wall 4
	32	series of disconnected blocks, likely once part of wall 27
	35	lower layer in the west trench, same as SU 38 but distinct from it at the end separating the external part below D not preserved by the cover of the west side entrance, same

		layer as SU 53 in depth
	49	hole made by the separation of the stones between the inside and outside of wall 4
	50	topsoil filling SU 49
	51	layer of gray soil covered by wall 4
	53	layer of yellow soil same as superficial layer outside wall 4
	54	lens of black carbonized soil rich in small blackened shingles
	55	cavity found at significant depth west wall 4
	56	layer of brown-beige-white soil
North face and layers under the courtyard entrance and the *celletta* (N)	1	superficial layer
	33	*capanna* 1 structure beneath *celletta*
	39	MC occupation layer in *celletta* NE
	40	three rocks placed in a triangle in the *celletta*
	42	MC occupation layer north of *celletta*
	43	part of the *capanna* 1 structure north of the *nuraghe*
	44	layer with Monte Claro material east of wall 43
	45	isolated block likely part of walls 43 and 46
	46	two blocks that are part of *capanna* 1
	47	layer with MC material between walls 46-58 and 57
	57	arched wall of *capanna* 2
	58	two stones that make up part of *capanna* 1
	59	group of stones between wall 57 and wall 4
	60	lower layer in the space between the MC *capanna* 1 and 2
	61	lower layer in MC *capanna* 1, north section B

	65	lower layer in MC *capanna* 1, under the *celletta*
	70	sterile soil at the base of *capanna* 1
	71	sterile soil at the base of *capanna* 1, below *celletta*
	72	piece of basalt half in SU 65 and half in SU 71
East face (E)	1	superficial layer
	16	short linear row of stones northeast of courtyard wall
	18	series of blocks northeast of the *nuraghe*
	41	large collection of stones east of the *nuraghe*
	48	accumulation of stones between walls 5 and 2
	52	layer with rocks under the humus in the east
	66	north wall of the Roman building
	67	collapse layer in Roman building
	68	south wall of the Roman building
	69	large north-south wall of Roman building

*Contexts that have been radiocarbon dated.

Appendix C: List of species identified at Bingia ‘e Monti

Scientific name	Common name
Aves	bird
Mollusca	mollusk
Passeriformes	passerine
Rodentia	rodent
Serpentes	snake
Bos taurus	cattle
Canis familiaris	domestic dog
Capra hircus	goat
Cervus elaphus	red deer
Equus asinus	domestic donkey
Erinaceous europaeus	European hedgehog
Gallus gallus	domestic chicken
Lepus capensis	Cape hare
Ovis aries	sheep
Prolagus sardus	Sardinian pika
Rattus rattus	black rat
Sus scrofa	pig

Appendix D: Condensed NISP for Bingia ‘e Monti faunal assemblage

L- limb, R- ribs, vertebra, and girdle, C- cranium, F- foot, and O- other: did not fit in any of the first four categories

SU	Find ID	Recovery Date	Period	Taxon	Quantity	F	L	C	R	Other
1	(O)N/1/1	24/25-8-89	MC	bos	3	3	0	0	0	0
1	(O)N/1/1	24/25-8-89	MC	s/g	17	2	4	11	0	0
1	(O)N/1/1	24/25-8-89	MC	sheep	2	2	0	0	0	0
1	(O)N/1/1	24/25-8-89	MC	sus	3	0	1	2	0	0
1	(O)N/1/1	24/25-8-89	MC	UNID lg mammal	3	0	0	0	0	3
1	(O)N/1/1	24/25-8-89	MC	UNID med mammal	58	0	20	8	15	15
1	(O)N/1/1	24/25-8-89	MC	UNID med/lg mammal	1	0	0	1	0	0
1	(O)N/1/2	5-9-89	MC	s/g	2	1	0	0	1	0
1	(O)N/1/2	5-9-89	MC	sus	1	0	0	1	0	0
1	(O)N/1/2	5-9-89	MC	UNID lg mammal	1	0	0	1	0	0
1	(O)N/1/2	5-9-89	MC	UNID med mammal	3	0	1	1	1	0
1	(O)N/1/2	5-9-89	MC	UNID med/lg mammal	5	0	0	0	0	5
1	(O)N/1/3	7-9-89	MC	bos	1	0	0	1	0	0
1	(O)N/1/3	7-9-89	MC	s/g	1	0	0	1	0	0
1	(O)N/1/3	7-9-89	MC	UNID lg mammal	1	0	0	1	0	0
1	(O)N/1/3	7-9-89	MC	UNID med mammal	6	0	2	2	2	0
1	(O)W/1/1	26-7-89	MC	s/g	6	0	1	5	0	0
1	(O)W/1/1	26-7-89	MC	UNID med mammal	18	0	5	4	2	7
1	(O)W/1/2	20-7-89	MC	bos	1	0	0	1	0	0
1	(O)W/1/2	20-7-89	MC	s/g	4	2	2	0	0	0
1	(O)W/1/2	20-7-89	MC	UNID med mammal	5	0	4	0	0	1
1	(O)W/1/3	22-7-89	MC	s/g	6	1	5	0	0	0
1	(O)W/1/3	22-7-89	MC	sheep	1	1	0	0	0	0
1	(O)W/1/3	22-7-89	MC	sus	2	2	0	0	0	0
1	(O)W/1/3	22-7-89	MC	UNID med mammal	42	0	9	5	13	15
1	(O)W/1/4	1-8-89	MC	s/g	6	1	1	4	0	0
1	(O)W/1/4	1-8-89	MC	sus	1	1	0	0	0	0

1	(O)W/1/4	1-8-89	MC	UNID med mammal	12	0	6	0	2	4
1	(O)W/1/5	7-9-89	MC	bos	1	1	0	0	0	0
1	(O)W/1/5	7-9-89	MC	goat	1	1	0	0	0	0
1	(O)W/1/5	7-9-89	MC	s/g	3	1	0	1	1	0
1	(O)W/1/5	7-9-89	MC	sheep	1	1	0	0	0	0
1	(O)W/1/5	7-9-89	MC	sus	4	2	1	1	0	0
1	(O)W/1/5	7-9-89	MC	UNID med mammal	12	0	4	2	2	4
35	(O)W/35/1	25-7-89	MC	bos	1	0	1	0	0	0
35	(O)W/35/1	25-7-89	MC	s/g	8	4	0	3	1	0
35	(O)W/35/1	25-7-89	MC	sheep	2	2	0	0	0	0
35	(O)W/35/1	25-7-89	MC	sus	1	0	0	1	0	0
35	(O)W/35/1	25-7-89	MC	UNID large mammal	6	0	6	0	0	0
35	(O)W/35/1	25-7-89	MC	UNID med mammal	65	0	31	3	16	15
35	(O)W/35/2	2-8-89	MC	s/g	3	0	0	3	0	0
35	(O)W/35/2	2-8-89	MC	UNID large mammal	1	0	1	0	0	0
35	(O)W/35/2	2-8-89	MC	UNID med mammal	9	0	4	0	1	4
39	(O)N/39/1	24-8-89	MC	s/g	1	0	1	0	0	0
39	(O)N/39/1	24-8-89	MC	UNID med mammal	2	0	2	0	0	0
39	(O)N/39/2	25-8-89	MC	bivalve	1					
39	(O)N/39/2	25-8-89	MC	s/g	2	0	1	1	0	0
39	(O)N/39/2	25-8-89	MC	sus	1	0	0	0	1	0
39	(O)N/39/2	25-8-89	MC	UNID med mammal	7	0	5	1	0	1
39	(O)N/39/3	3-10-90	MC	s/g	4	0	0	4	0	0
39	(O)N/39/3	3-10-90	MC	sheep	1	0	1	0	0	0
39	(O)N/39/3	3-10-90	MC	sus	2	2	0	0	0	0
39	(O)N/39/3	3-10-90	MC	UNID med mammal	21	0	7	0	2	12
39	(O)N/39/4	4/10-10-90	MC	bivalve	5					
39	(O)N/39/4	4/10-10-90	MC	s/g	3	0	0	3	0	0
39	(O)N/39/4	4/10-10-90	MC	sus	3	1	0	1	1	0
39	(O)N/39/4	4/10-10-90	MC	UNID med mammal	25	0	11	1	3	10
39	(O)N/39/5	10-10-90	MC	UNID med mammal	1	0	0	0	0	1
42	(O)N/42/1	23/24-8-89	MC	bivalve	2					
42	(O)N/42/1	23/24-8-89	MC	human	6	0	6	0	0	0
42	(O)N/42/1	23/24-8-89	MC	s/g	8	0	1	7	0	0
42	(O)N/42/1	23/24-8-89	MC	sheep	1	0	1	0	0	0
42	(O)N/42/1	23/24-8-89	MC	sus	3	1	0	2	0	0

42	(O)N/42/1	23/24-8-89	MC	UNID large mammal	14	0	1	0	0	13
42	(O)N/42/1	23/24-8-89	MC	UNID med mammal	63	0	25	12	2	24
42	(O)N/42/1	23/24-8-89	MC	UNID med/lg mammal	1	0	0	1	0	0
42	(O)N/42/2	22/24-9-90	MC	bivalve	1					
42	(O)N/42/2	22/24-9-90	MC	canis	1	0	0	1	0	0
42	(O)N/42/2	22/24-9-90	MC	goat	1	1	0	0	0	0
42	(O)N/42/2	22/24-9-90	MC	s/g	19	1	2	16	0	0
42	(O)N/42/2	22/24-9-90	MC	sheep	2	1	1	0	0	0
42	(O)N/42/2	22/24-9-90	MC	sus	5	3	0	2	0	0
42	(O)N/42/2	22/24-9-90	MC	UNID large mammal	5	0	3	1	1	0
42	(O)N/42/2	22/24-9-90	MC	UNID med mammal	123	0	43	14	11	55
42	(O)N/42/3	24/27-9/1-10-90	MC	bos	1	0	0	1	0	0
42	(O)N/42/3	24/27-9/1-10-90	MC	s/g	1	0	0	1	0	0
42	(O)N/42/3	24/27-9/1-10-90	MC	UNID med mammal	17	0	11	1	1	4
42	(O)N/42/3	24/27-9/1-10-90	MC	UNID med/lg mammal	1	0	0	0	1	0
47	(O)N/47/1	24-9-90	MC	bivalve	6					
47	(O)N/47/1	24-9-90	MC	bos	1	0	1	0	0	0
47	(O)N/47/1	24-9-90	MC	goat	1	1	0	0	0	0
47	(O)N/47/1	24-9-90	MC	human	1	1	0	0	0	0
47	(O)N/47/1	24-9-90	MC	Rattus	1	0	1	0	0	0
47	(O)N/47/1	24-9-90	MC	s/g	34	3	14	17	0	0
47	(O)N/47/1	24-9-90	MC	sheep	1	1	0	0	0	0
47	(O)N/47/1	24-9-90	MC	sus	4	0	0	4	0	0
47	(O)N/47/1	24-9-90	MC	UNID large mammal	4	0	4	0	0	0
47	(O)N/47/1	24-9-90	MC	UNID med mammal	289	3	104	32	57	93
47	(O)N/47/1	24-9-90	MC	UNID med/sm mammal	2	0	2	0	0	0
47	(O)N/47/1	24-9-90	MC	UNID small mammal	1	0	0	0	1	0
51	(O)W/51/1	31-8-89	MC	bos	1	1	0	0	0	0
51	(O)W/51/1	31-8-89	MC	s/g	1	0	1	0	0	0
51	(O)W/51/1	31-8-89	MC	sheep	1	0	1	0	0	0
51	(O)W/51/1	31-8-89	MC	UNID med mammal	8	0	6	1	1	0
51	(O)W/51/2	4-9-89	MC	bos	1	1	0	0	0	0

51	(O)W/51/2	4-9-89	MC	s/g	1	0	0	1	0	0
51	(O)W/51/2	4-9-89	MC	sheep	1	1	0	0	0	0
51	(O)W/51/2	4-9-89	MC	UNID large mammal	2	0	1	1	0	0
51	(O)W/51/2	4-9-89	MC	UNID med mammal	5	0	4	0	1	0
53	(O)W/53/1	6-9-89	MC	Aves	2	0	0	0	0	2
53	(O)W/53/1	6-9-89	MC	bos	1	0	0	1	0	0
53	(O)W/53/1	6-9-89	MC	s/g	25	2	6	17	0	0
53	(O)W/53/1	6-9-89	MC	sheep	2	1	1	0	0	0
53	(O)W/53/1	6-9-89	MC	sus	9	4	0	5	0	0
53	(O)W/53/1	6-9-89	MC	UNID med mammal	99	0	31	27	17	24
53	(O)W/53/1	6-9-89	MC	UNID med/lg mammal	1	1	0	0	0	0
53	(O)W/53/2	12-9-89	MC	s/g	11	0	1	10	0	0
53	(O)W/53/2	12-9-89	MC	sheep	1	1	0	0	0	0
53	(O)W/53/2	12-9-89	MC	sus	2	0	1	1	0	0
53	(O)W/53/2	12-9-89	MC	UNID med mammal	34	0	11	10	3	10
53	(O)W/53/3	12-9-89	MC	bivalve	1					
53	(O)W/53/3	12-9-89	MC	canis	1	1	0	0	0	0
53	(O)W/53/3	12-9-89	MC	s/g	2	0	0	2	0	0
53	(O)W/53/3	12-9-89	MC	UNID med mammal	34	0	11	10	3	10
53	(O)W/53/4	13-9-89	MC	UNID large mammal	1	0	1	0	0	0
53	(O)W/53/4	13-9-89	MC	UNID med mammal	1	0	0	0	1	0
54	(O)W/54/1	14-9-89	MC	s/g	1	0	0	1	0	0
54	(O)W/54/1	14-9-89	MC	UNID med mammal	2	0	0	0	1	1
56	(O)W/56/1	13-9-89	MC	s/g	2	0	0	2	0	0
56	(O)W/56/1	13-9-89	MC	UNID med mammal	5	0	3	1	0	1
56	(O)W/56/2	13-9-89	MC	UNID med mammal	5	0	2	1	2	0
56	(O)W/56/3	14-9-89	MC	UNID med mammal	6	0	2	0	1	3
56	(O)W/56/4	13-9-89	MC	bivalve	1					
56	(O)W/56/4	13-9-89	MC	cervus	1	0	0	1	0	0
56	(O)W/56/4	13-9-89	MC	s/g	6	0	0	6	0	0
56	(O)W/56/4	13-9-89	MC	UNID med mammal	23	0	6	6	6	5
56	(O)W/56/5	13-9-89	MC	UNID med mammal	1	0	0	0	1	0
56	(O)W/56/5	13-9-89	MC	UNID med/lg mammal	1	0	1	0	0	0
59	(O)N/59/1	25-9-90	MC	bivalve	6					
59	(O)N/59/1	25-9-90	MC	s/g	1	0	0	0	1	0
59	(O)N/59/1	25-9-90	MC	sus	2	0	0	2	0	0

59	(O)N/59/1	25-9-90	MC	UNID med mammal	20	0	11	0	2	7
60	(O)N/60/1	25/26-9-90	MC	bivalve	2					
60	(O)N/60/1	25/26-9-90	MC	s/g	3	0	1	2	0	0
60	(O)N/60/1	25/26-9-90	MC	sus	1	0	0	1	0	0
60	(O)N/60/1	25/26-9-90	MC	UNID large mammal	2	0	2	0	0	0
60	(O)N/60/1	25/26-9-90	MC	UNID med mammal	71	0	24	5	4	38
60	(O)N/60/1	25/26-9-90	MC	UNID med/lg mammal	1	0	0	1	0	0
60	(O)N/60/2	27-9/1-10-90	MC	bivalve	7					
60	(O)N/60/2	27-9/1-10-90	MC	bos	1	0	1	0	0	0
60	(O)N/60/2	27-9/1-10-90	MC	land snail	1					
60	(O)N/60/2	27-9/1-10-90	MC	s/g	7	1	0	6	0	0
60	(O)N/60/2	27-9/1-10-90	MC	sus	1	1	0	0	0	0
60	(O)N/60/2	27-9/1-10-90	MC	UNID large mammal	4	0	4	0	0	0
60	(O)N/60/2	27-9/1-10-90	MC	UNID med mammal	122	0	37	5	12	68
61	(O)N/61/1	6/8-10-90	MC	bivalve	3					
61	(O)N/61/1	6/8-10-90	MC	bos	1	0	0	1	0	0
61	(O)N/61/1	6/8-10-90	MC	s/g	12	2	3	7	0	0
61	(O)N/61/1	6/8-10-90	MC	sheep	1	1	0	0	0	0
61	(O)N/61/1	6/8-10-90	MC	sus	1	1	0	0	0	0
61	(O)N/61/1	6/8-10-90	MC	UNID large mammal	3	0	3	0	0	0
61	(O)N/61/1	6/8-10-90	MC	UNID med mammal	87	0	34	1	17	35
61	(O)N/61/2	10-10-90	MC	sheep	1	0	1	0	0	0
61	(O)N/61/2	10-10-90	MC	UNID large mammal	1	0	0	0	0	1
61	(O)N/61/2	10-10-90	MC	UNID med mammal	29	0	8	1	10	10
61	(O)N/61/3	11-10-90	MC	bivalve	10					
61	(O)N/61/3	11-10-90	MC	s/g	3	1	0	2	0	0
61	(O)N/61/3	11-10-90	MC	sus	1	1	0	0	0	0
61	(O)N/61/3	11-10-90	MC	UNID large mammal	1	0	1	0	0	0
61	(O)N/61/3	11-10-90	MC	UNID med mammal	11	0	4	1	1	5
61	(O)N/61/4	13-10-90	MC	human	1	0	0	1	0	0
61	(O)N/61/4	13-10-90	MC	sus	1	0	0	1	0	0
61	(O)N/61/4	13-10-90	MC	UNID med mammal	20	0	8	1	1	10
61	(O)N/61/5	9-11-90	MC	bivalve	3					
61	(O)N/61/5	9-11-90	MC	s/g	3	0	0	3	0	0
61	(O)N/61/5	9-11-90	MC	UNID large mammal	2	0	2	0	0	0
61	(O)N/61/5	9-11-90	MC	UNID med mammal	53	0	22	8	12	11

65	(O)N/65/1	10/12-10-90	MC	bivalve	8					
65	(O)N/65/1	10/12-10-90	MC	s/g	7	0	1	5	1	0
65	(O)N/65/1	10/12-10-90	MC	sheep	1	1	0	0	0	0
65	(O)N/65/1	10/12-10-90	MC	sus	1	0	0	1	0	0
65	(O)N/65/1	10/12-10-90	MC	UNID large mammal	4	0	4	0	0	0
65	(O)N/65/1	10/12-10-90	MC	UNID med mammal	21	0	10	0	0	11
65	(O)N/65/1	10/12-10-90	MC	UNID med/sm mammal	4	0	0	0	4	0
65	(O)N/65/2	5-11-90	MC	Erinaceous	1	0	0	1	0	0
65	(O)N/65/2	5-11-90	MC	s/g	4	0	3	1	0	0
65	(O)N/65/2	5-11-90	MC	UNID med mammal	18	0	11	1	4	2
65	(O)N/65/3	6/8-11-90	MC	bivalve	4					
65	(O)N/65/3	6/8-11-90	MC	s/g	4	1	2	1	0	0
65	(O)N/65/3	6/8-11-90	MC	sheep	1	1	0	0	0	0
65	(O)N/65/3	6/8-11-90	MC	UNID med mammal	35	0	14	7	1	13
37-38	(O)W/37-38/1	4-9-89	MC	s/g	3	0	0	3	0	0
37-38	(O)W/37-38/1	4-9-89	MC	sus	1	0	0	1	0	0
37-38	(O)W/37-38/1	4-9-89	MC	UNID med mammal	4	0	2	1	0	1
42-47	(O)N/42-47/1	8-9-89	MC	bos	2	0	0	2	0	0
42-47	(O)N/42-47/1	8-9-89	MC	marine shell	1					
42-47	(O)N/42-47/1	8-9-89	MC	Prolagus	1	0	0	1	0	0
42-47	(O)N/42-47/1	8-9-89	MC	s/g	13	1	5	6	1	0
42-47	(O)N/42-47/1	8-9-89	MC	sheep	1	0	1	0	0	0
42-47	(O)N/42-47/1	8-9-89	MC	sus	2	1	0	1	0	0
42-47	(O)N/42-47/1	8-9-89	MC	UNID med mammal	93	1	33	17	23	19
51-53-56	(O)W/51-53-56/1	19-9-90, 3-12-90	MC	bivalve	1					
51-53-56	(O)W/51-53-56/1	19-9-90, 3-12-90	MC	s/g	2	0	1	1	0	0
51-53-56	(O)W/51-53-56/1	19-9-90, 3-12-90	MC	UNID med mammal	2	0	1	0	1	0
TOTAL					2081	74	707	389	272	577
3	(O)A/3/1	11-11-83	NUR	cervus	1	0	0	1	0	0
3	(O)A/3/1	11-11-83	NUR	goat	1	1	0	0	0	0
3	(O)A/3/1	11-11-83	NUR	s/g	1	0	0	1	0	0
3	(O)A/3/1	11-11-83	NUR	sheep	1	1	0	0	0	0
3	(O)A/3/1	11-11-83	NUR	sus	6	6	0	0	0	0

3	(O)A/3/1	11-11-83	NUR	UNID med mammal	18	2	3	0	2	11
3	(O)A/3/2	15-11-83	NUR	s/g	1	1	0	0	0	0
3	(O)A/3/2	15-11-83	NUR	sheep	1	0	1	0	0	0
3	(O)A/3/2	15-11-83	NUR	sus	9	9	0	0	0	0
3	(O)A/3/2	15-11-83	NUR	UNID med mammal	4	0	1	0	2	1
3	(O)A/3/3	25/29-11-83	NUR	sus	1	0	0	1	0	0
3	(O)A/3/4	6/7-10-88	NUR	Aves	1	0	1	0	0	0
3	(O)A/3/4	6/7-10-88	NUR	goat	1	1	0	0	0	0
3	(O)A/3/4	6/7-10-88	NUR	UNID med mammal	4	2	1	0	0	1
3	(O)A/3/5	16-11-83	NUR	cervus	2	0	0	2	0	0
3	(O)A/3/5	16-11-83	NUR	sus	1	0	0	1	0	0
3	(O)A/3/5	16-11-83	NUR	UNID med mammal	2	0	0	1	1	0
3	(O)A/3/6	5-10-88	NUR	goat	1	1	0	0	0	0
3	(O)A/3/6	5-10-88	NUR	s/g	1	0	0	1	0	0
3	(O)A/3/6	5-10-88	NUR	UNID med mammal	3	0	2	0	0	1
3	(O)A/3/7	12-10-88	NUR	sus	1	0	0	1	0	0
3	(O)A/3/7	12-10-88	NUR	UNID large mammal	2	0	0	1	1	0
3	(O)A/3/7	12-10-88	NUR	UNID med mammal	6	0	1	0	2	3
3	(O)A/3/7	12-10-88	NUR	UNID small mammal	1	0	1	0	0	0
6	(O)B/6/1	10/18-10-85	NUR	UNID med/large mammal	1	0	0	0	0	1
6	(O)B/6/2	21/25-10-88	NUR	bos	1	0	1	0	0	0
6	(O)B/6/2	21/25-10-88	NUR	canis	1	0	1	0	0	0
6	(O)B/6/3	11/14-10-85	NUR	s/g	3	3	0	0	0	0
6	(O)B/6/3	11/14-10-85	NUR	UNID large mammal	1	0	1	0	0	0
6	(O)B/6/3	11/14-10-85	NUR	UNID med mammal	10	0	4	2	4	0
6	(O)B/6/4	14/18-10-88	NUR	bos	1	0	0	1	0	0
6	(O)B/6/4	14/18-10-88	NUR	Prolagus	1	0	0	1	0	0
6	(O)B/6/4	14/18-10-88	NUR	s/g	6	1	2	2	1	0
6	(O)B/6/4	14/18-10-88	NUR	sus	2	1	1	0	0	0
6	(O)B/6/4	14/18-10-88	NUR	UNID large mammal	1	0	0	0	0	1
6	(O)B/6/4	14/18-10-88	NUR	UNID med mammal	40	0	14	7	11	8
8	(O)A/8/1	1-12-83	NUR	goat	1	0	0	0	1	0
8	(O)A/8/1	1-12-83	NUR	s/g	2	0	1	1	0	0
8	(O)A/8/1	1-12-83	NUR	sheep	2	2	0	0	0	0
8	(O)A/8/1	1-12-83	NUR	sus	1	0	0	1	0	0

8	(O)A/8/1	1-12-83	NUR	UNID large mammal	2	0	0	0	0	2
8	(O)A/8/1	1-12-83	NUR	UNID med mammal	5	0	0	1	2	2
8	(O)A/8/2	30/31-7-84	NUR	Rattus	1	0	1	0	0	0
8	(O)A/8/2	30/31-7-84	NUR	s/g	2	0	1	0	1	0
8	(O)A/8/2	30/31-7-84	NUR	UNID med mammal	8	0	1	1	4	2
8	(O)A/8/3	2-8-84	NUR	s/g	1	1	0	0	0	0
8	(O)A/8/3	2-8-84	NUR	sheep	1	0	1	0	0	0
8	(O)A/8/3	2-8-84	NUR	UNID med mammal	1	0	0	0	1	0
8	(O)A/8/3	2-8-84	NUR	UNID small mammal	1	0	0	0	0	1
8	(O)A/8/4	9/10-8-84	NUR	goat	2	2	0	0	0	0
8	(O)A/8/4	9/10-8-84	NUR	Prolagus	2	0	1	1	0	0
8	(O)A/8/4	9/10-8-84	NUR	Rattus	1	0	1	0	0	0
8	(O)A/8/4	9/10-8-84	NUR	s/g	4	2	1	1	0	0
8	(O)A/8/4	9/10-8-84	NUR	sheep	2	0	2	0	0	0
8	(O)A/8/4	9/10-8-84	NUR	sus	1	1	0	0	0	0
8	(O)A/8/4	9/10-8-84	NUR	UNID large mammal	1	0	0	0	0	1
8	(O)A/8/4	9/10-8-84	NUR	UNID med mammal	36	2	1	4	12	17
8	(O)A/8/5	24-8-84	NUR	UNID med mammal	1	0	1	0	0	0
8	(O)A/8/6	8/10-10-88	NUR	Prolagus	2	0	1	0	1	0
8	(O)A/8/6	8/10-10-88	NUR	s/g	1	0	0	1	0	0
8	(O)A/8/6	8/10-10-88	NUR	UNID large mammal	1	0	0	0	0	1
8	(O)A/8/6	8/10-10-88	NUR	UNID med mammal	3	0	2	0	1	0
8	(O)A/8/7	14-10-88	NUR	goat	2	2	0	0	0	0
8	(O)A/8/7	14-10-88	NUR	UNID large mammal	4	0	0	2	1	1
8	(O)A/8/7	14-10-88	NUR	UNID med mammal	12	1	0	1	7	3
8	(O)A/8/7	14-10-88	NUR	UNID small mammal	3	0	1	0	2	0
8	(O)A/8/8	14-10-88	NUR	bos	2	2	0	0	0	0
8	(O)A/8/8	14-10-88	NUR	s/g	3	1	0	1	1	0
8	(O)A/8/8	14-10-88	NUR	UNID large mammal	2	0	0	0	0	2
8	(O)A/8/8	14-10-88	NUR	UNID med mammal	22	0	1	1	14	6
8	(O)A/8/9	15-10-88	NUR	s/g	2	2	0	0	0	0
8	(O)A/8/9	15-10-88	NUR	sheep	1	1	0	0	0	0
8	(O)A/8/9	15-10-88	NUR	sus	1	1	0	0	0	0
8	(O)A/8/9	15-10-88	NUR	UNID large mammal	3	0	0	0	0	3
8	(O)A/8/9	15-10-88	NUR	UNID med mammal	7	2	0	0	2	3
9	(O)A/9/1	29-8-84	NUR	UNID med mammal	10	0	0	0	2	8

9	(O)A/9/1	29-8-84	NUR	UNID small mammal	1	0	1	0	0	0
9	(O)A/9/10	28-8-84	NUR	Prolagus	1	0	0	1	0	0
9	(O)A/9/10	28-8-84	NUR	s/g	1	0	1	0	0	0
9	(O)A/9/10	28-8-84	NUR	sheep	1	1	0	0	0	0
9	(O)A/9/10	28-8-84	NUR	UNID med mammal	11	0	1	0	8	2
9	(O)A/9/11	13-10-88	NUR	s/g	1	0	0	1	0	0
9	(O)A/9/11	13-10-88	NUR	UNID med mammal	1	0	1	0	0	0
9	(O)A/9/12	17-10-88	NUR	bos	2	0	1	1	0	0
9	(O)A/9/12	17-10-88	NUR	goat	1	1	0	0	0	0
9	(O)A/9/12	17-10-88	NUR	Prolagus	1	0	0	1	0	0
9	(O)A/9/12	17-10-88	NUR	s/g	14	2	4	0	8	0
9	(O)A/9/12	17-10-88	NUR	UNID large mammal	6	0	2	0	4	0
9	(O)A/9/12	17-10-88	NUR	UNID med mammal	53	0	16	0	29	8
9	(O)A/9/2	31-8-84	NUR	bos	4	3	0	0	1	0
9	(O)A/9/2	31-8-84	NUR	sheep	1	0	1	0	0	0
9	(O)A/9/2	31-8-84	NUR	UNID large mammal	1	0	1	0	0	0
9	(O)A/9/2	31-8-84	NUR	UNID med mammal	5	0	1	0	3	1
9	(O)A/9/3	?-8-84	NUR	cervus	1	0	0	1	0	0
9	(O)A/9/3	?-8-84	NUR	goat	1	1	0	0	0	0
9	(O)A/9/3	?-8-84	NUR	Prolagus	1	0	1	0	0	0
9	(O)A/9/3	?-8-84	NUR	Rodentia	1	0	1	0	0	0
9	(O)A/9/3	?-8-84	NUR	s/g	3	1	0	1	1	0
9	(O)A/9/3	?-8-84	NUR	sus	3	3	0	0	0	0
9	(O)A/9/3	?-8-84	NUR	UNID med mammal	37	0	9	1	9	18
9	(O)A/9/3	?-8-84	NUR	UNID small mammal	1	0	1	0	0	0
9	(O)A/9/4	7-8-84	NUR	goat	1	0	0	1	0	0
9	(O)A/9/4	7-8-84	NUR	s/g	2	0	0	1	1	0
9	(O)A/9/4	7-8-84	NUR	sheep	2	2	0	0	0	0
9	(O)A/9/4	7-8-84	NUR	UNID large mammal	1	0	0	0	0	1
9	(O)A/9/4	7-8-84	NUR	UNID med mammal	20	0	6	3	4	7
9	(O)A/9/4	7-8-84	NUR	UNID small mammal	1	0	0	1	0	0
9	(O)A/9/5	21-8-84	NUR	bos	1	1	0	0	0	0
9	(O)A/9/5	21-8-84	NUR	goat	1	1	0	0	0	0
9	(O)A/9/5	21-8-84	NUR	Prolagus	2	0	0	2	0	0
9	(O)A/9/5	21-8-84	NUR	s/g	5	0	0	4	1	0
9	(O)A/9/5	21-8-84	NUR	sheep	2	0	2	0	0	0

9	(O)A/9/5	21-8-84	NUR	UNID med mammal	44	0	2	8	20	14
9	(O)A/9/5	21-8-84	NUR	UNID med/large mammal	1	0	0	1	0	0
9	(O)A/9/6	22-8-84	NUR	Aves	1	0	1	0	0	0
9	(O)A/9/6	22-8-84	NUR	bos	1	1	0	0	0	0
9	(O)A/9/6	22-8-84	NUR	Rodentia	1	0	1	0	0	0
9	(O)A/9/6	22-8-84	NUR	s/g	1	0	0	1	0	0
9	(O)A/9/6	22-8-84	NUR	UNID med mammal	40	0	3	5	7	25
9	(O)A/9/6	22-8-84	NUR	UNID med/lg mammal	1	0	0	1	0	0
9	(O)A/9/7	23-8-84	NUR	s/g	3	0	3	0	0	0
9	(O)A/9/7	23-8-84	NUR	sus	1	1	0	0	0	0
9	(O)A/9/7	23-8-84	NUR	UNID med mammal	27	0	0	4	9	14
9	(O)A/9/8	24-8-84	NUR	s/g	3	0	2	1	0	0
9	(O)A/9/8	24-8-84	NUR	UNID med mammal	9	0	2	0	4	3
9	(O)A/9/9	27-8-84	NUR	goat	1	0	0	0	1	0
9	(O)A/9/9	27-8-84	NUR	s/g	1	0	0	1	0	0
9	(O)A/9/9	27-8-84	NUR	UNID med mammal	3	0	0	2	0	1
9	(O)A/9/9	27-8-84	NUR	UNID small mammal	1	0	1	0	0	0
11	(O)B/11/1	12/13-9-85	NUR	goat	1	0	1	0	0	0
11	(O)B/11/1	12/13-9-85	NUR	human	2	1	1	0	0	0
11	(O)B/11/1	12/13-9-85	NUR	Prolagus	1	0	1	0	0	0
11	(O)B/11/1	12/13-9-85	NUR	s/g	8	1	2	3	2	0
11	(O)B/11/1	12/13-9-85	NUR	sheep	1	0	1	0	0	0
11	(O)B/11/1	12/13-9-85	NUR	UNID large mammal	1	0	1	0	0	0
11	(O)B/11/1	12/13-9-85	NUR	UNID med mammal	25	0	6	0	4	15
11	(O)B/11/10	11/14-11-88	NUR	bos	2	0	1	1	0	0
11	(O)B/11/10	11/14-11-88	NUR	goat	1	0	1	0	0	0
11	(O)B/11/10	11/14-11-88	NUR	s/g	3	1	0	0	2	0
11	(O)B/11/10	11/14-11-88	NUR	sheep	1	0	1	0	0	0
11	(O)B/11/10	11/14-11-88	NUR	sus	1	1	0	0	0	0
11	(O)B/11/10	11/14-11-88	NUR	UNID med mammal	15	0	2	1	11	1
11	(O)B/11/11	20/24-10-88	NUR	goat	2	1	1	0	0	0
11	(O)B/11/11	20/24-10-88	NUR	s/g	11	3	3	3	2	0
11	(O)B/11/11	20/24-10-88	NUR	sheep	2	1	1	0	0	0
11	(O)B/11/11	20/24-10-88	NUR	sus	1	0	0	1	0	0
11	(O)B/11/11	20/24-10-88	NUR	UNID large mammal	1	0	1	0	0	0

11	(O)B/11/11	20/24-10-88	NUR	UNID med mammal	24	0	4	13	3	4
11	(O)B/11/12	24/25-10-88	NUR	s/g	7	2	0	4	1	0
11	(O)B/11/12	24/25-10-88	NUR	UNID med mammal	6	1	2	1	1	1
11	(O)B/11/13	26-10-88	NUR	UNID large mammal	2	2	0	0	0	0
11	(O)B/11/14	26-10-88	NUR	s/g	2	0	2	0	0	0
11	(O)B/11/14	26-10-88	NUR	UNID med mammal	1	0	0	0	0	1
11	(O)B/11/15	23-11-88	NUR	UNID med mammal	5	0	2	0	3	0
11	(O)B/11/16	23-11-88	NUR	UNID large mammal	1	0	1	0	0	0
11	(O)B/11/16	23-11-88	NUR	UNID med mammal	1	0	0	1	0	0
11	(O)B/11/17	23-11-88	NUR	s/g	2	0	0	1	1	0
11	(O)B/11/17	23-11-88	NUR	UNID med mammal	6	0	2	1	2	1
11	(O)B/11/18	23-11-88	NUR	UNID large mammal	1	0	0	0	1	0
11	(O)B/11/18	23-11-88	NUR	UNID med mammal	1	0	0	1	0	0
11	(O)B/11/19	15-11-88	NUR	cervus	1	0	1	0	0	0
11	(O)B/11/19	15-11-88	NUR	s/g	9	2	0	7	0	0
11	(O)B/11/19	15-11-88	NUR	sheep	1	0	1	0	0	0
11	(O)B/11/19	15-11-88	NUR	sus	1	0	0	1	0	0
11	(O)B/11/19	15-11-88	NUR	UNID large mammal	2	0	2	0	0	0
11	(O)B/11/19	15-11-88	NUR	UNID med mammal	27	0	11	3	7	6
11	(O)B/11/2	14/17-12-85	NUR	s/g	1	0	0	1	0	0
11	(O)B/11/2	14/17-12-85	NUR	sus	1	0	0	1	0	0
11	(O)B/11/2	14/17-12-85	NUR	UNID med mammal	5	0	2	1	1	1
11	(O)B/11/20	23-11-88	NUR	s/g	5	2	0	3	0	0
11	(O)B/11/20	23-11-88	NUR	UNID large mammal	2	0	2	0	0	0
11	(O)B/11/20	23-11-88	NUR	UNID med mammal	4	0	1	1	0	2
11	(O)B/11/21	19-7-89	NUR	bivalve	1					
11	(O)B/11/21	19-7-89	NUR	Prolagus	1	0	0	1	0	0
11	(O)B/11/21	19-7-89	NUR	s/g	6	1	2	3	0	0
11	(O)B/11/21	19-7-89	NUR	sheep	2	0	2	0	0	0
11	(O)B/11/21	19-7-89	NUR	sus	1	1	0	0	0	0
11	(O)B/11/22	19-7-89	NUR	UNID med mammal	1	0	0	1	0	0
11	(O)B/11/23	1-9-89	NUR	s/g	3	1	1	1	0	0
11	(O)B/11/23	1-9-89	NUR	UNID large mammal	3	0	0	0	0	3
11	(O)B/11/23	1-9-89	NUR	UNID med mammal	20	0	4	4	4	8
11	(O)B/11/24	1/4/5/12/13-9-89	NUR	s/g	2	1	1	0	0	0

11	(O)B/11/24	1/4/5/12/13-9-89	NUR	sheep	1	0	1	0	0	0
11	(O)B/11/24	1/4/5/12/13-9-89	NUR	UNID med mammal	7	0	3	0	3	1
11	(O)B/11/3	4-10-88	NUR	s/g	7	0	1	6	0	0
11	(O)B/11/3	4-10-88	NUR	UNID large mammal	1	0	0	0	0	1
11	(O)B/11/3	4-10-88	NUR	UNID med mammal	10	0	4	1	4	1
11	(O)B/11/3	4-10-88	NUR	UNID med/large mammal	1	0	0	0	1	0
11	(O)B/11/4	4/5-10-88	NUR	s/g	1	0	0	1	0	0
11	(O)B/11/4	4/5-10-88	NUR	sheep	1	0	1	0	0	0
11	(O)B/11/4	4/5-10-88	NUR	UNID med mammal	11	0	5	0	2	4
11	(O)B/11/5	4/5-10-88	NUR	goat	1	0	1	0	0	0
11	(O)B/11/5	4/5-10-88	NUR	s/g	5	0	1	2	2	0
11	(O)B/11/5	4/5-10-88	NUR	sus	1	0	0	1	0	0
11	(O)B/11/5	4/5-10-88	NUR	UNID med mammal	17	0	3	7	6	1
11	(O)B/11/6	20-10-88	NUR	cervus	13	0	0	13	0	0
11	(O)B/11/6	20-10-88	NUR	human	1	1	0	0	0	0
11	(O)B/11/6	20-10-88	NUR	s/g	3	0	0	3	0	0
11	(O)B/11/6	20-10-88	NUR	UNID large mammal	1	0	0	1	0	0
11	(O)B/11/6	20-10-88	NUR	UNID med mammal	6	0	3	0	2	1
11	(O)B/11/7	26-10-88	NUR	sus	1	0	0	1	0	0
11	(O)B/11/7	26-10-88	NUR	UNID med mammal	1	0	1	0	0	0
11	(O)B/11/8	27/31-10-88	NUR	s/g	3	0	0	0	3	0
11	(O)B/11/8	27/31-10-88	NUR	sheep	1	1	0	0	0	0
11	(O)B/11/8	27/31-10-88	NUR	sus	3	1	0	2	0	0
11	(O)B/11/8	27/31-10-88	NUR	UNID med mammal	14	0	5	2	5	2
11	(O)B/11/9	8/10-11-88	NUR	sus	3	1	2	0	0	0
11	(O)B/11/9	8/10-11-88	NUR	UNID large mammal	2	0	0	1	0	1
11	(O)B/11/9	8/10-11-88	NUR	UNID med mammal	10	0	0	1	3	6
12	(O)B/12/1	16/17-11-88	NUR	s/g	2	0	1	1	0	0
12	(O)B/12/1	16/17-11-88	NUR	sheep	3	1	1	0	1	0
12	(O)B/12/1	16/17-11-88	NUR	UNID large mammal	5	0	5	0	0	0
12	(O)B/12/1	16/17-11-88	NUR	UNID med mammal	6	0	4	0	2	0
12	(O)B/12/2	23-11-88	NUR	s/g	1	0	0	0	1	0
12	(O)B/12/3	23/25-11-88	NUR	sheep	1	1	0	0	0	0

12	(O)B/12/3	23/25-11-88	NUR	UNID med mammal	4	0	3	0	0	1
12	(O)B/12/4	19-7-89	NUR	sus	2	0	0	2	0	0
12	(O)B/12/4	19-7-89	NUR	UNID med mammal	6	0	3	1	0	2
12	(O)B/12/5	20-7-89	NUR	UNID med mammal	1	0	1	0	0	0
12	(O)B/12/5	20-7-89	NUR	UNID small mammal	1	0	0	0	1	0
12	(O)B/12/6	21-7-89	NUR	sus	1	1	0	0	0	0
12	(O)B/12/7	29-8-89	NUR	s/g	1	0	1	0	0	0
12	(O)B/12/7	29-8-89	NUR	UNID med mammal	1	0	0	1	0	0
14	(O)C/14/1	29/31-10-88	NUR	goat	1	0	0	1	0	0
14	(O)C/14/1	29/31-10-88	NUR	s/g	3	0	0	3	0	0
14	(O)C/14/1	29/31-10-88	NUR	sus	1	0	0	1	0	0
14	(O)C/14/1	29/31-10-88	NUR	UNID large mammal	1	0	0	0	0	1
14	(O)C/14/1	29/31-10-88	NUR	UNID med mammal	16	0	3	2	2	9
14	(O)C/14/2	3-11-88	NUR	UNID large mammal	5	0	0	0	0	5
14	(O)C/14/2	3-11-88	NUR	UNID med mammal	7	0	3	1	1	2
14	(O)C/14/3	25-7-89	NUR	goat	1	1	0	0	0	0
14	(O)C/14/3	25-7-89	NUR	s/g	4	0	1	3	0	0
14	(O)C/14/3	25-7-89	NUR	sus	2	1	1	0	0	0
14	(O)C/14/3	25-7-89	NUR	UNID large mammal	1	0	0	1	0	0
14	(O)C/14/3	25-7-89	NUR	UNID med mammal	20	0	1	8	5	6
14	(O)C/14/3	25-7-89	NUR	UNID small mammal	1	0	0	0	1	0
22	(O)B/22/1 box 1	14/15-11-88	NUR	Prolagus	1	0	0	1	0	0
22	(O)B/22/1 box 1	14/15-11-88	NUR	s/g	2	0	1	1	0	0
22	(O)B/22/1 box 2	14/15-11-88	NUR	bos	4	2	0	2	0	0
22	(O)B/22/1 box 2	14/15-11-88	NUR	s/g	3	0	2	1	0	0
22	(O)B/22/1 box 2	14/15-11-88	NUR	UNID med mammal	3	1	1	0	1	0
22	(O)B/22/1 box 2	14/15-11-88	NUR	UNID med/large mammal	1	0	0	0	1	0
23	(O)B/23/1	1-10-90	NUR	UNID med mammal	2	0	0	0	0	2
23	(O)B/23/10	25-8-89	NUR	Prolagus	1	0	0	1	0	0
23	(O)B/23/10	25-8-89	NUR	s/g	6	0	3	3	0	0
23	(O)B/23/10	25-8-89	NUR	sus	2	0	0	2	0	0
23	(O)B/23/10	25-8-89	NUR	UNID med mammal	32	0	8	5	11	8
23	(O)B/23/11	14/19-9-89	NUR	bos	1	1	0	0	0	0
23	(O)B/23/11	14/19-9-89	NUR	s/g	4	0	0	4	0	0
23	(O)B/23/11	14/19-9-89	NUR	UNID large mammal	1	0	1	0	0	0

23	(O)B/23/11	14/19-9-89	NUR	UNID med mammal	40	0	4	9	20	7
23	(O)B/23/12	5-8-89	NUR	s/g	2	0	0	2	0	0
23	(O)B/23/12	5-8-89	NUR	UNID med mammal	10	0	2	0	5	3
23	(O)B/23/13	5-8-89	NUR	UNID med mammal	1	0	0	1	0	0
23	(O)B/23/14	5-8-89	NUR	UNID med mammal	1	0	1	0	0	0
23	(O)B/23/15	5-8-89	NUR	s/g	1	0	1	0	0	0
23	(O)B/23/15	5-8-89	NUR	UNID med mammal	4	0	2	0	2	0
23	(O)B/23/16	5-8-89	NUR	UNID med mammal	12	0	1	0	7	4
23	(O)B/23/17	5-8-89	NUR	bos	1	1	0	0	0	0
23	(O)B/23/17	5-8-89	NUR	UNID med mammal	5	0	3	2	0	0
23	(O)B/23/18	5-8-89	NUR	UNID large mammal	1	1	0	0	0	0
23	(O)B/23/18	5-8-89	NUR	UNID med mammal	2	0	1	0	1	0
23	(O)B/23/19	5-8-89	NUR	s/g	2	0	1	1	0	0
23	(O)B/23/19	5-8-89	NUR	UNID med mammal	8	0	6	1	1	0
23	(O)B/23/2	9/11-11-88	NUR	cervus	15	0	0	15	0	0
23	(O)B/23/2	9/11-11-88	NUR	goat	1	0	1	0	0	0
23	(O)B/23/2	9/11-11-88	NUR	s/g	7	0	0	7	0	0
23	(O)B/23/2	9/11-11-88	NUR	UNID large mammal	3	0	0	0	1	2
23	(O)B/23/2	9/11-11-88	NUR	UNID med mammal	17	0	4	2	9	2
23	(O)B/23/20	5-8-89	NUR	s/g	4	0	1	3	0	0
23	(O)B/23/20	5-8-89	NUR	sus	1	1	0	0	0	0
23	(O)B/23/20	5-8-89	NUR	UNID med mammal	10	0	2	1	7	0
23	(O)B/23/21	5-8-89	NUR	bos	1	1	0	0	0	0
23	(O)B/23/21	5-8-89	NUR	s/g	1	1	0	0	0	0
23	(O)B/23/21	5-8-89	NUR	sheep	1	0	1	0	0	0
23	(O)B/23/21	5-8-89	NUR	UNID large mammal	2	0	1	1	0	0
23	(O)B/23/21	5-8-89	NUR	UNID med mammal	20	0	4	3	7	6
23	(O)B/23/22	5-8-89	NUR	UNID med mammal	1	0	1	0	0	0
23	(O)B/23/23	28/29-8-89	NUR	UNID med mammal	11	0	3	3	2	3
23	(O)B/23/24	28/31-8-89	NUR	s/g	2	0	1	1	0	0
23	(O)B/23/24	28/31-8-89	NUR	sus	1	0	1	0	0	0
23	(O)B/23/24	28/31-8-89	NUR	UNID med mammal	14	0	4	3	6	1
23	(O)B/23/25	28/31-8-89	NUR	land snail	1					
23	(O)B/23/25	28/31-8-89	NUR	s/g	2	1	0	1	0	0
23	(O)B/23/25	28/31-8-89	NUR	UNID med mammal	10	0	4	3	1	2
23	(O)B/23/25	28/31-8-89	NUR	UNID small mammal	1	0	1	0	0	0

23	(O)B/23/26	29/30-8-89	NUR	s/g	1	0	1	0	0	0
23	(O)B/23/27	29/30-8-89	NUR	bos	1	0	1	0	0	0
23	(O)B/23/27	29/30-8-89	NUR	goat	1	0	1	0	0	0
23	(O)B/23/27	29/30-8-89	NUR	s/g	2	1	0	0	1	0
23	(O)B/23/27	29/30-8-89	NUR	UNID med mammal	9	0	4	0	1	4
23	(O)B/23/28	29/30-8-89	NUR	bos	1	0	0	1	0	0
23	(O)B/23/28	29/30-8-89	NUR	s/g	1	0	1	0	0	0
23	(O)B/23/28	29/30-8-89	NUR	sus	1	0	1	0	0	0
23	(O)B/23/28	29/30-8-89	NUR	UNID med mammal	5	0	1	0	4	0
23	(O)B/23/28	29/30-8-89	NUR	UNID med/large mammal	1	0	0	1	0	0
23	(O)B/23/29	1/12-9-89	NUR	bos	1	0	1	0	0	0
23	(O)B/23/29	1/12-9-89	NUR	s/g	1	0	1	0	0	0
23	(O)B/23/29	1/12-9-89	NUR	sus	1	0	0	1	0	0
23	(O)B/23/29	1/12-9-89	NUR	UNID large mammal	1	0	1	0	0	0
23	(O)B/23/29	1/12-9-89	NUR	UNID med mammal	5	0	0	0	5	0
23	(O)B/23/3	23/24-11-88	NUR	bos	1	0	1	0	0	0
23	(O)B/23/3	23/24-11-88	NUR	s/g	1	0	1	0	0	0
23	(O)B/23/3	23/24-11-88	NUR	sheep	1	1	0	0	0	0
23	(O)B/23/3	23/24-11-88	NUR	UNID large mammal	5	0	0	0	5	0
23	(O)B/23/3	23/24-11-88	NUR	UNID med mammal	2	0	1	1	0	0
23	(O)B/23/30	4-9-89	NUR	bos	1	0	0	1	0	0
23	(O)B/23/30	4-9-89	NUR	s/g	4	0	2	2	0	0
23	(O)B/23/30	4-9-89	NUR	UNID med mammal	11	0	3	0	1	7
23	(O)B/23/30	4-9-89	NUR	UNID med/large mammal	5	0	0	0	5	0
23	(O)B/23/31	6-9-89	NUR	sus	1	0	0	1	0	0
23	(O)B/23/31	6-9-89	NUR	UNID med mammal	8	0	3	0	2	3
23	(O)B/23/32	6-9-89	NUR	s/g	1	0	0	1	0	0
23	(O)B/23/32	6-9-89	NUR	UNID med mammal	8	0	5	0	3	0
23	(O)B/23/33	6-9-89	NUR	s/g	1	1	0	0	0	0
23	(O)B/23/33	6-9-89	NUR	sheep	1	0	1	0	0	0
23	(O)B/23/33	6-9-89	NUR	sus	1	1	0	0	0	0
23	(O)B/23/33	6-9-89	NUR	UNID large mammal	1	0	0	0	0	1
23	(O)B/23/33	6-9-89	NUR	UNID med mammal	9	0	2	1	2	4
23	(O)B/23/34	6/7-9-89	NUR	bos	1	0	1	0	0	0

23	(O)B/23/34	6/7-9-89	NUR	Passeriformes	6	0	6	0	0	0
23	(O)B/23/34	6/7-9-89	NUR	s/g	14	2	5	5	2	0
23	(O)B/23/34	6/7-9-89	NUR	sheep	2	0	1	0	1	0
23	(O)B/23/34	6/7-9-89	NUR	UNID large mammal	2	0	0	1	0	1
23	(O)B/23/34	6/7-9-89	NUR	UNID med mammal	84	0	33	7	30	14
23	(O)B/23/35	6/12-9-89	NUR	bivalve	1					
23	(O)B/23/35	6/12-9-89	NUR	cervus	1	0	0	1	0	0
23	(O)B/23/35	6/12-9-89	NUR	s/g	4	2	1	1	0	0
23	(O)B/23/35	6/12-9-89	NUR	UNID med mammal	22	0	4	2	7	9
23	(O)B/23/36	12-9-89	NUR	bos	2	1	1	0	0	0
23	(O)B/23/36	12-9-89	NUR	s/g	3	0	0	3	0	0
23	(O)B/23/36	12-9-89	NUR	sus	1	1	0	0	0	0
23	(O)B/23/36	12-9-89	NUR	UNID med mammal	7	0	2	3	2	0
23	(O)B/23/36	12-9-89	NUR	UNID med/large mammal	1	1	0	0	0	0
23	(O)B/23/37	12/13-9-89	NUR	UNID med mammal	1	0	0	1	0	0
23	(O)B/23/38	13-9-89	NUR	s/g	1	0	0	1	0	0
23	(O)B/23/38	13-9-89	NUR	UNID large mammal	1	0	1	0	0	0
23	(O)B/23/38	13-9-89	NUR	UNID med mammal	16	0	1	5	7	3
23	(O)B/23/39	14-9-89	NUR	bivalve	1					
23	(O)B/23/39	14-9-89	NUR	UNID large mammal	1	0	0	1	0	0
23	(O)B/23/39	14-9-89	NUR	UNID med mammal	11	0	9	2	0	0
23	(O)B/23/4	23/24-11-88	NUR	bos	1	0	1	0	0	0
23	(O)B/23/4	23/24-11-88	NUR	UNID large mammal	3	0	1	2	0	0
23	(O)B/23/4	23/24-11-88	NUR	UNID med mammal	3	0	1	1	0	1
23	(O)B/23/40	14-9-89	NUR	Prolagus	1	0	0	1	0	0
23	(O)B/23/40	14-9-89	NUR	s/g	3	2	1	0	0	0
23	(O)B/23/40	14-9-89	NUR	UNID large mammal	1	0	0	1	0	0
23	(O)B/23/40	14-9-89	NUR	UNID med mammal	18	0	5	4	9	0
23	(O)B/23/41	5-8-89	NUR	s/g	2	0	1	1	0	0
23	(O)B/23/41	5-8-89	NUR	UNID med mammal	2	0	1	0	1	0
23	(O)B/23/42	1/4/5-9-89	NUR	UNID med mammal	4	0	0	0	1	3
23	(O)B/23/43	4/5-9-89	NUR	s/g	3	1	0	2	0	0
23	(O)B/23/43	4/5-9-89	NUR	sus	1	0	0	1	0	0
23	(O)B/23/43	4/5-9-89	NUR	UNID large mammal	1	0	1	0	0	0
23	(O)B/23/43	4/5-9-89	NUR	UNID med mammal	18	0	4	2	4	8

23	(O)B/23/44	30-10-90	NUR	UNID med mammal	2	0	0	0	0	2
23	(O)B/23/5	23/24-11-88	NUR	bos	1	0	1	0	0	0
23	(O)B/23/5	23/24-11-88	NUR	UNID med mammal	4	0	0	0	1	3
23	(O)B/23/6	23/24-11-88	NUR	goat	1	1	0	0	0	0
23	(O)B/23/6	23/24-11-88	NUR	s/g	2	1	1	0	0	0
23	(O)B/23/6	23/24-11-88	NUR	sus	1	0	0	0	1	0
23	(O)B/23/6	23/24-11-88	NUR	UNID med mammal	7	0	5	1	0	1
23	(O)B/23/7	25-8-89	NUR	s/g	3	0	2	1	0	0
23	(O)B/23/7	25-8-89	NUR	sheep	1	0	1	0	0	0
23	(O)B/23/7	25-8-89	NUR	sus	2	1	0	1	0	0
23	(O)B/23/7	25-8-89	NUR	UNID med mammal	11	0	2	5	2	2
23	(O)B/23/8	25-8-89	NUR	UNID med mammal	7	0	0	0	3	4
23	(O)B/23/9	25-8-89	NUR	bos	3	0	2	1	0	0
23	(O)B/23/9	25-8-89	NUR	s/g	1	0	0	0	1	0
23	(O)B/23/9	25-8-89	NUR	UNID large mammal	1	0	0	1	0	0
23	(O)B/23/9	25-8-89	NUR	UNID med mammal	17	0	4	3	3	7
23	(O)B/23/9	25-8-89	NUR	UNID med/large mammal	1	0	0	0	1	0
25	(O)B/25/1	14/19-9-89	NUR	goat	1	0	1	0	0	0
25	(O)B/25/1	14/19-9-89	NUR	s/g	2	0	0	2	0	0
25	(O)B/25/1	14/19-9-89	NUR	UNID large mammal	2	0	1	1	0	0
25	(O)B/25/1	14/19-9-89	NUR	UNID med mammal	21	0	6	4	5	6
25	(O)B/25/10	25-8-89	NUR	bos	1	0	1	0	0	0
25	(O)B/25/10	25-8-89	NUR	s/g	3	0	2	1	0	0
25	(O)B/25/10	25-8-89	NUR	sus	1	0	0	1	0	0
25	(O)B/25/10	25-8-89	NUR	UNID med mammal	14	0	2	3	7	2
25	(O)B/25/11	8-9-89	NUR	s/g	3	1	0	2	0	0
25	(O)B/25/11	8-9-89	NUR	sheep	1	1	0	0	0	0
25	(O)B/25/11	8-9-89	NUR	sus	2	2	0	0	0	0
25	(O)B/25/11	8-9-89	NUR	UNID large mammal	1	0	0	0	0	1
25	(O)B/25/11	8-9-89	NUR	UNID med mammal	21	0	7	2	8	4
25	(O)B/25/2	14/19-9-89	NUR	UNID med mammal	2	0	0	0	1	1
25	(O)B/25/2	14/19-9-89	NUR	UNID small mammal	1	0	0	0	1	0
25	(O)B/25/3	8/11-9-89	NUR	s/g	4	1	2	1	0	0
25	(O)B/25/3	8/11-9-89	NUR	sheep	1	0	1	0	0	0
25	(O)B/25/3	8/11-9-89	NUR	UNID large mammal	1	0	0	0	1	0

25	(O)B/25/3	8/11-9-89	NUR	UNID med mammal	2	0	1	0	1	0
25	(O)B/25/4	20/25-9-90	NUR	bivalve	1					
25	(O)B/25/4	20/25-9-90	NUR	cervus	2	0	0	2	0	0
25	(O)B/25/4	20/25-9-90	NUR	land snail	2					
25	(O)B/25/4	20/25-9-90	NUR	Prolagus	2	0	0	2	0	0
25	(O)B/25/4	20/25-9-90	NUR	s/g	8	1	0	7	0	0
25	(O)B/25/4	20/25-9-90	NUR	sheep	4	3	1	0	0	0
25	(O)B/25/4	20/25-9-90	NUR	UNID med mammal	71	1	20	5	19	26
25	(O)B/25/5	20/25-9-90	NUR	land snail	2					
25	(O)B/25/5	20/25-9-90	NUR	Prolagus	1	0	1	0	0	0
25	(O)B/25/5	20/25-9-90	NUR	s/g	4	0	1	3	0	0
25	(O)B/25/5	20/25-9-90	NUR	sus	1	0	0	1	0	0
25	(O)B/25/5	20/25-9-90	NUR	UNID med mammal	24	0	1	7	7	9
25	(O)B/25/6	20/25-9-90	NUR	land snail	3					
25	(O)B/25/6	20/25-9-90	NUR	s/g	4	2	0	2	0	0
25	(O)B/25/6	20/25-9-90	NUR	UNID fetal	1	0	1	0	0	0
25	(O)B/25/6	20/25-9-90	NUR	UNID large mammal	1	0	1	0	0	0
25	(O)B/25/6	20/25-9-90	NUR	UNID med mammal	37	0	11	3	19	4
25	(O)B/25/7	26-9/3-10-90	NUR	goat	1	1	0	0	0	0
25	(O)B/25/7	26-9/3-10-90	NUR	land snail	5					
25	(O)B/25/7	26-9/3-10-90	NUR	s/g	1	0	0	1	0	0
25	(O)B/25/7	26-9/3-10-90	NUR	UNID med mammal	13	0	5	1	6	1
25	(O)B/25/8	26-9/3-10-90	NUR	goat	1	0	1	0	0	0
25	(O)B/25/8	26-9/3-10-90	NUR	land snail	2					
25	(O)B/25/8	26-9/3-10-90	NUR	s/g	11	0	0	10	1	0
25	(O)B/25/8	26-9/3-10-90	NUR	sheep	1	0	1	0	0	0
25	(O)B/25/8	26-9/3-10-90	NUR	sus	2	0	0	2	0	0
25	(O)B/25/8	26-9/3-10-90	NUR	UNID large mammal	1	0	1	0	0	0
25	(O)B/25/8	26-9/3-10-90	NUR	UNID med mammal	33	2	13	10	8	0
25	(O)B/25/8	26-9/3-10-90	NUR	UNID small mammal	2	0	1	0	1	0
25	(O)B/25/9	26-9/3-10-90	NUR	land snail	3					
25	(O)B/25/9	26-9/3-10-90	NUR	marine shell	2					
25	(O)B/25/9	26-9/3-10-90	NUR	Rattus	1	0	1	0	0	0
25	(O)B/25/9	26-9/3-10-90	NUR	s/g	6	1	0	5	0	0
25	(O)B/25/9	26-9/3-10-90	NUR	sus	2	2	0	0	0	0
25	(O)B/25/9	26-9/3-10-90	NUR	UNID fetal	2	0	2	0	0	0

25	(O)B/25/9	26-9/3-10-90	NUR	UNID med mammal	114	0	25	7	54	28
30	(O)D/30/1	28/29/31-7-89	NUR	bos	1	1	0	0	0	0
30	(O)D/30/1	28/29/31-7-89	NUR	canis	5	2	3	0	0	0
30	(O)D/30/1	28/29/31-7-89	NUR	s/g	10	0	2	8	0	0
30	(O)D/30/1	28/29/31-7-89	NUR	sheep	1	0	1	0	0	0
30	(O)D/30/1	28/29/31-7-89	NUR	UNID large mammal	1	0	0	0	0	1
30	(O)D/30/1	28/29/31-7-89	NUR	UNID med mammal	44	1	4	2	14	23
30	(O)D/30/1	28/29/31-7-89	NUR	UNID fetal mammal	1	0	1	0	0	0
30	(O)D/30/1	28/29/31-7-89	NUR	UNID small/med mammal	1	0	1	0	0	0
34	(O)C/34/1	3/21/22-8-89	NUR	s/g	1	0	0	1	0	0
34	(O)C/34/1	3/21/22-8-89	NUR	sus	1	0	0	1	0	0
34	(O)C/34/1	3/21/22-8-89	NUR	UNID med mammal	7	0	3	0	1	3
34	(O)C/34/2	3-8-89	NUR	bos	4	0	0	4	0	0
34	(O)C/34/2	3-8-89	NUR	s/g	2	0	1	1	0	0
34	(O)C/34/2	3-8-89	NUR	UNID med mammal	11	0	8	0	3	0
34	(O)C/34/3	3-8-89	NUR	UNID med mammal	1	0	1	0	0	0
34	(O)C/34/4	3-8-89	NUR	sus	1	1	0	0	0	0
34	(O)C/34/4	3-8-89	NUR	UNID med mammal	3	0	1	0	1	1
34	(O)C/34/5	3-8-89	NUR	goat	1	1	0	0	0	0
34	(O)C/34/5	3-8-89	NUR	UNID med mammal	2	0	0	2	0	0
34	(O)C/34/6	3-8-89	NUR	s/g	1	0	0	1	0	0
34	(O)C/34/6	3-8-89	NUR	UNID med mammal	1	0	1	0	0	0
34	(O)C/34/7	3-8-89	NUR	goat	1	1	0	0	0	0
34	(O)C/34/7	3-8-89	NUR	s/g	1	0	1	0	0	0
34	(O)C/34/7	3-8-89	NUR	UNID med mammal	4	0	2	0	0	2
36	(O)D/36/1	1-8-89	NUR	human	1	0	0	1	0	0
36	(O)D/36/1	1-8-89	NUR	s/g	3	1	0	2	0	0
36	(O)D/36/1	1-8-89	NUR	sus	1	0	0	1	0	0
36	(O)D/36/1	1-8-89	NUR	UNID med mammal	4	0	1	1	0	2
36	(O)D/36/1	1-8-89	NUR	UNID small mammal	1	1	0	0	0	0
37	(O)D/37/1	24-8-89	NUR	bivalve	1					
37	(O)D/37/1	24-8-89	NUR	goat	4	4	0	0	0	0
37	(O)D/37/1	24-8-89	NUR	s/g	4	1	1	2	0	0
37	(O)D/37/1	24-8-89	NUR	sus	1	1	0	0	0	0
37	(O)D/37/1	24-8-89	NUR	UNID med mammal	22	1	4	10	4	3

37	(O)D/37/1	24-8-89	NUR	UNID med/large mammal	1	0	1	0	0	0
37	(O)D/37/2	24-8-89	NUR	goat	1	1	0	0	0	0
37	(O)D/37/2	24-8-89	NUR	s/g	2	1	0	1	0	0
37	(O)D/37/2	24-8-89	NUR	UNID med mammal	4	0	2	0	1	1
37	(O)D/37/3	24-8-89	NUR	UNID med mammal	3	0	2	0	0	1
62	(O)B/62/1	11/12-10-90	NUR	goat	1	1	0	0	0	0
62	(O)B/62/1	11/12-10-90	NUR	land snail	1					
62	(O)B/62/1	11/12-10-90	NUR	s/g	2	0	0	1	1	0
62	(O)B/62/1	11/12-10-90	NUR	UNID med mammal	19	0	3	2	0	14
62	(O)B/62/1	11/12-10-90	NUR	UNID small mammal	1	0	1	0	0	0
62	(O)B/62/2	4/12-10-90	NUR	land snail	1					
62	(O)B/62/2	4/12-10-90	NUR	s/g	2	0	0	1	1	0
62	(O)B/62/2	4/12-10-90	NUR	UNID med mammal	8	0	2	0	4	2
62	(O)B/62/2	4/12-10-90	NUR	UNID med/large mammal	1	0	0	0	1	0
62	(O)B/62/3	4/12-10-90	NUR	land snail	5					
62	(O)B/62/3	4/12-10-90	NUR	marine shell	1					
62	(O)B/62/3	4/12-10-90	NUR	s/g	5	0	0	4	1	0
62	(O)B/62/3	4/12-10-90	NUR	sus	2	0	0	2	0	0
62	(O)B/62/3	4/12-10-90	NUR	UNID large mammal	3	0	2	0	0	1
62	(O)B/62/3	4/12-10-90	NUR	UNID med mammal	40	0	9	4	10	17
62	(O)B/62/4	4/12-10-90	NUR	bivalve	1					
62	(O)B/62/4	4/12-10-90	NUR	goat	2	1	1	0	0	0
62	(O)B/62/4	4/12-10-90	NUR	land snail	7					
62	(O)B/62/4	4/12-10-90	NUR	Prolagus	2	0	0	2	0	0
62	(O)B/62/4	4/12-10-90	NUR	s/g	31	6	4	20	1	0
62	(O)B/62/4	4/12-10-90	NUR	sheep	1	0	1	0	0	0
62	(O)B/62/4	4/12-10-90	NUR	sus	4	0	0	4	0	0
62	(O)B/62/4	4/12-10-90	NUR	UNID	2	0	2	0	0	0
62	(O)B/62/4	4/12-10-90	NUR	UNID fetal cervid/bovid	1	0	1	0	0	0
62	(O)B/62/4	4/12-10-90	NUR	UNID large mammal	3	0	3	0	0	0
62	(O)B/62/4	4/12-10-90	NUR	UNID med mammal	218	0	28	15	91	84
62	(O)B/62/4	4/12-10-90	NUR	UNID small mammal	2	0	0	0	2	0
62	(O)B/62/5	13-10/5-11-90	NUR	s/g	1	0	1	0	0	0
62	(O)B/62/5	13-10/5-11-90	NUR	UNID med mammal	8	0	1	0	1	6

62	(O)B/62/5	13-10/5-11-90	NUR	UNID small mammal	1	0	1	0	0	0
62	(O)B/62/6	13-10/5-11-90	NUR	land snail	1					
62	(O)B/62/6	13-10/5-11-90	NUR	s/g	1	0	0	1	0	0
62	(O)B/62/6	13-10/5-11-90	NUR	UNID large mammal	1	0	0	0	1	0
62	(O)B/62/6	13-10/5-11-90	NUR	UNID med mammal	5	0	2	0	0	3
62	(O)B/62/7	13-10/5-11-90	NUR	sus	2	0	0	2	0	0
62	(O)B/62/7	13-10/5-11-90	NUR	UNID large mammal	3	0	0	0	0	3
62	(O)B/62/7	13-10/5-11-90	NUR	UNID med mammal	24	0	5	4	2	13
6-11	(O)B/6-11/1	11/10-12-8-85	NUR	UNID med mammal	1	0	0	1	0	0
6-12	(O)B/6-12/1	14/18-10-88	NUR	s/g	3	1	0	2	0	0
6-12	(O)B/6-12/1	14/18-10-88	NUR	sus	1	1	0	0	0	0
6-12	(O)B/6-12/1	14/18-10-88	NUR	UNID large mammal	2	0	2	0	0	0
6-12	(O)B/6-12/1	14/18-10-88	NUR	UNID med mammal	7	0	1	2	4	0
6-12	(O)B/6-12/2	19-10-88	NUR	Aves	1	0	1	0	0	0
6-12	(O)B/6-12/2	19-10-88	NUR	goat	2	1	0	1	0	0
6-12	(O)B/6-12/2	19-10-88	NUR	s/g	5	0	0	4	1	0
6-12	(O)B/6-12/2	19-10-88	NUR	sus	1	1	0	0	0	0
6-12	(O)B/6-12/2	19-10-88	NUR	UNID large mammal	10	0	5	0	0	5
6-12	(O)B/6-12/2	19-10-88	NUR	UNID med mammal	32	2	6	8	8	8
6-12	(O)B/6-12/3	21/24-10-88	NUR	s/g	3	1	1	0	1	0
6-12	(O)B/6-12/3	21/24-10-88	NUR	UNID med mammal	5	0	4	0	0	1
6-12	(O)B/6-12/3	21/24-10-88	NUR	UNID med/large mammal	1	0	1	0	0	0
6-22	(O)B/6-22/1	22-10-88	NUR	human	3	0	0	0	0	3
6-22	(O)B/6-22/1	22-10-88	NUR	Prolagus	1	0	1	0	0	0
6-22	(O)B/6-22/1	22-10-88	NUR	s/g	2	0	0	1	1	0
6-22	(O)B/6-22/1	22-10-88	NUR	UNID large mammal	1	0	1	0	0	0
6-22	(O)B/6-22/1	22-10-88	NUR	UNID med mammal	4	0	2	1	0	1
11-22	(O)B/11-22/1	24-10-88	NUR	s/g	2	0	0	2	0	0
11-22	(O)B/11-22/1	24-10-88	NUR	sheep	1	0	1	0	0	0
11-22	(O)B/11-22/1	24-10-88	NUR	UNID med mammal	5	0	4	0	1	0
11-22	(O)B/11-22/2 bag 1	7-11-88	NUR	UNID large mammal	2	0	0	0	0	2
11-22	(O)B/11-22/2 bag 2	7-11-88	NUR	Prolagus	1	0	1	0	0	0
11-22	(O)B/11-22/2 box	7-11-88	NUR	s/g	1	0	0	1	0	0

11-23	(O)B/11-23/1	6-9-89	NUR	cervus	2	0	1	1	0	0
11-23	(O)B/11-23/1	6-9-89	NUR	s/g	2	0	1	1	0	0
11-23	(O)B/11-23/1	6-9-89	NUR	UNID med mammal	1	0	0	0	0	1
12B	(O)B/12B/1	24-10-88	NUR	bos	2	0	1	1	0	0
12B	(O)B/12B/1	24-10-88	NUR	s/g	4	1	2	0	1	0
12B	(O)B/12B/1	24-10-88	NUR	sus	1	1	0	0	0	0
12B	(O)B/12B/1	24-10-88	NUR	UNID large mammal	10	0	0	7	3	0
12B	(O)B/12B/1	24-10-88	NUR	UNID med mammal	4	0	0	1	3	0
12B	(O)B/12B/1	24-10-88	NUR	UNID med/large mammal	9	0	0	0	0	9
23/25	(O)B/23-25/1	29-10-88	NUR	sheep	1	1	0	0	0	0
23/25	(O)B/23-25/1	29-10-88	NUR	UNID large mammal	1	0	0	0	0	1
23/25	(O)B/23-25/1	29-10-88	NUR	UNID med mammal	6	0	3	0	0	3
23/25	(O)B/23-25/2	31-10-88	NUR	goat	3	0	3	0	0	0
23/25	(O)B/23-25/2	31-10-88	NUR	s/g	2	0	0	1	1	0
23/25	(O)B/23-25/2	31-10-88	NUR	UNID large mammal	6	0	6	0	0	0
23/25	(O)B/23-25/2	31-10-88	NUR	UNID med mammal	5	0	0	0	0	5
23/25	(O)B/23-25/3	27-7-89	NUR	bos	3	0	0	3	0	0
23/25	(O)B/23-25/3	27-7-89	NUR	s/g	5	0	0	5	0	0
23/25	(O)B/23-25/3	27-7-89	NUR	sus	1	0	0	1	0	0
23/25	(O)B/23-25/3	27-7-89	NUR	UNID large mammal	3	0	0	3	0	0
23/25	(O)B/23-25/3	27-7-89	NUR	UNID med mammal	14	0	6	1	2	5
23/25	(O)B/23-25/4	2-11-88	NUR	bos	3	1	2	0	0	0
23/25	(O)B/23-25/4	2-11-88	NUR	goat	1	0	1	0	0	0
23/25	(O)B/23-25/4	2-11-88	NUR	s/g	8	3	2	3	0	0
23/25	(O)B/23-25/4	2-11-88	NUR	sheep	1	1	0	0	0	0
23/25	(O)B/23-25/4	2-11-88	NUR	sus	1	0	0	1	0	0
23/25	(O)B/23-25/4	2-11-88	NUR	Cervus	1	0	0	1	0	0
23/25	(O)B/23-25/4	2-11-88	NUR	UNID med mammal	26	0	9	3	4	10
23/25	(O)B/23-25/5	3/7/8-11-88	NUR	s/g	15	2	1	11	1	0
23/25	(O)B/23-25/5	3/7/8-11-88	NUR	sheep	1	0	1	0	0	0
23/25	(O)B/23-25/5	3/7/8-11-88	NUR	sus	4	1	0	3	0	0
23/25	(O)B/23-25/5	3/7/8-11-88	NUR	UNID large mammal	3	0	1	0	0	2
23/25	(O)B/23-25/5	3/7/8-11-88	NUR	UNID med mammal	105	0	13	20	14	58
23/25	(O)B/23-25/6	8-11-88	NUR	goat	1	1	0	0	0	0
23/25	(O)B/23-25/6	8-11-88	NUR	s/g	11	2	2	7	0	0

23/25	(O)B/23-25/6	8-11-88	NUR	UNID large mammal	1	0	0	0	1	0
23/25	(O)B/23-25/6	8-11-88	NUR	UNID med mammal	13	0	1	3	6	3
23/25	(O)B/23-25/6	8-11-88	NUR	UNID med/large mammal	1	0	0	0	0	1
23/25	(O)B/23-25/7	9/11-11-88	NUR	goat	1	1	0	0	0	0
23/25	(O)B/23-25/7	9/11-11-88	NUR	Prolagus	3	0	0	3	0	0
23/25	(O)B/23-25/7	9/11-11-88	NUR	s/g	3	1	0	2	0	0
23/25	(O)B/23-25/7	9/11-11-88	NUR	sheep	1	0	1	0	0	0
23/25	(O)B/23-25/7	9/11-11-88	NUR	UNID fetal	1	0	0	0	1	0
23/25	(O)B/23-25/7	9/11-11-88	NUR	UNID large mammal	7	0	6	0	1	0
23/25	(O)B/23-25/7	9/11-11-88	NUR	UNID med mammal	21	0	0	4	12	5
TOTAL					3216	194	754	652	808	762
1	(O)E/1/1	27/28-10-88	Roman	Aves	1	0	1	0	0	0
1	(O)E/1/1	27/28-10-88	Roman	bos	35	11	17	7	0	0
1	(O)E/1/1	27/28-10-88	Roman	cervus	1	0	1	0	0	0
1	(O)E/1/1	27/28-10-88	Roman	Prolagus	1	0	0	1	0	0
1	(O)E/1/1	27/28-10-88	Roman	s/g	70	1	5	64	0	0
1	(O)E/1/1	27/28-10-88	Roman	sheep	2	1	1	0	0	0
1	(O)E/1/1	27/28-10-88	Roman	sus	24	0	3	21	0	0
1	(O)E/1/1	27/28-10-88	Roman	UNID	4	0	0	0	0	4
1	(O)E/1/1	27/28-10-88	Roman	UNID large mammal	68	0	23	3	18	24
1	(O)E/1/1	27/28-10-88	Roman	UNID med mammal	371	2	142	64	28	135
1	(O)E/1/1	27/28-10-88	Roman	UNID med/large mammal	1	0	1	0	0	0
1	(O)E/1/10	28-8-89	Roman	bos	2	0	1	1	0	0
1	(O)E/1/10	28-8-89	Roman	s/g	3	0	0	3	0	0
1	(O)E/1/10	28-8-89	Roman	sus	1	1	0	0	0	0
1	(O)E/1/10	28-8-89	Roman	UNID large mammal	5	0	3	2	0	0
1	(O)E/1/10	28-8-89	Roman	UNID med mammal	9	0	5	0	2	2
1	(O)E/1/11	5/6-10-90	Roman	bos	1	0	0	1	0	0
1	(O)E/1/11	5/6-10-90	Roman	s/g	4	2	1	1	0	0
1	(O)E/1/11	5/6-10-90	Roman	sus	2	2	0	0	0	0
1	(O)E/1/11	5/6-10-90	Roman	UNID med mammal	40	1	12	1	14	12
1	(O)E/1/12	29/30-8-89	Roman	UNID large mammal	1	0	1	0	0	0
1	(O)E/1/12	29/30-8-89	Roman	UNID med mammal	9	0	4	0	3	2
1	(O)E/1/13	31-8 + 1-9-89	Roman	s/g	2	1	0	1	0	0

1	(O)E/1/14	15-10-90	Roman	Aves	3	0	3	0	0	0
1	(O)E/1/14	15-10-90	Roman	bos	3	0	1	1	1	0
1	(O)E/1/14	15-10-90	Roman	cervus	1	0	0	1	0	0
1	(O)E/1/14	15-10-90	Roman	land snail	1					
1	(O)E/1/14	15-10-90	Roman	Lepus	1	0	1	0	0	0
1	(O)E/1/14	15-10-90	Roman	s/g	3	0	1	2	0	0
1	(O)E/1/14	15-10-90	Roman	UNID large mammal	41	0	20	1	7	13
1	(O)E/1/14	15-10-90	Roman	UNID mammal	2	0	0	2	0	0
1	(O)E/1/14	15-10-90	Roman	UNID med mammal	260	0	40	13	23	184
1	(O)E/1/15	18-10-90	Roman	Aves	2	0	2	0	0	0
1	(O)E/1/15	18-10-90	Roman	bos	1	0	0	1	0	0
1	(O)E/1/15	18-10-90	Roman	s/g	2	0	0	2	0	0
1	(O)E/1/15	18-10-90	Roman	sheep	1	1	0	0	0	0
1	(O)E/1/15	18-10-90	Roman	sus	1	0	0	1	0	0
1	(O)E/1/15	18-10-90	Roman	UNID large mammal	14	0	7	0	1	6
1	(O)E/1/15	18-10-90	Roman	UNID med mammal	78	1	25	8	5	39
1	(O)E/1/16	16-10-90	Roman	bos	1	0	1	0	0	0
1	(O)E/1/16	16-10-90	Roman	cervus	1	1	0	0	0	0
1	(O)E/1/16	16-10-90	Roman	equus	1	0	1	0	0	0
1	(O)E/1/16	16-10-90	Roman	s/g	7	0	0	7	0	0
1	(O)E/1/16	16-10-90	Roman	sus	1	0	0	1	0	0
1	(O)E/1/16	16-10-90	Roman	UNID large mammal	19	0	5	2	3	9
1	(O)E/1/16	16-10-90	Roman	UNID med mammal	78	0	19	5	7	47
1	(O)E/1/16	16-10-90	Roman	UNID small/med mammal	3	0	0	0	3	0
1	(O)E/1/17	17-10-90	Roman	bos	3	1	0	2	0	0
1	(O)E/1/17	17-10-90	Roman	s/g	5	0	0	5	0	0
1	(O)E/1/17	17-10-90	Roman	sus	5	2	0	3	0	0
1	(O)E/1/17	17-10-90	Roman	UNID	2	0	0	2	0	0
1	(O)E/1/17	17-10-90	Roman	UNID large mammal	12	0	8	1	0	3
1	(O)E/1/17	17-10-90	Roman	UNID med mammal	82	1	18	5	15	43
1	(O)E/1/17	17-10-90	Roman	UNID small mammal	9	0	9	0	0	0
1	(O)E/1/2	22/23-8-89	Roman	bos	5	3	1	1	0	0
1	(O)E/1/2	22/23-8-89	Roman	s/g	11	0	1	10	0	0
1	(O)E/1/2	22/23-8-89	Roman	sus	18	0	0	18	0	0
1	(O)E/1/2	22/23-8-89	Roman	UNID large mammal	6	0	0	0	0	6

1	(O)E/1/2	22/23-8-89	Roman	UNID med mammal	77	0	36	8	7	26
1	(O)E/1/2	22/23-8-89	Roman	UNID small mammal	1	0	1	0	0	0
1	(O)E/1/3	4-8-89	Roman	s/g	2	0	0	2	0	0
1	(O)E/1/3	4-8-89	Roman	UNID large mammal	3	0	3	0	0	0
1	(O)E/1/3	4-8-89	Roman	UNID med mammal	15	0	3	5	2	5
1	(O)E/1/4	1-10-90	Roman	bos	3	3	0	0	0	0
1	(O)E/1/4	1-10-90	Roman	s/g	4	2	0	1	1	0
1	(O)E/1/4	1-10-90	Roman	sheep	1	1	0	0	0	0
1	(O)E/1/4	1-10-90	Roman	sus	4	0	1	3	0	0
1	(O)E/1/4	1-10-90	Roman	UNID med mammal	64	0	28	4	2	30
1	(O)E/1/4	1-10-90	Roman	UNID med/large mammal	2	0	0	2	0	0
1	(O)E/1/5	5-8-89	Roman	s/g	2	1	0	1	0	0
1	(O)E/1/5	5-8-89	Roman	UNID large mammal	2	0	1	1	0	0
1	(O)E/1/5	5-8-89	Roman	UNID med mammal	7	0	0	2	2	3
1	(O)E/1/6	2-10-90	Roman	bivalve	2					
1	(O)E/1/6	2-10-90	Roman	goat	1	1	0	0	0	0
1	(O)E/1/6	2-10-90	Roman	s/g	11	1	0	10	0	0
1	(O)E/1/6	2-10-90	Roman	sheep	2	2	0	0	0	0
1	(O)E/1/6	2-10-90	Roman	sus	5	2	1	2	0	0
1	(O)E/1/6	2-10-90	Roman	UNID large mammal	2	0	2	0	0	0
1	(O)E/1/6	2-10-90	Roman	UNID med mammal	54	1	22	12	3	16
1	(O)E/1/6	2-10-90	Roman	UNID med/large mammal	3	0	0	3	0	0
1	(O)E/1/7	21-8-89	Roman	bos	1	0	0	1	0	0
1	(O)E/1/7	21-8-89	Roman	s/g	3	0	0	2	1	0
1	(O)E/1/7	21-8-89	Roman	UNID med mammal	16	0	7	3	4	2
1	(O)E/1/8	3-10-90	Roman	s/g	10	0	4	6	0	0
1	(O)E/1/8	3-10-90	Roman	sheep	1	0	1	0	0	0
1	(O)E/1/8	3-10-90	Roman	sus	4	2	0	2	0	0
1	(O)E/1/8	3-10-90	Roman	UNID med mammal	50	1	24	9	3	13
1	(O)E/1/8	3-10-90	Roman	UNID med/large mammal	2	0	0	2	0	0
1	(O)E/1/9	9/11-10-90	Roman	Aves	1	0	0	0	1	0
1	(O)E/1/9	9/11-10-90	Roman	bivalve	1					
1	(O)E/1/9	9/11-10-90	Roman	bos	1	0	1	0	0	0

1	(O)E/1/9	9/11-10-90	Roman	s/g	4	4	0	0	0	0
1	(O)E/1/9	9/11-10-90	Roman	sus	1	1	0	0	0	0
1	(O)E/1/9	9/11-10-90	Roman	UNID med mammal	42	0	22	3	1	16
1	(O)E/1/9	9/11-10-90	Roman	UNID med/large mammal	3	0	2	1	0	0
52	(O)E/52/1	8-10-90	Roman	s/g	2	1	1	0	0	0
52	(O)E/52/1	8-10-90	Roman	sheep	2	2	0	0	0	0
52	(O)E/52/1	8-10-90	Roman	UNID med mammal	12	0	6	1	3	2
52	(O)E/52/1	8-10-90	Roman	UNID med/large mammal	5	0	0	0	5	0
52	(O)E/52/2	12/13-10-90	Roman	bos	1	0	0	1	0	0
52	(O)E/52/2	12/13-10-90	Roman	sus	1	0	0	1	0	0
52	(O)E/52/2	12/13-10-90	Roman	UNID large mammal	2	0	0	0	0	2
52	(O)E/52/2	12/13-10-90	Roman	UNID med mammal	24	0	10	3	1	10
67	(O)E/67/1	23/30-10-90	Roman	Aves	1	0	1	0	0	0
67	(O)E/67/1	23/30-10-90	Roman	bos	1	0	1	0	0	0
67	(O)E/67/1	23/30-10-90	Roman	land snail	5					
67	(O)E/67/1	23/30-10-90	Roman	s/g	4	1	0	1	2	0
67	(O)E/67/1	23/30-10-90	Roman	snake	1	0	0	0	1	0
67	(O)E/67/1	23/30-10-90	Roman	sus	2	1	0	1	0	0
67	(O)E/67/1	23/30-10-90	Roman	UNID large mammal	4	0	3	0	0	1
67	(O)E/67/1	23/30-10-90	Roman	UNID med mammal	26	0	18	4	1	3
67	(O)E/67/1	23/30-10-90	Roman	UNID small mammal	3	1	2	0	0	0
67	(O)E/67/2	22-10-90	Roman	bos	2	0	1	1	0	0
67	(O)E/67/2	22-10-90	Roman	canis	1	0	0	1	0	0
67	(O)E/67/2	22-10-90	Roman	human	2	0	2	0	0	0
67	(O)E/67/2	22-10-90	Roman	land snail	2					
67	(O)E/67/2	22-10-90	Roman	s/g	5	0	0	5	0	0
67	(O)E/67/2	22-10-90	Roman	sheep	1	0	0	1	0	0
67	(O)E/67/2	22-10-90	Roman	sus	5	2	0	3	0	0
67	(O)E/67/2	22-10-90	Roman	UNID large mammal	8	0	8	0	0	0
67	(O)E/67/2	22-10-90	Roman	UNID med mammal	54	0	23	10	6	15
67	(O)E/67/2	22-10-90	Roman	UNID small mammal	1	0	1	0	0	0
67	(O)E/67/3	22/30-10-90	Roman	canis	1	0	0	1	0	0
67	(O)E/67/3	22/30-10-90	Roman	human	2	0	2	0	0	0
67	(O)E/67/3	22/30-10-90	Roman	s/g	1	0	1	0	0	0

67	(O)E/67/3	22/30-10-90	Roman	sus	1	0	0	1	0	0
67	(O)E/67/3	22/30-10-90	Roman	UNID large mammal	1	0	1	0	0	0
67	(O)E/67/3	22/30-10-90	Roman	UNID med mammal	20	0	5	0	1	14
67	(O)E/67/3	22/30-10-90	Roman	UNID med/large mammal	1	0	1	0	0	0
67	(O)E/67/3	22/30-10-90	Roman	UNID med/sm mammal	4	0	0	4	0	0
67	(O)E/67/3	22/30-10-90	Roman	UNID small mammal	4	0	4	0	0	0
67	(O)E/67/4	2-11-90	Roman	s/g	1	0	1	0	0	0
67	(O)E/67/4	2-11-90	Roman	UNID med mammal	5	0	3	0	0	2
67	(O)E/67/5	3-11-90	Roman	bos	1	0	0	1	0	0
67	(O)E/67/5	3-11-90	Roman	gallus	1	0	1	0	0	0
67	(O)E/67/5	3-11-90	Roman	human	2	0	2	0	0	0
67	(O)E/67/5	3-11-90	Roman	s/g	1	0	0	1	0	0
67	(O)E/67/5	3-11-90	Roman	sus	5	2	1	2	0	0
67	(O)E/67/5	3-11-90	Roman	UNID large mammal	7	0	6	0	1	0
67	(O)E/67/5	3-11-90	Roman	UNID med mammal	64	0	22	8	14	20
67	(O)E/67/5	3-11-90	Roman	UNID med/large mammal	4	0	4	0	0	0
67	(O)E/67/6	5-11-90	Roman	Aves	3	0	2	0	1	0
67	(O)E/67/6	5-11-90	Roman	s/g	1	0	0	1	0	0
67	(O)E/67/6	5-11-90	Roman	UNID large mammal	5	0	4	0	1	0
67	(O)E/67/6	5-11-90	Roman	UNID med mammal	35	0	9	3	10	13
67	(O)E/67/7	6-11-90	Roman	goat	1	1	0	0	0	0
67	(O)E/67/7	6-11-90	Roman	s/g	1	0	0	1	0	0
67	(O)E/67/7	6-11-90	Roman	UNID large mammal	2	0	2	0	0	0
67	(O)E/67/7	6-11-90	Roman	UNID med mammal	31	0	18	2	1	10
41-52	(O)E/41-52/1	17/18-10-90	Roman	s/g	4	1	2	1	0	0
41-52	(O)E/41-52/1	17/18-10-90	Roman	sus	1	1	0	0	0	0
41-52	(O)E/41-52/1	17/18-10-90	Roman	UNID med mammal	17	0	6	1	4	6
41-52	(O)E/41-52/1	17/18-10-90	Roman	UNID med/sm mammal	1	0	1	0	0	0
41-52	(O)E/41-52/2	26/30/31-10-90	Roman	bivalve	1					
41-52	(O)E/41-52/2	26/30/31-10-90	Roman	s/g	4	1	1	2	0	0
41-52	(O)E/41-52/2	26/30/31-10-90	Roman	sus	4	0	0	4	0	0
41-52	(O)E/41-52/2	26/30/31-10-90	Roman	UNID large mammal	1	0	1	0	0	0
41-52	(O)E/41-52/2	26/30/31-10-90	Roman	UNID med mammal	36	1	21	4	1	9
TOTAL					2198	69	741	419	210	747

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