

LONG-TERM RESILIENCE IN CULTURAL SYSTEMS:  
AN ARAUCANIAN EXAMPLE FROM SANTA SYLVIA,  
SOUTH-CENTRAL CHILE

By

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To Mandy

“Are you the Doctor?”

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## CHAPTER 1

### INTRODUCTION TO THE RESEARCH

The exploration and colonization of the Americas by European nation/states after AD<sup>1</sup> 1492 has been heralded by scholars as one of the most important and world-changing events in human history (Hanke 1952; López de Gomára 1964[1552]; Prescott 2001; Restall 2003). Though many previous anthropological and historical studies focused primarily on the European experience in the Americas, in recent decades archaeologists, historians, ethnographers, sociologists, and geographers, have tried to examine the “conquest” of the Americas from the perspective of the indigenous inhabitants (Calloway 1997; Given 2004; Hulme 1986; McNiven and Russell 2005; Paterson 2011; Rothschild 2003; Saunders 1998; Silliman 2009; Sokolow 2003. Trigger 1980). These groups often were and are treated as peripheral actors in the story of European conquest, since most became subject to foreign political, economic, social, and religious control beginning in the 16<sup>th</sup> and 17<sup>th</sup> Centuries.

Many groups that militarily confronted European colonizers, such as the Puebloans of the southwestern United States or the Yucatec Maya in Mexico, were intermittently successful. But within 20 (Puebloan) and 50 (Yucatec) years, these societies were re-colonized, or came back under the political and economic authority of the Spanish Empire (G. Jones 1989; Robins 2005; Wilcox 2009). Resistance to European control was often limited in scope and duration, as indigenous groups sought new ways to protect ancestral traditions while acclimating to the new realities of colonization. This often produced new hybridized and/or syncretized cultures, subject to a foreign power and forced to negotiate their position within the new regime (Brown 1996; Farriss 1993; Hollander and Enwohner 2004; Katz 1988; Scott 1990, 2010). Issues of cultural

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1 All dates, unless otherwise indicated, are AD.

identity, integrity, position, and power in the wider (national) society continue to affect how indigenous groups see their history, their relationships to the larger states in which they find themselves, and the relationships within and between their communities (Castro Lucic 2005; Heise 2001; Nesti 2001; Nygren 1998).

Thus, many archaeological, ethnographic, and historic studies tend to investigate indigenous groups that were colonized, or brought under the politically and economically controlling authority of a European nation-state. These studies include the varied reactions of these groups to foreign occupation from the time of European arrival in the 16<sup>th</sup> and 17<sup>th</sup> Centuries through the end of colonial control in the 19<sup>th</sup> and 20<sup>th</sup> Centuries (Boccaro 2002; Chust Calero 1995; Cusick 1998; Gasco 2005; Given 2004; Góngora 1998[1975]; Gosden 2001; Lydon and Rizvi 2010; Murray 2004; Thomas 1989, 1990, 1991). Many scholars examine various “rebellions” and aspects of direct resistance that happened among indigenous groups (Katz 1988; Kicza 2003; Liebmann and Murphy 2011; Stern 1993). Most research, however, investigates the common ways in which indigenous cultures maintained facets of pre-colonial social and religious practice after losing much of their political and economic autonomy (Scott 1985, 1990). Other studies analyze the ways in which indigenous cultures became hybridized and/or syncretized to confront a wide array of political, economic, social, and religious pressures from the European invaders and neighboring groups, as well as similar tensions within the societies themselves (Kicza 1993; Robins 2005; Scott 1985; Taylor and Pease 1994).

One of the largest areas colonized by Europeans was present-day Latin America. The wide variety of responses by both indigenous groups and Europeans to the colonial effort have influenced researchers for many years (Calloway 1997; Cook 1998; Elliott 2009; Góngora 1998[1975]; Hardoy and Aranovich 1969; Himelblau 2004; Hulme 1986; Keen 1985; Lynch 1992; Schaedel 1992; Stern 1992; Trigger 1980; Van Buren 2010). As in other colonial situations, the majority of indigenous groups in the Americas were colonized or subjected to some form of control from an outside power (Axtell 1985;

Gasco 2005; Paterson 2011). Resistance to colonization took many shapes as indigenous groups attempted to maintain their traditional practices, but most became hybridized and/or syncretized during the colonization process (Liebmann and Murphy 2010).

### **The Araucanians of Chile and Argentina**

This research presents an understudied and different perspective on the topics of colonialism, resistance, identity, and agency, by examining the Araucanians (today known as the Mapuche<sup>2</sup>), a Mapudungun-speaking culture that developed in central and south-central Chile<sup>3</sup> and western Argentina for several centuries prior to European arrival in the mid-16<sup>th</sup> Century. Araucanians living near to and south of the Maule River (see Figure 1) first confronted and resisted the expanding Inka Empire in the late-15<sup>th</sup> Century (Betanzos 1996 [1557]; de la Vega 1991 [1609]; Sarmiento 1999 [1572]). Araucanians south of the Bio Bio River later confronted Spanish colonizers who arrived in south-central Chile around 1550 and built numerous settlements between the Bio Bio and Bueno Rivers (Figure 2; Valdivia 1929 [1550]; Vivar 1979 [1558]). Over 48 years (1550-1598), the Araucanians and Spanish engaged in continual rounds of tension, mistrust and violent conflict (called by the Spanish the *Guerra de Arauco* or “War of Arauco”). Battles ranged from the Pacific coast to the Andes Mountains in the west and east, and from the Bio Bio and Bueno Rivers in the north and south. This area is referred to generally as the “Araucania,” or traditional Araucanian territory (Figure 1; Villalobos 1985).

Of specific interest to this study is that sometime between 1580 and 1598 Araucanians living near the present-day town of Pucón, located in the western Andean

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2 “Araucanian” is a generic term employed to refer to the indigenous, Mapudungun-speaking inhabitants of south-central Chile, living generally between the Mapocho River in the north and Reloncaví Bay in the south. The name “Mapuche,” meaning “people of the land” came to be used in the mid-18<sup>th</sup> Century to refer to the same Araucanian groups, and is the name by which they are known today. See Chapter 3 for further details.

3 Central Chile is defined here as the area between the Mapocho and Itata Rivers (present-day Santiago to Chillan) and south-central Chile as the area between the Itata River and Reloncaví Bay (Chillan to Puerto Montt) See Figure 1.



Figure 1: General extent of Mapudungun-speaking peoples in south-central Chile prior to Spanish arrival. Dark gray area indicates the extent of the traditional Araucania, or Araucanian heartland.

foothills in the lake district of south-central Chile, forced the evacuation and perhaps destruction of a small *casa fortificada* (“fortified house”) known today as Santa Sylvia. This *casa fortificada* was likely built by the Spanish for mining and trade activities by as part of a series of outlying support fortifications to the larger fortification of Villarrica, located 30km (22 miles) to the west on the mouth of Lake Villarrica (Gordon 2011;

Harcha and Castro 2000; Vidal et al. 1986). Santa Sylvania may have been occupied by a Spanish landowner (*encomendero*) for about 10 years before tensions with the local Araucanian population evidently forced him, other Spaniards, and any native allies (known as *indios amigos* or “friendly Indians”) to flee to Villarrica (Figure 3; Gordon 2011; Sauer 2010)

In AD 1598, these and other Araucanians living in the region of Pucón-Villarrica besieged the Spaniards at Villarrica as part of a larger offensive throughout the Araucania. The Araucanians forced the evacuation of all colonizers and allies and destroyed this last European holdout south of the Bio Bio River in 1602 (Gonzalez 1986; Rosales 1989[1674]; Saavedra and Sanzana 1990; Tribaldos de Toledo 2009[1630]). Subsequent efforts to re-colonize previous settlements, subjugate through military force, or convert the Araucanians were unsuccessful. In 1641 the Spanish Crown formally recognized the Bio Bio River as the southern frontier of the empire. The Spanish thus acknowledged the Araucanians south of the Bio Bio, including those living in and around Pucón, Villarrica, and Santa Sylvania, as an autonomous, independent people in a treaty largely dictated by the Araucanians and not the Spanish (Abreu y Bertodano 1740; Bengoa 2000, 2003; Contreras 2009; Zavala and Dillehay 2010). No other indigenous group in the whole of the Spanish empire received such coronal recognition, before or after this treaty, as no other known indigenous society in North or South America achieved this level of military success and cultural resilience on their own terms and for such an extended period of time. Not until AD 1885 did the Araucanians in the Santa Sylvania area become subject to an external power, in this case the modern nation-state of Chile (Navarro 2008[1890]), a period of nearly 350 years of successful resistance to non-Araucanian authority.

While evidence suggests that the majority of the Araucanians actively resisted the Spanish, there existed a smaller group of what the Spanish termed *indios amigos* (“friendly Indians”) who allied themselves with the colonizers and acculturated to their ways (Ruiz-Esquide 1993). Elsewhere in the Americas, these *indios amigos* or *indios de*





Figure 2: Map of Inka expansion and Spanish fortifications in southern Chile.

*paz* (“peaceful indians”) were essential to the success of Spanish colonial efforts (Altman 2007; Schroder 2002; Yannakakis 2011). In Chile, many native allies were known as *yanacona*, who came south from Peru as servants to the Spanish (Dillehay 2007), but there existed a small subset of Araucanians who “accommodated, cooperated and colluded” with the invaders (Liebmann and Murphy 2010; Ruiz-Esquide 1993). However, documentary evidence indicates that a larger population of *indios enemigos* (“enemy

indians”) or *indios de guerra* (“war indians”) in the Araucania took the fight directly to the Spanish and successfully expelled the invaders (see Chapter 3).

The Araucanians in general, including those living near Santa Sylvia, evidently accomplished the expulsion of the Spanish and maintained independence without experiencing extensive changes in their existing cultural systems and practices, arguably until the 19<sup>th</sup> Century. As previously mentioned, most other indigenous groups in the Americas who were directly colonized by European nation-states kept many aspects of their traditional, pre-Hispanic culture, but lost political and economic autonomy. Hybridization and syncretism became the way in which many colonized indigenous societies (and many who were not directly colonized; see Witgen 2012) adapted to European incursion. These groups created practices that included elements of pre-Hispanic patterns but contained enough change to be new ways of perpetuating their culture (Restall 2003; Robins 2005).

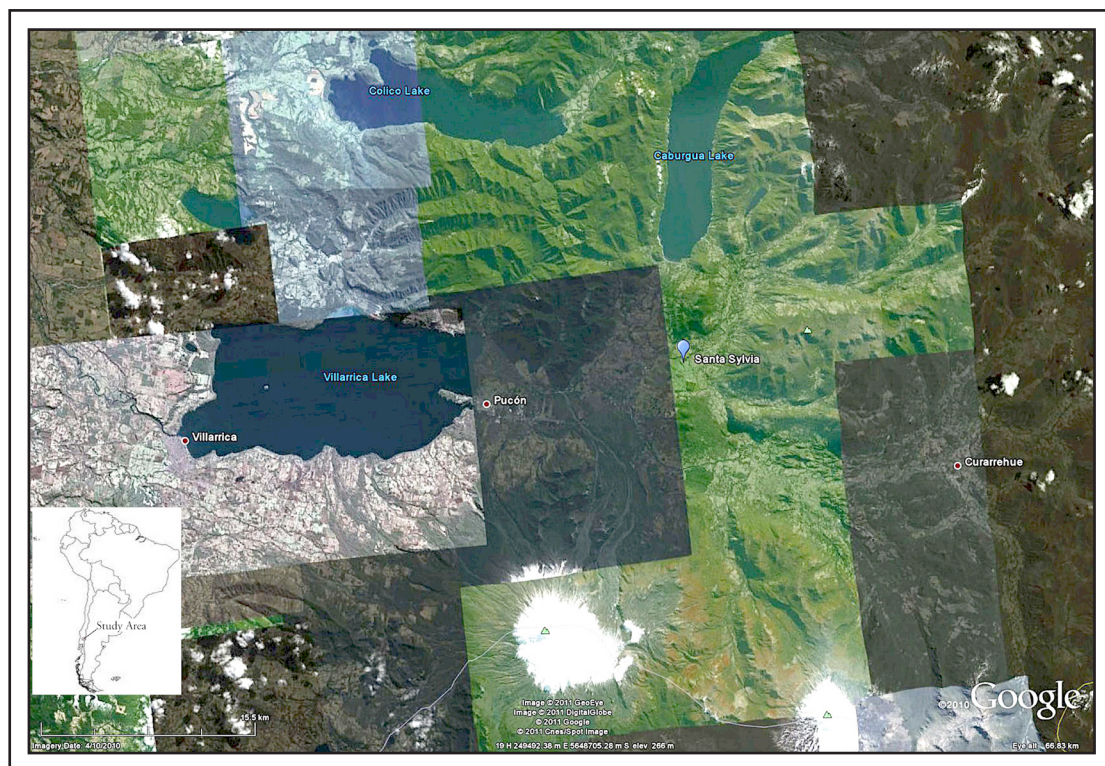


Figure 3: Map of general research area. Note locations of Santa Sylvia, Pucón, and Villarrica.



Figure 4: Map of the southern cone of South America indicating: 1) the general extent of Mapudungun-speaking peoples (solid black line); 2) the traditional Araucania (dashed line); and 3) Araucanian expansion after AD 1602.

Like their kin living in the Araucania region and other indigenous groups elsewhere in the Americas, the Araucanians at Santa Sylvania actively incorporated European products into their economy such as horses, cows, sheep, pigs, wheat, and barley (Gordon 2011). Conversely, they did *not* adopt (and perhaps intentionally rejected; see Ercilla 2003[1569]; Rosales 1989[1674]) most Spanish<sup>4</sup> culture, including religious practice, political organization, economic patterns, metallurgy, and technology. The pre-existing or traditional indigenous culture remained, was emphasized, and continued to develop. At the same time, Araucanian populations expanded across the Andes into

<sup>4</sup> The Spanish living along the frontier and to the north of the Bio Bio, for their part, acquired ponchos, chili peppers, some strains of maize, potatoes, and other, limited foodstuffs from the Araucanians (Berger 2006). Both groups, it seems, limited the amount of acquisition of products from the other.

Argentina via trade and marauding raids (called *maloca*), particularly in the 17<sup>th</sup> and 18<sup>th</sup> Centuries (Leon 1996; Mandrini 1984; Mandrini and Ortelli 1995). This strengthened pre-existing and created new kin networks in the Pampas and Patagonia until Araucanian influence reached as far east as the Rio Plata delta (Figure 4; Berón 2006; Mandrini and Ortelli 2002). During the entire European colonization of the Americas, no other indigenous group accomplished what the Araucanians did: maintain prolonged and continuous cultural autonomy from the outset of contact and expand in the face of direct military aggression on their own terms and for several centuries.

How did they accomplish this? What allowed the Araucanians at Santa Sylvia and elsewhere in the Araucania to directly confront and defeat the largest, perhaps most successful empire in the Americas when many other, larger groups did not? How did this happen at places like Santa Sylvia while minimizing changes to the existing Araucanian culture system and practices? How representative are places like Santa Sylvia of other contact areas between the Araucanians and Spanish? More broadly, what were or are the cultural developmental processes that created a group as resilient as the Araucanians at Santa Sylvia, and throughout the wider Araucania? How can these processes be detected and explained in the archaeological, ethnohistoric, and ethnographic records which patterns can then be compared with the colonial experiences of other indigenous groups, past and present, in the Americas? What are the wider implications of these processes to our knowledge and understanding of power relations throughout history?

Answers to these questions can be centered in the interconnected political, economic, social, and ideological structures of the Araucanian culture system, and perhaps most importantly, in a social character or identity based on individual and group independence. In other words, who the Araucanians in and around Santa Sylvia were/are, how they defined themselves, their neighbors, and foreigners, how they organized themselves, what they believed, and how they *acted* allowed them to: **1)** incorporate particular Spanish material goods and behaviors (i.e. military tactics, horses, foodstuffs,

etc.) into their culture while perhaps intentionally avoiding others; **2**) eventually remove the Spanish and their allies (i.e. *indios amigos*) from ancestral lands and maintain political, economic, social, and ideological autonomy; and **3**) minimize, at least at the outset, hybridized and/or syncretized changes to their own way of life, through strategic reorganization of traditional cultural structures.

The Araucanians and their culture at Santa Sylvia and elsewhere in the Araucania did change before and after the arrival of the Spanish—indeed, change in any cultural system is an inevitable, historical process regardless of external stimuli (Wolf 1997). Sahlins (1985:ix) argues that a “[cultural] system is a synthesis in time of reproduction and variation.” The research reported here at Santa Sylvia suggests that the political, economic, social, and ideological structures of Araucanian culture had developed in the area well before the arrival of the Spanish, perhaps by as early as AD 300 (Navarro et al. 2012) and by AD 900 at Santa Sylvia itself. For centuries before European arrival, these structures were “reproduced” (*sensu* Sahlins) with variations, such as changes in ceramic styles and the construction of ritual spaces, in trajectory similar to other areas in the Araucania (Dillehay 2007; Dillehay and Saavedra 2010). Therefore, Araucanian culture around Santa Sylvia, and likely in the broader Araucania, was not static or unchanging before or after the Spanish and up to the present day. Rather, this research argues that Araucanian system already established and stabilized provided a foundation flexible enough to structure modification to some existing practices and incorporate some external elements, i.e. use of Spanish goods, and new military tactics, by Araucanian actors. At the same time, these actors reproduced pre-existing cultural patterns and norms, such as material culture and religious practice, as a way to strengthen Araucanian identity and consolidate power in order to successfully confront the Spanish.

These changes and reproductions were part of traditional political, economic, social, and religious structures that constituted the Araucanian culture system. Araucanian actors adapted the existing system to Spanish and Chilean (for a brief time) influences

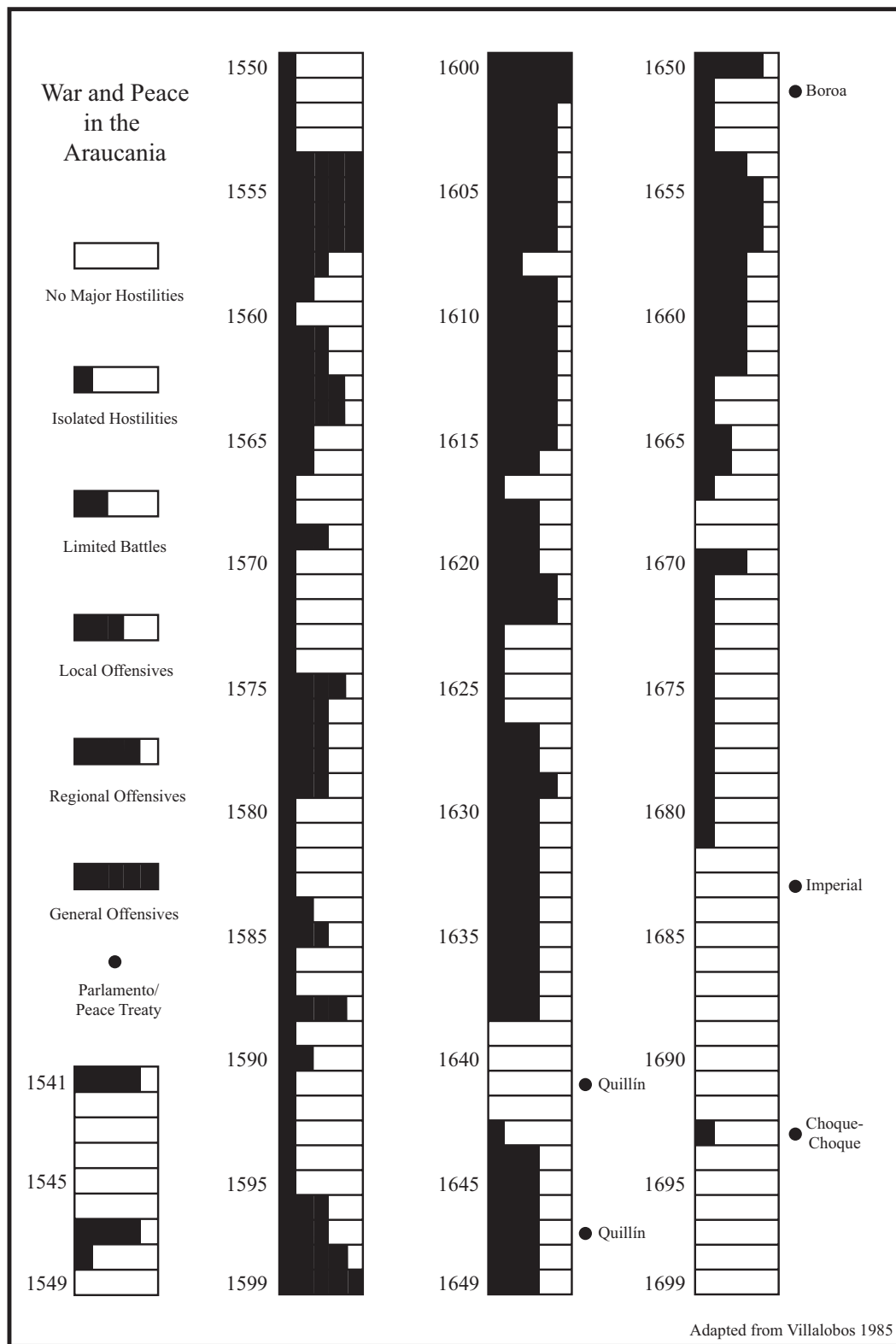


Figure 5: Diagram showing periods of “war and peace” in the Araucania. From Villalobos 1985.

and incursions. Changes that did occur, such as a shift to a semi-permanent war footing, incorporation of refugees, emphasis on broader spatial organizations, *maloca* raiding, trade networks, and others happened as part of the existing cultural milieu and were probably dictated largely by Araucanians at Santa Sylvia themselves and less by a foreign power (Boccaro 1999; Padden 1993). Strategic changes emerged as part of a mechanism used to defeat external threats and maintain extant cultural norms and practices (Dillehay 2007). In other words, this research hypothesizes that power over the changes to the Araucanian culture system and structures remained with the Araucanians themselves, influenced from but not dictated by the Inka, Spanish, or Chileans until the end of the 19<sup>th</sup> Century.

### **Research Focus**

Santa Sylvia, the central focus of this study, is located about 650km (450 miles) south of the Chilean capital Santiago and along the western foothills of the Andes Mountains (Figure 3). The region surrounding Santa Sylvia (Pucón-Villarrica) is ideal for this research, because indigenous groups have lived in the area for millennia and still do. They provide the possibility of long, diachronic sequences of human occupation and cultural development that can be seen archaeologically, historically, and ethnographically (Aldunate 1989, 1996; Navarro et al. 2012). Santa Sylvia itself lies 14km (9 miles) east of the present-day town of Pucón and about 40km (26 miles) west of several perennial passes across the Andes into the Argentinian Pampa, which have been in use for millennia to exchange obsidian, salt, ceramics, foodstuffs (among other materials), and to establish or strengthen kin networks (Garcia 2009; Harcha and Vásquez 2000). Villarrica, on the opposite side of Lake Villarrica from Santa Sylvia, was one of the first fort/cities the Spanish established south of the Bio Bio River, in 1552 (Valdivia 1929 [1552]), Later Spanish activity apparently included a series of support fortifications, akin to Santa Sylvia, surrounding the lake (Vidal et al. 1986). Santa Sylvia was likely built

in a strategic location to protect trans-Andean passes into Argentina (Olaverría 1594, in Medina 1960:391) and occupied for mining gold, silver, copper, and other ores in the area (Harcha and Vásquez 2000). Outside Santa Sylvania, Pucón-Villarrica holds the distinction of being the last area in the Araucania to be controlled by the Chilean government in AD 1883 (Navarro 2008[1890]).

The site itself was first discovered in the mid-1980s by workers on the Fundo El Coihue, owned by Benjamin Davis. Upon recognition of several artifacts, Davis contacted archaeologist Americo Gordon, who tested the site in 1987 and performed intensive excavations from 1988-1990. Gordon identified five distinct structures (*complejos*, or “complexes”) dating to the mid-16<sup>th</sup> Century, which he argued included the home of a Spanish colonial *encomendero*, a chapel/mausoleum, a work area, soldiers quarters, and the house of *indios amigos* (Gordon 2011). Based on artifact deposits, including human remains recovered beneath the floor of the chapel/mausoleum, and available historical information, Gordon hypothesized that Santa Sylvania was occupied for about 40 years, or from AD 1558-1598, before being abandoned and destroyed around the same time the Spanish were evacuating south of the Bio Bio River (*ibid*). Gordon passed away in 1995 before being able to complete his synthesis of his work at the site. Part of this research has sought to reconfirm many aspects of his research and build upon the base that he provided. Subsequent investigations (Dillehay and Saavedra 2010; Harcha et al. 1999; Mera et al. 2004) have recognized and emphasized the importance of Santa Sylvania, but have been limited in scope and duration.

Santa Sylvania is the only site in south-central Chile securely identified thus far that contains a pre-Hispanic Araucanian occupation, a Spanish “fortified house” occupied in the 16<sup>th</sup> Century, and a post-Hispanic occupation by the Araucanians *in one place*. Others likely exist or have been tentatively identified, but have yet to be thoroughly investigated (Harcha and Vásquez 2000; Harcha et al. 1988; Mera, personal communication, 2010; Vidal et al. 1986). Consequently, archaeological investigations at Santa Sylvania, combined



with ethnographic information from the area and ethnohistoric research in the Araucania, offers important data regarding: **1)** Araucanian/Spanish interaction; **2)** diachronic and synchronic studies of cultural patterns and development, particularly Araucanian but Spanish as well; and **3)** intercommunity relationships between Araucanians living elsewhere in south-central Chile and across the Andes into Argentina.

The need for interdisciplinary approaches to studying the Araucanians, as well as colonial power relations and outcomes, identity, and agency, is fundamental to this research. Many researchers have analyzed at the long-term developments in Araucanian culture but have emphasized the historical record, such as the documents written by Spanish *cronistas* (chroniclers), government officials, clerics, and others (Bengoa 2000, 2003; Boccara 1996, 1999; Goicovich 2002, 2006; Parentini 1996; Silva 1994, 2001; Silva and Tellez 1993; Villalobos 1985, 1989, 1995; cf. Boccara 2008; Dillehay 2007; Zavala 2008). These early writers provide important information, but are oftentimes biased, had agendas, or simply were not writing for a scientific or academic audience (Aldaz 1579 in Medina 1959; Alvarez 1600 in Medina 1961; Arias de Saavedra 1984[1650]; Ercilla 2003[1569]; Góngora 1990[1577]; Gonzalez de Najera 1889[1614]; Gonzalez de San Nicolas 1902[1563]; Hurtado de Mendoza 1561 in Medina 1963; Mariño 1865[1595]; Nuñez de Pineda 2001[1673]; Ocaña 1995[1604]; Olaverria 1594 in Medina 1960; Oña 1917[1596]; Ovalle 2003[1646]; J. Quiroga 1979[1677]; Rosales 1989[1674]; Valdivia 1929; Vivar 1979[1558]). Yet, these chroniclers are essential to investigating early Araucanian/Spanish interactions, as they documented aspects of Araucanian culture such as religious practice and spatial organization.

However, gaps exist in this information. These chroniclers wrote at one point in time and provided information for specific purposes, such as receiving favors from governmental officials or defending actions to the Spanish crown, not to provide an anthropological or historical treatment of the Araucanians. Lack of information has affected subsequent Araucanian historical and legal treatment, up to the present day. It

has culminated in the modern Mapuche being treated, from a legal standpoint, as the *result* of Spanish arrival, rather than as a people with a long, continuous culture history dating to pre-Hispanic times (Heise 2001; Nesti 2001). This perspective of a recent Araucanian/Mapuche ethnogenesis influences land tenure and water rights, standing before the Chilean government, and other legal issues (Boccará 1999; Marimán et al. 2006). In many cases, historians researching the Araucanians ignore or treat lightly the archaeological and ethnographic record in their studies (cf. Castro and Adán 2001; Dillehay 2007; Gordon 2011; Harcha et al. 1988; Mera et al. 2004; Saavedra and Sanzana 1991; Vidal et al. 1986).

At the same time, ethnographic studies of the Araucanians/Mapuche have illuminated on cultural developments, particularly in the 20<sup>th</sup> Century (Bacigalupo 2007, 2010; Canals 1944; Cooper 1946; Course 2010; Faron 1964, 1986; Foerster 1993; Luna 2007; Ray 2007; Saavedra 2002, 2006; Stuchlik 1976; Titiev 1951). As the modern Mapuche have been incorporated into the wider Chilean society, many cultural aspects have declined, including speaking *Mapudungun*, religious practice, and traditional land use patterns. Ethnographers have sought to record this information before it becomes “lost” (Marimán et al. 2006). Many of these studies, however, have been limited in their use of the archaeological and historical records (cf. Aldunate 1989, 1996; Dillehay 2007; Millalén 2006).

Archaeology and ethnography, among other disciplines such as geography, genetics, and linguistics, have the potential to offer complementary and critical information. When coupled with the historical record, they offer a stronger or amplified picture of past and present Araucanian cultural practices and patterns, as well as new avenues for research and collaboration (see Adán et al. 2007; Boccará 2008; Dillehay 2007; Dillehay and Saavedra 2010; Castro and Adán 2001; Harcha et al. 1988; Mera and Harcha 1999; Mera et al. 2004; Retamal 2000, 2002; Silva et al. 1988; Villalobos and Hidalgo 1985; Villalobos et al. 1982). Thus, this work builds upon the work initiated

by Gordon and adds, from interdisciplinary perspective, important information on the Araucanians at Santa Sylvia and the wider Araucania. It combines archaeological evidence from in-depth excavations at the site, ethnographic information from living indigenous informants in the area, and ethnohistorical data on the Araucanians from the extensive Spanish colonial documentary record and modern Chilean historiography.

The long-term development of Araucanian culture and the nature of individual and group resistance to Spanish influence make explanation difficult. During the history of Araucanian/Spanish interactions, several instances appear to be “make or break” moments for the Araucanians. If they could defeat the Spanish, they would remain in control of their own lands and society. If they lost, they would come under the authority of the Spanish. Historians such as Boccara (2007) Goicovich (2006), and Villalobos (1985) have noted phases of interaction and cycles of “war and peace” between the Spanish and Araucanians. These can also be seen as states of tense peace punctuated by moments of outright war (see Figure 5). Two general Araucanian offensives, one beginning in 1553 and the other in 1598, destroyed all Spanish fort/cities south of the Bio Bio River. The latter offensive marked the end of permanent colonization efforts by the Spanish in the Araucania (Bengoa 2000). Sometime in between these offensives, Santa Sylvia was occupied, abandoned and destroyed.

With these patterns evidenced in the archaeological, historic, and ethnographic records, how can researchers understand the processes that went into Araucanian cultural development? How did these processes, cultural features, and organizations aid in resisting the Spanish? What mechanisms can account for the ability of the Araucanian system to remain stable, while at the same time being flexible enough to incorporate changes? In what ways can these mechanisms be seen in both time and space? More broadly, what theoretical orientation can provide a framework to answer the above questions, while incorporating issues of identity, agency, and power relations?

## **Resilience Theory**

This work is guided by Resilience Theory (RT), which was initially developed in economics and ecology, and in recent years has been used to describe the interactions between human social systems and the environment (Berkes et al. 2003b; Folke 2006; Holling 1973; Schumpeter 1950). In brief, RT states that “resilience is the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function” (Walker et al. 2004:5; see Chapter 5). In other words, a cultural or ecological system is resilient if it can take in or incorporate the effects of outside stimuli, such as the colonization of a new group (plant, animal, etc.), without being affected so much that the system begins to function in an entirely new way.

For example, in this study an argument can be made that if a culture system loses its political, economic, social, or ideological autonomy, or a combination of them, the system becomes something new, even though some previous traits still exist. Resilience, then, is more than resistance (Hollander and Enwohner 2004; Ortner 1995; Scott 1990). RT emphasizes the flexibility, stability, and adaptability of a cultural system, through which actors are able to incorporate useful changes, outside materials, and new ideas without losing autochthonous control of the system itself as it continues to adapt (Gunderson 1999; Gunderson and Pritchard 2002; Walker 2004). As Thompson and Turck (2009:256) point out, “RT emphasizes both stability and transformations within systems” which applies to the development of Araucanian culture at Santa Sylvia and in the wider Araucania.

RT is modified in this research to emphasize social or cultural systems more than ecological or the interplay between the two (Nelson et al. 2006). This incorporates individual and group identity (or ethnicity), ideology, and human agency in the creation and maintenance of cultural systems. How people see themselves and how they act on that knowledge creates the political, economic, social, and ideological structures that

compose their society (Giddens 1984; Jones 1996). For the Araucanians, these structures appear to have been organized in such a way that actors (or agents) incorporated particular elements of Spanish culture into their society while avoiding other aspects mentioned above. It is hypothesized here that these actors then used those traditional structures to actively fight against and eventually expel the Spanish while continuing to adapt and develop, but *on their own terms*, not those dictated by the Spanish or other foreign groups.

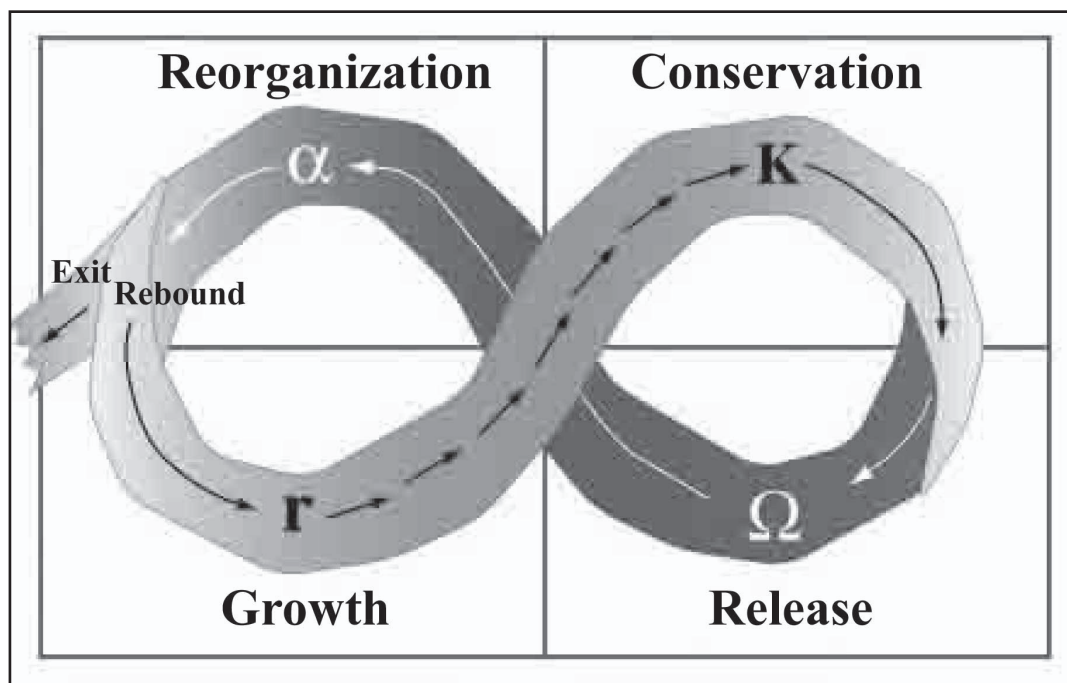


Figure 6: Diagram of Resilience Cycle (RC) showing phases of growth, conservation, release, reorganization/rebound and reorganization/exit. Adapted from Walker et al. 2004.

The flexibility and resiliency of the Araucanian system continued through the 16<sup>th</sup>, 17<sup>th</sup>, and 18<sup>th</sup> Centuries, passing through several cycles in RT: growth, conservation, release, and reorganization/rebound within what is called the Resilience Cycle (RC). In the early to late 19<sup>th</sup> Century and during what this research defines as a conservation phase in the Araucanian Resilience Cycle (ARC), some actors, particularly along the Bio Bio frontier, began to ally more closely with the Spanish and Chileans, becoming

*indios amigos* (Ruiz-Esquide 1993). This appears to have caused a breakdown down in kin relations and networks in parts of the Araucania, perhaps including Pucón-Villarrica, Santa Sylvania, and surrounding areas (Bengoa 2000). These breakdowns appear to have limited the number of available warriors, restricting Araucanian armies near Pucón-Villarrica to the point that the Chilean army encountered almost no resistance when taking Villarrica and Pucón in 1883 (Navarro 2008[1890]). Other actors could not quickly adapt or incorporate changes brought by the Chilean government, particularly those stemming from new technologies such as trains, telegraph, and repeating rifles. By 1885, the Araucanian culture system and structures had broken down enough from internal and external influences that the Araucanians at Santa Sylvania and elsewhere in the Araucania lost political and economic autonomy, becoming subjects to the Chilean state (Gonzalez 1986). The system thus entered a reorganization/exit phase wherein the Araucanian adapted to new power relationships and not on their terms. This use of RT, then, analyzes the long-term *processes* and *steps* that structured the actions of Araucanians/ Mapuche at Santa Sylvania to maintain their cultural system and structures for nearly 350 years, rather than the analyzing the ability of a culture to resist outside influences (Kicza 1993, 2003).

As will be shown in the following chapters, RT outlines these processes and steps through the ARC<sup>5</sup>. Briefly, the cycle is illustrated as a figure-8 Mobius strip, which outlines the four steps or phases that a cultural system passes through in the Resilience Cycle mentioned above: growth, conservation, release, and reorganization, which this research splits into rebound and exit phases (Figure 6). Each phase contains particular material and historic signatures that correspond to the development of the system. For example, the initial growth phase can include the creation or development of the Araucanian cultural structures (political, economic, social, ideological), including the incorporation of new technologies, ritual practices, and political organization. This phase

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5 In most Resilience literature, this cycle is called the “Adaptive Cycle.” To facilitate its use, the name was changed in this research to the Resilience Cycle to illustrate the long-term, diachronic process of resilience.

may be seen in the archaeological record at Santa Sylvania beginning by AD 900 possibly earlier (Navarro et al. 2012). This occupation includes use of Pitrén-style ceramics, one of the first ceramic complexes in southern Chile, and likely is a part of a wider development of agriculture and sedentism in the area of Pucón-Villarrica and the Araucania in general (Dillehay 2010).

The conservation phase includes the continued development of the culture system, which can incorporate new technologies and practices, but also can include the arrival and effects of an outside disturbance. A second occupation at Santa Sylvania, dating to around AD 1100, includes new ceramic types (El Vergel and Valdivia), and the construction of ritual kuel mounds nearby, indicating an incorporation of new materials and the continued growth of Araucanian culture in the area (Dillehay 2007). Elsewhere in the Araucania, northern influences, such as the expanding Inka Empire, brought “disturbances” that influenced material culture, language, and other cultural practices, which may have trickled into the Santa Sylvania area (Dillehay 2007; Dillehay and Gordon 1998). These and other disturbances could dramatically change the system, leading to a new political or economic order which can include changes to material culture.

Finally in the RC is a release phase or a “breaking point,” the moment when disturbances to the system build to a crossroads: where will the system go? Will it be able to rebound, or will it exit to a new system with new structures and power relationships? The buildup of tensions between the Araucanians and Spaniards at Santa Sylvania, influenced by war leaders and events in the wider Araucania, came to a head by 1598 (Roales 1989[1674]). Though no evidence has yet been found at the site of a direct confrontation, it was first hypothesized by Gordon that the Spanish abandoned Santa Sylvania and the site was later destroyed (Gordon 1991). The Araucanians then “rebounded” to a similar RC with some modifications, such as the abovementioned war footing, broader socio-political organization, and incorporation of European materials. Had any confrontation resulted in the Araucanians becoming subject to the Spanish,

the reorganization phase would have likely been an “exit” to a new cycle, wherein the political and economic power would have changed from Araucanian to Spanish control. It also would have affected social and religious activities and practices. This did not happen, and it is argued here that the Araucanian system rebounded to the same Resilience Cycle, apparently returning to conservation and other release phases until an eventual reorganization/ exit in the late 19<sup>th</sup> Century. These hypothetical stages will be explored further in Chapters 8 and 9.

These RT processes and phases can be long-term, stretching over decades or centuries; they can also be seen in fast, short cycles, often in a small, localized area such as Santa Sylvania (Thompson and Turck 2009). The Araucanian system described here mostly applies to the broader Araucania and operates in a long-term cycle of resilience, punctuated by several release phases until the aforementioned exit to a new RC around 1885. The short-term cycles and phases, specific to regions such as Santa Sylvania, may have slightly different signatures than others, but exist as a larger Araucanian system and cycle<sup>6</sup>. Research at Santa Sylvania, including the work of Gordon, suggests that the influence of Spanish political organization, economic activity, and religious practice--seen in the material culture in the form of ceramics, lithics, and metal and through the ethnohistoric and ethnographic record--was extremely limited into the terminal 19<sup>th</sup> Century. In other areas of the Araucania, including those closer to the Bio Bio frontier, Spanish material culture and some social practices may have been incorporated more, particularly in the 18<sup>th</sup> and 19<sup>th</sup> Centuries (Berger 2006). Though the signatures are somewhat different, the overall archaeological, ethnographic, and historical record indicates that the both areas were part of an overall Araucanian resilience cycle that was likely maintained from at least AD 300--seen in an increase in sedentism, agriculture, and the introduction of ceramics, and later religious practices and places--to the late 1800's.

The present research argues that the Araucanians at Santa Sylvania, probably in

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6 These large-scale and small-scale cycles are known as “Panarchy” (Gunderson and Holling 2004) and will be explored in Chapter 5.



ways similar to actors in other areas of the Araucania, maintained autonomy through the ability of local actors to strategically utilize the existing culture system to incorporate outside disturbance, while strengthening traditional practices and creating new ones, a “synthesis in time of reproduction and variation” (Sahlins 1985). In large part, this is due to the flexibility of the structures of Araucanian culture as a whole, which allowed for functional re-structuring and opposition to colonization, or anti-colonialism (Dillehay 2007:82), explored below. Perhaps more importantly, ideology played an essential role in both the creation of Araucanian identity as well as the perpetuation of the Araucanian culture system. Numerous writers and researchers (Arias 1984[1650]; Ercilla 2003[1569]; Rosales 1989[1674]; see also Bengoa 2000; Boccara 2007; Dillehay 2002, 2007) point to the Araucanians creating what can be termed an “anti-colonial identity” (Lomba 2005) which seems to have pervaded most aspects of Araucanian society. Seen by many outsiders as *indomito* (indomitable), this ideology went beyond culture towards an “*Araucanian cause*” (Dillehay 2007:386, emphasis his). This “cause” appears to have emphasized continued independence, avoidance of hybridized practices, and maintenance of traditional practices, born out in the explicit actions of Araucanian actors.

Timing was also important, as direct, offensive confrontation with the Spanish occurred within three years of Spanish-initiated settlements south of the Bio Bio River (Valdivia 1929[1552]; Vivar 1979 [1558]). These tensions and military confrontations remained basically continuous for the next 50 years (see Villalobos 1985), until the Spanish were fully removed from south of the Bio Bio (Abreu y Bastidias 1740; Bengoa 2003). Unlike most indigenous groups in the Americas, the Araucanians in Pucón-Villarrica and elsewhere acted quickly and effectively from the outset of contact (if not before, initiated by Inka expansion), utilizing existing cultural systems and structures to repel the invaders. Essential to this are the actions of Araucanian individuals, particularly the dispersed nature of Araucanian leadership and authority (see Chapter 2) and communities to protect and defend their ancestral lands, cultural system, and liberties,

as well as to eschew those aspects of European material culture they did not wish to incorporate into the system (Arias de Saavedra 1984[1650]; Ercilla 2003[1569]; Marimán et al. 2006; Nuñez de Pineda 2001[1673]; Vivar 1979[1558]).

This research will demonstrate the utility of RT for analyzing the long-term processes that go into developing and maintaining political, economic, religious, and social controls in a culture system and the various stages or phases through which a system can pass while confronting outside disturbance. In this case, it is the hypothesized ability of the Araucanians at Santa Sylvia to successfully reject the Spanish while preserving traditional cultural patterns and practices with limited systemic changes, similar to what is seen in other Araucanian areas (Dillehay 2007). Again, this research emphasizes long-term and interdisciplinary analyses, which employ the archaeological, ethnohistoric, and ethnographic records. By looking at a broader picture of cultural development and change, researchers can better understand the myriad processes and effects of cultivating and retaining cultural systems or, conversely, how systems may experience dramatic changes and how those changes affect the individuals and communities that make up the system. RT, as compared to other theoretical orientations, provides a flexible framework that includes can include concepts of identity and agency through a long-term perspective that includes archaeological, ethnographic, and historic information. The Araucanians represent an important and under-utilized example of a cultural system that effectively conserved integrity while confronting external disturbance (Marimán et al. 2006).

More broadly, the Araucanian example can speak to wider issues of colonialism, agency, identity, ethnicity, power relations, and other topics of interest to societies worldwide. How can native groups successfully protect their own culture while confronting the “disturbance” of increased globalization? Why do some nations resist outside influences in particular ways, and how does that resistance affect their culture system? What role do agents play in developing and maintaining identities, both

individual and ethnic? How can individuals and communities navigate shifting power relationships and maintain autonomy? The Araucanian example has the potential to suggest answers to these and other questions important to researchers worldwide.

### **Organization of this Research**

The following research is divided into three sections. Chapters 2 through 6 provide the theoretical and methodological background to the research. Chapter 2 presents the anthropological and historic background of the Araucanian culture system and its political, economic, social, and ideological structures. Terms and concepts that appear throughout this work are defined and elaborated upon in this chapter. Chapter 3 is an overview of the research on colonialism, anticolonialism, culture contact, and related discussions, especially pertaining to Spanish efforts in the Americas in general and Chile in particular, as seen through the material record at Santa Sylvania. Studies of colonialism have cast light on concepts of identity, ethnicity, and agency, which are important aspects of the Araucanian case and are explored in Chapter 4. How individuals view themselves, how they view others, and how they act upon that knowledge and understanding underlies a culture's to successfully be resilient to the disturbances of colonialism. RT is then discussed more fully in Chapter 5, including further elucidation of RC, Panarchy, and a discussion on "stability domains". Finalizing the first section, Chapter 6 describes the overall methodology used in the archaeological, ethnographic, and ethnohistoric aspects of this project, including excavations at Santa Sylvania and how the recovered materials are seen through RT.

Chapters 7 through 9 provide the archaeological, ethnographic, and ethnohistoric research conducted at the site of Santa Sylvania. Chapter 7 outlines the geographical and geological background of the area surrounding Santa Sylvania, as well as a summary of previous work of Gordon from 1987 to 1992. Excavations and research in the area

conducted by the author since 2006 are described in Chapter 8, including in-depth excavations at Santa Sylvania that indicate four distinct occupation episodes from early pre-Hispanic times (ca. AD 900) to the late 19<sup>th</sup> Century (ca. AD 1850). These occupations suggest conservation, release, and rebound phases of Araucanian resilience, which are discussed within the context of RT and the ARC at the end of the chapter. Chapter 9 presents the analysis of the cultural materials recovered during excavations at Santa Sylvania and their interpretation within the larger context of Araucanian identity, agency, and resilience at Santa Sylvania with linkages to the wider Araucania, again through the interpretive lens of RT.

Chapters 10 through 13 summarize the archaeological and ethnohistoric background to the Araucanians in south-central Chile generally and how Santa Sylvania fits into the broader Araucanian narrative, based on available historical information, previous archaeological research in southern Chile, and the data presented in the previous chapters. Chapter 10 explores the first growth and conservation phases of Araucanian culture from the late Pleistocene (ca. 12,500 BC) into the Archaic (7000 BC to AD 300) periods. It tracks the suggested shift to sedentism, agriculture, and pastoralism beginning around AD 300. Included is the hypothetical development of “proto-Araucanian” culture (Dillehay 2007) beginning around AD 1100 at Santa Sylvania and in the wider Araucania. Chapter 11 offers an overview and commentary/criticism of the historical, ethnographic, and archaeological sources to date, from which most treatments of the Araucanians derive. Chapter 12 examines the continuing ARC phases, including conservation, release, and reorganization (rebound and exit): first, the arrival and influence of the Inka Empire around 1475, followed by the arrival of the Spanish in 1536, the construction of Santa Sylvania around 1580, and the major offensives by the Araucanians (which are identified as release phases, or the phase of tension buildup that led to the offensives), leading to Spanish expulsion from the site and the rest of the Araucania by 1602.

Chapter 13 describes the frontier society established along the Bio Bio River

in the mid-17<sup>th</sup> Century, the general state of tensions, sporadic fighting, and infrequent voyages by Spanish travels to the area around Santa Sylvania. This period was a general detente between the Araucanians and Spanish into the 18<sup>th</sup> Century and to Chilean independence in 1820. This, argued in Chapter 13, corresponds to a conservation phase at Santa Sylvania and the wider Araucania. Following attrition along the Bio Bio frontier, the Araucanians, by this time calling themselves Mapuche, eventually capitulated to the Chilean state around 1885, and subsequently reorganized into a new RC that remains today. Chapter 14 is a synthesis of the archaeological, ethnographic, and ethnohistoric research presented in this work into Araucanian cultural development over time at Santa Sylvania and in Pucón-Villarrica. Included is a reiteration of the relationships between Santa Sylvania and other areas in the Araucania, and the applicability to similar investigations into colonialism, culture contact, resilience, and resistance elsewhere in Chile and the Americas. Finally, seven (7) appendices include the analysis of pollen phytolith, and starch from recovered groundstone (Appendix A); carpological analysis from float samples (Appendix B); raw chemical obsidian data (Appendix C); site maps (Appendix D); feature descriptions (Appendix E); raw ceramic data (Appendix F); and raw lithic data (Appendix G).

### **Importance**

This investigation is relevant because it will introduce a unique and understudied case of cultural resilience into discussions of colonialism, post-colonialism, and culture contact (Cusick 1998; Loomba 2005; Memmi 2000; Rice 1998; Rogers 2005; Stein 2005). As noted above, the majority of the discussions on these topics deal with groups that succumbed to colonial forces-- whether politically, economically, socially, ideologically, or a combination—and were unable to resist outside forces and influences, or who had their culture patterns irrevocably transformed by colonization (Thomas

1991; Stern 1987). This is an important area of research that should provoke discussion and further investigation into why the Araucanians at Santa Sylvania and elsewhere in the Araucania succeeded for so long while other groups in the Americas were less successful in resisting European incursion into ancestral lands. The Araucanians also maintained traditional social patterns and organization, only incorporating or intentionally adopting that which was perceived as useful. The uniqueness of the Araucanian example is not that they resisted, but the *timing* and *context* of that resistance, and the nature of the changes to their culture and territorial expansion. This research will explore how the Araucanian culture system developed at Santa Sylvania, how it was maintained, magnified, and augmented during interactions with the Spanish. More broadly, this research will explore what it means for the Mapuche living in the area today as well as elsewhere in the Araucania, and what it has the potential to offer other indigenous groups who are dealing with their own issues of identity and ethnicity.

This research will also provide an examination of Araucanian identity, agency, resilience, and social development in the region of Santa Sylvania before, during, and after the Spanish arrival in the mid-16<sup>th</sup> Century. The development of these patterns may be applied elsewhere in the Araucania. Recent legislation has reinforced the importance of understanding indigenous history (Estrada 2008a, 2008b), particularly of the Araucanians since modern identity is constantly redefined by governments of Chile and Argentina and the Mapuche themselves (Dillehay 2007; Haughney 2006; Ray 2007; Saavedra 2006). Dillehay's research (2007) suggests that Araucanian culture developed much earlier than previously indicated by historians and lawmakers, perhaps by AD 1200, instead of happening as a result of Spanish arrival and interaction (cf. Boccardo 1997, 2008). This project will contribute a study of the long-term processes and stages through which Araucanian culture, identity, and agency developed at Santa Sylvania, with some comparison to other Araucanian areas. This can help researchers and public officials (Araucanian, Chilean, and Argentinian) better understand Araucanian history and culture

in particular and Argentina and Chile in general. Again, the unique nature of Santa Sylvania coupled with the larger Araucanian ethnographic and ethnohistoric context offers the opportunity to see how the Araucanian culture system changed through time, from before the arrival of the Spanish, during Araucanian and Spanish interaction, after the Spanish expulsion, and to the present day. This will allow researchers and others to see how and why the local culture survived, with some changes, in the face of repeated conflict and colonization attempts, and how this affects modern indigenous and nation-state societies.



Figure 7: View of Villarricao Volcano from Santa Sylvania, looking southwest.

## CHAPTER 2

### ETHNOGRAPHIC AND ETHNOHISTORIC PERSPECTIVES ON THE ARAUCANIANS OF SANTA SYLVIA AND THE WIDER ARAUCANIA

This chapter presents a brief introduction to the Araucanians at Santa Sylvia and the surrounding Araucania, emphasizing their social, political, and economic organization and religious practice. Many of the terms describing leadership and household activity appear throughout the following chapters, and in most cases native *Mapudungun* words rather than Spanish or English equivalents are used. Much of this is derived from ethnographic research from other areas of south-central Chile as only a limited amount of work has been done thus far in the region surrounding Santa Sylvia (Aldunate 1996; Bacigalupo 2010; Cooper 1943; Course 2010; Dillehay 2010; Faron 1964, 1986; Foerster 1993; Hernández 2003; Ray 2007; A. Saavedra 2002, 2006; Stuchlik 1976; Titiev 1951). Relationships noted between geographically separated Araucanian communities in both the historical and ethnographic records (R. Quiroga 1577 in Medina 1962; Quiñenao<sup>1</sup>, personal communication, 2010), do not suggest major differences in structures between Araucanians and around Santa Sylvia and elsewhere in the Araucania. The material record, including ritual spaces (*kuel* and *nguillatun*; see below), ceramic styles (Pitrén, El Vergel and Valdivia styles), house construction (*ruka*) and settlement patterns also indicate continuity between Araucanian communities in south-central Chile and western Argentina (Beron 2006; Dillehay 2010; Gordon 2011; Mera and Harcha 1999; Mera et al. 2004). Thus, without any contradictory evidence, the ethnographic record produced elsewhere in the Araucania applies to the Araucanians at Santa Sylvia for information about their culture system's traditional structures. It may also be projected backwards into the archaeological record (Ascher 1961; Peregrine 2001).

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<sup>1</sup> Rosita Quiñenao is the current (as of 2012) *lonko*, or chief of Pucón, presiding over a *rehue* of 24 families in the area.



As with every culture, the Araucanians at Santa Sylvia developed over centuries. Below is an outline of the possible composition of Araucanian culture at first Spanish contact. These organizations and structures remain in general to the present day, though with some reorganization and restructuring. Dillehay (2007) suggests that “proto-Araucanian” culture likely arose around AD 1000, and by AD 1550 had developed into what might be recognized as Araucanian culture “proper,” which continued to evolve. This research diverges from Boccara (1999, 2007) and others (Goicivich 2006; Silva 2004) who posit that the ethnogenesis of the modern Mapuche happened in the 18<sup>th</sup> Century *because* of the arrival of the Spanish. This research hypothesizes that Araucanian/Mapuche culture is the result of many centuries of development and evolution (see Chapter 10). The archaeological record at Santa Sylvia and in other areas indicates that Araucanian culture was well-established by European arrival in the mid-16<sup>th</sup> Century, and that the reorganization and restructuring that occurred in subsequent centuries is not the genesis of a new culture, but rather another phase in cultural development built upon the structures already in place.

### **The Araucanians**

To begin, the term “Araucanian” refers to the genetically and linguistically interrelated indigenous communities that inhabited central and south-central Chile and western Argentinian Patagonia before the Spanish arrived (Boccara 2007; Cooper 1944; Dillehay 2007; G. Sánchez 2007; Zavala 2008). These communities, referred to in historical texts, included the northern *Picunche* (“people of the north,” often called *Promocaes*) who lived north of the Bio Bio River, *Pehuenche* (“people of the pine”) who lived in and around the Andes Mountains in both Chile and Argentina, *Huilliche* (“people of the south”) who lived south of the Rio Bueno, and later *Tehuelche* (“people of the east”) who lived in Patagonia (Figure 8; Ramirez 1999; Silva 1990; Silva and



Figure 8: Map of southern cone of South America showing Araucanian-related Che groups. From K. Jones 1999.

Tellez 1993; Villalobos 1989)<sup>2</sup>. Evidence suggests that these groups all spoke the Mapudungun language, likely with some regional dialects, and shared the same general material culture with limited regional variation (Boccaro 2007; Zavala 2008). Many of the above names are derived from Spanish *cronistas*, and subsequent historians have built upon the perceived differences outlined in historical texts with limited archaeological or ethnographic information (Boccaro 1996, 1999, 2008; Silva 2005; Silva and Tellez 1993; Tellez 2004; Villalobos 1989). Without evidence to the contrary, this research aligns with the position of Faron (1962:1163):

Some writers have taken these geographico-directional classifications to mean that fixed political and ethnic divisions existed among the pre-reservation Mapuche. There seems no good evidence in the literature in support of this conclusion. Rather, these are clearly relative terms by which all Mapuche are able to orient themselves and sort out blocks of other Mapuche if necessary.

As shown below and by others (Dillehay 2007; G. Sánchez 2007) spatiality and geographic orientation was and continues to be important for Araucanian communities. These names (e.g. *Picunche*, *Pehuenche*, *Huilliche*, *Tehuelche*) likely were used and recorded by the Spanish as specific ethnic identifiers based on the position of the interlocutors, i.e. speaking as an individual living near Arauco or Purén, and identifying groups based on compass directions. Most pre-Hispanic communities may have considered themselves “Araucanian” or *Reche* (“true people”; Boccaro 1999) at least until the mid-18<sup>th</sup> Century when the Araucanians began using the name “Mapuche” to refer to themselves and their relations (Bengoa 2000; Boccaro 2007; Zavala 2008).

Geographically, Mapudungun-speaking peoples ranged throughout central and south-central Chile (see Figure 1). The northernmost extent of what may be termed the *Picunche* was north of the Maipó River and south to the Itata or Bio Bio Rivers. These

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<sup>2</sup> Notably, there is no *-che* related name for the communities who lived in the Spanish-defined Araucanian “Estado,” likely due to this being the area of activity of most *cronistas*.

northern communities likely allied and interacted with those to the south, and drew upon relationship networks when the Inka arrived in the 15<sup>th</sup> Century for warriors and defense (see Chapter 12). Dillehay (2007) differentiates between the “northern Araucanians,” which include the *Picunche* communities north of the Bio Bio River, and the “southern Araucanians,” including those communities south of the Bio Bio or in the traditional “Araucania.” Evidence indicates that many northern Araucanians may have fled south of the Bio Bio and were incorporated into communities in the Araucania, or became subjected to the Spanish in the mid-16<sup>th</sup> Century (Bengoa 2000; Rosales 1989 [1674]; Sauer and Dillehay 2012). In either case, historians have argued that most *Picunche* assimilated or mixed into colonial society early in the Spanish colonization of Chile (Goicovich 2007; Silva 2002; Villalobos 1989).

The area between the Bio Bio and Toltén Rivers has been termed the Araucanian “heartland,” or what this research considers a “socio-geographic region” (Jones 1997; Parmenter 2010; see Chapter 4). The region is composed of the highest concentrations of Araucanian populations both prehistoric and historic times who resisted<sup>3</sup> the Spanish and Chileans via direct confrontation for the longest time (Aldunate 1989; Bengoa 2000, 2004; Dillehay 1990, 2007; Zavala and Dillehay 2010). The largest Araucanian communities and principal Spanish settlement attempts occurred between the Bio Bio River in the north and the Bueno River (near modern-day Valdivia) in the south. The Huilliche lived from the Bueno River south to Reloncaví Bay, and may have extended even farther south among the Chiloe islands (Aldunate 1989; Boccara 2008; K. Jones 1999)

Today there is some debate over what the Araucanians called themselves in the past (Boccara 1999, 2008; G. Sánchez 2007; Zavala 2008). Most scholarly work before about 1990 refers to these groups as “Araucanian” or sometimes “Mapuche,”

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3 The southern Araucanians may have also resisted the Inka, or sent warriors to aid their northern relations in their efforts, but this is an area that requires further study (see Dillehay 2007; Dillehay and Gordon 1998; Sauer and Dillehay 2012).

the name by which they began calling themselves in the 18<sup>th</sup> Century (see Chapter 13). Zavala (2008) indicates that the terms “Araucanian” and “Mapuche” were first utilized in the historical and ethnographic literature in the late 19<sup>th</sup> Century, though Molina (2000[1795]) may have first disseminated the term “Araucanian” in the late 18<sup>th</sup> Century. Boccara (1996, 1999, 2007) has argued extensively that the different communities may have referred to themselves as *Reche* (“true people”) before Mapuche, though there is limited ethnographic support for this position (see Faron 1962; Sanchez 2007). Today, for political purposes, many governmental and non-governmental organizations, as well as some Mapuche themselves, use the term *pueblos originarios* (“first people”) when referring to the Mapuche and other indigenous groups in Chile (Boccara and Bolados 2008; Haughney 2003). As noted in the Introduction, this research utilizes the term “Araucanian” to simplify presentation of the material.

### *Social Organization and Settlement Patterns*

The distributed nature of Araucanian settlement patterns and social organization, seen generally in the Araucania and at Santa Sylvia, is one of their most striking features. This was first noted by the early Spanish *cronistas*<sup>4</sup> (Nuñez 2001[1673]; Ovalle 2003[1646]; J. Quiroga 1979[1677]; Rosales 1989[1674]; Vivar 1979[1558]) as well as later anthropologists (Cooper 1946; Dillehay 1991, 2007; Faron 1986; Latcham 1924; Saavedra 2006; Titiev 1951). Titiev (1949:3) states that “[there] are no streets, no central plaza, no stores or public buildings, in short, nothing that suggests the spatial arrangement of a village or town.” Jeronimo de Quiroga (1979[1677]), a Spanish soldier writing in the late 17<sup>th</sup> Century, noted that the Araucanians generally lived “distant from each other” in the various river valleys of south-central Chile. However, Quiroga and Pedro de Valdivia

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4 It should be noted at the outset that (and has been illustrated by other anthropologists; Cooper 1946; Dillehay 2007; Titiev 1951) many of the Araucanian terms for social and political organization vary widely amongst each *cronista*, sometimes contradictory and confusing in their employment. For the present purposes, this research uses the terms as most widely accepted today.

(1929 [1550]) both indicate that before the arrival of the Spanish Araucanian settlements may have been more nucleated (see also Bengoa 2003; Dillehay 1990, 2007). Settlements were found on hilltops or in areas with views of neighboring habitations, and close to water sources and arable farmland (Bengoa 2003; Cooper 1946; Gonzalez 1889; Rosales 1989[1674]). Archaeological surveys done in Purén-Lumaco and around Santa Sylvia support this pattern (Dillehay 2007; Dillehay and Saavedra 2010).

These settlements were divided into several spatial and organizational levels. The most basic level was the patrilocal and patrilineal nuclear family, which included a man, his wives, and children known as *ruka*, which is also the name given to an individual house (Boccaro 1997; see Figure 9). The extended family living in the same general area was known as *lof* (or perhaps *levo* in some of the chronicles; see Cooper 1946; Mariño 1865 [1595]), and the semi-nucleation of their houses, the closest thing that could be considered a village or hamlet, was known as *lofche* (Titiev 1951). *Lof* (sometimes spelled *lov* or *lob*) would be headed by a *lonko*, a man who was generally older, respected and often wealthy (see below for more on *lonko*; Cooper 1946; Titiev 1951). Several *lof* related through a common ancestor or ceremonial space, or who were related through wife exchange and trade networks were known as a *regua*<sup>5</sup> (Cooper 1946; Dillehay 2007; Nuñez 2001[1673]; Ovalle 2003[1646]). In pre-Hispanic times, the *lof* and *regua* appear to have been the central focal points of social organization or recognition of neighbors and relationships (Bengoa 2003; Titiev 1951).

Nine *regua*, “allied geopolitically and religiously” (Dillehay 2007:116) composed the next level of organization, known as *ayllarehue* (Cooper 1946; Latcham 1924; Zavala 2008). Though likely pre-dating the arrival of the Spanish<sup>6</sup>, the *ayllarehue* organization became more important in the 16<sup>th</sup> to 19<sup>th</sup> Centuries as a way for military leaders to

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5 As Dillehay (2007:116) points out, the term *rehue* had several different connotations and uses, and were often confused or used interchangeably by *cronistas* and anthropologists.

6 It is possible that the Inka or some other northern Andean Quechua-speaking group influenced the creation of the *ayllarehue* organizational unit. The prefix *aylla-* is similar to the term *allyu*, which refers to a community related through lineage that would come together in common defense, trade, etc (Zuidema 1977; see also Dillehay 2007:24).

draw upon warriors from various *lof* and *regua* throughout Araucanian territory (Bengoa 2003, 2004; Dillehay 2007; Latcham 1924; Padden 1996; Zavala 2008). Above the *ayllarehue* was the *butanmapu*, which divided Araucanian territory longitudinally (Figure 10). Initially composed of three regions encompassing the coast, the central valley, and the western Andean foothills, *butanmapu* later incorporated the Argentinian Patagonia (Dillehay 2007; Molina 2000; Nuñez 2001; Titiev 1951). Some historians (Goicovich



Figure 9: Traditional *ruka* constructed of wood and thatch, located near Pucón

2006; Silva 2001, 2005; Silva and Tellez 2001) have argued that the *butanmapu* was created at the arrival of the Spanish or in the early 17<sup>th</sup> Century as an organizational schema to confront the invaders (Goicovich 2006; Zavala 2008).

These geopolitical and social organizations were based in the household unit. The Araucanians were and continue to be patrilineal and patrilocal, determining descent and inheritance based on the father's bloodline (Faron 1956; 1986; Titiev 1951). Faron (1961)

suggested that the Araucanians may have been at one time matrilocal and matrilineal, but over time patrilocality and patrilineage began to dominate. Incest was strictly taboo, and wives were acquired from outside the *lof*, through purchase, trade, or raiding (Cooper 1946). Exogamy also increased kin ties throughout the Araucania, strengthening *regua* and *ayllarehue* relationships. These relationships were further strengthened in ceremonial events and trade activities (Faron 1986).

Houses, known as *ruka* (Figure 9), were built of thatch around a wood or cane framework of varying sizes. They were generally oval, often with multiple doorways depending on the owner's eminence and the number of wives (Cooper 1946; Joseph 2006; Mariño de Lovera 1865; Valdivia 1929). Dillehay (1990) posits that these *ruka* settlements could be quite mobile, their movements coinciding with hunting or gathering activities or changes in social leadership. Depending on its size, the *ruka* could house numerous individuals (Sors 1921, cited in Cooper 1946), though inhabitants were generally limited to the owner, his wives and children (Joseph 2006; Titiev 1951). In some cases, each wife had her own entrance to the *ruka*, as well as a separate firepit and exterior area for keeping animals (Boccarda 1999). Excavations at Santa Sylvia may suggest the presence of at least three firepits within or near a possible *ruka*, as well as an exterior animal pen (see Chapter 8). As noted above, *ruka* and the larger *lofche* settlements were built in fertile areas close access to water and arable land, often on hills or above rivers in areas that afforded clear views of possible enemies and lines of sight to other *ruka* (Cooper 1946).

### *Political Organization*

The heterarchical nature of its political organization possibly aided in Araucanian cultural resilience. A heterarchy, as defined by Crumley (1995) is "...the relation of elements to one another when they are unranked or when they possess the potential for being ranked in a number of different ways." In other words, a "diffused but



complementary corporate leadership” wherein “power was not unified in any one person, lineage or religious or political institution but heterarchically structured in different local and regional settings whereby one or more categorical leaders dominated over others whether it be in a ritual, battle or political setting” (Dillehay 2007 339, 342). In a heterarchy, leaders function at different times and places based on the cultural system and structures, though coordination can and does occur. Evidence suggests that this was the case with the Araucanians (Dillehay 2007). Importantly, these leaders’ authority was based on their skills and abilities and through the consent of members in their particular lineage, as in the case of political and military leaders, or in their skills in healing and ancestor propitiation in the case of religious leaders. Thus power and authority was disbursed, not residing in any one individual or specific *lof* or *regua*. This vexed the Spanish, who were used to dealing with leadership that spoke for communities or whole groups.

Araucanian political organization was centered in the *lof* or *regua*, led by *lonko*<sup>7</sup> (chiefs, called *caciques* by the Spanish; Ovalle 2003[1646]; Rosales 1989[1674]; Valdivia 1929[1550]; Vivar 1979[1558]). The position of *lonko* was usually hereditary, but as noted above authority of the *lonko* was earned, not generally assumed or given (Titiev 1951). *Lonko* and similar leaders such as *toqui* (see below) relied on skills in forging alliances, wealth distribution at reunions such as *cahuin* and *nguillatun*, as well as rhetoric. Wealthy individuals, known as *ülmen*, also had positions of power and prestige, comparable with but not equal to *lonko*. *Ülmen* could become *lonko* through skill and alliance-forging, particularly if a *lonko* was too young or considered unable to perform his responsibilities (Cooper 1946).

In times of war, noted by the Spanish in the 16<sup>th</sup> Century, numerous related *lonko* (likely within *regua* or *ayllarehue*) would come together in *cahuin* (or “council”), to

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7 Boccara (1999, 2007) argues for the term *ülmen* in place of *lonko* to define these hereditary kin-group leaders. Dillehay (2007) argues that *ülmen* and *lonko* may have been interchanged by the Spanish, though *ülmen* generally refers to a wealthy, respected individual and *lonko* to the chief. Today in Pucón, the hereditary leader, Rosita Quiñanao, is called a *lonko*.

discuss tactics and to elect *toqui* war leaders (Ercilla 2003[1569]). These *toqui*, similar to generals today, recruited warriors, planned strategies, and directed the course of battle (Alvarado 1996). Like *lonko*, *toqui* relied on rhetorical skill and their ability in battle to conserve their position as *toqui*, which even then could be tenuous if their warriors so decided<sup>8</sup>. According to Ercilla (2003[1569]), *toqui* were elected based on reputation and through feats of strength. Upon election a *toqui* was given a *toquikura*, a stone axe worn around the neck as a symbol of position (Rosales 1989[1674]). Gordon recovered several fragments of possible *toquikura* at Santa Sylvia (Gordon 2011). When they “retired” from war, *toqui* generally returned to being *lonko* or *ülmen* with no greater authority than before, though with increased prestige. Prior to the Spanish, it is possible that *toqui* directed small-scale intercommunity or interregional fighting (Alvarado 1996). To combat the Spanish, the *toqui* authority may have increased to draw upon fighting forces throughout south-central Chile in the 17<sup>th</sup> and 18<sup>th</sup> Centuries through *ayllarehue* and *butanmapu*, some *toqui* perhaps presiding over the different *butanmapus* (Molina 2000). This is seen in the various direct Araucanian offenses against the Spanish, which were often directed overall by at least two *toqui*, one of whom seems to have had supreme authority (known as *gentoqui*; Ercilla 2003[1569]; see also Chapter 12).

In addition to their war leader positions, *toqui* often acted as a bridge between the religious and political spheres (Dillehay 2007). In the heterarchy of Araucanian society, the *toqui* could serve as a mediator amongst *lonko* and religious leaders to gain support and recruit warriors. *Toqui* and *lonko* also worked to incorporate refugee, displaced, and fragmented Araucanian populations, particularly those that fled from areas north of the Bio Bio River. Research indicates that these displaced groups were incorporated into more stable, functioning *regua* and *ayllarehue* (ibid).

#### *Economic Organization*

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<sup>8</sup> Such as in the case of Lautaro, whose warriors essentially rebelled against marching on Santiago, forcing a retreat back south. See Chapter 12 for more on that episode.

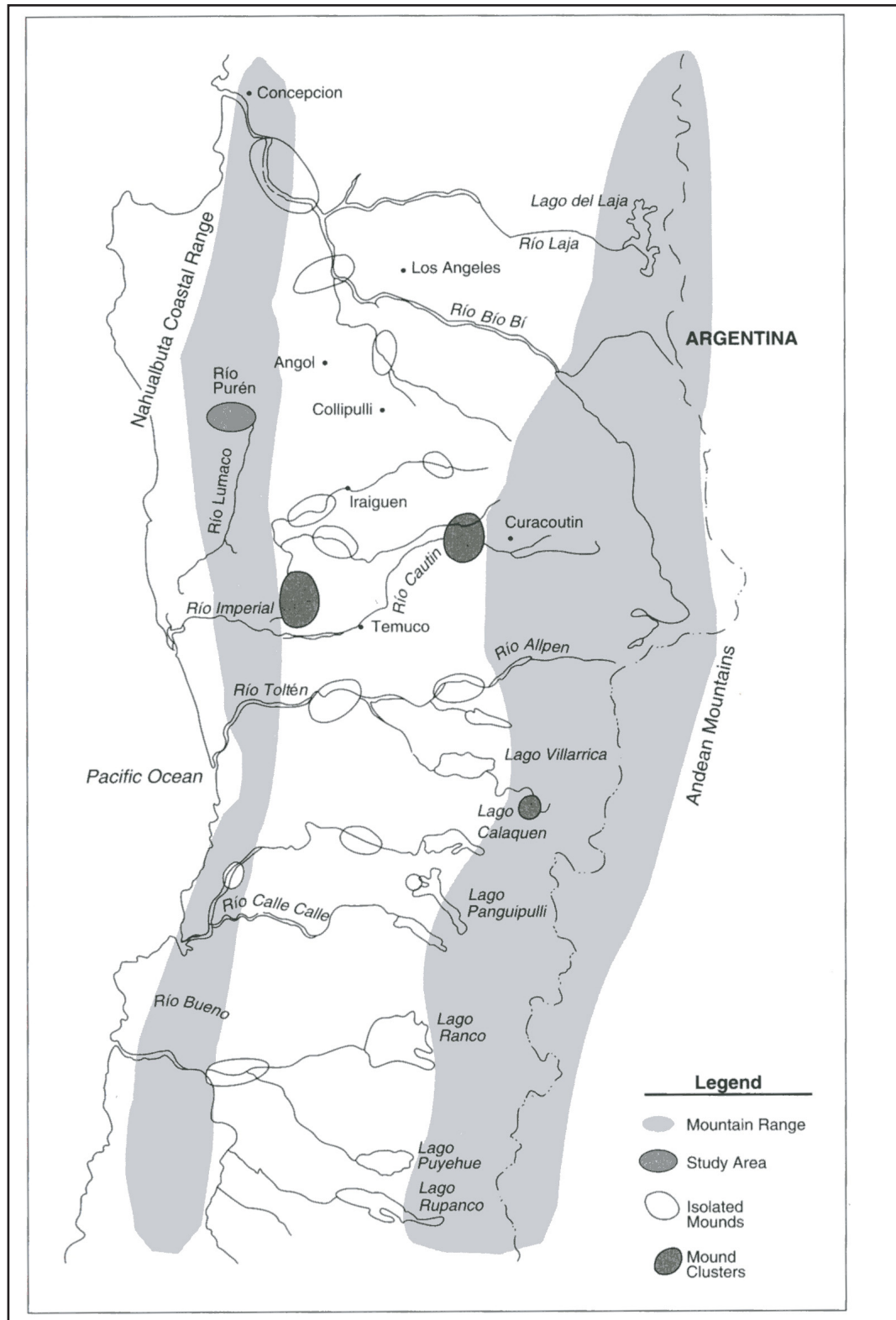


Figure 10: Map showing three of the four butanmapu: coastal, central valley, and Andes. A fourth was added later to encompass the Argentinian Pampa. From Dillehay 2007.

Economically, the Araucanians are considered subsistence-based sedentary agro-pastoralists. In pre-Hispanic times, from about AD 300 to 1500, they raised llamas and possibly chickens in some areas (Storey et al. 2007), fished in lakes and rivers, and grew maize, beans, quinoa, peppers and other plants. Agricultural activities appear to have started around AD 300 in various parts of the Araucania (Aldunate 1989; Bengoa 2004; Dillehay 2007; Nuñez 2001[1673]; A. Saavedra 2006; Valdivia 1929[1550]; Vivar 1979[1558]). Along the coast, communities hunted seals and gathered shellfish (Quiroz 2001), and gathered piñon seeds from the Araucaria tree in the Andes, from which the name “Araucanian” is derived (Aldunate 1989; Dillehay 1990; Faron 1986; Millalén 2006; Parentini 1996). Gathering of wild plants and hunting animals remained essential into the historic period (ca. AD 1550), particularly at Santa Sylvia and along the Andes. Recent and past excavations at Santa Sylvia revealed not only the use of maize from pre-Hispanic into Hispanic times as well as fishing in the local rivers and lakes, but also the continued exploitation of wild plants, such as strawberries and edible grasses (see Chapter 9 and Appendices A and B; Gordon 2011).

After the Spanish arrived in 1550, llama herding gave way to raising horses, sheep, cows, and pigs. Horses in particular became important both for mobility and as signs of prestige (Aldunate 1989; Bengoa 2004; Stuchlik 1976; Padden 1993). Gordon recovered horse and cow bones at Santa Sylvia, though in very limited quantities (Gordon 2011). The concept of individual land ownership was weak, each *lof* and/or *regua* generally claiming territorial rights to particular tracts of land for settlement, agriculture, and gathering. These rights would be passed down from father to sons (Cooper 1946), but the concept of ownership has changed over time, particularly along the later Bio Bio River frontier and into the modern era (see Chapter 13; Bengoa 2000, 2004). The reasons for these changes are due in large part to Chilean state efforts to privatize communally-held lands, especially in the late 1970’s and 1980’s (Millalén 2006).

Trade networks that likely stretched from the coast, and across the Andes into

the Argentinian Pampa and Patagonia were essential in Araucanian culture from early Pre-Hispanic times (Navarro and Pino 1999; Quiñanao, personal communication, 2010). Trade was often closely tied to religious activities, particularly *nguillatun* festivals. At these festivals, families from invited *lof* or *regua* came together to perform ceremonies, feast, trade goods and information, exchange wives, and strengthen ties. The Araucanians also engaged in *maloca*, raids to capture women and goods and to avenge wrongs perpetuated against allies (Nuñez 2001[1673]). Later *malocas* were used on the frontier and across the Chile-Argentina border, perhaps originating in the area around Santa Sylvia (Harcha and Castro 2000) as a form of “continuous war” against the Spanish (Berger 2006; Leon 1990). Berger (2006) argued that this “continuous war,” primarily via *maloca* along the frontier, was seen as mutually beneficial for the Araucanians and Spanish. Those living along the frontier took advantage of the resources sent by the viceroyalty in Santiago to protect the border (see also Berger 2001; Leon 2005).

### *Religion*

Of all the structures of the Araucanian cultural system, religious practice appears to have experienced the least influence or impact from the outside, at least through the last century (Faron 1964). These practices, developed in prior centuries, grew to transcendent importance amongst the Araucanians in the 15<sup>th</sup> and 16<sup>th</sup> Centuries --perpetuating memory, creating alliances, and protecting overall cultural integrity (Bacigalupo 2007; Dillehay 2007; Foerster 1993; Foerster and Gundermann 1996). Constructing the landscape through ritual mounds as well as sacred and ceremonial spaces was important in these practices. These constructions provided “reconstituted social meanings, genealogies, memories, compatriotism, and shared political identities” (Dillehay 2007:153). The constructed landscape was essential to creating Araucanian social and religious identity and affected all else, including trade relationships, power structures, and political organization.

Though Araucanian religion recognizes several different deities, practices centered more on ancestor propitiation and forces of nature (Foerster 1993). Latcham (1924) emphasized the importance of totemism, which Foerster (1993:49) explained as “the phenomenon from which a certain group of individuals, united by real or fictitious blood ties, derives their name. This is, at the same time, the distinct name of the group and, in the end, the mark, sign, or device collectively employed by the group to externalize their name.” For different *lof* and *regua*, these names were derived from a common ancestor, who may also be entombed in some areas, such as near Santa Sylvia and the Purén-Lumaco valley. These tombs are often specifically-named ritual mounds known as *kuel* (Dillehay 2007; Dillehay and Saavedra 2010; Faron 1964). Lineage markers can also be seen in the construction and placement of wooden statues known as *chemamull* (Figure 11), which function as lineage border markers and serve for spatial orientation. Constructing *kuel* (a process known as *kueltun*), was an important ceremony that brought together related lineages and invited allies, which aided in establishing spatial organization. Different *kuel*, known by name, became a way by which individuals and communities oriented themselves on the landscape and in relation to other communities (Dillehay 1995, 1999, 2007; Faron 1964; Foerster 1993). *Kuel* seem to have first been constructed around AD 1200 in the Purén-Lumaco valley and near Santa Sylvia, indicating some degree of connected pan-Araucanian religious practice between the two areas before Spanish arrival (Dillehay 2007; Dillehay and Saavedra 2010). Several *kuel* have been identified close to Santa Sylvia, though more investigation is needed on these mounds (Figure 12).

Though some important individuals could have been interred in *kuel*, most Araucanians were buried in cemeteries, often located on hills or in groves near *lof* lands (Cooper 1946). Individuals could interred in wooden coffins (ibid) or in large funerary urns (Bullock 1955; Gordon 1978) as part of the *awn* funerary rite. The *awn* also included inviting related communities, and over several days memorialized the deceased and



Figure 11: Wooden *chemamull* statues denoting lineage and territorial markers. From Dillehay 2007.



Figure 12: Map of *kuel* ritual mounds identified near Santa Sylvania.

helped the spirit to join the ancestors (Cooper 1944; Faron 1964, 1968; Foerster 1993).

Another important ceremony mentioned before is the *nguillatun*, which may be most closely defined as an annual or semi-annual fertility festival (Faron 1964; Foerster 1993). *Nguillatun* also served as venues for for *cahuin*, *parlamento*, or other ceremonial purposes (Dillehay 2007; Zavala 2005; Zavala and Dillehay 2010). For *nguillatun*, a lineage head *lonko* invited at least two other allied lineages to a ceremonial field (*lepún*, often with an associated *kuel*; see Figure 13), where the host and invitees performed rites, played games such as *chueca*, which is similar to field hockey, traded goods, exchanged wives, discussed events, and other activities (Foerster 1993; Titiev 1951). Within a few years, invited lineages were expected to reciprocate by hosting their own *nguillatun* (Dillehay 2007). Thus, alliances were forged amongst many lineages, which networks were used by *lonko* and *toqui* for the war against the Spanish and to maintain the Araucanian culture system. Like *kuel*, several *nguillatun* fields have been identified near Santa Sylvia, and a *nguillatun* was held as recently as December 2010 (Dillehay and Saavedra 2010; Quiñanao, personal communication, 2010).

Ritual specialists, who in the past may have been known as *boquibuye* and *nguillatufe* priests, presided over these and other rituals and would direct activities along with *machi* shamans (Faron 1964; Titiev 1951). In centuries since the arrival of the Spanish, *machi* seem to have taken over performing most religious practice (Bacigalupo 1996; 2007; Dillehay 2007). Generally female, *machi* also serve as healers of humans, *kuel*, and other ritual spaces, repositories of sacred and secular knowledge and oral histories, legal arbiters, and the counterpart to *lonko* (Bacigalupo 2010). If the authority of the *lonko* is seen as acting in the real, secular world and in daytime activities, the authority of *machi* encompasses the spiritual world and nighttime activities (Bacigalupo 2007; Cooper 1946; Dillehay 2007). According to Mapuche informants in Pucón, *machi* are born, not made, and thus the area around Pucón and Santa Sylvia currently (as of 2012) does not have a *machi*.



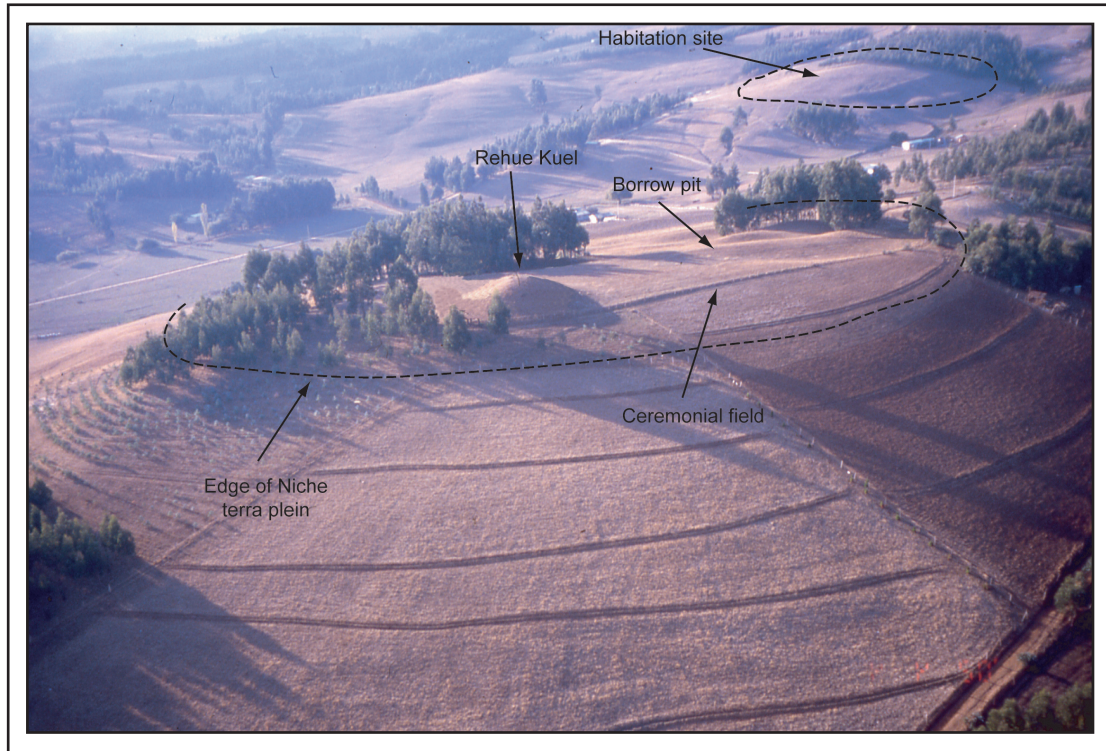


Figure 13: Layout of kuel and nguillatun-related ritual/activity spaces near Purén. From Dillehay 2007.

### Summary

Together, all of this outlines the basic organization of the Araucanian cultural system. As mentioned above, Dillehay (1992:387) describes Araucanian organization as “heterarchical peer groups” rather than a typical hierarchical chiefdom or other form of social organization. By diffusing power and authority, the Araucanian system appears to be more flexible than many other indigenous groups in the Americas. This research argues that the Araucanians were able to incorporate changes to their cultural system more fluidly, or adapt more quickly to the effects of outside stimuli, than many indigenous societies. As will be indicated in later chapters, the Araucanians at Santa Sylvia used these political, economic, social, and ideological structures to successfully adapt to and reject the Spanish incursion with only limited changes to those structures. The disbursed nature of authority and power among the Araucanians afforded actors such

as *toqui*, *lonko*, and *machi* the venues to intentionally modify these traditional structures, or use them to a particular advantage, in order to incorporate what was deemed useful from the Spanish, such as horses, cows, wheat, and barley. At the same time, these leaders acted to avoid other materials while maintaining the cultural system itself. As the centuries progressed, these leaders were also able to recruit and incorporate individuals from different *lof*, *regua*, and *ayllarehue* as well as refugees in their kin networks, thereby strengthening relationships across distances until most within the Araucania came to call themselves Mapuche (Boccaro 1997, 1999; Dillehay 2007; Millaman 2004).

## CHAPTER 3

### CULTURE CONTACT AND THE EXPANSION OF EMPIRE: SPANISH ATTEMPTS TO COLONIZE SOUTHERN CHILE

To say that the voyage of Christopher Columbus in 1492 “changed the world” may seem cliché, yet the impact of that voyage did and continues to affect the world, for both good and bad. Columbus did not “discover” the Americas, since humans have lived in both North and South America since the end of the Pleistocene more than 12,000 years ago (Dillehay 2000; Fagan 2003; Madsen 2010). Instead, Columbus brought the Americas to the attention of other European nation-states that were eager to gain territory and extract riches (Elliott 2009; Wolf 1998). At the same time, these European powers expanded into Africa, the Middle East, East Asia, and Australia in unprecedented waves. Increased capital from the Americas helped fuel colonial desires throughout the rest of the world (Loomba 2005; Paterson 2011). The eventual breakdown of colonial authority, particularly after World War II, has caused researchers, government officials, social organizations, and individuals to re-assess their understanding individual and group identities (Cooper 2005; Holland et al. 1998; S. Jones 2007; Shennan 1989)

Colonization as a human endeavor was nothing new. In fact, colonization can be seen as endemic to life in general and humans in particular (Gasco 2005; Loomba 2005). Since the first *Homo sapiens* migrated out of Africa, humans have gradually fanned out through every latitude, longitude, and climate (Scarre 2005). Sometimes these migrations went into areas where no people had been before, or often through direct, confrontation and appropriation of lands and territories traditionally inhabited by other groups (Hill 1998; Murray 2004; Stein 2004).

Because of these movements of people across the globe and throughout human history, no society exists in a vacuum. Contact happens and societies interact, regardless

of barriers or specific efforts to colonize (Wolf 1982). In other words, there is no “pristine” or “untouched” culture, one that has existed without some form of contact with a foreign group (Gosden 2004). Thus, as groups come into contact with one another, changes continuously happen among both cultures, though to varying degrees (Calloway 1997; Dobyns 1991; Gasco 2005; Memmi 1965; Silliman 2005). Resiliency, as seen through Resilience Theory, conditions these inevitable and transformative changes in groups, while looking to the stability from pre-existing or traditional cultural structures (Thompson and Turck 2009). Culture contact and colonization are often conflated, particularly when discussing the expansion of European nation-states since the 16<sup>th</sup> Century. As a heuristic, colonization should be treated as one form of culture contact. In other words, colonization comes with contact, while contact does not necessarily include colonization (Cusick 1998).

This chapter discusses colonialism and culture contact to place the occupations at Santa Sylvania in the wider context of the academic discourse surrounding colonialism and culture contact. Particular emphasis is given to Spanish efforts to colonize North and South America, the myriad effects of culture contact, and how these issues contribute to our understanding of identity, ethnicity, agency, power, and cultural resilience. Present and past research at Santa Sylvania has provided evidence for Spanish colonial efforts as well as cultural contact between the Spanish and Araucanians, and is thus subject to some of the questions and concerns of colonial and contact studies, though the Araucanians were not “colonized” until the late 19<sup>th</sup> Century

The nature of this study goes beyond culture contact. Contact studies are not, in the view presented here, theoretical orientations but broader topics for study within a narrower framework for understanding how cultures interact and develop. These interactions and the reactions to contact and colonization efforts affected Araucanian culture stability and influenced how the Araucanians successfully resisted the Spanish in the 16<sup>th</sup> and 17<sup>th</sup> Centuries. Though culture contact is a basic fact, it an important

discussion in order to place interactions between the Araucanians and Spanish in the 16<sup>th</sup>, 17<sup>th</sup>, and 18<sup>th</sup> Centuries at Santa Sylvania within broader discussions and comparisons. The hypothetical stability and resilience of the Araucanian cultural system can then be explored diachronically and synchronically as part of long-term developmental processes.

### **Colonialism**

“[Colonialism] can be defined as the conquest and control of other people’s lands and goods” (Loomba 2005:8). The interrelated studies of colonialism and culture contact (and sub-areas of study, including post-colonialism, anti-colonialism, etc.) developed largely from literary criticism in the 1950’s in the works of Fannon (1961), Cesaire (1955), and Memmi (1965). These writers were influential in the “liberation” movements that swept previously-colonized groups in North Africa, Southeast Asia and India beginning before World War II. These movements reached their height after 1945, though still influential today (Sartre 2006). Writers and orators described the “colonial experience” of individuals and groups that came under the direct political, economic, social, or ideological control of an outside, foreign power, usually from western European nations after AD 1492. This laid the foundation for later studies (Patterson 2008).

Though the topic had received limited discussion in the social sciences (Asad 1973; Crosby 1972; Horvath 1972; Lewis 1973), colonialism as a focus of study expanded after the publication of Said’s *Orientalism* in 1978. Said argued that “Western” officials and writers “exoticized” the peoples they met in the Middle East and east Asia, and by so doing created representations that had little to do with reality (Said 1978; Seed 1991). In essence, the “western” perceptions of these peoples affected how they were treated by colonial officials and led, directly or indirectly, to their own perceptions of self and cultural history. Said’s work influenced subsequent studies of colonialism and post-colonialism, particularly Spivak (1988) Chatterjee (1993), and Bhabha (1994). Their

analyses and criticisms also received influence from the works of social theorists such as Marx, Engels, Gramsci, and Foucault (Patterson 2008). These researchers and their intellectual descendants studied the effects of European colonialism from the perspective of the colonized and how previously-colonized peoples adapted to the “post-colonial” world. They also discussed how most, if not all, indigenous groups were marginalized or ignored in the “official” histories of colonization (Adorno 1993; Stern 1992). Many recent studies analyze how these groups resisted or rebelled against the colonizers, trying to protect and/or maintain previous cultural practices (Franklin and Pease 1994; Hoffman 1999; Katz 1988; Kicza 2003; Ortner 1995; Scott 1985, 1990; Silliman 2009; Stern 1987).

Generally, two lines of research developed over the last 30 years: colonialism, generally encompassing the events of European colonialism from 1492 to about 1950; and post-colonialism, the effects of the end of colonial domination from 1950 to the present (Barker et al. 1994; Cooper 2005; Liebmann and Rizvi 2008; Loomba 2005; Lydon and Rizvi 2010; Lyons and Papadopoulos 2002; Mignolo 1993; Spencer 1997). Many of these colonial or post-colonial studies examine societies colonized outside group (Boccaro 2002; Lydon and Rivzi 2010). Some have broadened the scope of colonialism to include the efforts of empires such as Rome (Dietler 2005; van Dommelen 1997, 2005). These later studies have pointed out that colonialism is not just the domain of European nation-states (Gosden 2004; Loomba 2005; Lyons and Papadopoulos 2002).

Colonialism, in general, is thus about intergroup relationships of power (Mann 1986a, 1986b; Wolf 1999). Restating the definition above, colonizers seek to control lands, goods, and services, which can be broken down to the transference of power from one group (indigenous) to another (foreign). Often, power is exerted over political and economic activities, such as the establishment of a colonial government or the imposition of capitalism onto native economies (Hall and Silliman 2006; Leone and Potter 1999). Power is also seen in the nature of the documentary record which tends to emphasize the

European over the native (Dillehay 2002).

For the Araucanians living at Santa Sylvia and the wider Araucania, the limited number of studies on the colonial era have tended to focus on the Spanish colonial perspective rather than indigenous culture. Many emphasize the primacy of the Spanish documentary record without including archaeological or ethnographic information (see Chapter 11; Dillehay 2002; Gonzalez 1986). Several interdisciplinary approaches have been attempted in recent years to bridge the gap between the archaeological and ethnohistoric records (Adán et al. 2007; Castro and Adán 2001; Dillehay 2007, 2010; Gordon 1975, 2011; Harcha and Vásquez 2000; Mera and Harcha 1999; Mera et al. 2004, 2006; Zavala 2008; Zavala and Dillehay 2010) but more work remains to be done.

It is important to remember that, in contrast with many older histories that treat the colonization of the Americas as an *a priori* conclusion, or as the inevitable domination of lands and peoples by the “superior” European civilizations (Prescott 2000 [1843]; Turner 1921; cf. Witgen 2012), colonization is a process (Gasco 2005), or give-and-take between colonizers and colonized. Spanish colonial efforts were not a monolithic enterprise wherein the methods employed for control were the same across the whole of the Spanish empire. Rather, local Spaniards had to develop their own ways of doing things, though within the strictures given by the Spanish crown (Lynch 1992; Restall 2003). In some cases, these modifications incorporated aspects of indigenous culture or worked as forms of negotiation between Spaniard and native (Rodríguez-Alegría 2005; Wernke 2011). Indigenous goods and practices also made their way back to Europe, part of what has been termed the “Columbian Exchange” (Crosby 1972). In confronting the Araucanians, the Spanish adopted some aspects of their culture such as clothes and food, indicating that the effects of contact were felt by both the Araucanians and Spanish, though to differing degrees (Berger 2001, 2006).

## Culture Contact

Avoiding the colonialism label, studies of culture contact have attempted to go beyond the one-sided nature of many colonial studies (Cusick 1998; Malinowski 1938; Paterson 2011). Culture contact research looks to the multiple forms of contact, which can include colonization, as well as the many ways in which natives and foreigners interacted and affected one another (Thomas 1989, 1990, 1991). Instead of being caught up in a methodology that treats colonization, resistance, and change as *a priori* inevitabilities, researchers have sought to understand the effects of contact at different scales (Murray 2004; Trigger 1980). These works have indicated that even within seemingly opposed groups (colonizer/colonized, indigenous/foreign, etc.) multiple strategies existed for mitigating the effects of contact (Murray 2004; Stein 2004). Some strategies were successful, many were not (Cusick 1998; Franklin and Pease 1994). The dichotomy of colonizer/colonized that has pervaded history, anthropology, archaeology, sociology, and other disciplines has given way to examining the myriad possibilities of interaction and exchange (Góngora 1998; Gosden 2004; Hildebrandt, 2004; Murray 2004; Paterson 2011). This may be due to a lack of consensus amongst researchers on how to interpret contact situations, including colonial events (Cooper 2004; Saunders 1998; Thomas 1989).

Each contact experience is different, though some general processes do occur. Contact forces groups to make definitions, usually “us” or “them.” For indigenous peoples, it can cause a re-evaluation of what it means to be a member of the group. This has led to discussions on the nature of identity and ethnicity, or what it means to “be native” (Brubaker 2004; Cooper 2005; Jenkins 2008). Loomba (2005:163) argues that in many cases these identities, particularly those she calls “anti-colonial,” are “shaped by a shared national past or a cultural essence which in turn becomes synonymous with a religious or racial identity.” Thus, the nature of culture contact often forces the issue of



identity creation or delineation as well as power relations.

This research is oriented by examples from both specific colonial studies as well as culture contact. It is a fact that what the Spanish attempted to do in at Santa Sylvania and south of the Bio Bio River in general was colonize but were unable to do so effectively for an extended period of time. Contact between persisted for several centuries, which is also a fact. Where, then, does the Araucanian example lie?

Gosden argues:

Dividing culture contact from colonialism is trickier. As there is no such thing as an isolated culture, all cultural forms are in contact with others. Culture contact is a basic human fact. Yet the nature of contacts between cultures varies enormously, and what differentiates colonialism from other aspects of contact are issues of power, which...is a differential power of material culture to galvanise and move people. Colonialism brings a new quality (or rather inequality) to human relations. (2004:5).

It is these relationships of power that are central to this study. Shifting relationships of power affect the development of particular cultures from both the inside and outside (Foucault 1978; Saunders 1998; Wolf 1999, 2001). These shifts then affect individual and group identity and agency. How individuals and the wider indigenous society react to outside force can partially determine how the culture or cultural system will continue, how individuals and groups will perceive themselves and their culture during contact situations and into the future, and how they will be perceived by outside groups (Loomba 2005).

In sum, the Araucanian example presented in this research straddles the line between colonialism-specific studies and wider contact studies. Both highlight the processes that go into interactions between cultures and the give-and-take between the groups in question. Contact studies can examine the multiple possibilities of interaction, incorporation, cooperation, and resistance that transpire in these situations. Colonization studies emphasize the differential power relationships that shift or are maintained as outside forces attempt control of indigenous peoples and territories. The Spanish efforts

at Santa Sylvia were colonial in nature, but because Spanish success appears limited in scope, incorporating aspects of general contact studies and help draw out the possibilities behind Araucanian success. This information can then be applied to broader examinations of both colonialism and contact worldwide.

### **Cultural Systems and Structures: Relationships of Power**

The processes behind modifications to cultural systems and shifts power relationships come in many forms. This research argues that four components or structures compose a cultural system: **political, economic, social, and ideological** (Dillehay 1981; Foucault 1977; Wolf 1999). **Political structures**<sup>1</sup> deal with issues of governmentality, from small egalitarian groups to large states and empires, how laws are enacted and enforced, decision-making at the group level, and other factors. **Economic structures** are those that direct how individuals and groups support themselves, including subsistence strategies, exchange/trade networks, and technology. **Social structures** comprise the settlement strategies, inter- and intra-group social organization, gender relationships, and hierarchy. **Ideological structures** compose religious activity and organization and individual and group perceptions of the group and outsiders. It is argued here that how these structures are maintained and controlled, and by who, affects the long-term resiliency of a cultural system.

Colonization-as-power (*sensu* Gosden), is the process whereby cultural systems experience shifts from autochthonous to heterochthonous control of the structures outlined above (Barker et al. 1994; Sartre 2006; Stern 1992). To say that a group has been colonized means that one or more of these structures come under the authority, or power of an outside group. The indigenous cultural system is thus changed from what it was prior contact and includes changes in power relations. For example, the Spanish managed

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<sup>1</sup> The following definitions are not expected to be all-encompassing or conclusive, but a general outline of the basic principles of these structures.

to exert political and economic authority over many of the indigenous societies between the southwestern United States and south-central Chile (Elliott 2009; Guy and Sheridan 2008; Thomas 1991). Though many facets of traditional cultures were maintained, such as some social organization or religious practice (Williams 1999), political and economic structures came under Spanish authority. These groups then experienced fundamental changes to their cultural system, making them similar to but distinct from what they were before.

This is not to say that power shifts are unavoidable or unwanted, or that resistance to the effects contact does not occur. As Rothschild (2003:3) points out, "...responses to invasion also held significant commonalities [among Native Americans], as they actively reorganized and altered European plans rather than passively acquiescing to them." How many indigenous groups reorganized and maintained aspects of traditional culture was not always done on their own terms. For example, the Puebloans in northern New Spain (present-day New Mexico), moved ceremonies to secret underground settings to protect the *Katsina* cult from the Spanish (Adams 1991; Knaut 1995; Kessell 1987; Silverberg 1994). This may be seen as an act of rebellion, or a way to protect pre-existing religious practice (Liebmann 2011). By so doing, however, the Puebloans were acting in their own way but *not on their own terms*. By taking the *Katsina* cult underground, they reacted to Spanish terms, imposition of Catholicism and punishment for traditional religious practice (Riley 1999), while under colonial authority.

In contrast, the Araucanians at Santa Sylvania and the wider Araucania set the terms whereby pre-existing cultural practices were maintained. This is particularly evident in the *parlamentos* ("parleys", or peace treaties) between Araucanians and Spaniards beginning in the 17<sup>th</sup> Century (Contreras 2007; Pavez 2006; Silva 2001; Zavala 2005). Recent ethnohistoric and archaeological work at *parlamento* sites indicate that the Araucanians, not the Spanish, specified where the *parlamento* would take place, who would camp where, and the terms of the treaty (Zavala and Dillehay 2011). Excavations

at Santa Sylvania reported here may indicate a similar pattern. The lack of Spanish-style materials suggests that the local Araucanians dictated aspects of the Spanish settlement through use of Araucanian ceramics and not Spanish<sup>2</sup>, limited metalwork, and incorporation of wheat, barley, horses, and cows. These practices continued after the Spanish were expelled from south of the Bio Bio River. General tensions that persisted in the area were encouraged by relatives living in other parts of the Araucania contributed to the limited occupation of the site, again precipitated by the actions of the Araucanians as a reaction to the Spanish, but on their terms (Rosales 1989[1674]).

*Timing* is also a crucial factor in both resistance as well as the colonial effort. Resistance can be violent, such as in the Pueblo revolt of AD 1680 (Knaut 1995; Liebmann 2010; Silverberg 1994), Yucatec Maya revolt in Mexico (G. Jones 1989, 1998), and Tupac Amaru rebellion in Peru (Stern 1987; see also Robins 2005); or they can be seemingly passive forms of everyday resistance (Scott 1985, 1990). What is notable about the above examples, however, is that these military confrontations or revolts came to pass *after* the Spanish had already established political and economic control, often within a few decades after contact. Authority over political and economic structures (and often social and ideological as well) had already shifted from indigenous to Spanish control decades before the uprisings came about.

The Araucanians, in contrast, fought against the Spanish from the outset of contact, first against Alvarado in 1536 (Amunátegui 1913; Armando 1953) and subsequent efforts of Valdivia and his successors beginning in 1546 (Valdivia 1929 [1546]; Vivar 1979 [1558]). Though initial accommodation and collusion likely transpired in some areas, allowing for the establishment of Spanish settlements such as Santa Sylvania, Araucanian leaders throughout the Araucania perpetuated resistance to the Spanish. Drawing upon extensive social networks for warriors these leaders

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2 It is noted here that at the Villarrica city/fort, 30km (17 miles) east of Santa Sylvania, Spanish ceramics were used, indicating that acquiring such ceramics was not outside of the realm of possibility for the owner of Santa Sylvania. Gordon (2011) did find some Spanish ceramics, which were in the extreme minority of the assemblage, as in the current research.

maintained of a general state of tension that translated into an Araucanian shift to a permanent war footing in the mid-16<sup>th</sup> Century and eventual expulsion of the Spanish (Ercilla 2003[1569]; R. Quiroga 1963[1577]; Rosales 1989[1674]). The Araucanians at Santa Sylvia, part of efforts within the wider Araucania, appear to have constructed an “anti-colonial identity” (*sensu* Loomba 2005; see also Dillehay 2007) from the outset of or soon after contact. Because of confrontation from initial contact and the creation of anti-colonial identity, the Spanish could not establish an effective colonial structure for an extended period of time that could have destabilized the Araucanian system and led to political and economic power shifts, similar to those that transpired among other Native American societies.

### **Spain in the Americas and *Indios Amigos***

The four cultural system structures mentioned above form the compositional bases for a society or group, not just the Araucanians (Dillehay 1981). Spain was perhaps the most successful of all the European nation-states exert some degree of authority over these indigenous structures in the Americas (Guy and Sheridan 1998; Jackson 1998). The Spanish had particular success in Mesoamerica and northern South America, including the circum-Caribbean region (Adorno 1993; Deagan 1987, 2002a, 2002b; Elliott 2009; Hulme 1986).

This success relied heavily upon what the Spanish called *indios amigos* (Matthew 2007; Ruiz-Esquide 1993). Records indicate that native allies were central to the conquest of both the Inka and Aztec Empires, and without those allies it is probable that the Spanish endeavor in the Americas in general would have failed (Restall 2003; Schroeder 2007). Liebmann and Murphy (2011:4) point out that “indigenous peoples in the Americas navigated the colonial encounter at various times by means of cooperation, compliance, collusion...ambivalence...and a host of other calculated tactics” (see also

Altman 2007). Thus, Spanish success came about from their ability to recruit indigenous allies, who often had agendas of their own irrespective of Spanish colonial intent (Restall 2003).

Spanish use of *indios amigos* in colonial efforts also occurred in Chile, and possibly at Santa Sylvia (Gordon 2011; Ruiz-Esquide 1993). Pedro de Valdivia brought an estimated 2,000 Indian auxiliaries (often called *yanacona* in the documents) from Perú to aid in the conquest of Chile. Many of these Peruvian *yanacona* aided in the establishment and construction of fort/cities in the Araucania after 1550 (Góngora Marmolejo 1990[1577]; Vivar 1979[1558]). Spaniards also recruited Araucanian allies, though these appear to be fewer in number (Rosales 1989[1674]). One account suggests that, were it not for the “atrocities” committed by the Spanish, the Araucanians would have “willingly” subjected themselves to Spain and been *indios amigos* (Nuñez 2001[1673]). Whether or not this is correct can be debated, yet nonetheless numerous Araucanians from Santiago to Punta Arenas willingly allied with the Spanish and were counted as *indios amigos*. In many cases, though, the Araucanians that were “given” as part of an encomienda grant were referred to as *indios amigos*, regardless of their actual status (Mariño 1865[1595]; Quiroga 1979[1690]; Rosales 1989[1674]; see also Ruiz-Esquide 1993). The actual number of true *indios amigos* and *indios enemigos* is unclear, though evidence suggests that *indios enemigos* were likely more populous and geographically widespread (Dillehay 2007).

At Santa Sylvia, Gordon referred to a particular construction (Complex C) as the *casa de indios amigos* (“house of friendly Indians”) though it is not clear whether these were Peruvian *yanacona* or Araucanian *indios amigos*. Recent excavations yielded no materials that would differentiate between the two. Burials recovered beneath the floor of the chapel/mausoleum (Complex A) indicate a mixed population—4 Hispanic males, 3 indigenous females, and one mestizo. The females, Gordon suggested, were the wives of the Spaniards, and the *mestizo* may have been the son of a Spaniard and an

Araucanian (Gordon 2011). Further, the construction of Santa Sylvania would have required considerable effort to bring granite cobbles up from the river, which were then worked and used to construct the wall bases in each Complex (see Chapter 9). The Spanish likely utilized *indios amigos* for this effort, if not Peruvian *yanacona*. Thus, *indios amigos* were probably an active and important part of the establishment and maintenance of Santa Sylvania.

However, records suggest that in the mind of many Araucanians, the nature of being an *indio amigo* was fluid (Rosales 1989[1674]). Valdivia 1929[1552]; Vivar (1979[1588]); Quiroga (J. Quiroga 1979[1677]) and other writers state that many *indios amigos* were “traitorous,” seeming to give fealty in one moment, then fighting against the Spanish the next. These actions may illustrate aspects of the underlying ideology of the Araucanians that may have served in their resistance against the Spanish. Similar to other examples of “cooperation and collusion” (Liebmann and Murphy 2011), some Araucanians may have actively sided with the Spanish in order to learn as much as they could about them (Ercilla 2003[1569]). Others may have allied briefly with the Spanish, but social pressures from other Araucanians caused them to break those ties (Tribaldos de Toledo 2009[1630]). Overall, many Araucanian leaders seem to have worked to promote the ideology of “being Araucanian,” which aided in the creation of a “shared national past and cultural identity” (sensu Loomba 2005) and resistance to the Spanish. Later, this ideology would be recognized by the Spanish and other nations as they referred to the Araucanians as *indomito* (indomitable; Arias 1984[1650]).

Despite different and changing motives, with the help of *indios amigos* Spanish success was greatest in north of the capital of Santiago (established in AD 1541 Valdivia 1929[1542]). Most of these northern indigenous groups had been assimilated by the Inkas and were then incorporated into the Spanish Empire with little resistance (Ampuero 2007; Antei 1989; Bengoa 2004). As they had elsewhere in the Americas (Himmerich and Valencia 1996; Simpson 2008), the Spanish instituted systems of *encomienda* grants

in Chile, which included the “right” to use native labor for mining and agricultural work (Góngora 1970; Orellana 2005). Successful in the north after several years of effort (see Rosales 1989[1674]), the *encomienda* system could never be effectively utilized south of the Bio Bío River. This is likely due to the inability of the Spanish to actually maintain general colonial control. Santa Sylvia itself may have been an *encomienda* given as an outlying support to Villarrica, similar to others seen around Lake Villarrica (Harcha and Castro 2000; Vidal et al. 1981). The Spanish encomendero may have drawn upon the labor of an estimated 1,500 Araucanians (Gordon 2011), though how Gordon came by this number is unknown.

After the Second General Araucanian Offensive of 1598-1602, the *encomienda* system was replaced by attempts at *repartimientos*, or forced-labor systems similar to other parts of the Spanish Empire (Voss 2008). These were also unsuccessful, likely for the same reasons as the *encomienda* system. At the same time, Catholic missionaries attempted to institute the *reducción* (reduction, or reservation) system, wherein populations of “converts” would be moved to a new settlement under the auspices of the missionaries. Through this, the missionaries thought to re-establish control of Araucanian lands in piecemeal fashion (Boccaro 1999, 2007; Foerster 1996; Pinto 1991). Like the other systems, *reducciones* were unsuccessful until the late 19<sup>th</sup> Century (Gay 1913). The number of true Catholic converts appears extremely limited (Foerster 1996). Not until the Chilean army occupied the Araucania that the Araucanians in Pucón-Villarrica were placed on *reducciones*, which were lands set aside based on *lof* and *rehue* traditional borders, rather than forced relocations (Dillehay personal communication 2011; see Chapter 13).

## Summary

Many researchers have pointed out that colonial interactions worldwide were and



continue to be much more multi-faceted than simple domination/resistance or colonizer/colonized dichotomies (Liebmann 2008; Patterson 2008; Rothschild 2003). Each culture dealt with European invasions and its attendant fallout in culturally-specific ways. Some managed to sustain many of their pre-existing cultural structures (Kicza 2003; Parmenter 2010) and others used different tactics and methods in order to maintain some degree of cultural order (Sheptak et al. 2011; Witgen 2012). What separates the Araucanians at Santa Sylvania and the wider Araucania from other indigenous groups in the Americas is that they maintained control over their own cultural system for over 350 years. The Araucanians accomplished this feat from the outset of contact, on their own terms and through the flexible rubric of pre-Hispanic structures. The political, economic, social, and ideological structures already in place allowed for local actors, in concert with kin and compatriots elsewhere in the Araucania, to incorporate useful European products while modifying the system (i.e. increased importance of *ayllarehue* and *butanmapu*) in such a way that it (the system) became highly resilient and capable of defeating the Spanish.

Another notable point of distinction between the Araucanians and other groups is the nature of the fighting that led to Spanish expulsion. The Puebloans, Yucatec, and Peruvian examples cited above have been labeled “rebellions” by researchers, as these groups confronted the Spanish militarily well after the establishment of Spanish authority and cultural system structures (Kicza 1994, 2003; Robins 2005). Some have labeled the Araucanian/Spanish conflict as a “rebellion” as well (Padden 1994; Paves 2006; Silva 2005; Villalobos 1985). The Araucanians did not engage in “rebellions” because, as this research argues, Spanish colonial control was not successful for an extended period of time. Villalobos (1988) and others have referred to the conflicts of 1553-1558 and 1598-1602 as “uprisings.” In contrast, this research suggests that these were actually offensives, in that the Araucanians at Santa Sylvania and the wider Araucania actively took the fight to the Spanish. The years prior to these general offensives were periods of general tension punctuated by smaller but no less violent outbreaks of military conflict.

Though some cooperation did transpire amongst the Araucanians and Spanish throughout contact, and *indios amigos* played an essential role in early Spanish success, evidence suggests it was not to the point that the structures of the Araucanian cultural system were supplanted by Spanish structures, as had transpired amongst the Puebloans, Yucatec, or Peruvians.

Again, timing is critical in the nature of the Araucanian case at Santa Sylvia (see also Dillehay 2007). Nearly 100 years before Valdivia crossed the Bio Bio River, Araucanian groups living around the Maule River, possibly aided by relations living to the south, successfully limited the military expansion of the Inka Empire (see Figure 2 and Chapter 12; Dillehay and Gordon 1998; Sauer and Dillehay 2012). This feat may have laid the foundation for later southern Araucanian resistance to the Spanish. Despite initial Spanish successes, Araucanian leaders fomented and maintained a pattern of distrust, hostility, and direct conflict from the outset of contact with the Spanish. This pattern continued throughout Araucanian and Spanish interaction and, some might argue, continues to the present day (Estrada 2008; Marimán et al. 2006).

This does not mean that all the Araucanians at Santa Sylvia and elsewhere in the Araucania immediately took up arms or that the whole population was united in resisting the Spanish. Documents suggest that numerous *indios amigos* actively supported and allied themselves with the Spanish, and many aided the Spanish in settlement establishment. Other sources state that in some areas, such as along the coast near Santa Maria island, there lived Araucanian “*indios de paz*” (“peaceful Indians”) who interacted with the Spanish more than their neighbors, as well as those who actively aided the Spanish in their efforts (Rosales 1989[1674]; Tribaldos de Toledo 2009[1630]).

## CHAPTER 4

### IDENTITY, ETHNICITY, AND AGENCY: DEVELOPMENT AND RECOGNITION OF “BEING ARAUCANIAN”

To understand why people behave the way they do, we must know their past and their understanding of the past.

-Elizabeth Brumfiel (2003)

As indigenous groups and Europeans continued to interact during the colonization of the Americas, the ways in which Europeans viewed native groups, how the natives viewed the new arrivals, and in many instances how the natives viewed themselves were modified. In addition, new groups came in to being, from both the melding of extant indigenous groups and the creation of mixed native-European individuals, social classes, and ethnic groups (Stannard 1991). Continuous interactions forced the identification of other societies, lands, territories, boundaries, frontiers, and social subdivisions. Divisions were oftentimes imposed arbitrarily by the colonizers, and sometimes with the input of indigenous interlocutors (Martinez 2004). These sorts of events--the identification of disparate groups, the reorganization of territories, boundaries, and societies --are nothing new in human history. Identification of “the other” at different scales is part of humanity. What made European colonization of the Americas, Africa, Asia, and Australia different, perhaps, is the scale and persistence of interaction and their effects on individual and group identities, compared to previous epochs (Loomba 2005; Patterson 2011).

Who people are, how they see themselves and are seen by others, and the decisions they are capable of making are central to research in the social sciences (Brubaker and Cooper 2000; Burke and Stets 2009; A. Cohen 2000; Farnen 1994; Grossberg 1996; Hall and du Gay 1996; Holland et al. 1998; Jenkins 2008; Meskell 2007;

Samaniego and Garbarini 2004; Stets and Burke 2000). A basic question here is “Who.” Who are the people studied from ethnographic, archaeological, historic, and biological perspectives? What are the criteria for distinguishing one group from another? How do we define identity archaeologically, particularly without written records or living descendants? Though it appears simple enough, defining identity is debated, particularly in sociology, anthropology, and psychology, as researchers come to terms with the multifaceted and sometimes contradictory aspects of human identity both past and present (Burke and Stets 2009; A. Cohen 2000; Díaz-Andreu et al. 2004; Insoll 2007; Meskell 2002). This is an important issue in this research. Differentiating between “Araucanian” and “Spanish” material culture at Santa Sylvia and being able to discern changes in the same material culture through time, is key to understanding the effects of interaction, the changes and continuity in the Araucanian cultural system<sup>1</sup>, and Araucanian resilience seen in both time and space.

Closely related to studies of identity are investigations into what actions people are capable of making, both as individuals and as groups. Over the last 20 years, researchers have dealt with issues of agency, or the ability of individuals and groups to make and implement decisions. These decisions are oftentimes based on social identity, power relations, education, and other factors (Dobres and Robb 2000b). *Who* people are, as perceived by themselves and others, often determines *what* actions they can perform, *why* they act, as well as *what* is behaviorally expected of them. However, the results of and reactions to those actions and behaviors fall outside their control (Gardner 2004). For example, in the Araucania, *toqui* war leaders were given authority and power by their followers to conduct the war against the Spanish based on their military and rhetorical skills. These leaders then used that power and authority to recruit warriors and direct battles (Bengoa 2000; Dillehay 2007). This authority, power, ability, and knowledge provided the means for *toqui* to act in accordance with traditional Araucanian cultural

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1 And, indirectly, the changes in Spanish culture as well.

norms structures. Failure to act in ways acceptable to the rest their followers could mean removal from the position of *toqui* and loss of power (Rosales 1989[1674]:980; see also Leon Echaiz 1971). Agency, or the ability to act and be acted upon, is fundamental to any anthropological or historical study, as researchers try to understand the why of events and actions, as well as the results.

In studying the Araucanians at Santa Sylvia before, during, and after European arrival, identity and agency are important parts of the formation of Araucanian society and culture, how the Araucanians were perceived and how they perceived the outsiders, how both groups acted upon percepts of themselves and others, and how these identities fostered resilience to outside influences and disturbance. Resilience Theory (RT) can aid in studying the long-term processes that create identity, seen in the material record, historic documentation, and ethnographic information. Particularly significant is how those identities form the base for resilience in cultural systems.

Briefly mentioned in the previous chapter, the Araucanians created what Loomba (2005) calls an “anti-colonial identity”. She states that, “The...inner core central to the construction of anti-colonial national identities is seen to be shaped by a shared national past or a cultural essence which in turn becomes synonymous with a religious or racial identity” (Loomba 2005:163). Loomba refers here to national identity creation after the dissolution of European colonial power after World War II, which affected how previously-colonized groups created new concepts of individual and nation. This definition can also be applied to the Araucanians at Santa Sylvia and the wider Araucania. Fortes (1969:231, cited in Jones 1997:50) introduces the concept of the “socio-geographic region” that may be applied to the Araucania:

For the concept of a society as a closed unit...we must substitute the concept of the *socio-geographic region*, the social elements of which are more closely knit together among themselves than any of them are knit together with social elements of the same kind outside of that region.

Though the Araucanians were not necessarily a “nation” at the time of Spanish arrival, they nonetheless had a “shared past” and “cultural essence” as part of a “socio-geographic region” that became synonymous with their cultural identity (see Dillehay 2007:386; Jones 1997). This identity provided the means for individuals and communities to forge networks for trade, exchange, ritual, and other practices. This also provided leaders the networks to recruit warriors, forge alliances, and successfully fight against the Spanish. The Araucanian anti-colonial identity appears to have increased with success, insomuch that maintaining liberty on their terms came to define the Araucanians in the view of outsiders (Lewis 1996; A. Saavedra 2006).

This chapter defines the concept of identity and its usefulness for the present study. Of import is how to see identity and agency from an anthropological perspective across time and space, how it may be seen in the material record (i.e. archaeological excavation at Santa Sylvania, historical documents, ethnographic interviews), and what that means for identifying the patterns and processes that went into making the Araucanian cultural system resilient. In this way, some hypotheses can be presented in the following chapters as to how the Araucanians at Santa Sylvania and the wider Araucania, identifying themselves *as* Araucanian, organized their society through individual and communal agency. These cultural developments influenced decisions to actively resist the Spanish, include or avoid European material culture, and later expand territorially into Argentina. Though the concepts of identity and agency are perceived by some as overused in anthropology (Kockelman 2007; Smith 2001), they are still useful for archaeological and historical analyses. This is of particular import for the research presented here, as it focuses on the actions and outcomes of specific groups (i.e. *indios amigos*, *indios enemigos*) whose agency is strongly linked to their changing identity.

## The Concept of Identity

As sociologist Richard Jenkins stated, “[much] writing about identity treats it as *something* that simply *is*.” (Jenkins 2008:17, emphasis his). That people perceive themselves and others in particular ways is generally taken to be apodictic reality. Human beings, whether through instinct or acquisition, classify themselves based on certain social and physical patterns (and in turn apply those classifications to others. Anthropology, sociology, and history, for much of their intellectual histories as disciplines, treated identity matters as something obvious, or to be simply defined by the researcher (e.g. archaeological “traditions” and “cultures”). To classify the world is both instinctive and taught and part of the human condition irrespective of area of the world or the society/individual under study (Burke and Stets 2009). Identity and identification, sensu Jenkins, simply *is*, and many researchers have treated it as a “human universal” (Brubaker 2004). It is difficult to argue against such a position. Ask any person on the street about identity (theirs or others) and it will often be treated as something that just *is*.

However, Jenkins goes on to argue:

Careless reification of this kind pays insufficient attention to how identification works or is done, to process and reflexivity, to the social construction of identity in interaction and institutionally. Identity can only be understood as a process of ‘being’ or ‘becoming’. One’s identity—one’s identities, indeed, for who we are is always multi-dimensional, singular and plural—is never a final or settled matter. (Jenkins 2008:17)

Jenkins’ direct criticism of the “careless reification” of identity illustrates the important point that identity, in its myriad forms, should not be taken as simply something that exists in and of itself, or *a priori*, but is a *process*: of creation, destruction, organization, reflection, absorption, and a host of other factors that go into influencing who a person or group is, how they relate to others, and how others relate to them. Identity is also contextual, defined through the life experiences, activities, and interactions between individuals and groups. Who a person is, as seen by themselves

and others, changes frequently throughout the life of the individual and throughout the history of the group. Often, identity is modified, challenged, or appropriated even after death (Jenkins 2008). In sum, identity should not be treated as something that *is*, but as a concept integral to the whole of anthropological and historical research.

In many instances, who an individual is finds definition in whom or what they are *not*, be the distinction social, religious, sexual, genetic, or another mental or physical construct, (Grossberg 1996). Jenkins states, “We need to recognize that identification is often most consequential as the categorization of others, rather than as self-identification” (2008:15). As Meskell (2002:280) suggests:

[self]-definition today coalesces around genealogy, heritage, citizenship, and sameness, but underlying that are also diverse and troubling contemporary concerns about disenfranchisement and difference. The constitutive outside, premised on exclusion and otherness, forms the corona of difference through which identities are enunciated.

In essence, it is through enumerating the differences between “us” and “them,” (particularly “them”), as well as formulating the behavioral expectations of both “us” and “them” that the bulk of personal identity is formed. This is particularly prevalent today as increased globalization has led to the endeavors of countless individuals and communities to define their own identity to confront encroachment from outside influences. Doing so, as shown below, is nothing new.

### *Defining Identity*

Every discussion of identity contains a different definition, some simple and some complex. Perhaps one of the simplest yet encompassing definitions comes from Burke and Stets, who define identity as “the set of meanings that define who one is when one is an occupant of a particular role in society, a member of a particular group, or claims particular characteristics that identify him or her as a unique person” (2009:3). Further, identity is a process of “self-categorization,” that which forms individual and group



identity (Stets and Burke 2000:224), and is “rooted in language—to know who’s who and what’s what” (Jenkins 2008:5). Again, the emphasis is on the *process* of identity and identification (Hall 1991, 1996). Identities can be acquired and lost, ascribed and removed, invoked and revoked, explicit and inferred, and all of this by the individual and group from within, and from outside by others (Brumfiel 2003; Grossberg 1996). Voss (2005:461) points out that “[identities] simultaneously provide ontological security (we know who we are) and are flashpoints in social conflict...” To know oneself (*nosce te ipsum*) provides a sense of belonging as well as psychological and a degree of physical security. To know oneself in relation to others can also provide security, but often leads to antagonism, particularly when resources or ideology come in to play (Brubaker 2004).

Forming personal identity begins almost at birth and continuously evolves over time. For the purposes of this study there are two types of individual identity: biological and psycho-social. Biological identity is rooted in genetic material, exhibited in such diverse forms as sex, height/size, skin/hair/eye color, age, and genealogy, and is closely related to ethnicity (see below). Biological identity is largely uncontrolled by the individual and immutable—most people cannot change their skin color, nor can they modify their height or age, and even transgender individuals are still genetically male or female—but are closely linked with and often define many aspects of psycho-social identity.

Psycho-social identity is often ascribed to or adopted by individuals, based on the above biological factors and elaborated by such things as religion, history, class, race, geography, education, and perception imposed by others (Bernbeck and Pollock 1996; Burke and Stets 2009; Brumfiel 2003; Hall 1996) . It is psycho-social identity that may be the most important, as it is the identity defined by the individual and determines how that person lives their life, how they interact with others including actions and reactions based on behavioral expectations and realities, or how one is *expected* to act vs. how one *really* acts and the consequences of both, and how they negotiate changes to or consistency in

their identity. Identity negotiation is a daily occurrence both within the individual mind and in social situations, which has repercussions in the individual life and in the lives of others (Hall 1996; Jenkins 2008; Strathern 1996). In essence, identity is who we are and influences what we *can* do and influences what we *think* we can do. Whether or not we can actually do anything is influenced by the society in which we live with its attendant possibilities, restrictions, and expectations, our understanding of those factors, and our physical abilities themselves

### *Identity in Anthropology*

For anthropologists, identity has been at the fore of the discipline from its inception, particularly borrowing from and collaborating with sociology and psychology (Bernstein 2005; Brubaker and Cooper 2000; Hall 1996; Holland et al. 1998; Stets and Burke 2000, 2009). Identity is closely allied with discussions of ethnicity (see below; A. Cohen 2000; R. Cohen 1978; Barth 1969; Emberling 1997). The last 30 years have seen a proliferation of research into identity, as anthropologists discuss issues of post-colonialism, gender and class relations, ethnicity, social movements, and other so-called “postmodern” topics (Bernstein 2005; Mercer 1992; Meskell 2002). In most instances, these discussions of identity treat the topic *a priori*, without delving into the theoretical implications of the term (Brubaker and Cooper 2000). This may be due to ethnographers’ analysis of what their informants are saying and doing, rather than a need for deeper theoretical constructs of identity. If an informant states that he or she is a member of a particular group, then the meanings behind “identity” are irrelevant—they are who they say they are and the ethnographer cannot dispute that (Bernstein 2005; Farnen 1994; Hale 1997; Hall 1996).

In archaeology, as in the rest of anthropology, identity has been important from the beginning of the discipline, albeit in a slightly different way. The general history of Archaeology has been interested in defining cultures based on material remains, and

thus establishing the “identity” of past peoples and groups (Trigger 1996). The “Culture-Historical” or “Direct Historical” methods worked backwards from known societies into the unknown or unidentified past cultures based on observations of similarities and differences in material culture and differences, and located geographic ranges for these groups (Insoll 2007; Jones 1997; Milke 1949; Steward 1949; Trigger 1980, 1996). This method was particularly used in the Americas, as European archaeologists had long based their sequences on known groups or through “classical” archaeology (Trigger 1996). In North and South America, the identity of most pre-European groups had been lost (Ford and Steward 1952; Jones 1997; Kluckhohn 1939; Spaulding 1953; Steward 1942). Where living traditions existed, identities were assigned based on the information provided by informants and historical records. Researchers then worked backward through time to assign classificatory schemes to artifacts from “unknown” groups, establishing long temporal and material sequences from small sites up to large regions (Bernbeck and Pollock 1996; Trigger 1996).

The 1960’s gave rise to “processual” archaeology, which focused on scientific techniques for discovering human “universals” or theories that could account for human activities across the globe and at various scales (Binford 1962; Trigger 1996; Watson et al. 1972). Identifying cultures or groups in the culture-history vein, though still used, was critiqued and relegated to limited use, as was the overall use of identity (Insoll 2009; Jones 1997). Various social upheavals and other changes in the 1970’s and 1980’s, as well as collaborations with sociologists and ethnographers brought identity back into archaeological discourse, closely allied with ethnicity and generally in terms of race, class, and gender, which debates continue to the present (Diaz-Andreu 2005; Meskell 2009). Identity and ethnicity thus became intertwined in archaeological discourse, as many archaeologists dealt with the issues surrounding identifying individuals vs. groups or cultural patterns (Bernbeck and Pollock 1996; Holland et al. 1998; Insoll 2009; Jones 1997).

However important and useful identity studies are in various disciplines, they are not without their critics (Hall 1996; Grossberg 1996; Mercer 1992). Brubaker (2004) and Brubaker and Cooper (2000) have been particularly vocal in their criticisms of identity (and ethnicity) as useful concepts. Primarily, their arguments center on the over-use of the term “identity” which has the potential to mean everything and nothing at the same time. If researchers, Brubaker and Cooper argue, try to be too encompassing in their use of identity, then it becomes so broad as to lose all meaning as a topic of study. On the other hand, if the definition is too narrow, then it is not applicable or useful across disciplines and study areas. Identity studies are important and essential for sociology and anthropology (among other disciplines), but need to be treated with care lest the overuse of the term render the subject useless or meaningless.

Despite these concerns, identity is an important aspect of this research from material, documentary, and modern perspectives. Hypothetically, the Araucanian sense of “self” as “being Araucanian,” may translate to consistency and some degree of conformity in material culture patterns across time and space, as well as maintenance of these traditions with limited influence from foreign groups. If the Araucanians at Santa Sylvia saw themselves as part of a larger Araucanian “socio-geographic region” (Fortes 1969; Jones 1997) with similar cultural patterns, they may have sought to maintain those cultural features in the face of Spanish incursion. The archaeological record indicates this in the lack of Spanish artifacts and the continuity of Araucanian styles and patterns through time and across space. Further research suggests that many Araucanians may have rejected that communal identity and became *indios amigos*, thus changing their identity to align more closely to the Spanish. In other instances, some Araucanians may have temporarily sublimated their identities in order to achieve a particular goal, such as acquisition of information or goods from the Spanish (Leon Echaiz 1971). Overall, ethnohistoric and ethnographic records indicate that the majority of Araucanians fought to maintain an “anti-colonial identity” rejecting the Spanish, which success appears to have

further strengthened that sense of “being Araucanian” (Millalen 2004; Ray 2008).

Spanish identity was likely in play at Santa Sylvania as well. Rodriguez-Alegria (2005) suggests that many Spaniards, in an effort to “win over” indigenous subjects, negotiated social relations through “eating like an Indian.” Spaniards would eat local foods and use indigenous material culture, rather than focusing on acquiring and using European-based products. This was done, in theory, to ingratiate the Spanish with the natives and facilitate conquest (ibid). In one sense, Spaniards may have suppressed some aspects of their own identity temporarily in order to achieve the long-term goal of colonial control. At Santa Sylvania, it is possible that the limited number of Spanish-style artifacts attests to this action. At the same time, the construction of structures with tapia (hardened clay) walls and Spanish-style roof tiles suggests that identity suppression went only so far. Rather than live in an Araucanian *ruka* made of thatch, the Santa Sylvania *encomendero* apparently had *indios amigos* construct buildings in style that was not used in the Araucania.

Thus, these brief examples show the fluid and changing natures of identity. As Brubaker (2000) has argued, because identity is flexible and ever-changing, it can lose much of its usefulness as an avenue of investigation. However, this research argues that not only is identity useful, it is crucial for understanding the long-term development of cultures and the actions of individuals and groups. Identity formation influences what actions people perform and why, as well as their responses to the actions of others.

### **Identity and Ethnicity**

Closely allied with discussions of identity is the concept of ethnicity. Like identity, ethnicity has been a part of the social sciences for quite some time, though it was not until the work of Barth (1969) that ethnicity came to be seen as an area of study within itself (R. Cohen 1978; Emberling 1997; McGuire 1982; Jones 1997). In

many respects, ethnicity can be seen as taking to the group level the same concepts and definitions related to individual identity. In most studies, the word “ethnic” is often near the word “group.” Whereas identity can be seen as something wholly individual, depending on the scale of analysis, ethnicity as a concept is often reliant on a larger association (Barth 1969; see also Brubaker 2004 for a critique of the “group” concept). In other words, ethnic *individuals* only exist as part of a larger ethnic *group*, often in particular or situational contexts.

Though work of Barth thrust ethnicity into the social sciences, the concept was much older, as part of anthropological research into “culture areas” (Kroeber 1939), and social boundaries (Evans-Pritchard 1940; Moerman 1965; see Emberling 1995 for an review of research on ethnicity). Barth (1969:10-11) proposed that an ethnic group be defined to “designate a population which...has a membership which identifies itself, and is identified by others, as constituting a category distinguishable from other categories of the same order.” In other words, ethnicity is defined by membership in a particular group that self-identifies as having particular traits (language, territory, materials, ancestry, ideology, etc.) unique to that group, and is in turn identified by outsiders as being a unique group.

Another way of looking at the concept of ethnicity can be though “collective identity” which is defined by Poletta and Jasper (2001:285) as “an individual’s cognitive, moral, and emotional connection with a broader community, category, practice, or institution”. Further,

Collective identities are expressed in cultural materials-names, narratives, symbols, verbal styles, rituals, clothing, and so on-but not all cultural materials express collective identities. Collective identity does not imply the rational calculus for evaluating choices that “interest” does. And unlike ideology, collective identity carries with it positive feelings for other members of the group. (ibid)

Ethnicity is, then, a collective identity, though not all collective identities are necessarily related to ethnicity. This is perhaps nowhere more evident than in the United States,

where different groups vie for the designation of “ethnic.” For example, to be “Hispanic” generally means to have ancestors who came from Central or South America with Spanish and Native American roots, with a specific language (Spanish) and other customs or cultural patterns particular to the country of ancestry though not wholly different from neighboring communities or nations that have similar genealogies. Membership, as with most other ethnic groups, is generally a matter of genetics—though one can speak Spanish fluently, live in Latin America, and practice numerous local customs, that individual will never be Hispanic.

This suggests up two important points. First, ethnicity is related to genetic identity and lies within the context of a group (Emberling 2007). Ethnic identity, in turn, is often a minority within a larger population and may in fact be defined by that minority status. To be “Hispanic” can mean to be “not white” or not of northern European descent. Ask an average person in the United States of northern European descent to identify their ethnicity and they would likely say “American” or a combination of nationalities (Irish, English, German, Polish, etc.). Ask a minority and they would probably state their ethnic identity and in turn be identified as that ethnicity by outsiders. For the majority of people, ethnicity is synonymous with race, culture, heritage, and language, though it need not be so (Terrell 2001).

This leads to a second point: like individual identity, ethnicity is malleable and situation-based. Though ethnicity as a concept is a part of everyday discourse within the social sciences, it is by no means uncontested (Brubaker 2004; Leve 2011; Shaw 1994). Who gets to define a particular ethnic group? Who defines membership? For example, research among the Lemba of South Africa has suggested a strong genetic relationship with Semitic peoples living in the Middle East, particularly Jews (Browdin 2002). Genetically speaking, the Lemba are Jewish, which concords with their oral traditions, but does not automatically make them Jews, as recognized by the state of Israel or most other Jewish groups. This is due in large part to traditional Jewish methods of

determining descent, cultural practice, and conversion, which the Lemba do not follow (ibid: 325). Another example comes from the United States, where numerous groups attempt to identify as “Native American” for various reasons (Haley and Wilcoxon 2005; Kohl 1998). These identities are debated by governmental agencies and other, more “established” Native American groups, and demonstrates that defining ethnicity, like identity, is no easy feat.

Brubaker (2004), as with identity, critiques the concept of ethnicity and encourages researchers to “rethink” ethnicity as a reality and what that means for a “group” as a whole. Brubaker argues that the use of “groups” is a forced concept that does more damage than good. Classifications of “ethnic groups” actually reify the groups instead of acting as a simple definitional schema, which can lead to unnecessary conflict and confusion. Groups, then, are not real: what is real is a shared feeling of “groupness” that defines the membership. In one sense he is correct; groups in fact do not exist outside of the minds of the people who create them. But the fact that the groups do not “exist” makes them no less real. As Jenkins (2008:9) points out, a “group” is a “human collectivity the members of which recognise its existence and their membership of it.” To put it another way:

An ethnic group is not one because of the degree of measurable or observable difference from other groups; it is an ethnic group, on the contrary, because the people in and the people out of it know that it is one; because both the ins and the outs talk, feel, and act as if it were a separate group. (Hughes 1984:153-154).

Thus, reified or not, groups exist to people and therefore affect their own personal identity and affect what they want to do, are capable of doing, and can actually accomplish.

Within the present Araucanian example at Santa Sylvania, identity and ethnicity appear linked across scales and form what it means to “be Araucanian.” By this it is argued, as above, that native individuals living at Santa Sylvania before, during, and after Spanish occupation likely self-identified as Araucanian, based on material culture that



exhibits continuity in style from pre-Hispanic times. At the same time, these individuals appear to have avoided using most European cultural materials. Most individuals and families may have considered themselves part of the larger Araucanian ethnic group, linked by shared language, materials, and interactions across the Araucania, a “socio-geographic region” (see above). These senses of identity probably influenced those who actively fought against as well as those who allied themselves with the Spanish (*indios amigos*). Identity also structured how certain leaders (*lonko, toqui, machi*) acted in particular ways and times for the maintenance or restructuring of the system. This identity also influenced recruiting others to follow their lead. These formulations of identity and ethnicity may have been less strict in pre-Hispanic times (Boccaro 1999), though still in existence, and were strengthened considerably during the protracted fighting against the Spanish and Chileans. This continued to develop into present Mapuche identity (Dillehay 2007; A. Saavedra 2006; Zavala 2006).

### **Agency**

Aligned with analyses of identity and ethnicity is the ability of people to move and act in accordance with how they perceive themselves, are perceived by others, and what they are able to do in their social milieu. These abilities and perceptions are often based on relationships of power, control, and negotiation (Wolf 1999). Decision-making processes to move and act, to control and negotiate, is defined by researchers as agency, and has enjoyed an increase in analysis over the few decades (Dobres and Robb 2000a). The concept of agency as an analytical tool primarily has its basis in the works of Bourdieu (1977, 1990) and Giddens (1979, 1984) who analyzed the structures that create a society and affect individual and group action. These structures, per Giddens, define individuals and societies and are in turn defined by the same individuals and societies (Giddens 1979). Bourdieu perceived these structures as part of *habitus*, or the “systems

of durable, transposable dispositions, structured structures predisposed to function as structuring structures (1977:72). In other words, the structures that make up human societies—political, economic, social, and ideological.—provide both the structure *for* and are structured *by* human activity and action: “people create the conditions and structures in which they live, largely as a result of the unintended consequences of their actions” (Dobres and Robb 2000b:5; see also Giddens 1979). Or, as Silliman (2001:192) states, “...social agents are both constrained and enabled by structure.”

Bourdieu (1977) argued that individual action is generally “unconscious” or the day-to-day result of habit or instinct, and that most (not all) human action is unintentional in nature. Giddens, on the other hand, states that “humans are neither to be treated as passive objects, nor as wholly free subjects” (1979:150; see also Silliman 2001:192). In essence, then, much of human action is based on predefined structures, or the *habitus*, wherein people move and act without much conscious awareness of what they are doing. Despite the instinctive nature of those actions, and contrary to Bourdieu, they are not specifically unconscious acts, but rather subconscious, available for later review and reflection by the actor or actors (Dornan 2002; Throop and Murphy 2002).

It may be a semantic argument to differentiate between “subconscious” and “unconscious” actions, though subconscious, at least in this research, allows for more personal control. Unconscious action is more instinctive and uncontrolled, whereas subconscious action is more indicative of the ability of the actor to control their actions. Though the individual may not be wholly aware of the action they are taking, they note it on some mental level. Unconscious acts, then, are not given to review—one cannot stop the beating of a heart, or the twitch of a muscle, even though they are acts—whereas subconscious acts can be reflected upon and will be used to define, constrain, and affect action in the future.

This aspect of agency is very broad. In one sense, all people are agents unto themselves. If all individuals are agents, the concept of agency loses much of its

expository ability. Like identity, agency can be applied to everything to the point that it means nothing (Ortner 1984, 2001; Silliman 2001). To strengthen the concept, then, theorists have inserted the importance of goals, for how agents move and accomplish activities. Hodder (2000:22) further refines this by stating that agency can be “seen in terms of the resources needed in order to act” along with a degree of “intentionality.” “Action is the doing, the mobilization of resources to have an effect” (Barrett 2000:61). For an individual to have agency, they must have knowledge of and access to the resources that will allow the achievement of goals via direct action, negotiation, and so on. Some of these actions can be small scale, such as a farmer needing the knowledge and materials to plant a crop and reap a successful harvest, or for a politician to use money, material, and an understanding of their constituency to get elected. Some actions can be large scale, such as rebels acquiring access to weapons in order to overthrow a regime, or a cabal of individuals working to destabilize a government. In any case, the fundamental precursor to action is knowledge of who the individual is (or what the group is), how the society is organized, what their role is, and how they can move and act based on that organization. Thus, individuals (*sensu* Silliman 2001) are “both constrained and enabled” by their understanding of self (identity), relationships to others (ethnicity), power structures, knowledge, and other factors to bring to pass change or maintain the *status quo*.

Agency, then, is the ability of individuals to exercise power to act, based on who the person is, what they believe they can do, and what others are willing to let them do (i.e. how others perceive them). Some aspects of agency are actionary and reactionary: individuals act in one, which causes others to react to those actions in another way. The construction of Santa Sylvania was an act on the part of the Spanish *encomendero*, as well as the decision by some Araucanians to be *indios amigos*. Evidence suggests that Araucanians leaders near Santa Sylvania and elsewhere chose to act to expel the Spanish from the site. Other Araucanians apparently chose to follow these leaders in those efforts

and to maintain autonomous control over traditional cultural structures and practices (Ercilla 2003[1569]; Rosales 1989[1674]). The Araucanian leaders, other Araucanians, and the Spaniards moved and acted based on their identity as perceived by others and the cultural structures which they viewed as the most appropriate way to do things. More broadly, Araucanian leaders appear to have strategically restructured the system in different ways (such as the increased importance of *ayllarehue* and *butanmapu*), adjusting to the necessities of the continued war, the incorporation of new materials and refugees, and the concurrent increase in the concept of “being Araucanian” (Bengoa 2000, 2003; Boccara 2007). Thus, Araucanians and Spaniards appear to have acted in specific ways based on their knowledge, abilities, and perceptions of themselves and the others.

### **The Araucanian Example**

What aspects of the Araucanian cultural system at Santa Sylvia “constrained and enabled” (Silliman 2001) the Araucanians to “synthesize” “and “reproduce” (Sahlins 1985) the flexible structures that fostered individual identity, group ethnicity, and agency, which in turn led to a maintenance of those structures while avoiding most Spanish influences? This section brings together some of the above concepts within the context of the Araucanians of Santa Sylvia and the broader Araucania to hypothesize that these concepts intertwined to create the structures and actions of a cultural system resilient to the effects of external pressures and influences.

#### *Araucanian, Ethnicity, and Agency*

There are several crucial questions in this research: how did the Santa Sylvia Araucanians see themselves and others, both within the cultural system and without? How did individuals and communities act, based on that identity? How did that point

of view translate into the material, historic, and ethnographic record? Lacking any contradictory information, it can be surmised that diversity of opinion and practice existed amongst the Araucanians, based principally on family relationships and affected by geographic location. Araucanian society was not exactly the same throughout the Araucania, but did exhibit close similarities in social structure (religious practice, burial customs, household organization, ceramic styles, etc.) that bonded geographically separated groups together (Bourdieu 1977; Dillehay 1990b, 2007; Giddens 1984). This overall connectedness may have created a sense of “being Araucanian” irrespective of geographic location or variations in material culture. Though disputes and enmity arose between individuals, families, lineages, and other forms of alliance, it is doubtful that the individuals involved would have seen another Araucanian as anything other than *che* or a “person.” In contrast, the Inka and Spanish were called *Winka* to differentiate those who were not *Che* and, by extension, not “people” (Bocarra 1999, 2007). The incursion of outsiders seen as “not *Che*” along with the actions of leaders unified the Araucanians as never before, but no evidence has been found to indicate that a new identity was created that did not exist previously (c.f. Bocarra 2002). Even those *indios amigos* who allied themselves with the Spanish and later Chileans do not appear to have been branded with the epithet *Winka* but continued to be *Che*, even though they were likely identified as blood traitors<sup>2</sup> and subject to some degree of censure.

The question of who the Araucanians were and how they relate to modern-day Mapuche has been debated relatively recently, as most historians, anthropologists, and Chilean law has indicated that the Mapuche as an ethnic group came into existence *because* of the arrival of the Spanish (Bengoa 2002; Bocarra 1999, 2002, 2007; Hernandez 2003; Luna 2007; Silva 1990; Villalobos 1982; c.f. Dillehay 2007; Millalén 2004; Zavala 2008). Perhaps most explicit in this view has been Bocarra, who has argued extensively (Bocarra 1996a, 1996b, 1999a, 1999b, 2002, 2007) that the Araucanians

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<sup>2</sup> This aspect is an interesting avenue of study that, as far as is known, has not yet been studied in-depth.

and the Mapuche are two separate ethnic groups, the latter obliquely related to do with the former. The Mapuche, Boccara argues, are the result of changes that came about to Araucanian society with the arrival of the Spanish, insomuch that these changes caused “the rising of a new sociocultural ethnicity whose structure and identity had little do with the groups from which it came (the central [Chile] *reche*<sup>3</sup>)” (Boccara 1999:426).

Boccara’s argument stems from Spanish documentary evidence that treat the changes in Araucanian society, such as the adoption of the *butanmapu*, the increase in the importance of *ayllarehue*, and limited interviews with indigenous informants as a demonstration that what the Mapuche *became* is only a weak reflection of what they and their ancestors previously *were*. Boccara relies on Spanish *cronistas* and later historians to trace the evolution of what he calls “Mapuche ethnogenesis” in the mid-18<sup>th</sup> Century (Boccara 1999b, 2002). This position has been adopted by other Chilean historians (Goicovich 2003, 2007; Menard 2010; Ortiz 2007; Sanchez 2007; Tellez 2004) and coincides with Chilean law and previous historical research (Ley No. 19.253; Heise 2001; Nesti 2001; Silva 1990; Villalobos et al. 1972). Thus, many view the Araucanians and modern Mapuche as the result of Spanish incursion, not as the continuation of several centuries of cultural development (cf Dillehay 2007). Recent excavations at Santa Sylvia and other research in the area, in contrast, indicate a long sequence of culture history and development with limited influence from the Spanish (Dillehay 2010; Gordon 2011; Mera et al. 2004). Had the Spanish arrival been so influential to create a new identity or the ethnogenesis suggested by Boccara and others, the archaeological record would likely reflect change rather than consistency (see also Dillehay 2007 for similar indications in Purén-Lumaco).

Rather, the argument regarding Araucanian identity and ethnicity may stem more from the ways in which the Araucanians/Mapuche were and are perceived by others,

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3 Elsewhere (Boccara 1996b, 2007) Boccara argues that the original name for the Araucanians is “*reche*” or “true people” (re = real or true, che = people in Mapudungun), though this name is limited primarily to the area around Arauco and does not include the other Araucanian che groups such as Pehuenche, Picunche, or Huilliche.

more than how they saw themselves. Cordero (2001) suggests that these changes can be identified in the writings of the *cronistas*, particularly her analysis of Valdivia's letters (1929) and Vivar's published journal (1979[1558]). Within a span of 10 years, the Araucanians changed from a wild, savage, and heathen people (per Valdivia) to formidable, respected warriors, though still savage (per Vivar; see also Cordero 2001). Subsequent *cronistas* followed the same pattern of Vivar: grudging admiration while lamenting their savagery (Ercilla 2003[1569]; Ovalle 2003[1646]; Rosales 1989[1674]). Eventually the Araucanians were viewed as *indomito* ("indomitable"; Arias 1984[1650]) a perception used by the Spanish, early Chilean statesmen, and even other Latin American revolutionaries (Bolivar 1815; Lewis 1996; Padden 1993). After Chilean independence, this view returned to views of the Mapuche as "wild," "savage," and "heathen" in the histories of Barros Arana (1999[1882]) and others. These historians seem to have sought to de-mystify the Mapuche during the Chilean efforts at conquest (Lewis 1996). These views have and continue to affect how the Mapuche today are perceived by outsiders (Haughney 2006; Heise 2001; Nesti 2001; Saavedra 2006).

### *Araucanian Cultural Development*

The position of Mapuche ethnogenesis fails to recognize and incorporate important and contradictory evidence from ethnography and archaeology. Positively, Boccara's (and others) argument does chart out the cultural evolution that did transpire during the contact period, important for tracking the development of any culture. Yet these works rarely incorporate evidence from outside the historic record in a meaningful way. Many of these researchers treat lightly diachronic Araucanian cultural development, focusing more on developments in the 16<sup>th</sup> through 18<sup>th</sup> Centuries as indicative of long-term cultural patterns and practices, as well as ignoring the abilities of the Araucanians themselves to chart their own course based on the cultural structures in place. Though these researchers acknowledge the ability of the Araucanians to resist the Spanish,

their identity as assigned by these investigations is attendant on the Spanish, and not the Araucanians themselves.

It should be remembered is that all cultures evolve, in one way or another (see Boyd and Richerson 1985, 2005; Johnson and Earle 2000; Smith 2000), and none exist in a vacuum unaffected by outside groups, or even pressures both internal and external (Wolf 1998). Boyd and Richerson (1985, 2005; see also Smith 2000) argue that cultures evolve under a general rubric of what they call Dual Inheritance (DI), which may help explain some of the development of the Araucanian/Mapuche material record from early pre-Hispanic times to the present day. DI posits that cultural evolution comes about in two ways: guided variation and biased transmission. Both of these include aspects of identity and agency, in that the transmission of cultural traits and practices are decisions made by individuals and communities. The development of those practices also recursively influence identity creation. The decision to transmit a trait, or remove it from the cultural toolkit, rests with individuals and communities, affecting how cultures continue to develop.

**Guided variation** refers to how cultural traits are passed down from one generation to the next (which may be referred to as enculturation or enstructuration). Some variations to the traits occur through time, based on the experience/knowledge of the individual or group, other cultural factors, and personal choice. One example can be a parent teaching a child how to make and decorate a ceramic vessel. The child will use the outline provided from the parent and may replicate exactly that style, or may introduce variations based on personal choice or through seeing the style of someone else. The child then teaches their children, who make changes, and so on, though the overall pre-existing style remains more or less intact. **Biased transmission** is the means by which cultural traits are observed and incorporated from the outside (which can mean outside the group) with modifications based on individual or group experience, extant culture, strategy, and choice. One example could be the initial acquisition of a particular



projectile point style that is particularly good for hunting deer. The style is observed and modified by an individual who does not have the same materials or knowledge to re-create the point, but produces a reasonable facsimile which is then incorporated into the cultural toolkit. Guided variation and biased transmission, though separate, play off of one another as cultures evolve and adapt. New ethnic identity is rarely created during this process unless the transference of cultural traits is so dramatic that a new genetically or psychologically separate society is created.

Applying DI to the Araucanian example, it can be hypothesized that the development of the culture that would become Araucanian at Santa Sylvia began by at least AD 300 with the beginnings of the Pitrén ceramic complex and the introduction of sedentary agriculture (Dillehay 1990, 2007; Navarro et al. 2012; see Chapter 7). Between AD 300 and 1200, most cultural patterns were probably guided variation (passed down from generation to generation), including ceramic styles, domestic architecture, and burial patterns. The site of Santa Sylvia itself was first occupied by 900, likely following the same patterns (see Chapters 8 and 10). Politically, it is difficult to say when the administrative positions of *lonko*, *ülmen*, and *toqui* were first developed or established, but social organization into sedentary settlements likely coincided with the development of agricultural activities (Aldunate 1989; Cooper 1946). Around AD 1200, the introduction of *kuel* ritual mounds developed near Santa Sylvia and elsewhere, possibly as a form of biased transmission of northern Andean *huacas*. This may have come to pass either through the introduction of new populations from the north, such as refugee Picunche (see Introduction), or via trade and other means (Dillehay 2007, 2010). These *kuel* were incorporated into Araucanian cosmology and ritual practice, which influenced other aspects of society such as domestic and political relations. There was likely the development of the ritual specialist class, the *machi* or *boquibuye*, as well as *nguillatun* festivals and other rituals related to kin and intercommunity relationships (see Chapters 1 and 2; Dillehay 2007; Foerster 1993; Titiev 1951). This likely coincided with

further developments of *lof*, *rehue*, and *ayllarehue* social organizations, and possibly the beginnings of *butanmapu* (see Chapters 7 and 9). New items may have entered via biased transmission, older items continued to be developed through guided variation, such as ceramics, *kuel* construction and maintenance, and domestic patterns. Each of these facets played off each other in their respective evolution as the cultural system continued to “synthesize” these developments and variations (*sensu* Sahlins 1985; see also Zavala and Dillehay 2010).

The Spanish arrival brought change for the Araucanians at Santa Sylvia as well as the wider Araucania, but all *within* the existing structures of the Araucanian culture system. These structures appear to have absorbed, through biased transmission, new cultural traits while at the same time maintaining and reproducing through guided variation traditional structural patterns. Notable examples of biased transmission are seen in European animals (horses, pigs, cows, sheep), foodstuffs (wheat, barley), and military tactics (mounted cavalry) which the Araucanians quickly incorporated and modified to suit their own purposes, again within the structures of their own system. The horse in particular suggests biased transmission, as the Araucanians modified the Spanish saddles to a lighter style that allowed for the nascent Araucanian cavalry to become dominant by the beginning of the 17<sup>th</sup> Century (Bengoa 2002, 2003) and supplanted llamas as wealth and status markers (i.e. wealth measured in the quantity owned; Boccara 1999; Dillehay 2007).

There is, however, no archaeological or ethnographic evidence to suggest, *sensu* Boccara and others, that these changes created a new *identity* for the Araucanians of Santa Sylvia, or that a new ethnicity arose. In fact, the opposite seems to have transpired: pre-existing cultural patterns were emphasized—what it meant to “be Araucanian” increased in importance—to confront Spanish attempts at colonial control. The incorporation of the name “Mapuche” in the 17<sup>th</sup> Century was not the result of a new ethnic identity being created, but as part of the evolution (“synthesis in time” *sensu*

Sahlins 1985) of a society with deep historical-cultural roots self-identifying individually and collectively in a way that would be meaningful amongst themselves and with others. In other words, this was simply a new historical condition—a part of Araucanian cultural development that nurtured their identity but did not create it.

Fundamentally, the traditional structures of Araucanian society were in place for many centuries prior to the arrival of the Spanish, which structures guided the development of the Araucanian culture system at Santa Sylvia and elsewhere in the Araucania. These structures also provided the framework for Araucanian agents to act in ways that perpetuated the cultural system. As shown above, structure is the framework whereby individuals and groups act and move and aid in the creation of individual and group identity. Structures constrain individual identity and action, while at the same time is created by the actions and identities of the individuals within the society (Giddens 1979). For the Araucanians, these structures appear to have revolved around combinations of kin group relationships, social recruitment, and religious practice which formed the base of later restructuring and modifications to the system, culminating in the expulsion of the Spanish and independence for 350 years (Dillehay 2007; A. Saavedra 2006).

The argument for Mapuche ethnogenesis in the 18<sup>th</sup> Century either ignores or depreciates these structures developed over centuries. Spatial and social organizations, such as *ayllarehue* and *butanmapu* were not created in reaction to the Spanish, but seem to have gained emphasis as the society evolved to confront the Spanish. Previously, Araucanian society likely focused on the *lof* and *rehue*, but as leaders such *toqui* called upon warriors from all over the Araucania, the relationships inherent in *ayllarehue* and *butanmapu* became more important. Additionally, the construction of kuel ritual mounds in distinct areas such as Purén-Lumaco and near Santa Sylvia, indicate some degree of pan-Araucanian religious practice (Dillehay 2007, 2010; Foerster 1996; G. Sanchez 2001-2002). Leaders such as *lonko* and *machi* would have likely used *nguillatun* and

*kueltun* ceremonies to further trade relationships and advance kin ties, which activities continued into the 20<sup>th</sup> Century (Dillehay 2007). These practices were *not new*, but evolved over time and in conjunction with the changes that came to Araucanian society in the 16<sup>th</sup> and 17<sup>th</sup> Centuries (Bengoa 2000).

Those structures were and are based on an overall conception of “being” Araucanian. Because individuals living at Santa Sylvia probably self-identified as Araucanian, they appear to have incorporated useful European goods and participated in expelling the Spanish as part of the wider military activity. These actions eventually forced the Spanish to abandon the Santa Sylvia and Villarrica areas (Gonzalez 1986; R. Quiroga 1577 in Medina 1963). Based on familial relations, language, religion, economics, material culture, and other factors, structure were developed perhaps as early as AD 300, grew, and evolved into the structures that could be flexible in the face of Spanish incursion. Again, not all Araucanians necessarily recognized themselves as “being Araucanian,” or did not ally themselves with the Spanish (see Chapter 3), turning more towards biased transmission as a result. But the overall structure of Araucanian society was based on an individual and communal recognition of what it meant to “be Araucanian” coinciding with political and economic structures that fostered recognition of “being Araucanian,” and overall cultural resilience to Inka, Spanish, and Chilean attempts at control. This concept of resilience will be explored in the next chapter.

## CHAPTER 5

### RESILIENCE THEORY AND THE SANTA SYLVIA ARAUCANIANS: RESILIENCE, ATTRACTION, AND STRATEGIC INCORPORATION

The previous chapter explored some of the discussion and debates on the concept of identity, and how individual identity relates to ethnicity (or group identity) which textures how individuals and groups act in accordance with their knowledge and power. An individual's identity, ethnicity, and agency are shaped by, though not completely dependent upon, the society in which they are found. In other words, the structures of a given society define, and are defined by, individuals and groups, how they perceive themselves, how they are perceived by others, what actions they perform and are capable of performing based on those perceptions, and vice-versa (Giddens 1984). The construction and re-construction of cultural structures coincides with and exerts reflexive influence on individual and group identities, as well as providing the venues for agents to act and to be acted upon.

To illustrate this recursive relationship between identity, ethnicity, agency, and power, how these relationships affected how the Araucanians at Santa Sylvia incorporated select Spanish materials while avoiding others while maintaining pre-existing cultural practices, this research uses Resilience Theory (RT) to hypothesize how the Araucanians and their culture could absorb influences from the Spanish without experiencing the kinds of changes that would create different power relationships. It is argued here that the traditional structures of the Araucanians at Santa Sylvia, part of the wider Araucanian culture system, through the actions of internal agents, developed both the stability and flexibility over centuries to incorporate useful items and concepts without irrevocably changing the long-standing aspects of the society, or affecting them insomuch that a different, hybrid society emerged.

Briefly, RT analyzes “the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function” (Walker et al. 2004:5). RT, as used here, places emphasis on not just the ability of a system to respond, but also the *flexibility* of systems, individuals and groups to absorb disturbance. This flexibility is contingent upon the identity and agency of the individuals within the system and their ideology: how these actors see themselves, how they perceive the system itself, and how they see others from outside the system affects what they incorporate, what they change, and why. The ideology of the individuals and communities within can affect the strength of the system itself and the effectiveness of any changes. For example, if the President of the United States sought to extend his presidency past the two terms allowed by the Constitution, he or she would likely fail due to the laws already in place as well as a negative response from the population. If the President could change the underlying ideology of the US population, success might be attainable. Ideology, then, is an important aspect in how actors are able to maintain and restructure a cultural system (Dillehay 2007).

Cultural systems, through actions inside and outside, pass through developmental cycles or phases (known here as the Resilience Cycle, or RC): growth, conservation, release, reorganization/rebound, and reorganization/exit (Figure 14). Resilience is thus more than resistance, or “oppositional behavior” (Hollander and Einwohner 2004), and more than structural functionalism (Murdock 1949; Parsons 1960). RT incorporates stability, flexibility, absorption, restructuring, and importantly agency and ideology. These aspects influence how actors experience and incorporate change into their cultural systems, while at the same time maintaining the base structures or traditions (Thompson and Turck 2009). This research further hypothesizes that for the Araucanians at Santa Sylvia, these facets of RT (flexibility, absorption, modification) came about through the actions of agents on *their* terms, not Spanish terms, which aided in avoiding hybridized or syncretized cultural practices, perpetuating the Araucanian cultural system and ideology

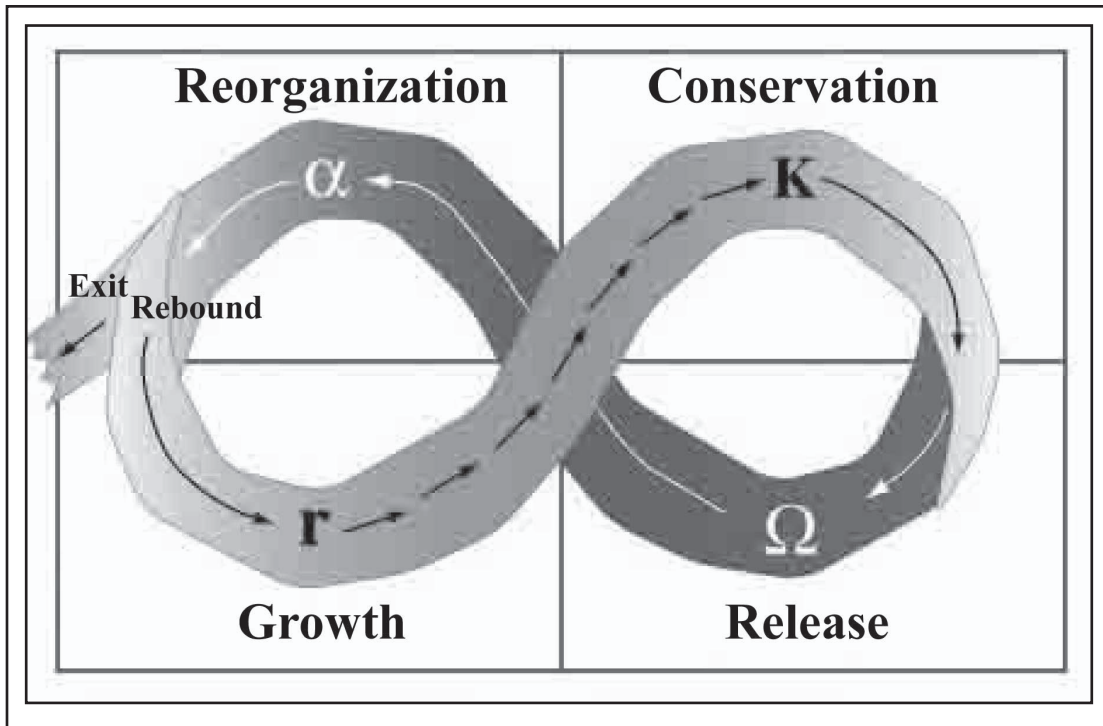


Figure 14: Diagram of the Resilience Cycle showing the various phases: growth, conservation, release, reorganization/rebound and reorganization/exit. Adapted from Walker et al. 2004.

for nearly four centuries.

Further, RT can illustrate power relationships and the effects between different cultural systems, referred to as “basins of attraction” (Walker et al. 2006). A basin of attraction is the “pull” or influence exerted by a combination of structure and ideology on the overall cultural system, illustrated as a 3-dimensional model (Figure 16a-b). The flexibility of system structures (or their ability to incorporate disturbance) and how individuals perceive the system exerts a “pull” towards maintenance of traditional practices and patterns, or a “stability domain.” The introduction of a new basin of attraction (such as one based on Spanish cultural structures and ideology) elicits a new “pull” on the cultural system. If the new basin is strong enough, the previous cultural system will pass a threshold to the new basin and stability domain. This change often signifies a shift in power relations, culminating in a reorganization/exit phase to a new RC. Using RT as a heuristic analytical concept, this research suggests that the creation

and maintenance of the Araucanian cultural system developed in such a way for actors to incorporate particular materials from the Spanish that were considered useful. At the same time, Araucanian actors strategically modified some aspects of traditional social and spatial organization to avoid a shift to the Spanish basin of attraction and stability domain.

In a counterexample to the Araucanians, the Puebloans of central New Mexico in the United States, like the Araucanians, managed to expel the Spanish in a revolt that lasted from 1680 to 1692 after having been subject for nearly 100 years (Barrett 2002; Bowden 1975; Kessell 2002; Liebmann 2010; Silverberg 1994; Weber 1999; Wilcox 2009). The Pueblo Revolt, however, was not sustained for multiple reasons, notably changes that came to their traditional economic (increased reliance on Spanish goods), social (movement away from prior settlements to Spanish towns and forts and the introduction of a mestizo class), political (pueblo chiefs allying themselves and their peoples with Spanish governors) and religious (introduction and adoption of Catholicism) systems from AD 1598 to the revolt in 1680 (Liebmann 2010; Preucel 2002; Riley 1999; Weber 1999)<sup>1</sup>. Even though the Puebloans managed to expel the Spanish for a decade, the accumulated effects from years of Spanish authority had already shifted their culture system into a new social structure and basin of attraction, one that could not sustain the efforts to return to the previous basin. Power relationships had shifted, alliances changed, and concepts of identity were transformed. Attributes of the previous system persisted, such as some religious practices, settlement patterns, and kin relationships (Adams 1991; Roberts 2004), but overall a new cultural system came into being in new RC, along with new identities, recognitions of ethnicity (including the growing mestizo class; Dobyns 2001), and different avenues of agency and power.

In sum, RT has potential to provide a framework for the processes that constitute

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<sup>1</sup> And, like the Araucanians, the Puebloans experienced intergroup fighting, but in the case of the Puebloans the infighting was widespread enough to limit the ability of revolutionary leaders to maintain the revolt (Haas and Creamer 1997; McGuire et al. 1996).



the maintenance, sustainability, and resurgence (“synthesis in time of reproduction and variability”; Sahlins 1985) of cultural systems and structures against outside disturbance. RT works as a conceptual device useful for understanding the development and maintenance of cultural systems and structures while incorporating elements of agency and power as part of the explanatory framework.

### **The Role of Structure, Agency, and Power in Resilience**

The previous chapter introduced the concepts of structure, agency, and power put forth by Giddens, Bourdieu, Wold and others. Here they are briefly expanded upon as they relate to RT. As noted before, structure, agency, ideology, and power are important for understanding resilience at Santa Sylvania and perhaps the wider Araucania, as the Araucanian cultural system, identities, and agency are recursive and contribute to system resiliency. Those structures that constitute a society influence the creation of individual and ethnic identity, and often construct the ways in which agents can maintain the system, or whether they reorganize into something new.

Structures, according to Giddens (1979:64) “provide the ‘binding’ of time and space in social systems” and “can be understood as rules and resources, recursively implicated in the reproduction of social systems.” Social structure is what members of a society or social system both perceive and make them to be, based on traditional patterns and societal needs in the present. Structures affect how people act and move, and how those actions are perceived by other members of the society. Structures are also scalar, in that what may be “the norm” at one level of society may not function at another, or the rubric whereby people move and act can change in a given situation based on the structures in place. Thus, agency, ideology, and power become important in navigating and changing structures—successful navigation or change requires knowledge and understanding of what can and cannot be done by an individual or group within the overall social system.

Social systems are “systems of social interaction; as such they involve the situated

activities of human subjects, and exist syntagmatically in the flow of time. Systems, in this terminology, have structures, or more accurately, have structural properties; they are not structures in themselves” (ibid:66). Social systems are composed of people who act and move based on structures that have been in place or are put in place, and those actions recursively create (reify) the structures and overall social system. This has the potential of devolving into a chicken-or-egg debate, but Bourdieu (1979) points out (referencing *habitus*) that these social systems are both structured by and re-create particular structures. In many cases, the structures themselves can be composed of structured systems, depending on the scale of activity or analysis (more on scale below).

In the present research, the primary structures that compose the Araucanian cultural system at Santa Sylvia were argued to be political, economic, social/demographic, and ideological in Chapter 3. Unlike systems, these structures exist outside of time and space (Giddens 1979:73). In other words, they have always existed and will always exist, in one form or another, though in various iterations based on the culture under study. Specific attributes provide coherency and meaning for the individuals and groups within a particular organization. Thus researchers are able to study politics or economics across the world and throughout time, as these structures are parts of any cultural system.

Araucanian agents are individuals who have an understanding of the system and one or more of its structures, and are able to navigate the same to meet their own or wider social goals, such as removal of the Spanish and emphasis on ancestor propitiation for success in that effort. “Action depends upon the capability of the individual to ‘make a difference’ to a pre-existing state of affairs or course of events. An agent ceases to be such if he or she loses the capability to ‘make a difference’, that is, to exercise some sort of power” (Giddens 1984:14). Agency is not simply the ability to move and to act, but to do so with a purpose, or with the potentiality of achieving a certain design or goal. Agency, knowledge, ideology, and power are inextricable: to be an agent means to have

knowledge and power to move and act; to have knowledge provides the potentiality to be an agent with power; and to have power means to know how to act and move in a particular sphere (Mann 1986; Wolf 1999, 2001).

Within the conceptual framework of RT, agents are the prime movers who affect and are affected by the structures and broader cultural systems. Structures and systems only exist inasmuch as people *make* them and are recursively made *by* them (Giddens 1984). For a system to be maintained, or to “absorb disturbance while retaining essentially the same function” (Gunderson and Holling 2002) depends on the actions of agents within. If Araucanian agents had failed to act, or acted in a way detrimental to the system, the traditional structures would have shifted to the authority and power of the Spanish. RT provides a framework for understanding this interplay between structure, system, agency, and action. By applying this to the Araucanian example, a richer understanding of how the Araucanians could and did resist the Spanish and maintained independence comes to light. Analysis of the material correlates along with oral and written histories, Araucanian resilience Santa Sylvia can include **1**) a continuation of a pre-existing or traditional system that included political, social, and economic patterns, and **2**) the incorporation of useful Spanish goods, such as foodstuffs and animals, with a concurrent avoidance of foreign control and influence.

## **Resilience Theory**

### *Overview*

The basis of RT is derived from the work of economist Joseph Schumpeter, who analyzed the stability of the capitalist economic system in the mid-20<sup>th</sup> Century (Schumpeter 1928, 1976, 1991). Schumpeter argued that the capitalist system was one of “creative destruction” wherein new goods and services would enter in the system, thereby “destroying” the old ways via new creativity (Schumpeter 1976). However, the overall

structure of the capitalist system remained, incorporating these outside “disturbances” into the pre-existing structure (Schumpeter 1928). He further argued, particularly in his discussions on Marxism and Socialism, that sociological effects could have the impetus to destroy the capitalist system if pushed to that level, as seen in the Russian and Chinese Revolutions (Schumpeter 1976, 1991). Schumpeter’s argument, then, suggests that social and economic interests are inextricable, and that a system could be resilient if it could absorb outside disturbance without experiencing fundamental systemic change.

Schumpeter’s arguments found limited use in anthropological or sociological circles and the RT model did not work into a general theoretical schema until the 1970’s. In 1973, ecologist C.S Holling first defined RT, specifically in the management of ecological systems. Holling argued that some ecological systems tended towards being “resilient” rather than “stable,” by which he meant that stability would tend to lock a system into a pattern that, when perturbed from the outside, would be unable to maintain systemic integrity and would morph into a new system. A resilient system, on the other hand, would be able to take in outside disturbance without experiencing the systemic shifts seen in less-resilient systems. Stability, though seemingly desirable, would not be conducive in the long term to managing or maintaining a system because all systems, at one point or another, are affected by some sort of outside disturbance (Holling 1973). This is similar to how all cultures are in contact with and influenced by others (Wolf 1998).

RT slowly gained traction amongst ecologists over the last 30 years, particularly in the late 1990’s and early 2000’s (Gunderson 1999; Gunderson and Folke 2002; Pritchard and Sanderson 1999; Walker 1995). Other researchers with interests in human-environment interactions began to adapt and expand the theory to analyze the interactions between human society and ecological systems, particularly how humans could learn to manage the environment for the purposes of sustainability (Walker and Salt 2006). The formation of The Resilience Alliance in 1999 brought together researchers from

various disciplines to study the effects of humans on the environment and vice versa, and to develop the methodologies for governance and maintenance of so-called “social-ecological systems” (or SES; Berkes et al. 2003; Folke 2006; van der Leeuw and Aschan-Leygonie 2001).

To the present day, most studies using RT tend to focus on SES analyses, since “[systems] of people and nature co-evolve in an adaptive dance” (Gunderson 2003; Walters 1986). These interdisciplinary studies center on the interplay between humanity and ecology. Though ecological studies using RT are often treated alone, rarely do these studies look at the social systems by themselves without an ecological viewpoint. This has been the case in recent archaeological uses of RT (Hegmon et al. 2008; Nelson et al. 2006; Redman 2005; Redman and Kinzig 2003). Like SES studies, RT in archaeology grew from analyses of human-environment interactions in ecological and landscape anthropology and archaeology (Crumley 1994; Hirsch and O’Hanlon 1995; Nelson et al. 2006; Redman 1999; Redman et al. 2004; Stewart and Strathern 2003; Thompson and Throck 2009) In some instances, researchers have used RT without defining it as such (Nelson 1999; Upham 1984). The present research focuses on using RT for strictly social phenomena, rather than the incorporation of ecological information.

Archaeology is particularly suited for using RT, due to the long-term views employed in most research. Redman (2005:70) states that, in studying the interactions between different aspects of human society, “[these] interactions can best be understood from a perspective that takes those long-term dynamics into account and addresses question from an integrated, often interdisciplinary, perspective on human societies....” Further, archaeology “permits more in-depth monitoring of the slow processes and low-frequency events that appear to be the key to ultimate system resilience” (ibid). Thus, archaeology is in the unique position to provide *longue-durée* analyses that bolster the theoretical strength of RT (Redman and Kinzig 2003). However, as Redman (2005) points out, RT should be used from an “integrated” and “interdisciplinary” perspective.

For the present research, studying the Araucanian/ Mapuche in and around Santa Sylvania, particularly during the era of Spanish contact (AD 1550-1602), must use archaeology, ethnography, and ethnohistory to view the development of culture and resilience through time, and the applicability to other Araucanian groups during the same time period elsewhere in south-central Chile.

### *Specifics of Resilience Theory*

RT itself has been defined by The Resilience Alliance and by most users of the theory as:

1. The amount of change [a] system can undergo and still retain the same controls on function and structure, or still be in the same state, within the same domain of attraction;
2. The degree to which [a] system is capable of self-organization; and
3. The ability to build and increase the capacity for learning and adaptation (Berkes et al. 2003:13)

Simplified, Walker et al. (2004) define RT as “the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks.” A system is resilient if, when exposed to strong outside forces, it can absorb or adapt to that change in such a way as to retain the overall pre-existing structural form with limited effects to the system, or without the base components of the system being modified into something new. The change that comes to a system, also called a “regime shift,” may have strong similarities to the previous system or subsystems, but at some level its nature has changed. As it is applied in this research, a regime shift signifies a change in power relations from one group to another, or when a culture reorganizes and political, economic, social, and/or ideological authority is vested in a foreign group. For the Araucanians at Santa Sylvania, this research suggests that that a regime shift did not transpire until the late 19<sup>th</sup> Century.

This research emphasizes the flexibility of a system, as well as its adaptability and transformability as directed by goal-oriented actors and their ideology. This sets RT apart from other, similar social theories such as structure-functionalism or Systems Theory described by Bourdieu, Giddens, and others (Gunderson et al. 2010; Redman and Kinzig 2003; Thompson and Turck 2009). The ability of a system to “absorb disturbance” and “retain...the same function” is largely based on the actions of agents with particular ideologies, which provides stronger ontological security for theorizing cultural continuity and change than other concepts by themselves. RT incorporates, in the vein of Giddens (1979), human agency in mitigating disturbance, strategic modification, and systemic maintenance and perpetuation.

More specifically, Walker et al. (ibid) include four “crucial aspects” of resilience that can “apply...to a whole system or the subsystems that make it up.” These are

1. **Latitude:** the maximum amount a system can be changed before losing its ability to [rebound] (before crossing a threshold which, if breached, makes [rebouncing] difficult or impossible).
2. **Resistance<sup>2</sup>:** the ease or difficulty of changing the system; how “resistant” it is to being changed.
3. **Precariousness:** how close the current state of the system is to a limit or “threshold.”
4. **Panarchy:** because of cross-scale interactions, the resilience of a system at a particular focal scale will depend on the influences from states and dynamics of scales above and below. For example, external oppressive politics, invasions, market shifts, or global climate change can trigger local surprises and regime shifts.

These four aspects will be explored in more depth below, but serve to point out that systems are usually multi-scalar, and that disturbances can have both bottom-up and top-down effects on the system, structures, individuals, and groups. For example, in the Araucanian system some disturbances might be identified at the household (*rūka*) level

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2 Not resistance in the same sense discussed above. See Holland and Einwohner 2002; Ortner 1995..

which can radiate upwards to the *lof*, *rehue*, *ayllarehue*, and *butanmapu* levels. These *ruka*-level disturbances may exhibit agency, as the *ruka* acts to rectify the disturbance by calling on kin relations and networks. If the disturbance is strong enough, those networks can expand to incorporate greater organizational levels. From the top-down, leaders of *butanmapu* and *ayllarehue*, recognizing an encroaching threat, might use their own networks to call upon warriors from various *rehue* and *lof*, which eventually affects the *ruka*-level organization.

Additionally, some disturbances are immediate and acute, while others may percolate for a period of time before affecting the system. “A key insight is that... resilience is mediated and lost due to the interaction of variables that operate at distinctive scales of space and time” (Gunderson et al. 2010:xvii). RT becomes highly useful as an analytical and heuristic tool for archaeologists and historians dealing with long cultural sequences with multiple variables and impacts. The construction of Santa Sylvania itself can be perceived as an “immediate and acute” event for the Araucanians living in the area, while in the wider Araucania the effects of one settlement may not be seen to be as affecting the overall cultural system. After the expulsion of the Spanish from the area in the late 16<sup>th</sup> Century, the prolongation of tensions and fighting along the Bio Bio frontier to the northwest was then “immediate and acute” in that area but does not appear to have exerted the same degree of effect on the Santa Sylvania area in the subsequent 17<sup>th</sup> and 18<sup>th</sup> Centuries. RT can be used to describe these multi-faceted and multi-scalar effects of Araucanian and Spanish interactions on the Araucanian system at Santa Sylvania.

The four intertwined system structures<sup>3</sup> mentioned above compose the bulk of system organization. Each structure functions separate from but in concert with the others under an overall cultural system, and the loss of control one or more has the potential to alter the others and the system as a whole. For example, changes to the political and economic structures may have a limited effect on social organization or

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3 These are also what Walker et al. (2004) call “nested dynamics operating at particular organization scales.”



religious practice, but changes to the former structures can modify the cultural system as a whole, eventually bringing change to the latter and altering, often irrevocably, the total system. These structures function together to structure the cultural system, to absorb and distribute disturbance or mitigate the effects of the same on the structure as a whole. Again, these structures are created and maintained by agents, acting in particular ways based on their knowledge, identity, ethnicity, ideology and goals. They are not in existence by and for themselves, but as part of the cultural system composed of individuals and related communities or groups.

### *The Resilience Cycle*

Because of its diachronic nature, RT is cyclical, or the result of actions and reactions to multiple disturbances at various scales over time (Folke 2006; Gunderson and Pritchard 2002; Gunderson et al. 2002; Redman 2005). This is illustrated in what Gunderson and Holling (2002) term the “Adaptive Cycle” (Figure 14), here called the “Resilience Cycle.” The Resilience Cycle (RC) illustrates the stages through which a system passes and can be expanded to fit various connected scales, known as Panarchy (Gunderson and Holling 2002; Walker et al. 2004). The cycle is seen as a figure-8 Mobius strip of four phases: growth (r), conservation (K), release ( $\Omega$ ) and reorganization ( $\alpha$ ), to which have been added “rebound” and “exit” subcomponents to better illustrate the ability of the system to return to the previous RC without experiencing a regime shift (*sensu* Thompson and Thurck 2009). Though illustrated as passing from one to another, systems can in fact skip phases based on disturbances or events and are not locked in to a particular sequence, e.g. a system can pass from growth directly to release and reorganization, bypassing the conservation phase. There is also no time limit to these phases, the conservation phase perhaps being the longest of the four in a given cycle. If a system, through the agents within, navigates disturbances to the system in the other

phases, during the reorganization phase the system can “rebound” back into the same RC. Additionally, an exit may exist within the reorganization phase for the creation of a new system if the former system cannot rebound, entering a new RC. This is known as a “regime shift,” or movement to a new “stability domain” (Gunderson et al. 2010; Holling et al. 2002; Walker and Salt 2006).

In a generic culture system, the growth phase usually involves the initial development of cultural attributes, particularly population increase and the creation of particular material culture elements. It can also include the development of trade and exchange networks (economic structures), household- and or kin-level patterns and interpersonal relationships (social structures); inter- and intra-community relations (political structures); and religious activities (ideological structures). Archaeologically speaking, the development of these systems can include or be suggested by attendant material correlates. For example, the early United States borrowed heavily from Great Britain for social foundations, but after independence developed separate trade networks, social hierarchy, political organization, and religious patterns, which could be seen in money, the construction of Washington D.C., road networks, the flag, and church diversity, among many other indicators of a “regime shift” from the British system to the new American system (Wood 1998).

The conservation phase generally continues systemic development from the growth phase, which can be seen as the amassing of political, economic, social, and religious capital, or overall “cultural capital” (Bourdieu and Passeron 1990)<sup>4</sup>. In this phase the system continues to operate in a state perhaps more stable than before as the base structures have been in place and function with minor modifications. Modifications may include the adoption of a new style of pottery or other technology, the transition from one governing individual or body to another, overall population increase, trade with a new partner, and so on. In essence, however, the fundamentals remain the same overall.

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<sup>4</sup> Bourdieu and Passeron (1990) consider cultural capital to be separate from political, economic, or social capital.

During the conservation phase, the system has the potential to enter into what is called a “rigidity trap” or what Holling initially viewed as a “stable system” (Holling 1973; Holling et al. 2002; Hegmon et al. 2008). Hegmon et al. (2008:314) state that “[rigidity] traps may be unintended consequences of repetitive acts that reproduce or extend the structure (i.e. a bureaucracy). In other cases, some segments of society may contribute to the creation of a rigidity trap by intentionally attempting to maintain a situation that they perceive to be beneficial.” In essence, during the conservation phase the system has some degree of **latitude** (see above) to change and adapt, and if a system becomes too rigid then the latitude decreases (Walker et al. 2004).

There can be multiple ways that social systems can fall into a rigidity trap, including strict ideology, lack of innovation, the aforementioned bureaucracy, and others, both internal and external to the system and agents. These can cause the system to be increasingly **resistant** to change which can be seen as detrimental to the system. For example, the Rappite religious sect in the eastern United States during the early 19<sup>th</sup> Century believed that sexual intercourse would lead to “disharmony” and thus practiced an extreme form of celibacy. Their numbers increased somewhat through the mid-1800’s, but with no children being born into the sect the number of adherents declined rapidly. Though some advocated sexual activity for the purposes of procreation, sect leadership refused and the group eventually became extinct by the beginning of the 20<sup>th</sup> Century (Sutton 2003). Rigidity traps, perhaps centered in the ideology of actors within the system, inhibit how the system “absorbs disturbance” and maintains integrity against outside influence. Rigidity traps may be the primary cause behind systemic shifts into new stability domains (Gunderson 1999; Holling et al. 2002).

Falling in to a rigidity trap can facilitate cycling into the release phase of the Adaptive Cycle, yet any form of strong disturbance can lead the system into the release phase, which Holling et al. (2002:34, drawing upon Schumpeter 1976) also call “creative destruction.” This phase exhibits the **precariousness** of the system. In some cases,

particularly ecological, the system becomes increasingly fragile during the conservation stage, and the introduction of disturbance forces the system to either adapt or reorganize (Holling et al. 2002; Walker and Salt 2006). In social systems, internal pressures can be the stressor that facilitates systemic change, though often it is external disturbance that throws into relief the fragility or rigidity of the system and structures (Redman 2005; Redman and Kinzig 2003; Walker et al. 2004). As will be discussed below, the principal stressor for indigenous groups in North and South America was the arrival of European colonizers who brought new structures and basins of attraction, and attempted to impose these on the native groups encountered.

After releasing, or experiencing “creative destruction,” a system has two options: exit to a new, different RC, or maintain systemic fundamentals and rebound back into the RC (see Figure 14). A different RC as part of a new stability domain is, in essence, a new system as some facets of the system structures have changed. This is often seen in a change in the power relationships within the system. The vestiges of the previous fundamentals are there, but overall the society in question exists with new structures and power relationships. With the same Rappite example, after the system could no longer be self-sustaining, the remaining followers exited to a new system. They likely adhered to many of the previous tenets and propagated those beliefs, but the general Rappite system and attendant structures were abandoned. The power that leaders had over adherents was lost, and the movement became extinct (Sutton 2003). Again, the internal and external effects on a system and movement through the different phases of RC come about because of the actions of individuals and groups, not because of the system itself.

### *Panarchy*

Mentioned above, RC is also a matter of *scale*, and generally involve a consistent interaction between various scales, both top-down and bottom-up. Additionally, these scales can and do move at different speeds. Sometimes large-scale changes take time to

reverberate down to the small scale and vice-versa. This scalar- and speed-based analysis is known in RT as *Panarchy* (Gunderson and Holling 2002). Holling et al. (2002:74) define Panarchy as “a cross-scale, nested set of [resilience] cycles, indicating the dynamic nature of structures...” (see also Berkes et al. 2003; Folke 2006; Folke et al. 2004; Redman and Kinzig 2003; Walker 1995).

Panarchy, illustrated in Figure 15, shows the interconnected, scalar nature of RC. All cultural systems operate in scales, whether it be a hierarchy or heterarchy within, or how the system relates to exterior stimuli, including other social systems and the environment. Some scales change rapidly, others slowly, depending on the aforementioned interior or exterior disturbances each with a connected RC and the action of agents (Holling et al. 2002). Smaller scales are generally affected the most by disturbance, moving into the release phase more often, which can eventually affect higher levels. Ripples of disturbance can continue to reverberate and affect increasingly higher levels if not contained or acted upon. This may be illustrated by a town such as Nashville, Tennessee being affected by a disturbance such as the flood of 2010, which effects reverberated to the regional level of Middle Tennessee. If the system is resilient, the state of Tennessee should be able to mitigate the effects of the disturbance (the K phase “remember” in Figure 4.2) and return Middle Tennessee and Nashville to a stable state (reorganization in the RC). If the system breaks down at the state level, then the Federal level steps in to aid in return to a stable state. If the effects are so great that the various scales break down, then the entire system and Panarchy will exit the previous system and reorganize anew (a new overall RC).

This example is overly simplistic, but illustrates the nested nature of human cultural systems within an RT framework. These can be broken down into smaller scales per investigative needs. Scales are important in the present Araucanian example as local and regional connections, interactions, and differences aided actors in overall Araucanian system resilience. “No [system] can be understood by examining it at only one scale”

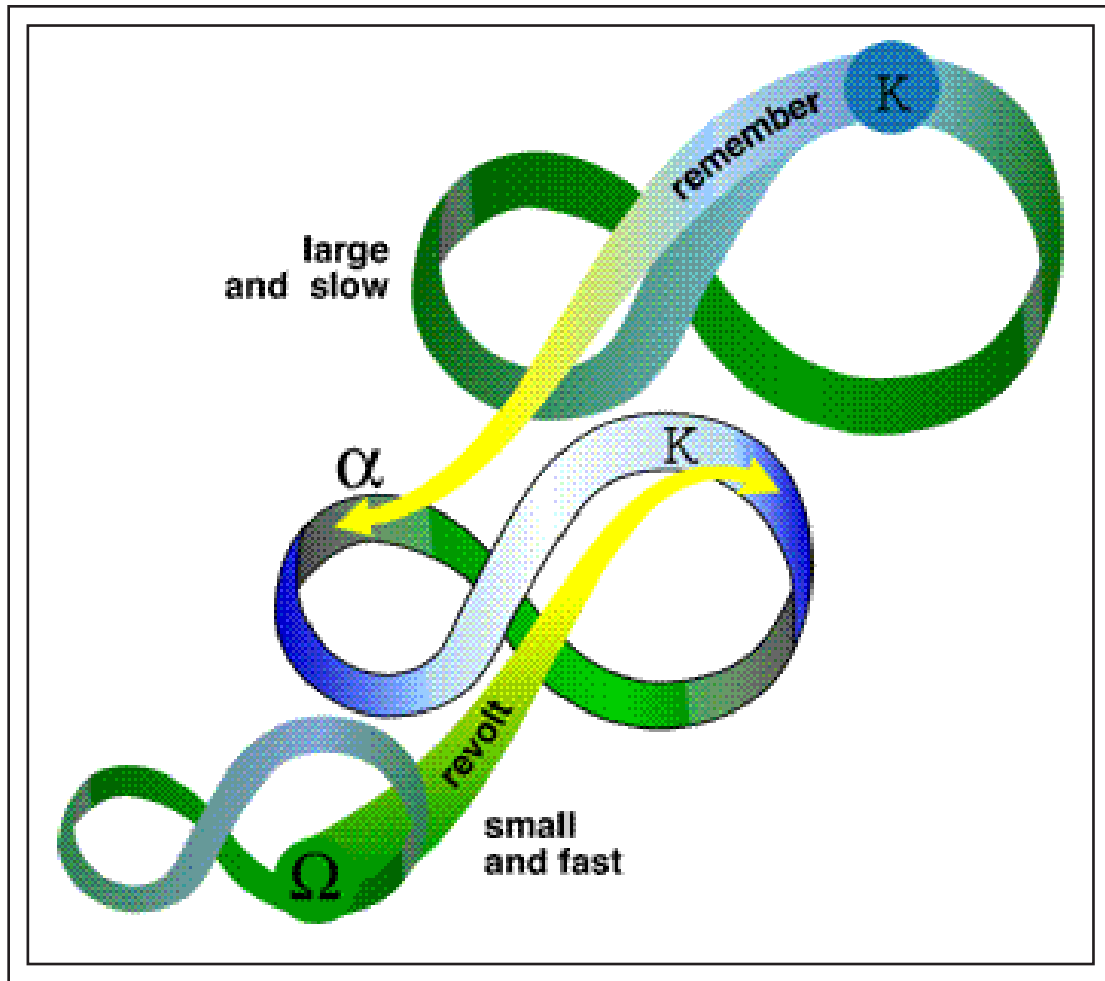


Figure 15: Diagram showing the nested, scalar Panarchy described in the text. From Gunderson and Holling 2004.

(Walker et al. 2004). For example, the present study focuses on the Araucanians in one place (Santa Sylvania) during one general time period (Spanish contact, AD 1550-1602). Though the emphasis is on what the Araucanians were doing at Santa Sylvania during a particular time, they were nonetheless part of larger Araucanian and Spanish cultural systems that extended geographically through kinship relations and other networks, seen in the sharing of artifact styles, religious practice, and settlement patterns across distances; oral and written histories; and modern ethnographies. Thus, Santa Sylvania is a part of the broader context of the Araucanian culture system and within the wider scope of the RT framework. Distinct but similar processes of adaptation and panarchy may have

been happening elsewhere, such as in Purén-Lumaco (Dillehay 2007), which, through social networks, affected Araucanians living in Pucón-Villarrica and at Santa Sylvania, and vice-versa.

*Stability Landscapes* .....

An important part of social system maintenance within RT is what Walker et al. (2004) call the “stability landscape” related to the “stability domains” mentioned above. These are useful to illustrate culture contact, and are defined as “the various basins that a system may occupy, and the boundaries that separate them” (ibid). Illustrated in Figure 16a-b as a three-dimensional model, these basins incorporate the abovementioned facets of **latitude**, **resistance**, and **precariousness**. Latitude, again, is how much a system can change before the effects of disturbance are irreversible, or how flexible the system can be. Resistance refers to the ease or difficulty in changing the system, and precariousness is how close the system is to the “threshold” or a regime shift to a new basin of attraction. The attraction that a basin exerts, argued here, is related directly to the perceptions of the individuals and groups that compose the system.

For example, the dominant two-party political system in the United States is seen by many as “the way” to administer governmental affairs, and changing to a multiple-party system has been difficult. The veracity of this position is irrelevant; what is important is that individuals within the system *perceive* the two-party system as correct. Thus, the two-party system “basin” has exerted pull on the political structure of the country and is highly resistant to change, though exhibiting latitude in allowing for some influences from other parties, such as the Tea, Green, and Libertarian, though their influence is usually minimal. Were the multiple-party system, or “basin” to gain more acolytes or exert more pull, the political system would shift towards this new basin and, possibly, cross the threshold into the multiple-party basin of attraction. This shift would bring a new set of attractors, resistors, and latitude, or a new “state space” that includes

new power relations for actors. More broadly, cultural systems and their compositional structures follow much of the same pattern, built by the individuals and groups who act in certain ways based on their understanding of how the system works and how they *want* it to work, and what can actually be done to maintain or change the system.

To briefly modify how Walker et al. (2006) define “state spaces” in SES’s, the “state space” of a cultural system is “defined by the...variables that constitute that system.” These variables that define a social system are the structures that compose the overall cultural system. The “state space is the three-dimensional space of all possible combinations of the amounts of these [four] variables” and a “basin of attraction is a region in state space in which the system tends to remain” which tends towards a “state of equilibrium” (ibid). In other words, a human cultural system is the result of unlimited possibilities in combinations of political, economic, social, and religious activity, composed of and constrained by human beings themselves. There thus exists an “idealized” or equilibrium state, wherein the system functions exactly as the majority of the inhabitants act for it to function, also known as an “attractor.” But, “all real world [systems] are...continuously buffeted by disturbances...and decisions of actors that tend to move the system off the attractor” (ibid). Notably, a system can change basins without itself changing immediately or obviously (Figure 16b), though it is now closer to the different basin that can exert a stronger attraction to the system than the previous basin. This can and often does lead to a regime shift, reorganization/exit to a new RC, and a change in power relations within the system.

Human systems, then, are affected by disturbances from both the inside and outside. Sometimes, the decisions made by agents within affect the system. Other times, the outside disturbance affects the system, or exerts such an influential “pull” that there is nothing the members can do to avoid movement to a new basin of attraction. Most times, though, it is a combination of the outside disturbance and the decisions of the agents in the system that can determine whether or not the system avoids a new basin of attraction,



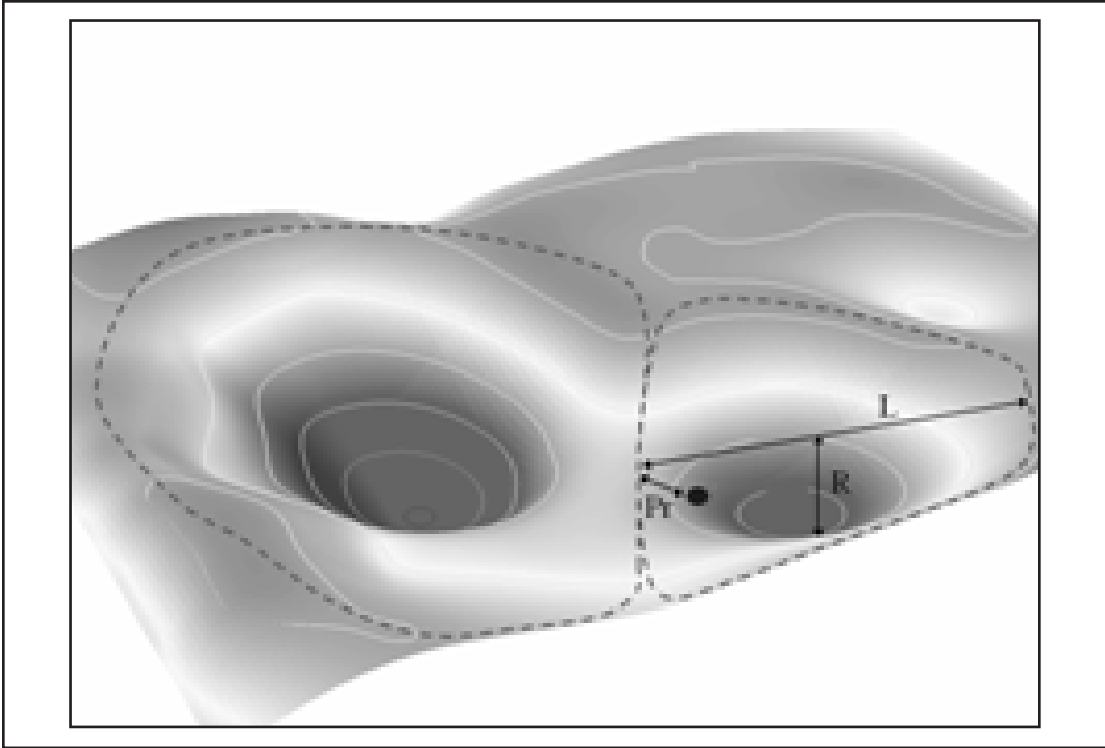


Figure 16a: Diagram of a stability domain with two basins of attraction and culture system (black dot) described in the text. From Walker et al. 2004.

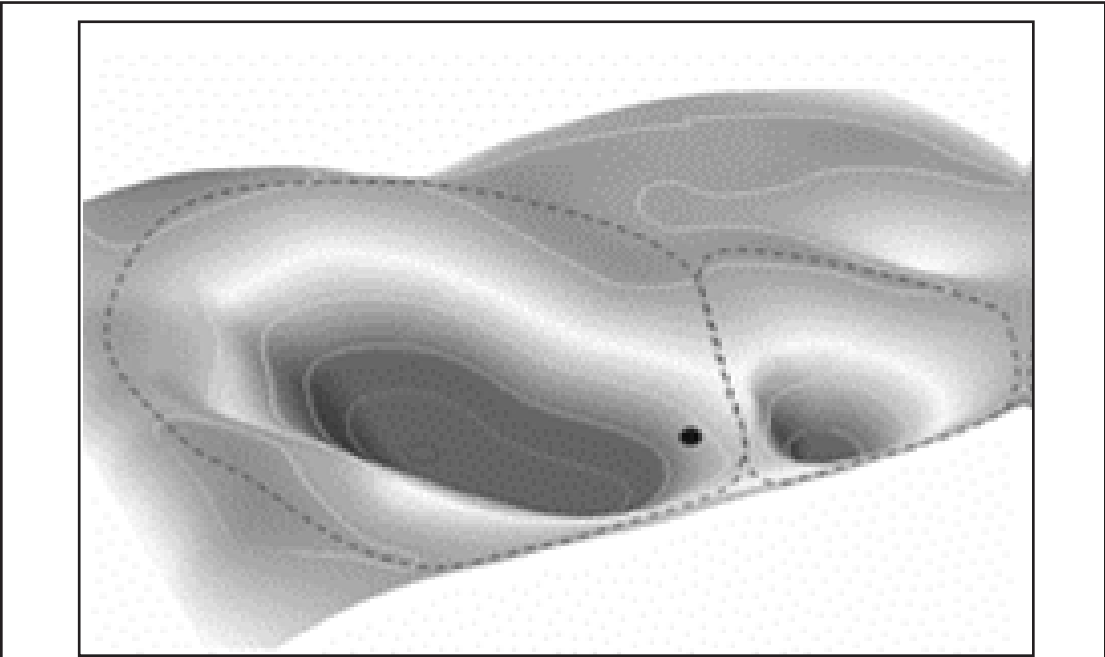


Figure 16b: Diagram of stability domain with basins of attraction in which a culture system has shifted from one basin to another. From Walker et al. 2004.

state space, and RC. Critics of RT have questioned normative issues of “good” vs. “bad” resilience—whether or not the shifts to new cycles or spaces is beneficial to the system or not (Duit et al. 2010; Leach 2008). In human systems, such debates can tend to the philosophical minutiae of moralizing “right” or “wrong” aspects of culture. On the one hand, if decisions made within an adaptive cycle maintain an oppressive political regime (see Duit et al. 2010), then the argument may be valid to say that such resilience is “bad.” Decisions made within that political regime that cause a shift to a new basin of attraction leading to an exit from the RC, making the previous system not resilient may be seen as “good.” In either case, Resilience Theory can be used to explain the various scales, shifts, attractions, decisions, and actions that go into make a system resilient or not.

### **Resilience Theory Hypothetically and Comparatively Applied to the Pueblos of New Mexico**

The Puebloan example was used earlier as a counterpoint to the Araucanians, noting some of the shifts that came about in their social system with the arrival of the Spanish. In this section that example is used within the framework of RT as the following chapters will flesh out the Araucanian example more in depth. The contrasting example of the Pueblos is used to briefly illustrate how RT can be used to frame the actions of agents and groups within a cultural system, as based on a particular identity, in adaptation to outside disturbance through the phases of RC. The Pueblos were chosen based on **1)** their similarities to the Araucanians (disbursed settlement pattern, demography, level of political development, and location at the other end of the Spanish empire, based on information from archaeology, ethnography, and ethnohistory), and **2)** their direct resistance to Spanish control, exhibited in the rebellion of AD 1680, which lasted until AD 1692.

The Pueblos (so-called by the Spanish because they lived in villages, or

*pueblos*) were first encountered by the Spanish in the late 16<sup>th</sup> Century in what today is central New Mexico in the southwestern United States (Kessel 2002). They were composed of numerous autonomous but linguistically-interrelated villages along the Rio Grande River basin from Taos in the north to Senecu in the south, extending to the west as far as Oraibi in Arizona (Preucel 2002b:10). The prevailing hypothesis is that the Puebloans arose from older southwestern groups, such as the Anasazi and Mogollon, who abandoned their lands in northwestern and southwestern New Mexico around AD 1250 in the face of a massive drought (which could be a further discussion with RT, notably by Hegmon et al. 2008; Nelson 1999; Nelson et al. 2006; see also Adams and Duff 2004; Cameron 1995; Cordell 1997; Plog 1997; Spielmann 1998; Stuart 2000). They cultivated farmland along rivers and streams, growing maize, squash, and beans, as well as gathering and hunting (Barrett 2002; Liebmann 2010; Preucel 2002a; Wilcox 2009). Pueblos spoke distinct, though interrelated languages, inasmuch that bilingualism allowed for extensive trade but maintained separation of the various Pueblos into distinct units, which at various times led to conflict (Liebmann 2010).

A shared religion, the *Katsina* cult, was practiced in central subterranean structures known as *kiva*. These religious activities further united the distinct Pueblos (Adams 1991; Bowden 1999; Riley 1999). The political organization consisted of a village chief and elders who oversaw day-to-day activities and relationships with other Puebloan groups (Bowden 1975; Haas and Creamer 1997; James 1997). Though aspects of political organization and religious practice were shared and economic activities were connected, the documentary and archaeological record does not indicate a shared, pan-Puebloan identity (Wilcox 2009). Rather, individual identity seems to be focused on the particular Pueblo, rather than the networks between communities. These differences in identity would play a major role with the arrival of the Spanish (Liebmann 2012). Despite this, the interrelations between Puebloan communities created a “state space” or basin of attraction, based on the structures of the Araucanian culture system. Religious activity,

social organization, material culture, and other aspects were shared across distances and exerted influence on the Puebloan culture system and the ability of Puebloan agents to act in particular ways.

*Resilience Cycle: Growth and Conservation Phases, AD 1540-1680*

The first Spaniards arrived in New Mexico in AD 1540, led by Francisco Vasquez de Coronado, searching for the mythic Seven Cities of Gold. Coronado did not stay long and left no permanent settlements, apparently forced to flee by the Puebloans (Weber 1999). Not until AD 1598 did the Spanish expend the effort at permanent settlement under the direction of Juan de Oñate, who established Santa Fe as the capital of “Nuevo Mexico” with the intent of mining precious ores (Kessel 2002). At this point, a new Spanish basin of attraction was introduced, with its attendant structural signatures (political orientation, economic activity, religion, and social organization) that exerted considerable pull from the outset on the Puebloan cultural system. Insufficient mineral deposits led to the near-abandonment of the settlements in AD 1605, but Roman Catholic Franciscan missionaries intervened, citing the need to save the souls of the thousands of indigenous peoples (Espinosa 1988; Wiget 1996). The Spaniards stayed, making a living through farming and limited mining, primarily through indigenous labor and massive taxation (Knaut 1995). Catholicism was imposed as well, the previous *Katsina* driven underground (literally and figuratively) on penalty of death (Riley 1999). At some point, the Puebloan cultural system underwent a regime shift wherein they passed a threshold from the influence of their previous basin of attraction into the Spanish basin. They reorganized and exited their previous RC and entered a new one in the early 17<sup>th</sup> Century.

Initially, then, Puebloans were in **growth** and **conservation** phases within RC (Figure 14). By the mid-17<sup>th</sup> Century, the Spanish exerted authority over the numerous Pueblos (at least in the Rio Grande drainage) politically, economically, and religiously, and an ever-increasing *mestizo* class contributed to major shifts in social dynamics.

The whys of this shift are numerous, and may be primarily attributed to Spanish force (military prowess particularly), and acquiescence on the part of a majority of the Puebloan peoples (initial revolts were limited; Preucel 2002; Weber 1999). Intentionally or not, the system shifted and power relationships changed, making movement back to the previous stability domain and basin of attraction difficult, though not impossible.

*Resilience Cycle: Release and Reorganization, AD 1680-1692*

In AD 1680, a Puebloan leader known as Popé coordinated attacks and uprisings amongst most Puebloan villages in the Rio Grande drainage and Arizona, which by the end of the year led to the expulsion and evacuation of all Spanish settlers from New Mexico. This unrest had been sparked by increased taxation and the effects of famine and disease among the various Pueblos, as well as the destruction of *Katsina* materials (Knaut 1995; see Weber 1999 for several discussions on the reasoning behind the 1680 revolt). As noted above, the Pueblos were not a united people prior to the arrival of the Spanish, and the coordination of the revolt was unprecedented (Robins 2005). After the Spanish fled, Popé attempted to unite all of the Pueblos together under one leadership, reinstated the *Katchina* cult and destroyed Catholic churches and icons (Knaut 2005). The Puebloans entered, then, into a **release** and **reorganization/exit** (not rebound) phase, release coming in the initial offensive against the Spanish and their eventual removal, and reorganization/exit in the attempts by Popé and other leaders to re-institute the *Katsina* cult, *kiva* worship, and other, pre-Hispanic lifeways and practices. Thus the actions of particular agents drove the movement of the cultural system to release and reorganize/exit, based on their identity as Puebloan with the attendant views on how they should be organized politically, economically, religiously, and socially.

However, the bickering and infighting that existed among Puebloan communities before the arrival of the Spanish (or the lack of a pan-Puebloan unity and identity)

erupted again, and this discord coupled with meager harvests spelled doom for the revolt from the beginning (Silverberg 1994). Within two years Spanish forces re-entered southern New Mexico and began to re-take lost villages, directed by Antonio de Otermín and numerous Franciscans (Barrett 2002; Kessell 2002; Silverberg 1994). By AD 1692, the revolt was over in the Rio Grande drainage (the western Pueblos, such as the Hopi, resisted for some time more, allied with Apaches from southeastern Arizona) and the Puebloans were irrevocably subjected to Spanish government. Unable to fully return to the previous cycle, the Puebloans **exited** the 12-year-old RC (Figure 14) and entered into another new cycle, with new **growth** and **conservation** phases based on a new (and stronger) power relationship with the Spanish.

#### *New Resilience Cycle: AD 1692-Present*

As noted above, the arrival of the Spanish immediately introduced a new basin of attraction into the Pueblo cultural system in a stability landscape, gradually shifting away from the previous basin of Puebloan patterns (Figure 16a). Within the new RC, the Puebloans attempted to **conserve** as many aspects of the structures in the pre-Hispanic cultural system from Spanish disturbance as they could, by moving the *Katsina* underground, adapting economic patterns to include Spanish goods and requirements, and remaining subject to village leadership at smaller scales. The larger scales, however, had probably experienced shifts in power (political and economic in particular) to a new regime and RC that took time to trickle down to the smaller scales, due to the overall imposition of Spanish economic, political, religious, and social authority. Eventually, Puebloans could “absorb” no more disturbance and revolted in AD 1680, attempting to “remember” the previous system (see Figure 15) and remove themselves from the Spanish basin of attraction while entering a new RC. The systemic changes that came about because of the Spanish, however, were too much to overcome for the agents involved, such as Popé and his allies amongst the various Pueblos. Numerous

villages became disenchanted with the revolt and returned quickly to Spanish authority (Silverberg 1994), shifting to a new stability domain and RC. The others could not come to terms with their pre-existing social differences or deal with economic problems, nor unite sufficiently under one political organization. These factors, coupled with the return of the Spanish in force during the late 1680's, tipped the **latitude** of the Puebloan system inexorably towards the Spanish basin of attraction from which it could not recover. Facets of the previous system remained (such as the *Katsina* remaining underground) but the political, economic, and social structures that existed before the Spanish, as well as those created during the revolt, could not withstand the disturbance and shifted to a new domain with attendant adaptive cycle.

### Summary

The Puebloan example illustrates, briefly and hypothetically, the various phases that compose the RC that all cultural systems pass through in the course of their continued development and interactions with foreign systems. For the Pueblos, the pre-existing political, economic, social, and ideological structures, as perceived and acted upon by the Pueblos themselves, were apparently insufficiently strong, or exerted insufficient attraction within their basin of attraction, to successfully avoid 1) the shift to a new basin of attraction (in this case the Spanish basin; Figure 16a); and 2) considerable changes to the structures of the cultural system. Though they were able to remove the Spanish, like the Araucanians, the changes to the structures appear to have been irreversible despite the efforts of Popé and others.

Overall, RT can provide an explanatory and illustrative framework that incorporates identity, agency, ideology, power relationships, social structure and organization, and other facets of human culture to describe the ability of a cultural system (directed by internal agents) to resist change and maintain pre-existing cultural patterns

and practices. The chapters that follow outline the ethnohistorical, ethnographic, and archaeological evidence of Araucanian resilience at Santa Sylvia through the various phases of RC up to the present day. RT is useful in this long-term, diachronic analysis, as it can outline the processes and patterns that have gone into the development of Araucanian culture from early pre-Hispanic times, through the arrival and subsequent defeat of the Spanish, and to the efforts of the present-day Mapuche to maintain cultural autonomy.



## CHAPTER 6

### INTERACTIONS OF ARCHAEOLOGY, ETHNOGRAPHY, AND ETHNOHISTORY: DATA DOMAIN AND METHODS

The intention of this research is to define and interpret the material correlates of Araucanian resilience to Inka, Spanish, and Chilean incursions within the framework of RT. How can the absorption of and adaptation to disturbance be identified at different scales? What are the indicators of Araucanian identity, ethnicity, and agency in the material, written, and ethnographic records? This research argues that evidence for the resiliency of the Araucanian system at Santa Sylvia can be seen in continuities of artifact styles through time, seen particularly in ceramics, lithics, and other materials with limited incorporation of Spanish-styles or influences. Evidence may also suggest an increase in and maintenance of traditional cultural structures with limited or no influence from European practices, such as the construction of ritual spaces that exhibit continuity from pre-Hispanic times. This continuity in spatial and social organization will also be identified, as well as incorporation of limited European goods and avoidance of others. Finally, evidence of open confrontation between the Araucanians and the Spanish will be identified in the material record, evidenced by a destruction layer at Santa Sylvia dating to the Spanish occupation.

In order to test the hypothesis that the Araucanians actively maintained cultural system and restricted the effects of Spanish influence, this research suggests five criteria. **First**, investigations should focus on an area with relatively high Araucanian domestic and ceremonial from prehistoric and historic periods. **Second**, evidence should exist of Spanish occupation, and Araucanian-Spanish interaction, seen in ethnohistoric accounts and the archaeological record. **Third**, the research area should contain access to survey areas, modern Mapuche settlements and informants, and other pertinent data such

as previous investigations, maps, and ethnohistoric data. **Fourth**, available primary source documentation from the earliest contacts between Araucanians and Spaniards should have the potential to provide insight into changes in the Araucanian culture system, interactions between communities, and cultural influences from the Spanish to the Araucanians and vice-versa. **Fifth**, viable archaeological materials pertinent to the research question should be accessible for excavation and analysis. Gordon stated that Santa Sylvia “contained the greatest potential for recovery of cultural materials from the early conquest period” (Gordon 1991; Harcha et al.1999) and remains to the present the only securely identified and intensively-investigated site in south-central Chile to contain pre-Hispanic, Hispanic, and post-Hispanic occupations.

This research will seek to illustrate how Santa Sylvia and the surrounding area contain these five criteria and have the possibility to answer the research question above. First, a strong indigenous population has lived in the area in both prehistoric and historic times (Adán and Alvarado 1999; Harcha 1999; Navarro et al. 2012). These occupations may indicate what changes have come about in Araucanian cultural patterns through time, and may be compared to other areas such as Purén-Lumaco. Second, the previous excavations by Gordon show a Spanish occupation at Santa Sylvia that may have lasted as long as 40 years (Gordon 2011). This research will expand upon the work initiated by Gordon and define pre-Hispanic occupations that may show the long-term development of Araucanian culture. As noted before, this type of occupation in south-central Chile is rarely known archaeologically as well as historically and important for further study. Third, limited survey has been conducted in the area (Dillehay and Saavedra 2010), but indicates a relatively high density of domestic and ritual spaces around Santa Sylvia. Additionally, a large Mapuche population exists in the region, which has maintained kin ties with communities living in Argentina and elsewhere in the Araucania (Quiñenao, personal communication, 2010). These may provide information regarding pre-Historic and historic use of the region, toponyms, and perspectives on the Mapuche today. Fourth,

Spanish accounts from the earliest founding of settlements in the Pucón-Villarrica area are available, which document not only the interactions between the Araucanians and Spanish, may also indicate the changes that transpired in the Araucanian cultural system. Finally, the site of Santa Sylvia itself suggests viability of long-term analyses of archaeological materials from pre- to post-Hispanic times, as shown by Gordon (2011), testing by Dillehay (Dillehay and Saavedra 2010), and later investigations (Mera et al. 2004).

### **Data Domain and Methods**

Evidence for maintenance of an Araucanian cultural system through the framework of RT is examined through a holistic approach, employing the complementary domains of archaeology, ethnohistory, and ethnography. As Lightfoot (1995:199) points out, “[representing] an interface of common concern, [interdisciplinary] studies may revitalize holistic...approaches that consider multiple lines of evidence from ethnohistorical accounts, ethnographic observations...native oral traditions, archaeological materials, and biological remains.” Only through multiple lines of inquiry can a better understanding be attained regarding the Araucanian/Mapuche social system diachronically (Aldunate 1989; Boccara 2007; Dillehay 1976, 1990a, 2007; Gordon 2011; Zavala 2008).

#### *Archaeology*

The bulk of this research is dedicated to archaeological investigation and excavation at Santa Sylvia and continuing research in the surrounding area of Pucón-Villarrica (Figure 17), in order to define the material correlates of Araucanian resilience in the region and at the site. This research draws upon the previous excavations and research of Gordon at Santa Sylvia (Gordon 2011), as well as archaeological survey and

excavations done by Dillehay (1990a, 2007, 2010), Mera and Harcha (1999), Navarro et al. (2012), and Harcha et al. (1999). Consultations were also carried out with the landowner, Benjamin Davis, and Chilean colleagues familiar with the area. Different areas of the site are referred to in this work as “interior” and “exterior” (Figure 18). The “interior” is that portion of the site surrounded by the barbed-wire fence erected by Davis around the time Gordon initiated excavations in the late-1980’s, which encloses the Spanish-built architecture and occupation area (Complexes A-E; Gordon 2011; Harcha et

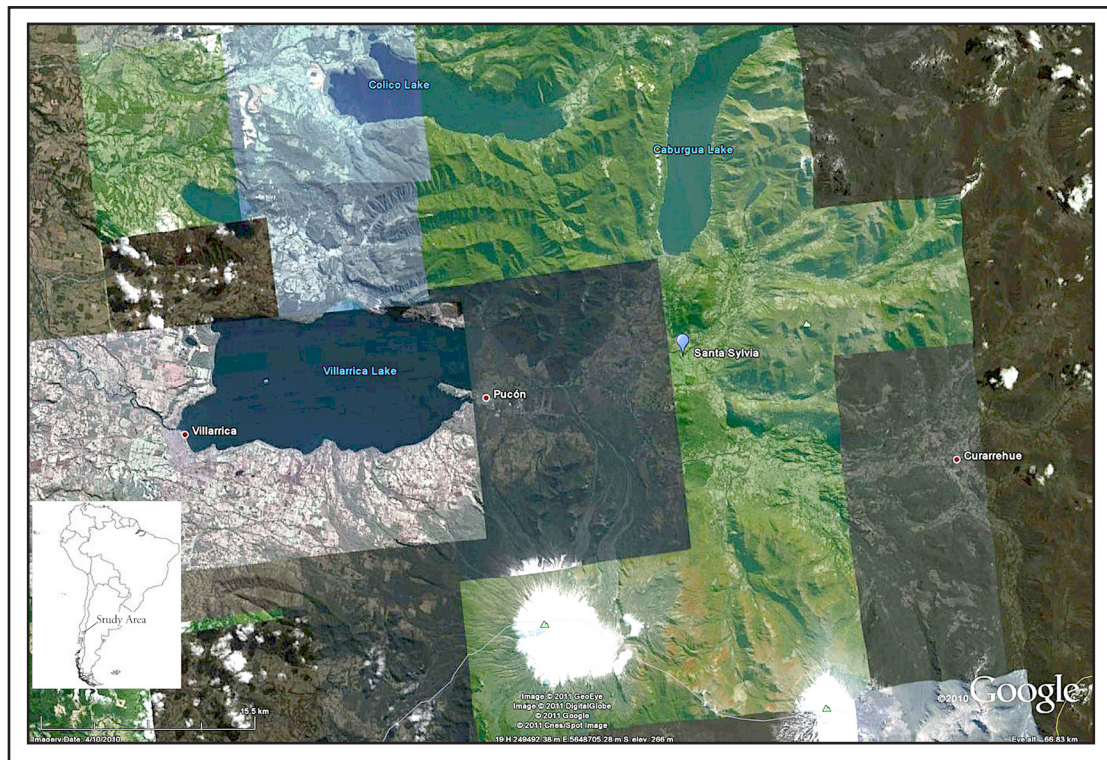


Figure 17: Overview of Pucón-Villarrica study region with Santa Sylvia location marked.

al. 1999). The “exterior” lies primarily to the west and south of the fence, away from the Spanish complexes, indicated by a magnetic resistivity survey carried out in 2006.

Excavations at Santa Sylvia were laid out in a 1x1 meter grid, based off a primary datum placed in an open area of a “plaza” between Complexes B and C (see Figure 18). The positioning of this datum was arbitrarily chosen, as the initial beginning coordinates of the Gordon excavations are unknown. From the information available, Gordon’s grid

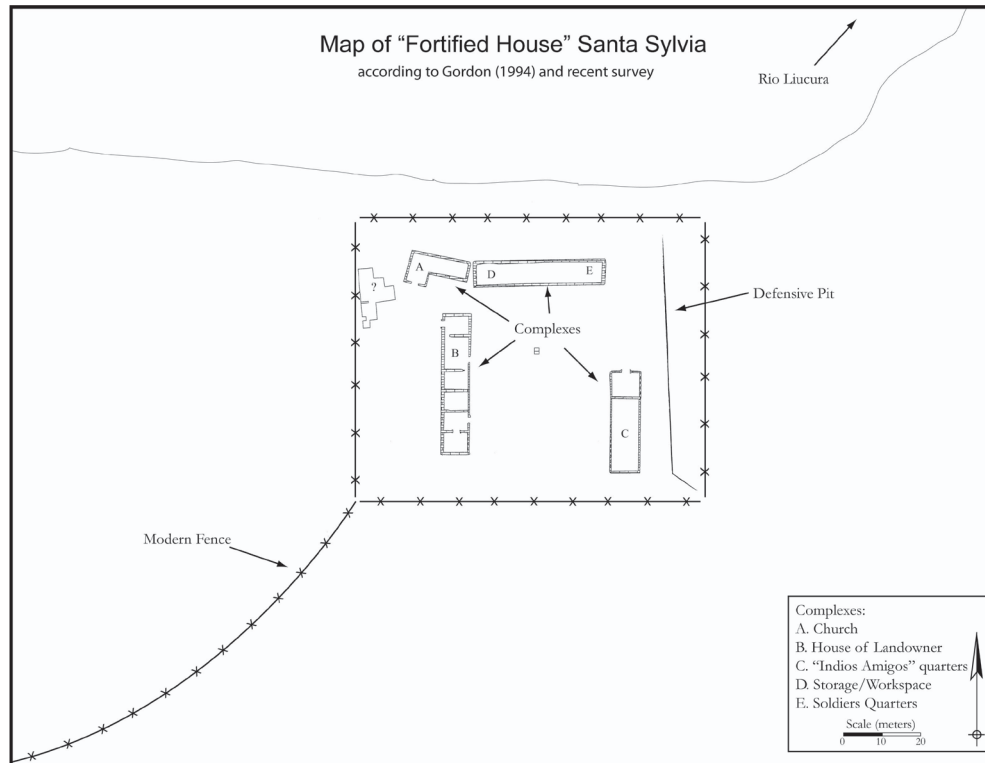


Figure 18: Initial map of Santa Sylvia from Gordon (2011), noting the complexes and modern barbed-wire fence at the site.

appears to have begun in the northwest corner of the site, near Complex A, with the grid coordinates running alphabetically east to west and moving numerically north to south in units of 2.5x2.5 meters (Gordon 2011). The primary datum may have been in unit B3, located in the northwest corner of the site (Harcha et al. 1999), but this portion is now covered by screened soil. Numerous open units are still visible in and around Complex C, but their precise address is impossible to determine. Additionally, backfill soil from Gordon's excavations piled north of Complexes A, D, and E, runs east-west from the west fence to the east tree line. Numerous discarded roof tiles are still found in the backfill.

Gordon's excavations indicated a relatively shallow Spanish occupation at about 30 to 40 cm deep from the present ground surface, with a few deeper deposits extending 80-90 cm deep along the walls of Complexes A and B. The majority of the artifacts he recovered were of Araucanian manufacture, with wheat, barley, horses, and sheep as the

primary evidence of Spanish materials (Gordon 1991, 2011; Rossen 2011). As noted above, Gordon suggested that the site may have been occupied for two generations, or about 30-40 years, indicated by the burials in the chapel and the quantity of materials recovered (Gordon 1991). Based on these results, it was anticipated and verified that this same mixed economy would be discovered, particularly in the exterior area. Historical information indicates that habitation zone of possible *indios amigos* may have been outside of the Spanish occupation zone (Zavala, personal communication, 2010). Overall, this research anticipated re-defining the stratigraphy and materials encountered by Gordon and expanding on his results, particularly regarding any pre-Hispanic occupation.

The primary datum was given the address 1000 North 1000 East. All excavation units were laid out and assigned directions based on this point. The choice of such an address provides the leeway and space to assign all excavation units to one single quadrant (North and East) should more features be identified during the project or in future work. One difficulty encountered during the project was the quantity of native plants encumbering the site, specifically wild blackberry bushes (*Rubus ulmnifolius*, see Chapter 9 and Appendix B), which, while protecting the site, also excavation difficult. Additionally, Davis planted Chilean firebush (or Notros, *Embothrium coccinium*) along the barbed wire fence and around the interior complexes (Figure 19). Most of the blackberry bushes were cut down during the project, growing back to full by the end, and most *Notros* were left to protect the site (Figure 20).

Excavations were carried out using a modified version of the Feature System developed by Jennings at the University of Utah in the 1970's. The Feature System breaks down the site into discrete, identifiable units, which include the whole of the site, the site notes, datums, as well as the excavation units and any uncovered features. Each are recorded and assigned an "F," "L," or "T" number (For "feature," "layer" and "trench" respectively; see Appendix E), which facilitates identification and recording of particular features, layers, and excavated areas in the site. For example, a post hole



Figure 19: View of wild blackberry (foreground) and Notros trees (background) covering the surface of Santa Sylvia, looking west from just north of Complex C.

(F40) found within a circular feature (F38) within a trench (T3) can be written F40 in F38 in T3, and each feature has a corresponding form with attendant definition, drawing, and photograph. This method can simplify data retrieval and analysis later on (Jordan and Talbot 2001). This system also aids in provenience control and delineating stratigraphic sequences, artifacts and features. Units were excavated in 10cm levels from the present ground surface, as regulated by of the Chilean Consejo de Monumentos Nacionales (National Monuments Council; CMN). All excavated soil was passed through 6 millimeter wire mesh screens and all sizeable cultural material, including ceramics, lithics, charcoal, bone, obsidian, ground stone, and roof tile were identified and saved (see Chapter 8 for detailed excavation results).

Features identified in the course of excavation were recorded on project feature

forms, including a description, drawings of both plan and profile, and photographs (Appendix E). A total of 175 features were identified across four excavation units, labeled T1, T2, T3, and T4, which included firepits, possible post holes, architectural features, and soil stains. Preservation of organic materials was poor, likely due to the copious precipitation saturating the soil, as well as later uses of the site for farming and cattle ranching. Though Gordon recovered animal bone, none was recovered during these excavations, nor were any metal artifacts.

Twenty-five 4-liter soil samples were taken from various features, primarily in T3. These samples were then taken to the Universidad Austral de Chile in Valdivia for flotation and later botanical analyses by Chilean palynologist Claudia Silva Diaz (see Appendix B; Silva 2010). These analyses were to determine what floral and faunal materials were consumed at the site to: **1)** distinguish foods consumed during different periods; **2)** reconstruct the long-term economy; and **3)** compare activity and use areas



Figure 20: View of Notros trees on surface of Complex C (mounded area in background) left to protect Santa Sylvania after clearing wild blackberry bushes and grasses, looking east.



between the Spanish and Araucanian inhabitants of the site, as well as to contrast these results to those gathered by Gordon. Floats were done by suspending the soil samples in water to separate non-soil material from the soil matrix. Heavier materials (called the “heavy fraction”), such as seeds, ceramics, lithics, etc. sink to the bottom and are caught in a fine mesh, while lighter, often organic materials (the “light fraction”) float to the surface and are captured in another fine mesh. The fractions were then dried, bagged, labeled, and sent to Silva for analysis. Standard archaeological studies were applied to all other recovered remains, including ceramic and lithic analyses, which were performed by the author in Pucón, at the Universidad Austral de Chile and at Vanderbilt University. Five C<sup>14</sup> samples (four charcoal, one maize from the Gordon excavations) were sent to Beta Analytic, Inc. and the University of Arizona AMS Lab to provide absolute dates (see Chapter 8 and 9 for results).

Two samples of dried materials recovered from groundstone wash were sent to PaleoResearch Institute, Inc. for pollen, starch, and phytolith analysis (See Appendix A; Yost and Cummings 2011). Numerous pieces of groundstone “manos” were recovered during the project, primarily in T3, and two were selected for wash. One sample was recovered from 10-20 cm, the other from 40-50 cm. These layers appeared to correspond to two different temporal occupations, the 40-50cm layer dating to around AD 1030-1220, the 10-20 dating to around AD 1560-1630 (see Chapter 8). Both were washed using distilled water and gently scrubbed with a toothbrush to remove materials, and the recovered material was allowed to dry before being bagged and sent for analysis (see Chapter 9 and Appendix A for results). Finally, 17 samples of obsidian (black, red, black/red, and gray) were sent to Dr. Charles Stern of the University of Colorado-Boulder for chemical compositional analysis (see Chapter 9 and Appendix C). Obsidian, a volcanic glass, contains chemical signatures unique to the particular volcano from which it is recovered, and can thus be sourced to specific geographic locations (Glascock 1998; Lopez et al. 2009; Stern et al. 2008, 2009). Identification of these sources can provide

information on trade networks, which are important in this research (Navarro and Pino 1999; Stern et al. 2008).

More broadly, the collective archaeological information can provide insights into the nature of Araucanian identity and ethnicity, particularly in comparative fashion with other areas and communities in the Araucania (for example, similarities in style, manufacture, and composition, between areas may indicate cultural solidarity and connectedness, or the sense of “being Araucanian”). The materials may also indicate the actions of agents in incorporating or rejecting European-style artifacts, and the overall resilience of the Araucanian culture system through time. The research has utilized the works of Adán, Aldunate, Bahamondes, Berón, Dillehay, Garcia, Gordon, Harcha, Mera, Navarro, Ocampo, Quiroz, Reyes, Saavedra, Sanchez, Sanzana, and the results of their investigations throughout south-central Chile (Adán et al. 2010; Aldunate 1989; Berón 2006; Dillehay 2007; Dillehay and Saavedra 2010; Garcia 2009; Gordon 1991, 2011; Harch and Vásquez 2000; Harcha et al. 1988, 1999; Mera et al. 2001, 2004; Navarro and Pino 1999; Navarro et al. 2012; Ocampo et al. 2003, 2005; Quiroz 2001, 2010; Quiroz and Sanchez 2005; Quiroz et al. 2005; Saavedra and Sanzana 1991; M. Sánchez 2005).

### *Ethnohistory*

Ethnohistoric information was gleaned from archival and documentary research conducted at the Archivo Nacional de Chile and Biblioteca Nacional in Santiago in 2004, 2006, 2009, and 2010 as well as the extensive library holdings of the Jean and Alexander Heard Library at Vanderbilt University. The late Simon Collier, professor of history at Vanderbilt, was integral in the acquisition of numerous important volumes related to the early colonial history of Chile, and the dedication of Vanderbilt University to Latin American Studies has increased those holdings. Additionally, the Directorio de Bibliotecas, Archivos, y Museos (DIBAM) of Chile has made available online copies of

numerous important documents<sup>1</sup>.

These documents include the earliest Spanish *cronistas* who first came into contact with the Araucanians in AD 1537 and again in AD 1546, and who wrote extensively on their personal experiences in the “War of Arauco” and (to a lesser degree) on Araucanian culture and customs (Ercilla 2003[1569]; Góngora 1990[1577]; Gonzalez 1889[1614]; Mariño 1865[1595]; Olaverria 1594 in Medina 1963; Valdivia 1929; Vivar 1979[1558]). These documents are important to understanding the Spanish perspective on interactions with the Araucanians, and to gain some insight into the attitudes and actions of the Araucanians in the mid-16<sup>th</sup> Century. By no means a perfect representation of Araucanian society, these documents when coupled with the archaeological and ethnographic record, provide important information on the Araucanians at the outset of contact. These works will be used in a complementary and critical manner, together with the archaeological research and ethnographic information, for examination of the Spanish perspectives on the Araucanians (demographic patterns, cultural practices, etc.), find possible original names for and occupants of Santa Sylvania, and identify perceived changes to the Araucanian culture system, among other possibilities. How can we see Araucanian identity and ethnicity in these accounts? Who are the Araucanian agents acting consciously or sub-consciously to maintain pre-existing cultural practices? How do the documentary sources compare to the archaeological and ethnographic record? What are the material correlates indicated in the documents?

Numerous documents speak to the interactions between the area surrounding Santa Sylvania and other parts of the Araucania (R. Quiroga 1577 in Medina 1963), the social organization of the Araucanians, including *lof*, *regua*, and *lonko* (Valdivia 1929[1950]), the increased importance of *ayllarehue* by the end of the 16<sup>th</sup> Century (Olaverria 1594 in Medina 1960) religious practice and social organization (Rosales 1989[1674]) and other pertinent information described in Chapters 10 and 11.

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1 Available at [www.memoriachilena.cl](http://www.memoriachilena.cl) as of 26 March 2012.

This research also benefitted from the collaboration of several Chilean colleagues, particularly Dr. José Manuel Zavala, who has spent time at the Spanish archives in Seville, Spain. Methodologically, emphasis has been placed, whenever possible, on primary sources (i.e. the Spanish *cronistas*, government officials, official correspondence, etc.), particularly in the contact period (AD 1550-1642) though the information and interpretations provided by later Chilean historians such as Bengoa (2000, 2003, 2004), Boccara (1996a, 1996b, 1999a, 199b, 2007), Goicivich (2001, 2003, 2006, 2007), Guarda (1961, 1966, 1968, 1973, 1984, 1987); Leon (1983, 1985, 1990, 1991, 1992, 1994, 2002, 2005), Orellana (1992, 2005), Silva (1990, 1995, 2008), Villalobos (1982, 1985, 1988) and other historians have been used.

### *Ethnography*

Ethnographic interviews, formal and informal, were carried out with individuals living in the area of Pucón-Villarrica, and information was utilized from previous ethnographic work in the region. Particularly helpful were discussions with Rosita Quiñanao, current *lonko* of 24 families belonging to the Pucón *rehue*. These interviews sought to document Mapuche oral histories of interactions with and relationships between the Araucanians/Mapuche living in the region with those elsewhere in south-central Chile and across the Andes into Argentina, both historic and modern; oral histories of the Inka, Spanish, and Chilean incursions; modern Mapuche perspectives on their history (where they came from and where they are going); and other details of the Araucanian/Mapuche social system and practices. Questions asked included: what is the Mapuche history of the region? What are the relationships between the Mapuche living here, those living to the west, and those in Argentina, both today and in the past? What would have happened to those Mapuche who collaborated with the Spanish? What is the future for the Mapuche in Pucón-Villarrica? The views presented by these informants are based on their own knowledge of the past and what they project today. However, research in other areas

(Dillehay 2007) has indicated strong correlations between Mapuche oral histories and the archaeological record.

It should be noted that, according to Quiñanao and others, the dictatorship of Pinochet from 1973 to 1989 greatly affected the Mapuche living in and around Pucón-Villarrica, which included a decrease in Mapungun speakers, breakdown in kin ties and social relationships, and a loss of some sources of cultural knowledge, such as from *machi*. Thus, the ethnographic record in Pucón-Villarrica is perhaps not as vibrant as in other areas, though still capable of providing important information. Additionally, this research has drawn upon the ethnographic research of Bacigalupo (1994, 2003, 2005, 2010), Cooper (1946), Dillehay (1990a, 1992a, 1992b, 1999, 2007), Faron (1955, 1956, 1961, 1968), Foerster (1988, 1996), Haughney (2006), Saavedra (2006, 2010), Titiev (1951), and others who provide important insights into the nature of Mapuche cultural development, ritual practice, oral history, demographic patterns, language, and social interactions throughout the Araucania.

### **Significance**

In sum, the methodological significance of this project was anticipated to be twofold. **First**, the results would add to the corpus of literature on the archaeology of colonization, the interplay between indigenous and colonial groups, discussions of identity, ethnicity, agency, and help in understanding cultural resilience through time and space. Importantly, it will add a needed perspective to the existing literature of a group that effectively resisted colonization where most research deals with fully-colonized societies. The Araucanians provide a unique example that needs to be included in discussions of colonization, anti-colonialism, resistance, and culture contact. It is anticipated that this research can provide important data about how peoples and groups identified themselves and their cultural system, and act upon or react to outside influences

and incursion through the framework of RT. Some forms of colonization, notably economic, continue today, and this research will aid in understanding how modern societies adapt to, are changed by, and resist outside influences.

**Second**, and more locally, the results of this project should provide information regarding the Araucanian culture at Santa Sylvia and in the wider Pucón-Villarrica area, and how its members adapted to Spanish incursion. This research hypothesizes that the amount of Spanish influence during the contact period was extremely limited. In fact, an active resurgence of traditional lifeways and avoidance of most of Spanish culture and influence appears to be the norm in throughout south-Central Chile, as opposed to other indigenous groups farther north that the Spanish successfully colonized. This success may be based on the strength of the Araucanian culture system and the actions of Araucanian agents in preserving that system. The methods employed by this analysis are a complement of the work by Dillehay and colleagues (Dillehay 1990b, 2007, 2010; Dillehay and Saavedra 2010) in Purén-Lumaco, which demonstrate that Araucanian social systems, religious practice, political organization, and ethnic identity existed prior to the Inka and Spanish and that the Araucanians actively used their cultural system and structures to prevent the changes experienced by other indigenous groups. At the same time the Araucanians successfully incorporated elements from the Spanish while maintaining their previous cultural patterns which have developed into modern Mapuche society. It is possible that there were different adaptive strategies employed at Santa Sylvia, which could be identified in the archaeological, ethnographic, and ethnohistoric records. This research anticipates bringing these signatures to light for comparative purposes with other areas in south-central Chile.

## CHAPTER 7

### SANTA SYLVIA SITE AREA AND BACKGROUND: CONTEXT ENVIRONMENT, AND INITIAL EXCAVATIONS

The following chapters present the geographical and archaeological context of Santa Sylvia, many of what are argued to be the archaeological correlates of Araucanian resilience within the framework of RT. If the cultural system of the Araucanians of Santa Sylvia was relatively unaffected by the Spanish, as has been argued, the material culture should hypothetically reflect a continuity in artifact styles, settlement patterns, and religious practice from before contact between the two cultures. Below is a brief outline of the geographic context for Santa Sylvia, a summary of the initial research carried out by Américo Gordon at the site from 1988 to 1991 and a presentation of other archaeological and ethnographic investigations carried out in the region. These investigations played a major role in defining and structuring the present research project, particularly the work of Gordon.

#### **Site Context: The Pucón-Villarrica Region**

Geographically, Pucón-Villarrica is dominated by the Andes Mountain range, which runs north-south to the east of Santa Sylvia (Figure 21). Several volcanoes are visible from the site, including Villarrica, Quetrupillan, and Lanin (Figure 22). To the northeast about 40 km (25 miles) are the remains of the Sollipulli Volcano, the primary obsidian source for tools recovered from sites in the region and elsewhere in the Araucania (see Chapter 9; Stern et al. 2009). Lake Villarrica (*Mallohuelfquen*, or “Sea of White Earth” in Mapudungun) lies immediately west of Pucón, Lake Caburgua due north of Santa Sylvia, and several other montane lakes are scattered throughout the



Figure 21: View of Andes Mountains east of Santa Sylvia.

Andes along the border with Argentina. These lakes were likely formed during the last glaciation, around 15000 years ago, and filled with water after the glacial retreat (Moreno and Gibbons 2007; Pucón 2007). Numerous rivers and streams, forming part of the Tolten hydrographic basin, run down from these lakes, which combine to form the Liucura River which runs just below Santa Sylvia. The Liucura joins with the Caburgua River to the west of the site before combining with the Pucón River, which runs into Lake Villarrica. The lake itself drains to the west out by the present-day town of Villarrica, through the Toltén River which runs west to the Pacific Ocean (Pucón 2007; Saavedra and Sanzana 1993). The Toltén was an important route of both communication and conquest from pre-Hispanic to Hispanic times (Inostroza 1992; Ovalle 2003 [1675]).

Volcanic activity has been continuous since the end of the Pleistocene and early Holocene. The Villarrica volcano (called *Quetrupillan* or “God of Fire,” and *Pukon*



or “dove’s nest” in Mapudungun) is one of the most active volcanoes in all of South America, having erupted at least 59 times since AD 1558. The last two major eruptions happened around 1750 BC and AD 330, one of which may have deposited a thick ash layer still seen in the stratigraphy at Santa Sylvia (L15; see Appendix E). These eruptions have provided abundant and fertile soil throughout the region, as well as the large quantities of basalt, granite, quartz, and other minerals (Pucón 2007).

The various water sources, combined with the temperate climate and ancient volcanic activity have created rich soils conducive to numerous plants both native and foreign. The area of Pucón-Villarrica lies in a “western climate type with Mediterranean influence” deciduous forest (ibid), dominated by oak and laurel (*Laurelia semprevivens*) trees in the lower elevations, with oak and araucaria pine (*Araucaria araucana*) trees up in the mountains (Aldunate 1989). The average yearly temperatures range between 6°-18° Celsius (42° -70° Fahrenheit), with an average rainfall of between 1,100-2,100 mm (42-82 inches)<sup>1</sup>. Because of these factors, as well as the fertile volcanic soil, corn, wheat, and barley are grown in abundance (Pucón 2007). Today, the majority of economic activity in Pucón-Villarrica relies on tourism and agriculture (ibid).

These environmental factors appear to have remained relatively unchanged from the late Pleistocene and Holocene epochs to the present day, at least until the arrival of the Spanish (Moreno and Gibbons 2007; Torrejón and Cisternas 2002). Apart from the important Araucanian pine (*Araucaria araucana*), laurel (*Laurelia semprevivens*), coligüe (*Chusquea* sp.), and lingue (*Persea lingue*) trees, the vegetation has included *boldo* (*Peumus boldus*), Chilean wineberry also known as *maqui* (*Aristotelia chilensis*), and *copihue* (*Lapageria rosea*), among other plants (Gordon 2011). Fauna include gray fox, mountain lion, skunk, hare, wild duck, partridge, salmon (in the lakes) and dog, as well as llama. The llama appears to have disappeared soon after the arrival of the Spanish, likely

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<sup>1</sup> In an El Niño year, such as that of 2009-2010, the quantity of rainfall can increase dramatically. Benjamin Davis informed that, by December of 2009, over 3300 mm (130 inches) of rain had fallen in Pucón.

supplanted by horse, cows, sheep, and pigs (Gordon 2011; Valdivia 1929[1550]).

The site of Santa Sylvia itself lies at about 351 meters (1,150 feet) above sea level, at the top of a steep rise on the south bank of the Liucura River, approximately 14 km (9 miles) east of Pucón and about 1 km (.8 miles) west of the small town of Villa San Pedro (see Figure 17). The site affords a strategic view of the Pucón river valley to the west (with Lake Villarrica visible in the distance) as well as views of the various valleys that lead to year-round passes between Chile and Argentina. The fertile, along with the

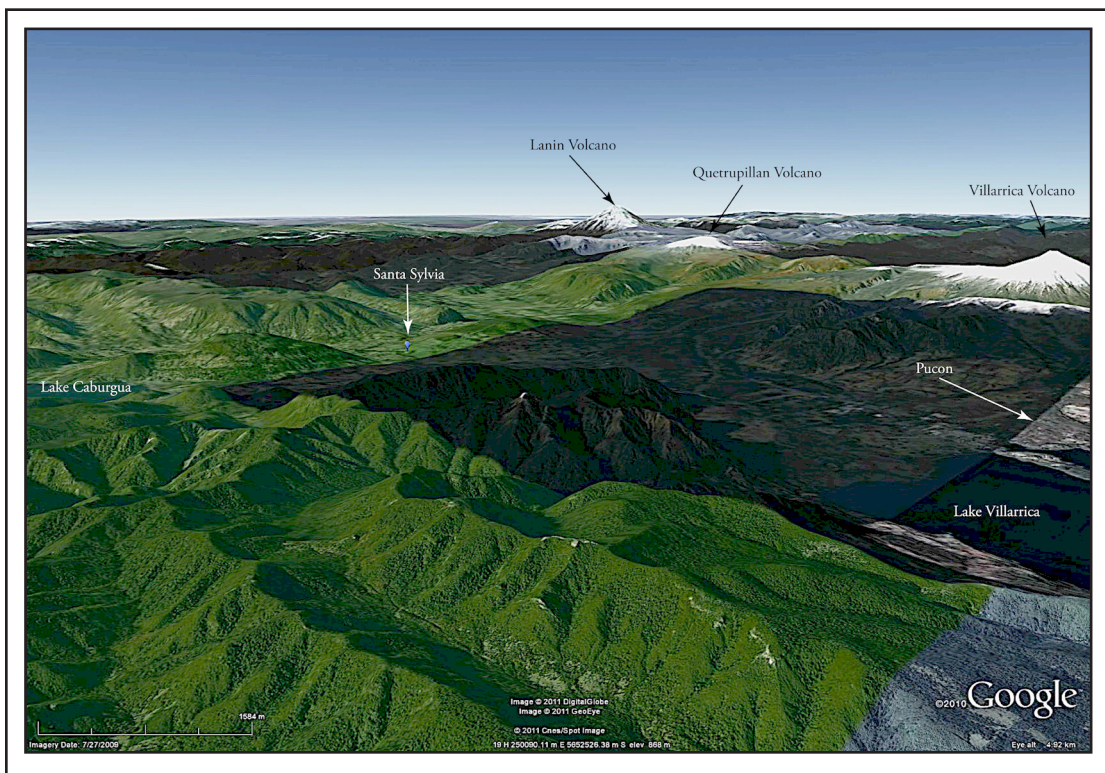


Figure 22: Image of the topography surrounding Santa Sylvia showing locations of Pucón, Lakes Villarrica and Caburgua, and the volcanoes Villarrica, Quetrupillán and Lanín.

strategic location and the possibility of precious minerals in the rivers and mountains, made Santa Sylvia a promising place of habitation, not just for the Spanish but for the Araucanians as well (Valdivia 1929[1552]; Vivar 1979[1558]). Rosales, writing in the 17<sup>th</sup> Century, stated that the area “is the most delightful, the most enjoyable, and has the

best vista, of all that are found in the Kingdom of [Chile]” (Rosales 1989[1674]:411)

### **Work at Santa Sylvania, 1987-1990**

#### *Discovery and Testing*

Towards the end of 1987, workers of Fondo El Coihue discovered ceramic Spanish-style roof tiles during tree removal. The landowner, Benjamin Davis, contacted archaeologist Americo Gordon from the Universidad de la Frontera in the city of Temuco, who visited the site for the first time in January of 1988. Gordon identified the possibility of buried subsurface features, indicated by several raised mounds. He inferred that the mounds and associated artifacts on the ground surface were from the colonial period. After discussion with Davis, Gordon received permission to excavate immediately with funds provided by Fondo El Coihue (Gordon 2011). According to Gordon, the lack of documentary evidence<sup>2</sup> for the region led him to name the site “Casa Fuerte Santa Sylvania” in honor of Davis’ wife Sylvania, who was an active supporter of the project<sup>3</sup> (Gordon 1991).

Initial test excavations were carried out April to May 1988. Gordon laid out the site in 2.5m by 2.5m units, beginning in the northwest portion of the mounds and following their outline from east to south. The units were identified alphabetically north-south and numerically east-west<sup>4</sup>. Initially, the grid covered 6,600m<sup>2</sup>, which was reduced through the course of excavation to about 2 hectares. This appeared to encompass the whole of the site, or at least the Spanish *recinto*.<sup>5</sup> Of that, about 600m<sup>2</sup> were excavated during the course of Gordon’s project, or field seasons in 1988, 1989, and 1990 (Figure

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2 See Chapter 12 for information on the possibility that Santa Sylvania was first named Antelepe.

3 The eponymous Sylvania, wife of Benjamin, contended that the site was named for Saint Sylvania, upon whose feast day the site was discovered. Gordon, however, explicitly stated at the Congreso Nacional de Arqueología Chilena in 1988 that the site was indeed named after Sylvania, wife of Benjamin (Gordon 1991).

4 As noted in Chapter 6, the location of Gordon’s primary datum is unknown, and thus the exact locations of his excavation units are impossible to determine at this point in time.

5 The *recinto* is the area I identify as surrounded by the modern fence (see Figure 18).

23; Gordon 2011).

After clearing the site of overgrowth, the first excavation units were placed and selected for excavation by random lottery in the highest mound with the greatest concentration of roof tiles on the ground surface. Walls were immediately uncovered, composed of compacted earth and clay (*tapia* or *adobe*) with a base of stones. The walls were about 50 cm thick with worked river cobbles for support on the exterior and interior, oriented on a north-south axis (see Figures 24, 25 and 26). Gordon followed the walls, identifying the corners and dimensions of the whole complex (labeled Complex B) without delving too deeply with the limited time available (Gordon 1991).

Gordon then turned to the northwest corner of the grid, where overgrowth removal indicated a mound with a large depression in the center. Testing revealed a square-shaped structure with an entrance facing south, which also contained burned beams and other charred material suggesting a large fire. This area was labeled Complex

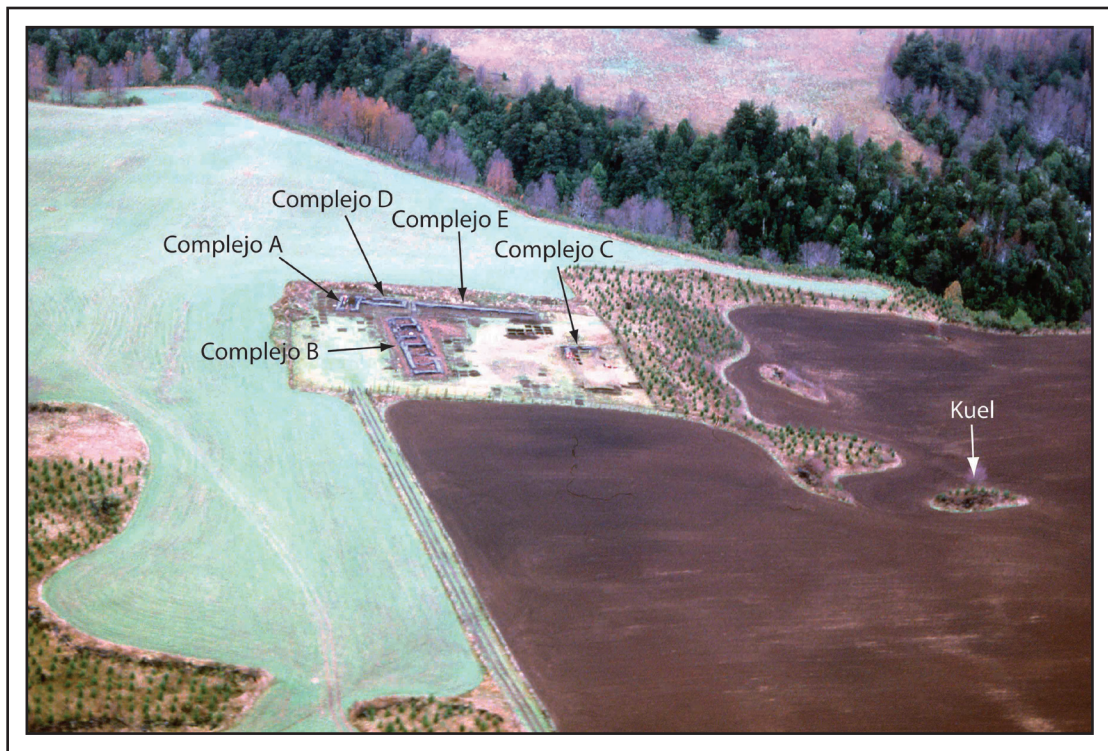


Figure 23: Aerial photo of Santa Sylvia during Gordon's excavations, showing complex and nearby kuel locations, looking north. Photo courtesy Tom Dillehay.

A. A final test unit was placed to the east of Complex B at the northern end of another mound, which revealed the presence of a wall running north-south. This mound was labeled Complex C, and the excavation season ended for the year after identification of a “defensive wall” of stones to the east of Complex C (Gordon 1991, 2011).

Based on this initial work, Gordon hypothesized that Santa Sylvia contained the remains of a *casa fortificada* (“fortified house”) built by a Spanish *encomendero* sometime in the mid- to late-16<sup>th</sup> Century. He believed that the *encomendero* had primary residence in Complex B, the only one of the three to have a tile roof, indicated by the quantity of tiles found in and around this complex and the lack of tiles with the other complexes. Gordon suggested that the other complexes may have been roofed with thatch. Gordon further argued that Complexes B and C appeared to have been made by stacking three rows of river cobble held together by clay separated by about 50 cm of compacted earth to form thick defensive walls. The upper structure of the wall was then formed by compacted earth, the entire wall reaching a height of about 2m. Complex A may have served as the chapel or mausoleum, and Complex C was the habitation/work area of the *indios amigos* that worked on the encomienda. Gordon hypothesized that the construction, which required a skilled workforce experienced in working with stone and making roof tiles, may have been done initially by *yanacona* from Peru as the Araucanians likely had no individuals skilled in working stone or making tiles (Harcha et al. 1999). Gordon argued that the site was occupied until about AD1598, abandoned in order to flee to the defense of Villarrica, which had just come under siege (Tribaldos de Toledo 2009[1630]). At some point after the Spanish abandonment, the site was burned the site to the ground (Gordon 1991; Harcha et al. 1999).

#### *Further Excavations*

Gordon applied for and received funds from the Chilean government (Fundación Nacional del Desarrollo Científico y Tecnológico, FONDECYT) to carry out a multi-

year project at Santa Sylvia. Fieldwork began again at the end of 1989 and lasted into early 1990, then began again at the end of 1990 into early 1991 for three total seasons. According to the few remaining notes from Gordon, plans existed to spend another field season that would involve some excavation with reconstruction of the site (Gordon 2011).

Excavations focused on the Spanish layer, which Gordon determined to end with the lowest roof tile, or about 30 cm below the present ground surface<sup>6</sup> (Harcha et al. 1999). Some test pits went deeper for a stratigraphic profile, yet the majority of work was limited to the Spanish occupation due to time and funding constraints, even though Gordon suggested that a *ruka* may have existed at the site previously (ibid).

Priority appears to have been given to Complex B, which was excavated in its entirety. The complex measured approximately 38 meters north-south by 10.5 meters east-west, subdivided into two “houses,” (20.4 m and 17.4 m long, respectively) each with a separate doorway (see Figure 26). Each “house” was further divided into three rooms (*recintos*) separated by earthen walls which were somewhat thicker in House #1. The threshold of each doorway was formed by a row of unworked river cobbles covered partially by a *coligüe* beam, which appeared to be burned. No furniture or similar household items were recovered, as they may have been burned or moved during the evacuation. A limited number of iron nails were discovered, which Gordon notes that “due to the lack of iron in Chile and the high price of nails” the constructors of Santa Sylvia opted for wooden dowels made from *coligüe* as fasteners and support (Gordon 2011; Guevara 1902).

Gordon argued that only the roof of Complex B had tiles, perhaps made on-site by *yanacóna* or *indios amigos*, or possibly imported from Villarrica (Harcha et al. 1999). Of particular note in Complex B (in Room #5; Figure 27) was the discovery and removal of two buried barrels made from *coligüe* branches lashed together with leather.

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6 Today, the plastic sheeting Gordon placed to mark the lowest level of excavation can be seen in many areas of the site, having eroded over the course of 20 years and showing that the excavations performed were not very deep. Subsequent excavation also confirmed an average limit of about 30 cm depth of excavation (see Chapter 7).

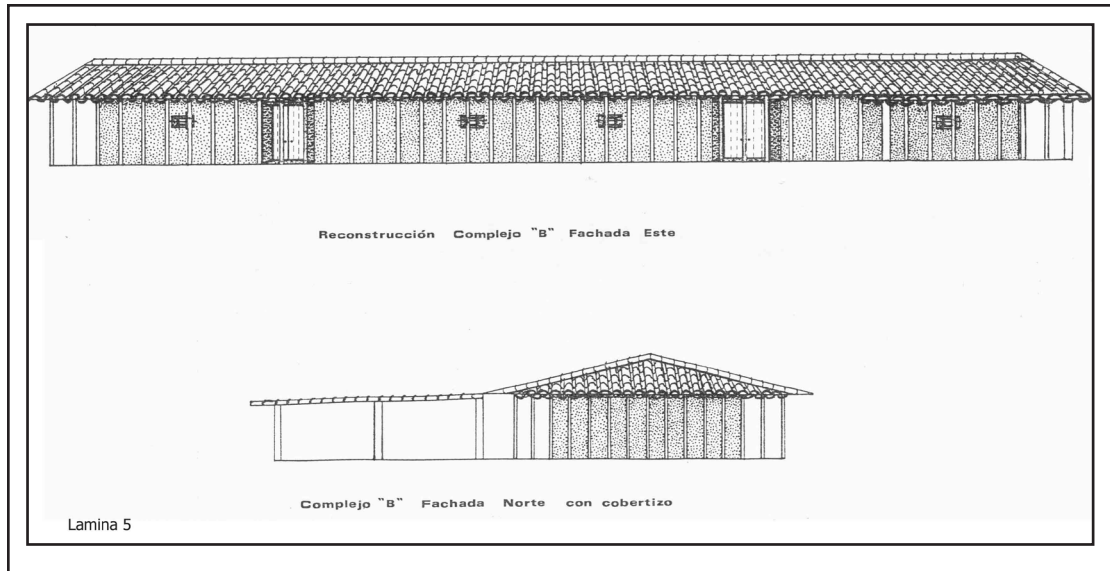


Figure 24: Possible reconstruction of Complex B, or the Casa del Encomendero, at Santa Sylvania. From Gordon 2011.



Figure 25: View looking west of western wall in Complex C (F17) to illustrate the possible wall composition of Complex B as described in the text.

One barrel was filled with wheat and barley, the other, slightly larger barrel was filled with corn all with evidence of burning. Gordon estimated that the barrels held about 9 m<sup>3</sup> of material (2.73 m<sup>3</sup> of wheat and barley and 6.14m<sup>3</sup> of maize, respectively; see Rossen 2011), which could have been able to feed 21 people for one year. This amount of material, Gordon argued, indicated intensive agriculture utilizing oxen-pulled plowing. Additionally, Gordon noted that subterranean storage was not generally not used by the Spanish. Elsewhere in the Araucania, maize and other seed materials were stored by

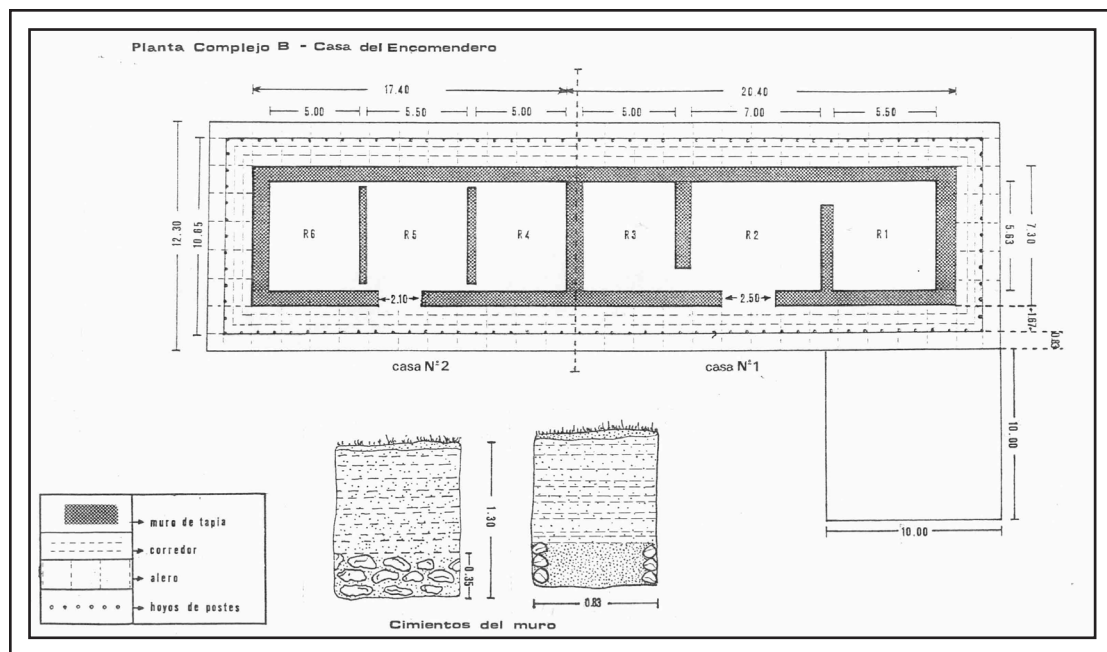


Figure 26: Reconstruction of the interior of Complex B. From Gordon 2011.

Araucanians in large ceramic vessels, and *Pehuenche* communities along the mountains utilized subterranean silos (Gordon 2011). The use of buried coligüe barrels, Gordon suggested, may indicate a mixing of traditions for food storage between the Spanish and Araucanians, particularly as the barrels were buried in the *encomendero*'s house and not in Complex C, the so-called *indios amigos* house (Gordon 2011; Rossen 2011).

Excavations in Complex A also revealed several burials in what Gordon considered to be the "chapel/mausoleum" of the *encomendero* (Gordon 1991; Harcha et al. 1999). This conclusion was reached during the test excavations of 1988-89, based



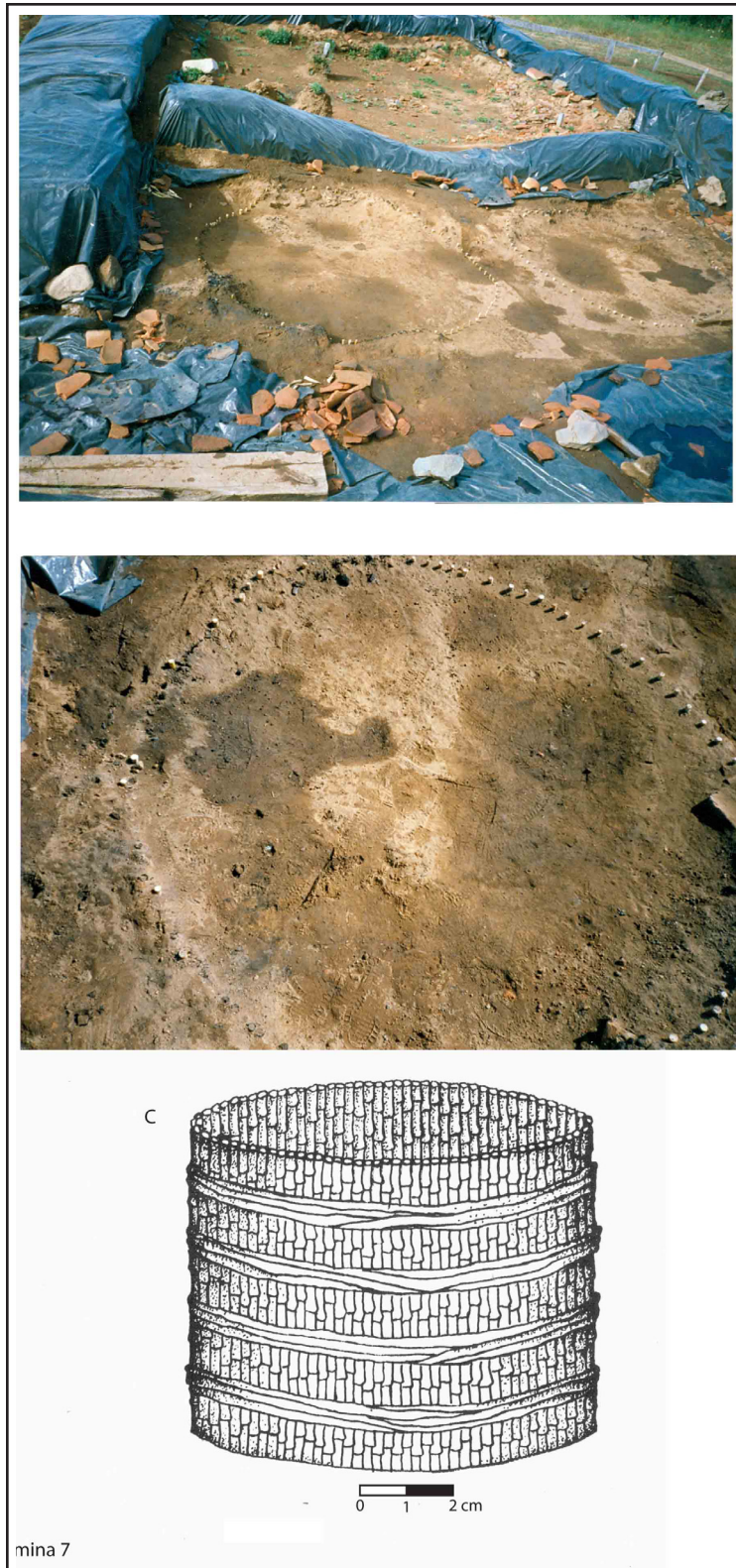


Figure 27: View of barrel excavations in Complex B during Gordon's project. Image C is a reconstruction of one of the barrels. From Gordon 2011.

on the location of the structure and its layout, which appeared to be similar to a chapel unearthed at a site named Puerto del Hambre (Figure 28; Gordon 1991; Ortiz 1977). Further excavations in this complex revealed a thick layer of charcoal with ceramic fragments, grinding stones, and cow bone mixed in, just above what Gordon termed as the “floor” of the chapel. Removal of the charcoal and the floor layer revealed 8 burials-- five European males, two indigenous women, and one infant. Five of the burials consisted only of cranial remains: #943, a male; 962, a female; 963, a male; 3503, a male; and 3511, a female. One burial (#960) had a cranium and most of the left side of a Spanish male, and another (nicknamed “Carlitos”, #961) contained most of the remains of an individual of about 25 years of age who died from some form of trauma. A final burial (#964) contained no human remains (Gordon 2011).

Other burials were found in what Gordon defined as a “cemetery” between Complexes B and C, though how many is unclear from the surviving notes. Two things are of particular note in the cases of each burial: first, the European burials were oriented with the head to the south and all the indigenous burials were oriented with the head to the north. Gordon proposed that this orientation indicated that the European, Catholic males would be resurrected facing the chapel altar, while the indigenous “pagan” females would arise to face Villarrica Volcano. If such is the case, then this may indicate that, though the indigenous females were part of the *encomendero*’s house, and would have been baptized into the Catholic Church, retention of indigenous burial rites may have been maintained. Then, at least at Santa Sylvia, the Spanish did not exercise religious control over the Araucanians, and the amount of syncretism that transpired appears extremely limited. Second, no funerary material was recovered from any burial, which Gordon believed stemmed from an “eagerness to eliminate all vestiges of traditional indigenous funerary rites” (ibid).

During the excavations of Complex A, another complex was found immediately adjacent to the east. Excavations in this area, labeled Complex D (see Figure 23) were

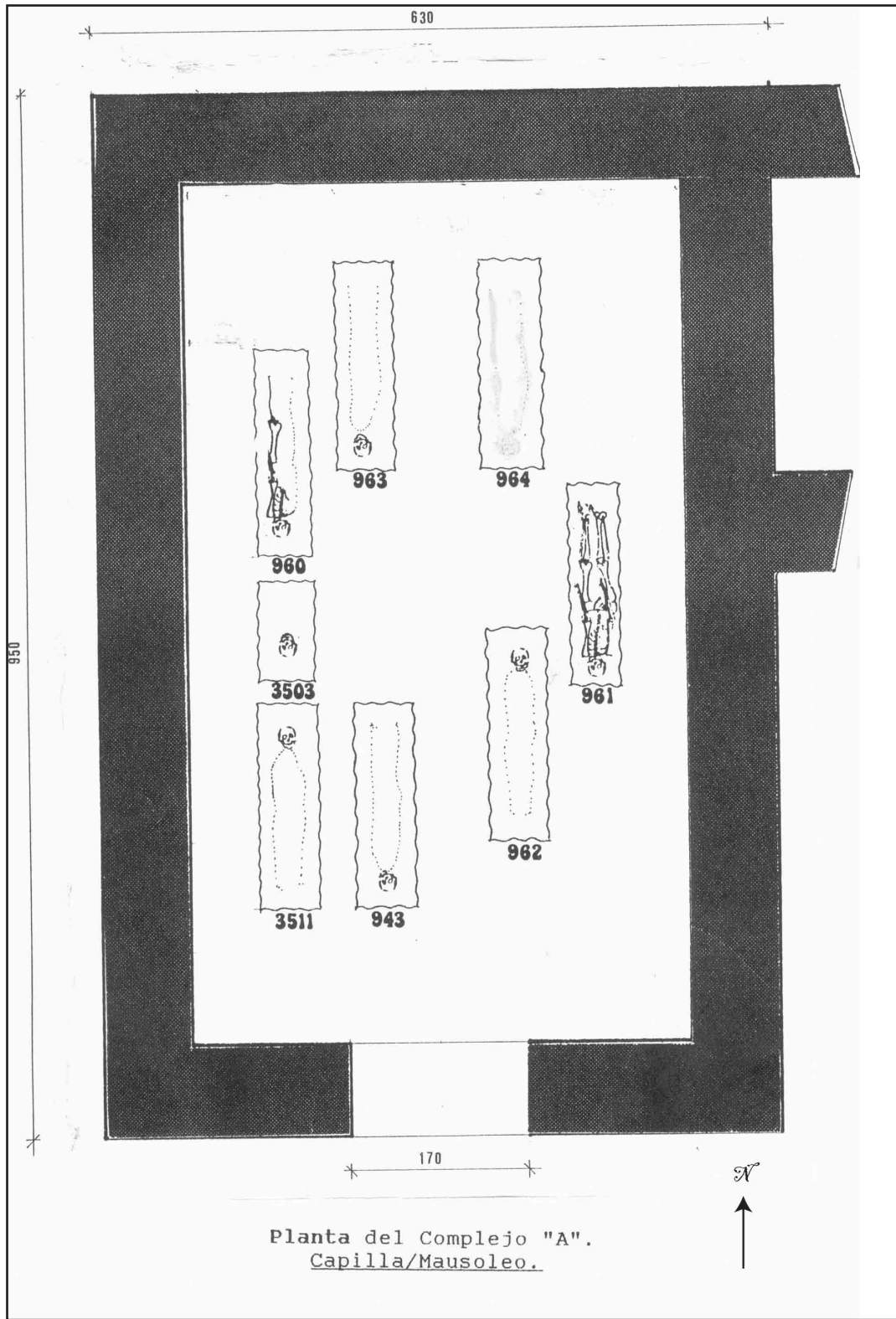


Figure 28: Diagram of burials recovered by Gordon below the floor of Complex A. From Gordon 2011.

limited, and Gordon estimated that the small structure (12.4 m by 4.2 m) served as a work area or storage. Separated by Complex D by about 1.25 m, excavations in the area labeled Complex E revealed the remains of three small firepits, fractured grinding stones, a few fragments of Spanish ceramics, and other limited materials. These artifacts were part of what Gordon termed to be the “Soldier’s quarters, a complex about 38 m long east-west and 10 m wide north-south. This was essentially the same dimensions as Complex B, though Complex E lacked the internal divisions, three-layer stone foundation, tile roof, and artifact quantity.

Excavations at Complex C were limited, according to Gordon’s remaining notes (Gordon 2011), to “four squares” in addition to the work during the test season that identified the wall and northwest corner of the complex. In total, Complex C measured 29 meters north-south and 12 meters east-west, bordered on the west by a patio area and on the east by a “defensive trench” with a stone-lined defensive wall above the Liucura River (see Figure 23). The only information available from the work at Complex C indicates the recovery of ceramic fragments and lithic material, particularly obsidian flakes, and points to the lack of roof tiles. Recent survey indicated that more than four squares were excavated, perhaps as many as 8-10 in the southern half of the complex. These units remained open after the termination of Gordon’s work. Several units, perhaps 10-12, were excavated in the defensive trench, information on which is not available (see Chapter 8 for more information on work in Complex C).

Approximately 40,000 ceramic fragments were recovered by Gordon, not including roof tiles, which were divided into 12 types (see Gordon 2011). Of those fragments, the majority<sup>7</sup> appear to have been of indigenous make, varying between red, black, gray, white, and brown slip with sand temper. Several of the painted red-on-white or red-on-gray Valdivia style fragments were also recovered. Other ceramic

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<sup>7</sup> The exact number of Spanish-style fragments recovered from by Gordon is unknown, though inferred from the surviving notes it is likely that less than 1% could be positively identified as European/Spanish in origin.

artifacts included several pipes, vessel lids, and gaming dice. These dice were part of a game called *Quechucahuiñ* played by the Araucanians from a possible Inka influence and mentioned by Rosales and Ovalle (Mera, personal communication, 2009; Ovalle 2003[1646]; Rosales 1989[1674]).

Several thousand lithic artifacts were recovered, including projectile points, grinding stone, pipes, axes, scrapers, awls, and lances, these latter possibly for drawing blood. Most of the larger artifacts (were made of andesite or granite, likely made from the abundant river cobbles. Smaller artifacts (projectile points, lances) were made from obsidian or chert/chalcedony. The exact number of lithic artifacts recovered is unknown.

Analysis of agricultural materials by Rossen indicated the use of maize, wheat, barley, and potatoes during the Spanish occupation, as well as the continued use of wild plants (Rossen 2011 in Gordon 2011). As noted above, the two storage barrels under the floor of Complex B were filled with wheat, barley, and corn in quantities that may have supported 21 people for a year. Of the maize, two types were identified. The first, composing 90% of the sample, was a known strain named “Arauco.” The other type, which composed 10% of the sample, was of an unknown type, apparently imported from elsewhere. This type may have been brought in by Peruvian *yanacona*, though this is speculative (Gordon 2011).

Finally, numerous animal bones were recovered. Gordon speculated that llamas (*Lama glama*, known as *ovejas de la tierra* or “land sheep” by some *cronistas*) were used certainly before and probably after the arrival of the Spanish, though no remains were recovered. In total, 78 bones were identified, 66% from equines and 33% from bovines, with 1 identified as pig (ibid).

In total, Gordon excavated approximately 600m<sup>2</sup>, which appear to have included the entirety of Complexes A, B, and D, most of Complexes C and E, portions of the eastern defensive trench, and other test areas within the confines of the barbed-wire fence (see Figures 18 and 23; Dillehay, personal communication, 2011). Overall, Gordon’s

work was one of the first to examine the interactions between the Araucanians and the Spanish during the contact/colonial period in the mid-16<sup>th</sup> Century. His research, though unfinished, provides a baseline of information and estimated dates on the Spanish occupation of Santa Sylvia and some of the material correlates of European/Indigenous interaction. Due to time constraints Gordon was unable to explore the development of Araucanian culture through time at the site. Gordon recognized the possibility of a previous occupation (Gordon 2011; see also Dillehay 2010), but focused on the Spanish constructions and artifacts, or any occupations lying away from the constructed complexes.

Recognizing the importance of Santa Sylvia both for the colonial period and for analyzing the development of Araucanian culture, this present research proposed to excavate in areas outside of Gordon's excavations and probe deeper to determine any sequences of occupation at the site. Using Gordon's research as a baseline, further investigation at Santa Sylvia has the potential, now and into the future, to provide essential information about both Araucanian and Spanish culture in the area.

### *Initial Conclusions*

Based on the excavations and materials recovered, Gordon proposed that Santa Sylvia was constructed in the early AD 1560's, soon after the end of the First Major Offensive against the Spanish, which identified in this research as a conservation phase that lasted from AD 1558-1588 (see Chapter 12). Santa Sylvia may have served three objectives (see Harcha and Vásquez 2000): **1)** mine gold and other ore from the Liucura River and elsewhere in the nearby mountains; **2)** provide protection for the passes across the Andes into Argentina; and **3)** act as a support to the larger occupation in Villarrica (Ovalle 2003[1646]). Though not as fortified as other "fortified houses" elsewhere in Chile such as one constructed by Pedro de Valdivia to the north of Santiago (Vera 1989) nor the size of fortified houses elsewhere in the Americas (South 1985), the thickness

of the walls of Complexes B and C, as well as the defensive trench and wall along the eastern edge above the river, point to the long-term occupation and defensive intent of the site as proposed by Gordon. Guarda (1973) suggests that wall thickness could also be an architectural feature designed to withstand the numerous earthquakes that have and continue to affect Chile. In either case, the continued tensions between the Araucanians and Spanish would require that the site have defensive components, particularly considering its exposed nature above the Liucura River.

Gordon further argued that perhaps two generations of Spaniards and Araucanians lived at Santa Sylvania over about 40 years, as evidenced by the number of burials in the chapel/mausoleum. Extensive farming occurred in the surrounding area, with continued maize cultivation and the introduction of wheat and barley, along with the raising of horses and cows. All of these activities may have supported mining activities in the river and at possible nearby mines (Colihuque Llañulef, personal communication, 1993). With no indications of destruction, the inhabitants of Santa Sylvania lived in relative peace until around 1598. The death of Governor Oñez de Loyola in that same year precipitated the Second Major Offensive against the Spanish, which eventually consumed all of the Araucania (see Chapter 12). Gordon believed that Santa Sylvania, by the order of the commander of Villarrica, was evacuated in or around AD 1599, the inhabitants fleeing to Villarrica to support the defense of the larger fort (Tribaldos de Toledo 2009[1630]). No evidence suggested that anything other than a speedy evacuation transpired. After the evacuation, the amount of burned material, particularly in the chapel/mausoleum, suggests that the Araucanians burned the site and reoccupied the area until the late 19<sup>th</sup> Century (Gordon 1991, 2011).

### **Other Research in the Area**

Other research conducted in the area surrounding Santa Sylvania sheds some light

on the use of the area by both the Araucanians/Mapuche and Spanish. Dillehay and colleagues (1985, 1990b; Dillehay and Saavedra 2010) conducted extensive survey and testing of the immediate area of the site, focusing on the identification of *kuel* ritual mounds, *nguillatun* ceremonial fields, and Araucanian habitation sites (Dillehay 2010; Dillehay and Saavedra 2010). Test excavations and radiocarbon dates indicate that the first *kuel* were constructed in the area beginning around AD 1200, and constitute the second-highest known concentration of mounds in south-central Chile, second only to Purén-Lumaco (Dillehay 2007). Habitational sites and cemeteries near Villarrica Lake, particularly on the peninsula, were occupied or used by about AD 1200 (see Chapter 7; Dillehay, personal communication, 2011; Pucón 2007; Navarro et al. 2012; Seelenfreund and Contreras 2001).

Surveys conducted by Mera and colleagues (Mera and Harcha 1999; Mera et al. 2001) identified 10 sites of “defensive character” around Santa Sylvia, and others were found across the Andes into the Neuquén Province of Argentina (Goñi 1986-1987). Of particular note is that these sites are of Araucanian construction, some dating to before the arrival of the Spanish. These pre-Hispanic fortifications may have been constructed and used by local *lof* or *rehue* as defense against enemy Araucanians in pre-Hispanic times, then later as places of redoubt against the Spanish. These fortifications may have also served as staging grounds from which the Araucanians near Santa Sylvia launched offensives against Spanish settlements (Mera et al. 2006). However, more work remains to be done with regard to all aspects of indigenous fortifications in south-central Chile.

### *Future Prospects*

Gordon was unable to fully synthesize and present the results of his work at Santa Sylvia due to his death in 1995. After his passing, misplacement of most of his artifacts and research notes have clouded subsequent studies of the site and the archaeological record of the area (Harcha et al. 1999; Mera et al. 2004). Additionally, Gordon focused



almost entirely on the Spanish occupation, halting most excavation at about 30cm though recognizing the possibility of previous occupation (Gordon 2011). Subsequent testing (Dillehay 2010) suggested pre-Hispanic occupation, but time impediments limited investigation into the relationships between the pre-Hispanic, Hispanic, and any possible post-Hispanic occupations (Harcha 1999; Mera et al. 2001).

But what was the nature of any pre-Hispanic occupation? Did the imposition of Spanish material culture and settlement patterns influence the Araucanians in the area more than their relations living elsewhere in south-central Chile? Did the Araucanian cultural system change, or was it able to maintain the structures that had been in place centuries before, despite Spanish influence? How are the phases of the Araucanian Resilience Cycle (ARC) materially expressed in the archaeological record? From these questions, Santa Sylvania was recognized in this research, unique to any other site identified to date in south-central Chile, as containing the possibility of identifying a long indigenous cultural sequence and evidence of Araucanian/Spanish interaction *in one place*. United with ethnohistoric and ethnographic information, Santa Sylvania has the potential to suggest a diachronic as well as synchronic understanding of the Araucanian cultural system.

In sum, the work initiated by Gordon at Santa Sylvania, with the concurrent regional survey by Dillehay, Adán, Harcha, Mera, Navarro, and others, provided the basis and influence for not just this project, but other research in the region which has spilled out into analyses of fortifications and Araucanian/Spanish interaction in other areas (Harcha 1999; Harcha et al 1989; Inostroza 1994; Mera et al. 2004, 2006; Saavedra 1994; Saavedra and Sanzana 1991). Due to the death of Gordon and the known importance of Santa Sylvania, it became imperative that more archaeological work should be done at the site. The results of that research will be discussed in the following chapters.

## CHAPTER 8

### FIELD SEASONS 2006, 2009-2010: ARCHAEOLOGICAL INDICATORS OF ARAUCANIAN RESILIENCE AT SANTA SYLVIA

As stated in previous chapters, the intent for this research was to identify possible material correlates of Araucanian resilience through the conceptual framework of RT, as well as aspects of Araucanian/Mapuche and Spanish interaction, cooperation, behavior, and activity. This was to be done at Santa Sylvia, known to contain a Spanish occupation and possible pre- and post-Hispanic Araucanian occupations. Gordon's initial work at Santa Sylvia focused on the Hispanic occupation, which he dated via thermoluminescence to the early contact period, or sometime between AD 1552 and 1598. Subsequent tests indicated pre-Hispanic use of the site (Dillehay and Saavedra 2010; Gordon 2011). This degree of possible long-term indigenous occupation along with Spanish interaction has not to date received extensive attention elsewhere in south-central Chile. This makes Santa Sylvia an important site for understanding the material cultural aspects of pre- to post-Hispanic Araucanian cultural development in and use of the region. This regional perspective can then be compared to other areas on the Araucania to see any similarities and differences in the ways in which Araucanian communities evolved over time, particularly during the periods of interaction with the Spanish.

Additionally, the archaeological and historical information from Santa Sylvia can be analyzed through the framework of RT to illustrate the processes through which the Araucanian cultural system passed at the site. This will be hypothesized through the different phases of the ARC as suggested by the excavation results at Santa Sylvia, and will be continued in the following chapters.

## Overview

Brief reconnaissance surveys were carried out at the site and the surrounding area in March of 2006 with Dr. Tom Dillehay and Chilean ethnographer Arturo Rojas, and February 2009<sup>1</sup> with the landowner Benjamin Davis. The site appeared in relatively good preservation, encumbered by wild blackberry bushes (*Rubus ulmifolius*) and *notros* (Chilean firebush, *Embothrium coccineum*) trees planted by Davis after the site was discovered. Informants indicated that the site may have been looted by individuals living in Villa San Pedro (2km to the east) and Pucón, though no indications were seen on the surface of looting activities. In the southern end of Complex C and to its immediate east, or what Gordon identified as a “defensive trench” (see Figure 29) numerous open pits were seen of similar size, likely open excavation units from previous excavations (Figure 30). Several trowel and shovel tests were placed north of the site, about 100 meters north and northwest of the modern fenceline, to see if any substantial cultural materials extended to the north. No deposits or materials were identified in these tests, indicating that the majority of activity took place around the Spanish constructions on hill above the Liucura River (Figure 31).<sup>2</sup>

Excavations at Santa Sylvania were initiated in late 2009. As the full extent of Gordon’s excavations is unclear, some degree of overlap inevitably took place between where he excavated and the present study (Gordon 2011; Harcha et al. 1999). As noted before, Gordon focused on: **1)** the mounded areas, or the Spanish complexes, apparently without testing to the west or south; and **2)** the Spanish occupation layers, with limited excavations below about 30-40 cm, though some areas along the walls within Complex B and test pits went deeper (Gordon 2011). Subsequent testing (Dillehay and Saavedra 2010) indicated pre-Hispanic features which had not yet been explored in greater depth.

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1 Mera et al. (2001, 2006) also conducted brief reconnaissance survey at the site with the same results.

2 Other surveys (Dillehay 2010) found *kuel* mounds approximately 500m northwest of the site, but the lack of artifacts in-between the two sites suggests no specific relation.

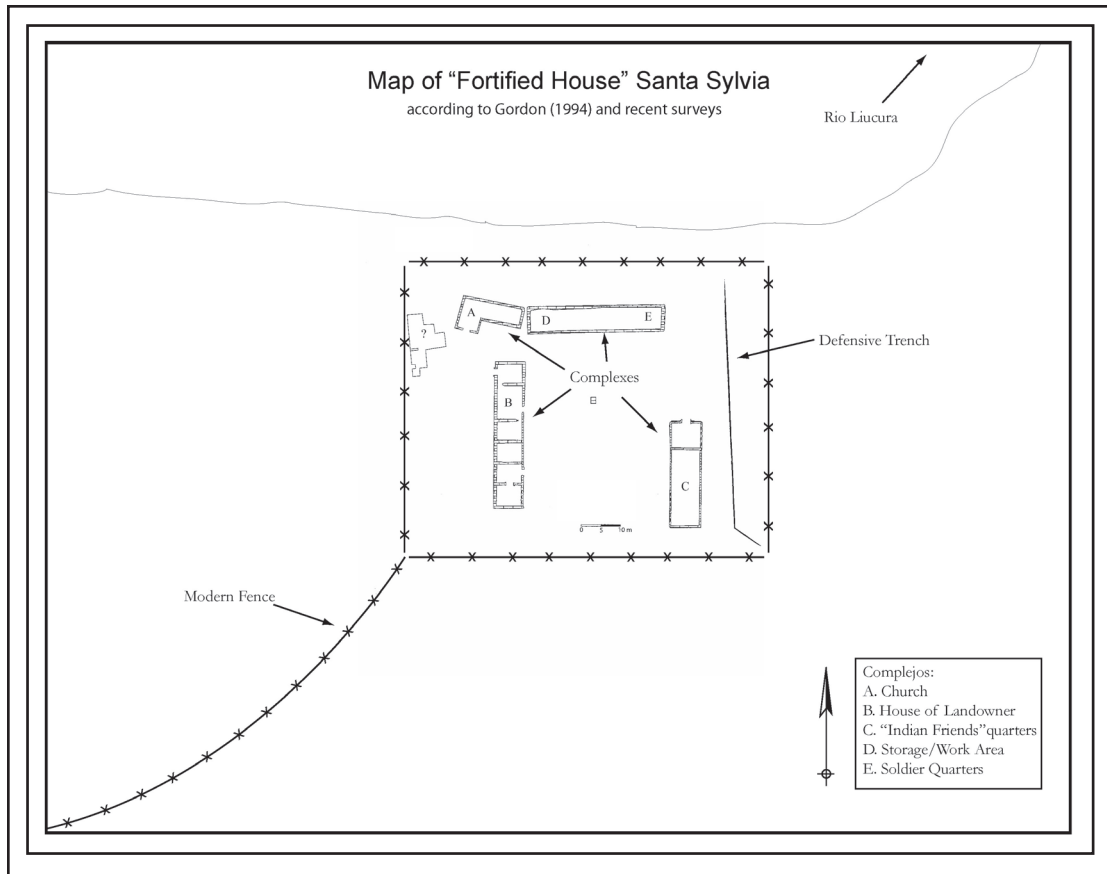


Figure 29: Map of Gordon’s excavations, adapted from Gordon 2011, showing complexes and modern barbed-wire fence.

Thus, initial test trenches were planned in four areas of the site, two near the Spanish architecture (the five “complexes” defined by Gordon; Figure 29), within the confines of a modern barbed-wire fence erected by Davis (referred to as the site “interior”); and two away from the complexes in outside the barbed wire fence (the site “exterior”). These areas appear to have been unexcavated and later testing identified possible buried deposits.

Work in the interior was intended, in part, to re-confirm the stratigraphy of Gordon and to explore identifying a possible *ruka* (see Gordon 2011). The first trench, labeled T1 (see Figure 32), began as a 2x1 meter unit oriented east-west that eventually expanded to the east and south for a total of 26m<sup>2</sup> (Appendix D Figure 1). Excavations in

T1 carried out in a apparent “plaza/patio” area between Complexes B and C on an area judged that did not appear to have been previously excavated. Work in this trench hoped to find any materials that would shed light on the nature of Complex C (labeled F17 in this research), which Gordon named the *casa de indios amigos* (“friendly indian house”). If *indios amigos* lived in this complex, were they Peruvian *yanacona* or Araucanian? Unfortunately, insufficient cultural materials left the question unanswered.

Trench #2, labeled T2, was placed to the south of Complex A (Figure 32), area that did not appear to have been excavated. T2 began as a 2x1m excavation oriented north-south, eventually extending north and south for a total of 31m<sup>2</sup> (Appendix D Figure 3). T2 was placed in this area to discover any remaining Spanish-era materials and identify any pre-Hispanic occupations in this portion of the site, as indicated by previous testing (Dillehay and Saavedra 2010). Since it appeared that Gordon had not excavated in this area, it likely had a high possibility of recoverable materials from the



Figure 30: View looking south of open pits from Gordon’s excavations to the immediate east of Complex C. These appear to be within the “defensive trench” noted by Gordon.

Spanish occupation, as well as pre-Hispanic. The exact number of Spanish-style materials recovered from Gordon's excavations is unclear, though fragments of ceramics, bones of horse, cow, and pig, as well as a few metal objects were discovered. It was hypothesized that that further excavations close to the Spanish complexes might yield more objects to bolster the analysis of Spanish material culture at the site and its effects on the Araucanians. Again, as in T1, no materials of Spanish manufacture were recovered in T2.

A third trench, labeled T3, was excavated west of the barbed-wire fence adjacent to the Spanish complexes (Figure 32). T3 began as a 2x1m excavation oriented east-west that eventually extended west, east, north, and south for a total of 51m<sup>2</sup> (Appendix D Figure 5). These units yielded the greatest quantity of artifacts, nearly 8000 ceramic and 4000 lithic fragments, grinding stones, arrowheads, and charcoal. The majority of

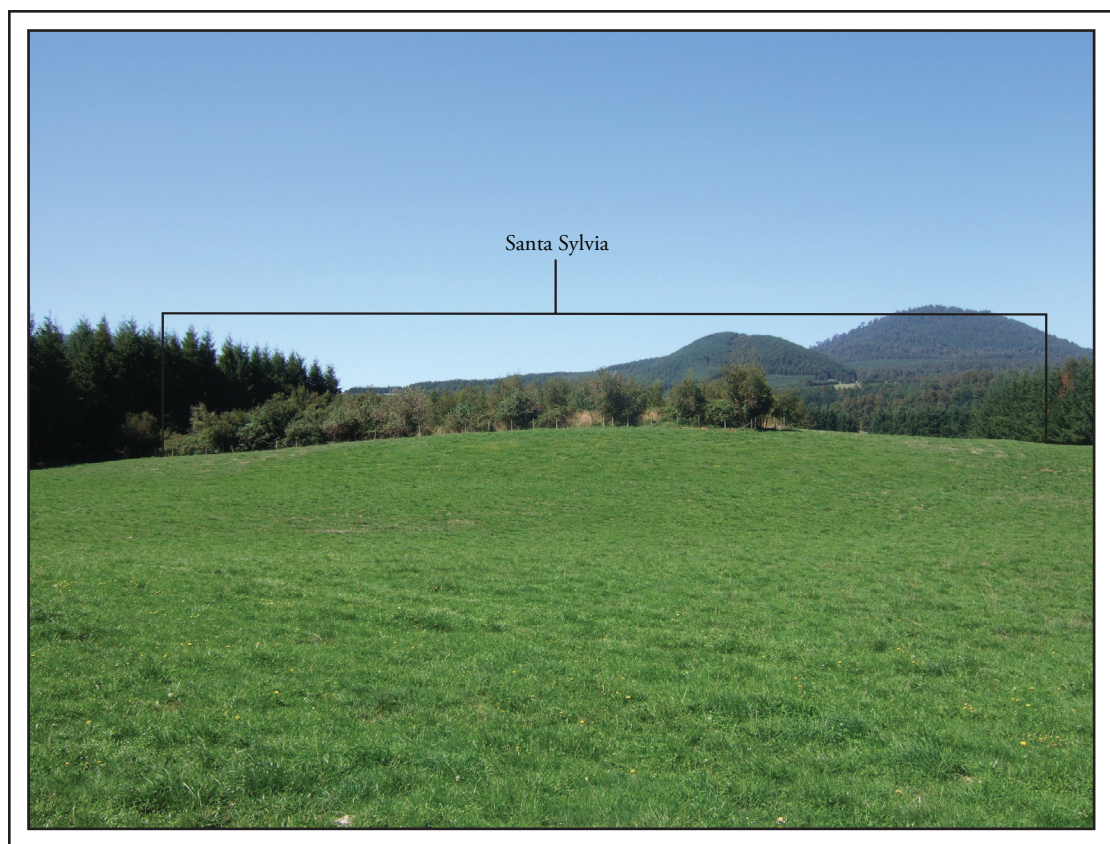


Figure 31: View of Santa Sylvia atop a hill in the background, looking southeast. Note barbed-wire fence delineating the “interior” of the site excavated by Gordon. Black line indicates the known extent of cultural materials.

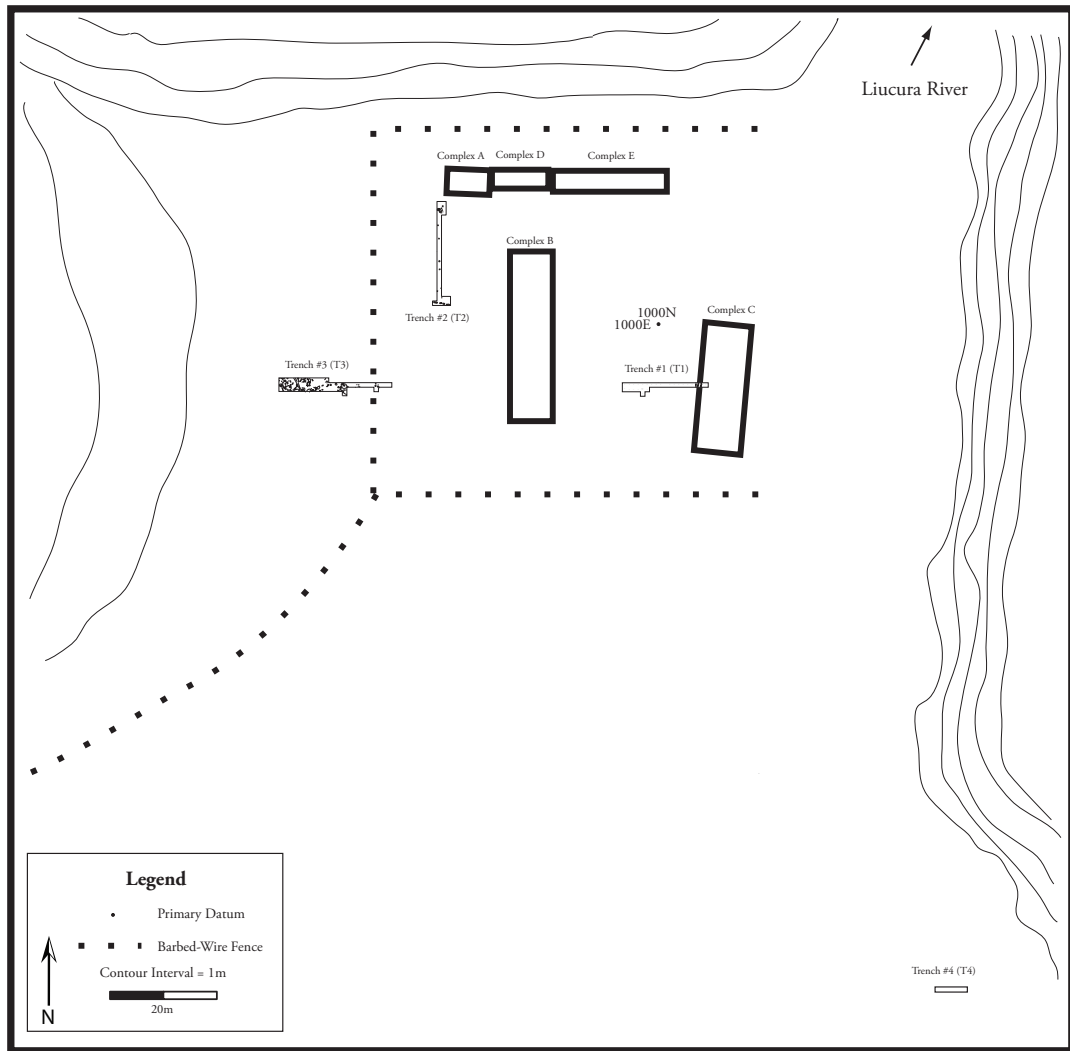


Figure 32: Updated map based on current research, including excavation units described in the text.

materials appeared to be of indigenous manufacture, with only three fragments securely identified as Spanish in origin (see Chapter 9). Additionally, 115 features, primarily soil stains, were identified in T3 (Appendix E). Many of these appear to have been post holes that may indicate the presence of *ruka* or similar structures, as well as a possible animal pen, firepits, and other features. These materials and features were located in what may have been three separate occupation episodes, based on  $C^{14}$  dates from charcoal and the stratigraphic profile. The first possible occupation in this area of Santa Sylvia began

around AD 900, the second occupation around AD 1100, and the third occupation around AD 1580 (see Figure 43).

After consultation with the project advisor, Trench #4, labeled T4, was placed to the southeast of the main part of the site, near the main slope down towards the Liucura River<sup>3</sup>. T4 was oriented east-west for a total of 6m<sup>2</sup> (Appendix D Figure 7). This trench revealed scarce artifacts, about 30 ceramic sherds, 50 lithic fragments, 3 broken grinding stones, and charcoal found within two stratigraphic layers (Appendix D Figure 8). Ten (10) features were identified, 9 of which appear to be possible post holes for some form of structure (Appendix D Figure 8). These features were not as large or as deep as those seen in T3, which, along with the limited cultural deposits, may indicate a short occupation episode. A C<sup>14</sup> date from charcoal recovered in F60 provided a date of about AD 1850, indicating a short occupation just prior to the arrival of the Chilean army in AD 1883 (Navarro 2008[1902]). Greater detail on work carried out at Santa Sylvania is given below.

### **Archaeological Investigations at Santa Sylvania**

#### *2006 Magnetic Resistivity Survey*

In March 2006, a brief magnetic resistivity survey (MRS) was carried out at the site using a Geonics EM38B resistivity meter. This machine sends electrical currents to a depth of about 1.5 meters below the ground surface, which can indicate subsurface anomalies such as archaeological features that are distinct from the surrounding, unmodified soil (McCoy 2005). This methodology has proven successful at other colonial sites in the Americas for identifying features in advance of intensive excavation (Fowler 2011).

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<sup>3</sup> Noted in Chapter 7, these areas (i.e. on hills above waterways) were favored by the Araucanians for habitation sites.



The MRS indicated possible subsurface features in the immediate western exterior near the barbed-wire fence (Figure 29). As far as could be determined, this portion of the site had not been excavated or tested previously. Based on the results of the MRS it was determined that a test trench should be placed in the section to determine the relationship of this area to the Spanish complexes. It was hypothesized that this area may have been an occupation of *indios amigos* that worked at Santa Sylvania but did not have constructions like the Spanish. Based on historical indications, *indios amigos* or natives assigned to a particular *encomienda* would have had their primary work areas located away from the Spanish occupation area, such as where Gordon focused his excavations (Zavala, personal communication, 2010). The quantity and types of materials and features, overwhelmingly Araucanian in style and manufacture, seem to support this hypothesis (see below).

#### *2009-2010 Survey and Excavations*

Initial preparations for excavations at Santa Sylvania began in early 2009 with a brief reconnaissance survey of the site and surrounding area with Davis and his wife. Davis granted permission for excavations to proceed later in the year. Work began in mid-October 2009 with the clearing of foliage (see Figure 33), and re-identification of the complexes. Permission was granted by the Chilean Consejo de Monumentos Nacionales (CMN) on 4 November 2009 (CMN permit #4654-09). Work at the site was assisted by Cristian Villalobos, Erwin Muñoz, Julio Astudillo, and Aldo Torres of the nearby Villa San Pedro, and Mandy Sauer. Leonor Adán of the Universidad Austral de Chile in Valdivia served as Chilean compliance overseer (*contraparte*), and Dr. Tom Dillehay of Vanderbilt University served as overall advisor to the project.

As noted in Chapter 6, the primary datum was positioned by random selection in-between Complexes B and C. The datum was given the address of 1000 North 1000 East<sup>4</sup>

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4 Hereafter all addresses will be given as “N” and “E” (e.g. 1000N 1000E) directions.

and provided the baseline directions for the subsequent excavation units (Figure 32). As noted above, T1 (Trench #1) and T2 (Trench #2) in the site interior were placed with reference to the previous excavations, attempting to avoid areas previously excavated based on a reading of Gordon's work and the site surface. Exterior excavations, T3 (Trench #3) and T4 (Trench #4), were placed solely at the discretion of the project director, based on the resistivity survey, site terrain, and discussion with Dr. Dillehay. Additionally, per CMN regulations, excavations were done in artificial layers of 10 cm<sup>5</sup> and screened through 6 mm wire mesh, retaining 100% of sizeable cultural materials<sup>6</sup> recovered (see Chapter 6). All addresses referred to as excavation units are 1x1 meter squares and all depths are below the present day ground surface, which was labeled F4.

#### *T1 (Trench #1)*

Excavations in T1 began at 985N 992E and extended east toward the western wall of Complex C (F17; Figures 32 and 34). The trench was closed at 985N 1010E, eventually totaling 26m<sup>2</sup>. The initial subsurface layer, labeled L6, was composed of dark brown, wet, earthy soil (5Y 4/1)<sup>7</sup> containing primarily decaying plant material to an average depth of about 15 cm. This appears to align with the stratigraphy recorded by Gordon (Figure 35a-b; Gordon 2011). Numerous roof tiles were recovered, likely from the erosion of Complex B in the centuries since the Spanish occupation, Gordon's excavations, and possible looters. Some fragments of ceramics and lithics were recovered in this layer, though not as abundant as roof tile. A second layer, labeled L7, was identified at 15 cm to about 40 cm. This layer contained lightly compacted brown/orange soil (2.5y 5/3) with inclusions of clay, gravel, and volcanic basalt nodules 1 to 2 cm in diameter.

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5 All depths are presented as below present-day ground surface (F4), unless otherwise noted.

6 Charcoal recovered from 0-10 cm was discarded due to proximity to the surface and possibility for contamination. Also, artifacts smaller than 1.5cm, ceramics in particular, were not saved.

7 All colors are based on Munsell 2000 soil color charts.

A third layer, labeled L9, was identified below L7. It was composed of loosely compacted brown/gray soil (7.5YR 5/1) containing ash and sand. The L9 layer only appeared in the western portion of T1, towards Complex B, and based on the amount



Figure 33: View of workers clearing brush from surface of Santa Sylvania with Complexes C and B noted, looking south.

of ash and charcoal seen may represent the burning the remains of the burning episode referred to by Gordon. L9 was seen generally from about 40 to 70cm below F4, though very irregular (see Appendix D Figure 1). L9 was not identified between 985N 1000-1010E. Gordon appears to have subsumed L7, L8, and L9 under one single layer he called “*lapilli poco meteorizado*” (Figure 35b), or a volcanically-deposited soil with little weathering.

Roof tiles, ceramics, lithics, and a stone pipe stem (Figure 36) were recovered, and artifact quantities gradually ceased by 40 cm. No artifacts were recovered below 40 cm in T1, and the majority recovered above 30 cm within the L7 layer. Based on



Figure 34: View of workers excavating in T1, looking southwest.

the artifacts recovered and the composition of the soil, L7 and L9 may be related to the Spanish occupation , dated to AD 1555 +/- 30 from a thermoluminescence assay acquired by Gordon from a sample of roof tile (Gordon 2011:12).

A hard, irregular gray clay layer (L8, Gley2 7/10B) appeared at about 70 cm and extended to 90 cm (approximately 20cm total thickness), particularly in 985N 995-998E, and was identified initially as possible wall decay from Complex B and/or C. L8 may also be a compacted floor level related to the L7 and L9 Spanish occupation layers, hardened from human activity during the Spanish occupation of the site. The irregular surface of this layer suggests it may be from the eroded *tapia* walls of Complexes B and C, rather than a floor. As noted above, no artifacts were recovered from this layer or any others below L8 (L23, L15, L21, and L22 respectively; Figure 35a), and in most units excavations ended at 60cm, partway into the L8 layer. As slight depression from 985N 1002 to 1006E appeared to be caused by erosion, perhaps from the frequent rainfall in the

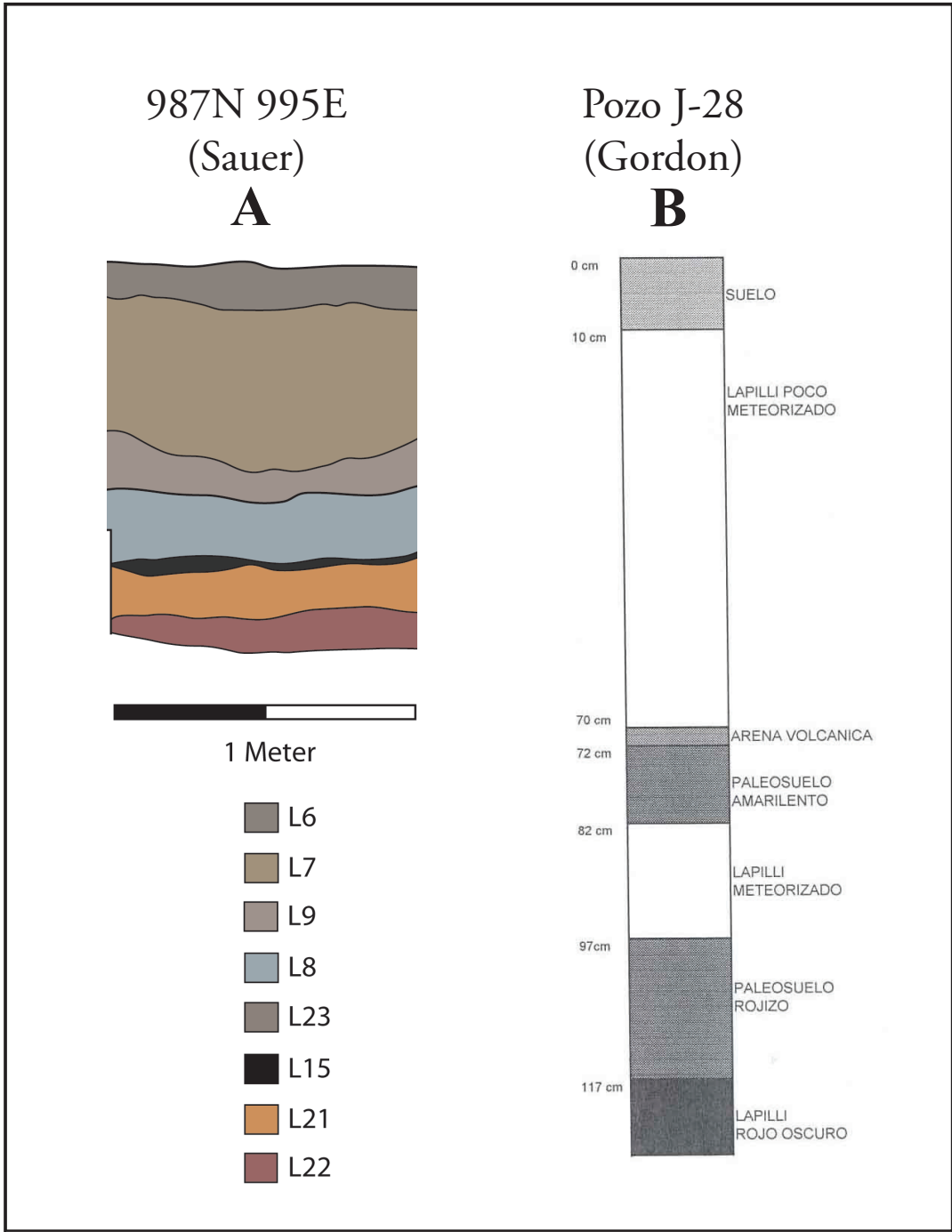


Figure 35: Comparative stratigraphic profiles of excavations in T1 (A) and from Gordon's excavations (B; Gordon 2011).

area, which removed all but the L6 and L8 layers.

Two units, 985N 995E and 996E, were excavated to 130cm to compare with the stratigraphy identified by Gordon, particularly in “Pozo J-28” (Figure 35b). A thin lens of black ash soil labeled L15 (Gley2 2.5/5B), about 15cm thick, was identified at about 90cm below F4. This layer may have been deposited by the last major eruption of Villarrica Volcano that occurred around AD 330 (Comuna de Pucón 2009) and corresponds to the “arena volcanica” or volcanic sand layer identified by Gordon (Figure



Figure 36: Stone pipe stem recovered in T1.

35). Below L15, a light brown/yellow (7.5YR 6/8) loosely compacted layer, labeled L21, was identified from 105cm to 120cm below F4. This layer contained no cultural materials and may be the “paleosuelo amarillento” or yellow paleosol in Gordon’s stratigraphy. A last layer, labeled L22, appeared below L21, composed of red/brown (2.5YR 4/6) very sandy soil from 120 to 130cm below F4 (Figure 35a), likely corresponding to the “paleosuelo rojizo” or reddish paleosol defined by Gordon (Figure 35b). The differences

in stratigraphic profiles between the present research and that of Gordon are probably due to where the respective profiles were defined within the site.

No features were identified in T1 until 985N 1008E, part of the outer western wall, labeled F12, of F17 (Complex C) was uncovered. The wall was composed of six rows, three interior and three exterior, of granite river cobbles, probably from the bank of the Liucura River, at a depth of 35 cm below F4 to 70cm. The two rows were separated by 50 cm of dark brown (10YR 3/2) compacted clay, labeled F14, and the whole wall

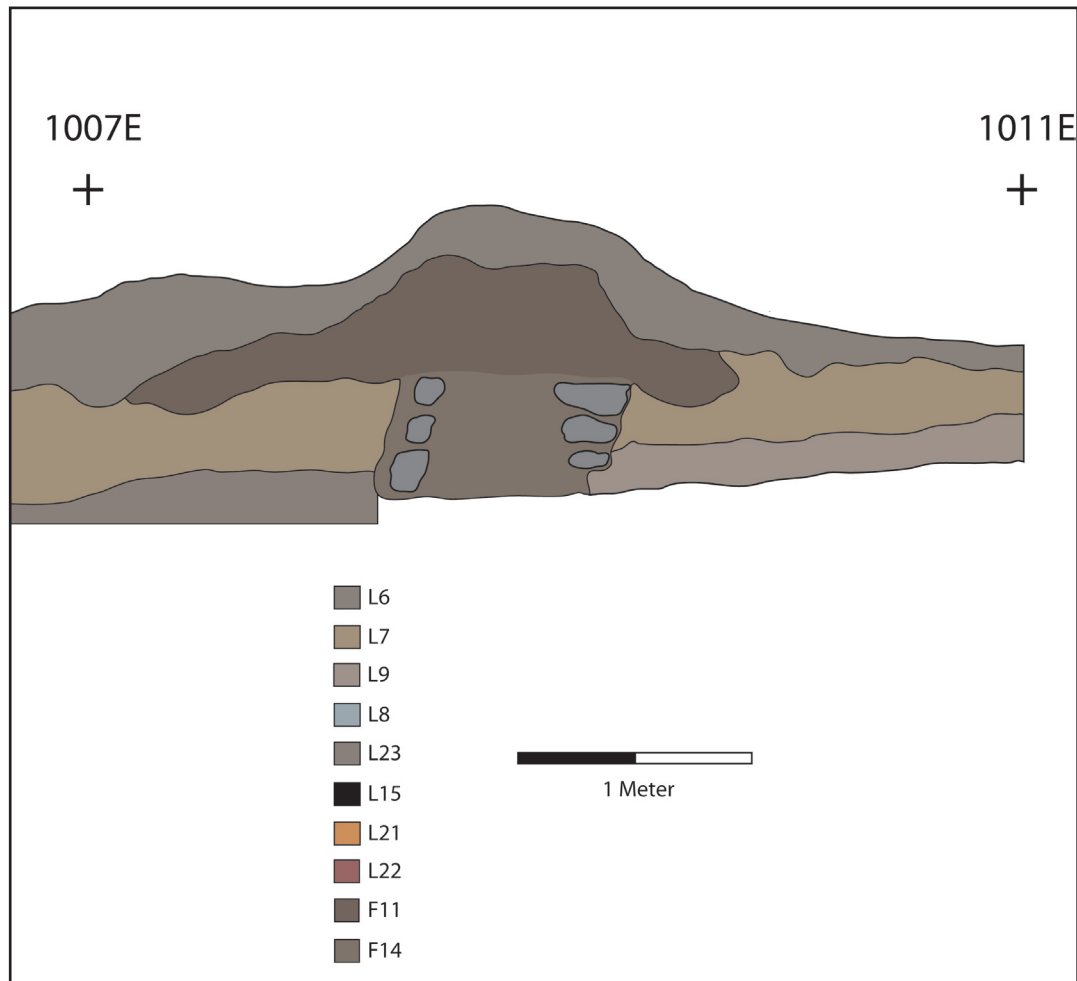


Figure 37: Profile view of western wall (F13) of F17 (Complex C) in T1.

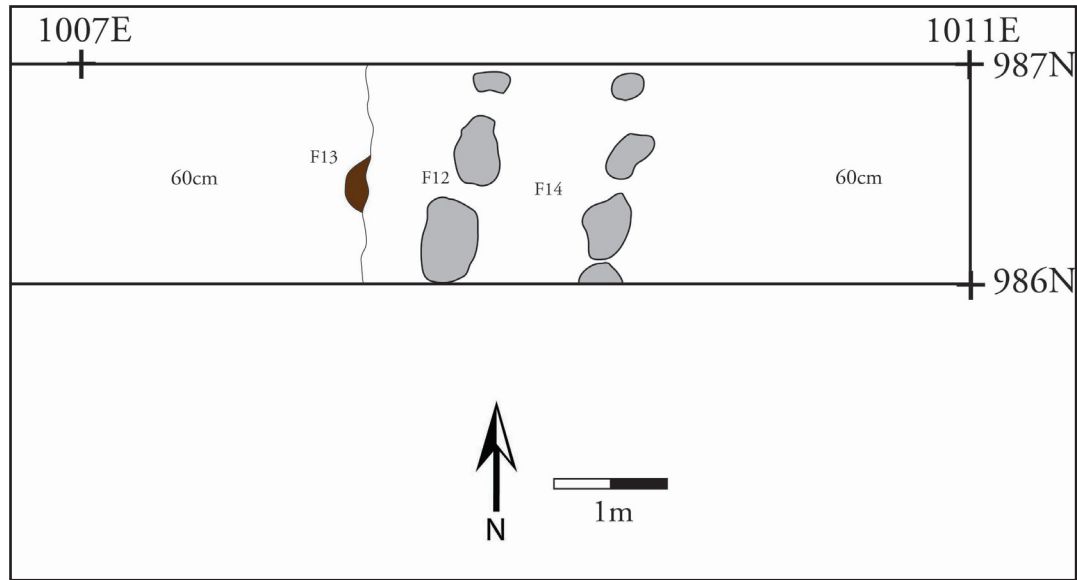


Figure 38: Plan view of western wall in F17 (Complex C), noting the stone wall (F12), possible post hole (F13) and fill within the wall (F14).

was oriented slightly north-northeast<sup>8</sup> (Figures 37 and 38). A hardened layer of gray/black (5YR 3/2) possible wall erosion, labeled F11, was excavated above F12, and appeared very similar in color and composition to F14. F11 extended east for 1.5m into 985N 1006E (Figure 37).

At the base of F12 in 985N 1009E, a possible posthole, labeled F13, was identified. This feature may be a remnant from the construction of F17 (Figure 38). F13 was first identified as a circular stain, about 7cm in diameter, which was revealed to be about 20cm deep with a rounded bottom. This may have been where a post was placed to provide the framework for making the *tapia* walls of F17. According to information from other colonial sites (Guarda 1973; Marquez de la Plata 2009) after the base of stones was in place, a series of posts would have been erected along the inside and outside edges, perhaps to a height of about 2 meters, with thin branches or other material woven tightly in-between on either side creating a basket-like framework. Clay and mud would have

<sup>8</sup> As Figure 10.3 indicates, few of the Spanish-era features at Santa Sylvania are oriented precisely on cardinal directions.



been poured into the gap and allowed to harden, making the upper portion of the wall. F13 may be a post hole used for such a purpose (see Chapter 9 for further discussion on the construction techniques). As noted in the previous chapter, the wall thickness may be a combination of defense against the Araucanians and earthquake stability (Guarda 1973).

Plastic sheeting from Gordon's excavations appeared on the interior of F17 at about 20cm along the 986N line, indicating that previous work in F17 did not extend much deeper than 20cm in the northern portion of the complex. Two units (985N 1009 and 1010E) were opened in the interior of F17 and yielded very sparse artifacts--less than 10 ceramic sherds or lithic fragments from the surface to 20 cm--and no cultural materials were recovered below 20 cm. This may be from erosion or previous excavation, though the southern halves 1009 and 1010E showed no signs of activity, archaeological or otherwise. Looting may have also transpired near F17, as a small plastic trash bag was unearthed in 985N 1007E at 30cm containing yogurt cups manufactured within the last 15-20 years<sup>9</sup>, which may have been deposited during Gordon's excavations, or by subsequent looters (Davis, personal communication, 2010).

Excavations in T1 concluded after finding no artifacts or identifiable features below 40cm in 985N 1010E. The dearth of artifacts may be largely due to erosion, and if the area between Complexes B and C was used as a plaza/patio area, as Gordon suggested, it was probably kept clean or free of cultural materials during the Spanish occupation. All artifacts recovered in T1 appear to have been of indigenous manufacture, which included ceramics, lithics, and ground stone. The lack of Spanish-style artifacts may indicate that Spaniards at the site may have been doing what Rodriguez-Algeria (2005) calls "eating like an Indian" in which mostly indigenous materials and foodstuffs were used by the Spanish in order to ingratiate themselves, or because they had spouses who were native. Gordon suggested that one of the female burials in Complex A may be the spouse of the *encomendero*, though how he came to this conclusion is unclear

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9 Based on the package design.

(Gordon 2011). In any case, the predominance of Araucanian-style material culture indicates, at the very least, that the Araucanians actively maintained their own, pre-Hispanic cultural traditions, and by extension cultural system, with the only Spanish influence coming in the incorporation of some European materials found during Gordon's excavations (wheat, barley, horse and cow bones; Gordon 2011).

### *T2 (Trench #2)*

Trench 2, labeled T2, began at 1003 and 1004N 951E and eventually expanded north and east. This area was selected because it did not appear to have been excavated by Gordon, and lay in a patio/plaza-like area like that of T1. Based on survey and surviving notes, it appeared possible that cultural remains might be found in the doorway area of Complex A (Gordon 2011:20), which materials may have extended south out into the patio area. In contrast to T1, T2 was laid out South-North, the excavations running parallel to Complex B and towards Complex A (Appendix D Figure 1).

T2 exhibited the same general stratigraphic pattern as T1 (Figure 39; Appendix D Figure 4). The initial surface layer, L6, contained the same dark brown soil composed of decomposing vegetation, though not as humid as in T1 perhaps due to this portion of the site less encumbered by trees and bushes. L6 had an average depth of about 15cm below F4 for the length of T2. The subsequent brown/orange L7 layer was identified from 15 to about 45cm, though deeper in some portions (Figure 39). At about 45cm, F7 transitioned to L8, the gray/black hard clay layer which was much denser and compact than in T1. Notably, no gray/brown L9 layer was identified in T2. L8 was hard enough to require a pickaxe to excavate, seen to a depth of 110cm below F4. In most of T2, excavations ended at about 50cm, or at identification of the F8 layer. Excavations in 1003-1004N 951E extended below L8 to ensure no cultural materials might be recovered below. At about 110m, a sandy, red-brown layer, labeled F23 (10YR 4/1) appeared and extended to

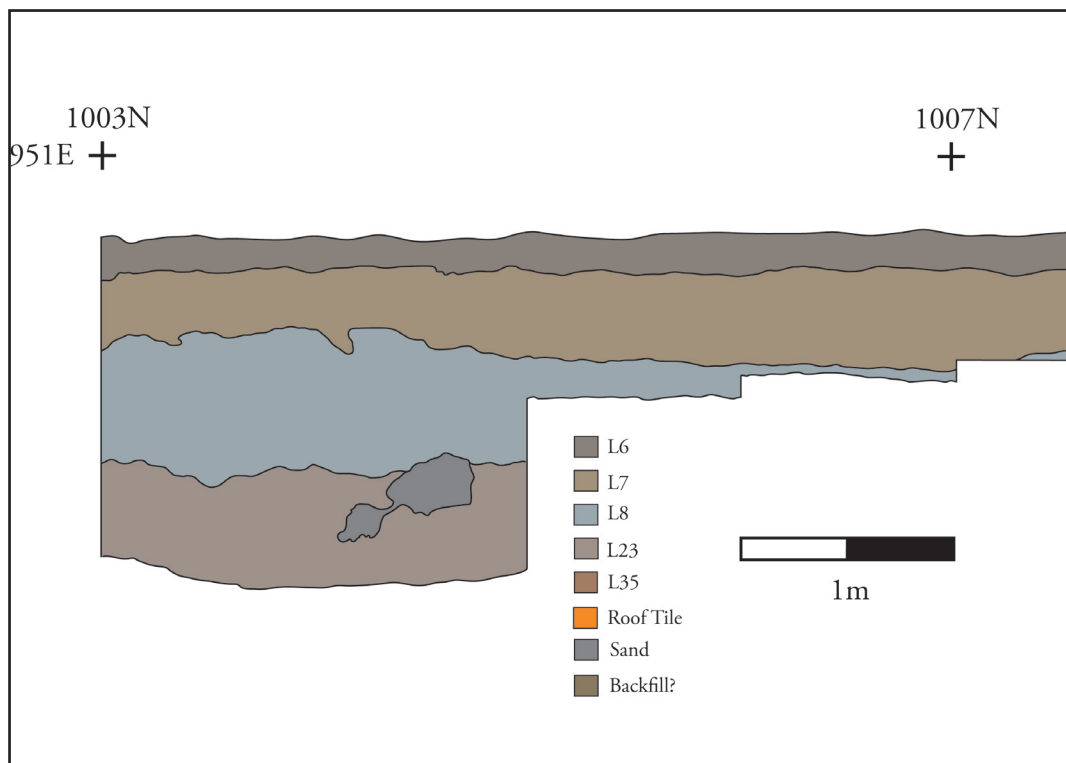


Figure 39: Closeup of west profile of T2.

140cm (Figure 39). The same volcanic ash lens appeared, previously labeled as L15, at about 150cm below F4. This was considerably deeper than in T1, where the L15 ash lens was identified at about 90cm below the surface. The reason for the difference in depth is not entirely clear. Excavations in 1003-1004N 951E were closed at 150cm. In the rest of T2, from 1005N to 1024N 951E, excavations extended to about 50cm, or upon reaching the hard clay L8 layer. No cultural materials were recovered below this layer and were extremely scarce between 30 and 50cm.

Ceramics, including the first recovered Valdivia style, lithics, roof tile, obsidian, charcoal, ground stone, and two black obsidian projectile points were recovered in the fill. The obsidian was likely procured from the Nevados de Sollipulli north of Santa Sylvia (see Chapter 9; Stern et al. 2009, 2012). One roof tile was worked in the form of a jar lid, similar to several pieces recovered by Gordon (see Gordon 2011:70). Most material, like in T1, was found in the first 30 cm throughout T2; however, in 1015N

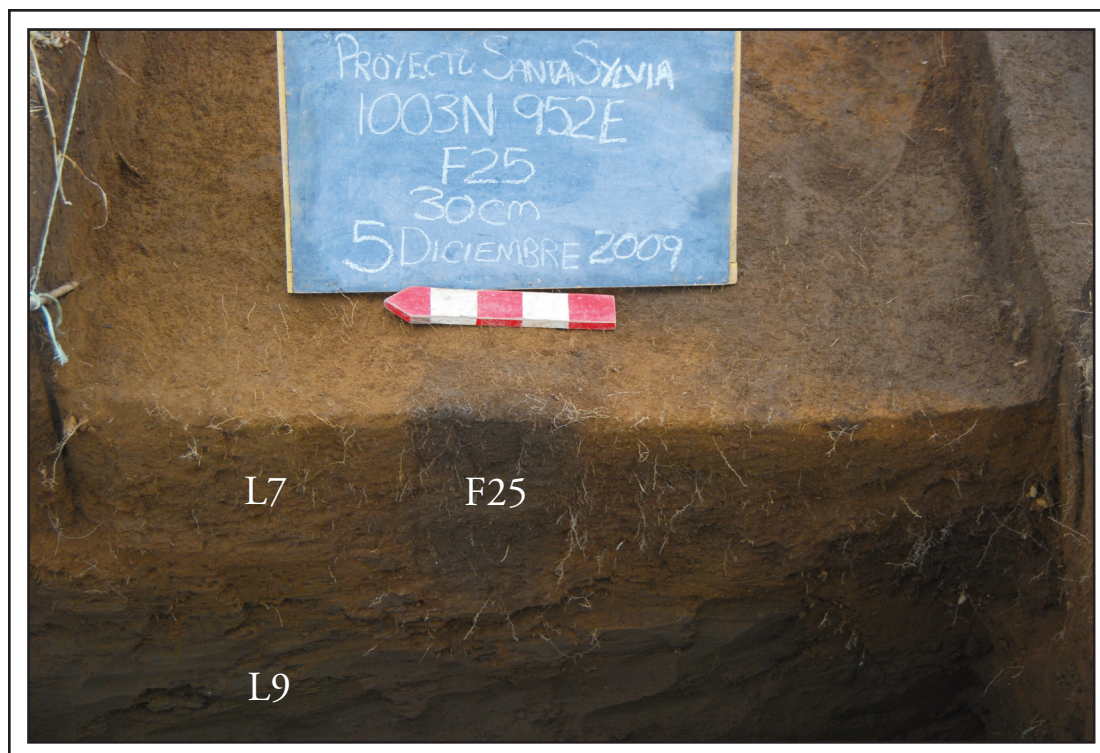


Figure 40: Profile of excavations in T2, showing possible post hole (F25) and stratigraphic layers L7 and L9, looking east.

951E, 1016N 951E, and 1024N 951E, ceramics, lithics, and charcoal were recovered as deep as 50-60cm. These units appeared to have been affected by the Gordon excavations as evidenced in the discovery of plastic sheeting, and the artifacts recovered in the present research may be fallout from that previous work. Overall, the use of this portion of the site appeared limited, like T1, to the first 30-40 cm and likely corresponds to Spanish use of the area around AD 1580. It is also possible that the area was kept clean of debris during the occupation, which would account for the limited number of recovered materials.

Seven possible post holes were identified in T2, six of which, labeled F24, F25, F28, F29, F32, and F33, were roughly linear, running north-northwest (Appendix D Figure 3). Each hole was about 20 cm in diameter and about 45cm deep, ending at the hard L8 layer (Figure 40). These features may indicate a fence line, perhaps dating to the Spanish period though a modern fence previous to the current barbed-wire fence



Figure 41: View of linear ash stain (F31) in southern portion of T2, looking east.

is also possible. A linear ash stain, labeled F31, was identified running west-northwest through units 1002N 950, 951, 952, and 953E at about 20 cm (Figure 41). No salvageable charcoal was recovered from the feature itself, which may be the remains of a post-occupation burning episode such as the one hypothesized by Gordon (2011). At the northern end of T2 an irregular pile of rock, noted as F34 (see Appendix E) appeared in 1022 and 1023N 951 east, extending east into 1022-1023N 952E (Figure 42). The rocks appeared to be basalt and may have been tossed aside from previous excavations in the portion noted as “?” in Figure 29. No apparent cultural purpose (i.e. human flaking of the rock, or association with a known feature such as Complex A) was identified in F34, and plastic sheeting from the previous work was found along the northern and western edges of the trench.

Excavations in T2 ended with no clear definition of activity or use areas. Like T1, this portion of the site may have been kept clean of material and debris during occupation, and any pre-Hispanic materials may have been destroyed during complex construction. The F31 soil stains, located in the southern end of the excavation, were less than 10 cm deep and may be evidence of a burning episode that happened after Santa Sylvia was abandoned. The series of possible post holes suggests a fence, which may be a western picket line built by the Spanish, running parallel to Complex B and just outside Complex A. It is difficult to determine from which time period this possible fence line was constructed, based on no apparent stylistic pattern (e.g. round Araucanian vs. square Spanish bases).

### *T3 (Trench #3)*

After concluding excavations in T2, a third trench was initiated in the site exterior, in a section identified as having possible subsurface features from the resistivity survey in 2006. The trench was labeled T3 and laid out east-west perpendicular to the modern barbed wire fence, beginning at 986N 932E. T3 started as 2x1m trench that amplified east



Figure 42: Rock pile in T2, possibly a feature or detritus from previous excavations, looking west.

and west to an eventual total of 51m<sup>2</sup>. The increase in excavation units was based on the amount of materials recovered and features identified, including more than 130 features, 8000 ceramic fragments, and 4000 lithics. This increase in the quantity and diversity of artifacts recovered, compared to T1 and T2, started from the beginning of excavations in T3, indicating extensive use of this portion of the site.

Stratigraphically, T3 differed pointedly from T1 and T2. The upper layer in T3, labeled L37, was composed of a thick, dark gray/black layer of soil (5YR 2.5/1) that had an average depth of about 40cm through most of the trench (Figure 43). From the amount of charcoal recovered during the excavations and the darkness of the soil, it is hypothesized that materials in this layer were burned, perhaps at the time of abandonment of Santa Sylvia (Gordon 2011). Carbon-14 (C<sup>14</sup>) dates from charcoal recovered from L37 suggest an occupation around AD 1580, which coincides with the types of artifacts recovered, particularly Valdivia-style ceramics and wheat and barley samples (see

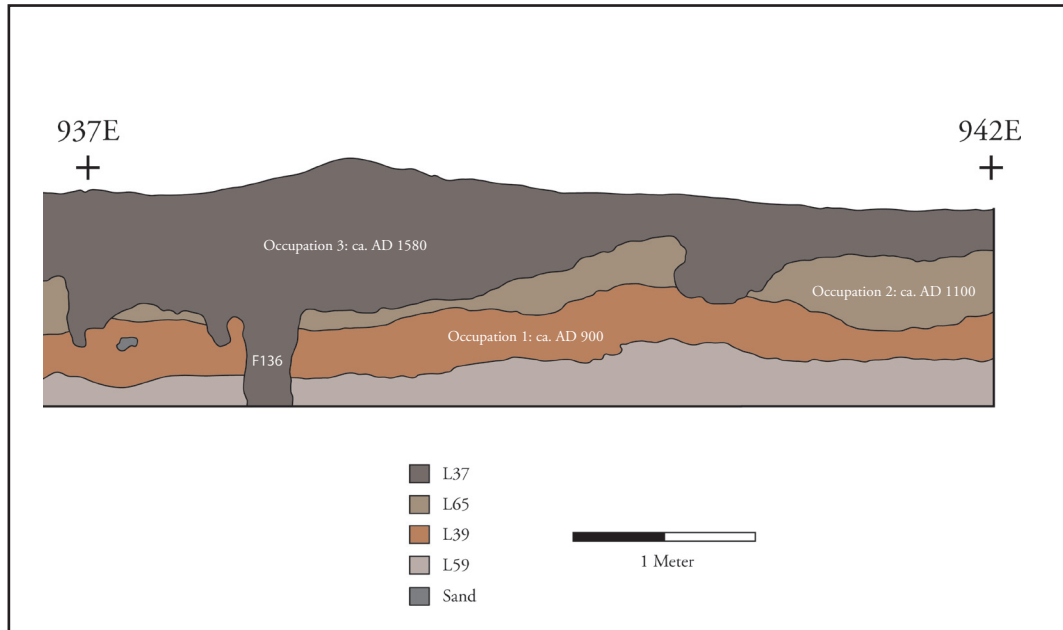


Figure 43: Closeup of profile in T3, noting stratigraphic layers and suggested C<sup>14</sup> dates indicated in the text.

Chapter 9 and Appendix A). L37, like layer L7 in T1 and T2 probably corresponds to the Spanish-era occupation. The possibility existed that the use of the land as a cattle farm may have contributed to the darkness of the soil, but excavations in other portions of the site, primarily Trench #4, T4 (see below) revealed a different stratigraphic pattern and soil composition, which areas had the same modern use as T3<sup>10</sup>. Thus, the burning that may have transpired at T3 likely happened near the time of Spanish abandonment, around AD 1590 or 1598 (see Chapter 9 and Gordon 2011) and burned a considerable amount of material to cause the soil to remain dark.

A possible fire pit appeared at about 20cm in 986N 932E, extending south and east into adjacent units (Figure 44). The feature, labeled F38, was composed this orange-brown soil (10R 6/8), approximately 10cm thick and 1m in diameter, and contained fire-cracked rock, ceramics, lithics, and two circular features labeled F40 and F41. F38

<sup>10</sup> And which, notably, had been burned within the last 30 years (see Figure 9.4). No evidence of the post-abandonment burning episode was apparent during excavations in T431.



appears to be the remains of a fire pit, owing to the orange oxidization of the soil and the quantity of fire-cracked rock in the fill, perhaps associated with a possible *ruka* (see below). One of the features, F40, which measured 25cm by 27cm with a depth of 20cm, may have been used to bury trash as numerous pieces of broken pottery, including one nearly-intact vessel (Figure 45) were recovered within. The adjacent feature, F41, measuring about 17cm by 15cm, was revealed to be shallow, about 12 cm deep, with no obvious purpose or cultural materials recovered.

Excavations expanded horizontally and vertically in T3, first to the west and south, then to the east toward the site interior. The L37 stratigraphic layer ended at about



Figure 44: Remains of a possible fire pit (F38) and two features (F40, F41) located in T3 at about 20cm below surface, looking north.

40cm, transitioning to an irregular brown/gray layer (10YR 5/3) labeled as L65<sup>11</sup>. This particular stratum was different from L37 in both color and consistency, which may signify a separate occupation sequence. Charcoal recovered in L65 returned a date to about AD 1100 (see Chapter 9). As seen in Figure 43, the upper L37 layer cut through L65 in numerous places, including post holes and other features. This may indicate that L65 acted as the floor of L37, but materials and dates recovered point to a separate occupation episode. Thickness of L65 varied between 20cm to 40cm, or from about 40-70cm below present-day ground surface, again heavily impacted by L37. Artifact quantities--primarily ceramics, lithics, and obsidian--and features began to decrease substantially during this layer. The occupation does not appear to have been substantial, perhaps as part of a seasonal movement as seen elsewhere in the Araucania (see Dillehay 1999).

Below the L65 layer at about 70cm, L39 was identified and labeled as a tan/brown layer (2.5YR 5/1), lighter than L65 and composed of finer-grained soil. This layer indicated the earliest occupation of Santa Sylvia may date to around AD 900 based on C<sup>14</sup> recovered from charcoal in this layer (see Chapter 9). However, it is possible that the early date may be an “old wood” problem, wherein a later occupation may have used older wood in their fires, thus affecting the date of the occupation. Although the L39 layer yielded Pitrén-style ceramics, no specific features were identified to this layer. This may indicate a less-intensive, seasonal occupation (Dillehay 1999) or features associated with the F39 layer may be located elsewhere in the site. Notably, Pitrén ceramics were found through all layers in T3, indicating a continued use of this artifact style through the three possible occupations of Santa Sylvia. L39 had a general depth of between 85cm to 100cm, transitioning to a dark red/brown (Gley 2 7/5PB) compacted clay layer, labeled L59. No artifacts or features were recovered or identified below 80cm unless coming out of features intruding from upper layers, primarily from L37. Due to the lack of artifacts

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11 This layer was not fully identified until excavations along the 987N line had proceeded for several units.



Figure 45: Small, nearly intact vessel from fill in F40.

from 80-100cm, excavations did not extend below 1m in T3, and 1m was reached only in 986N 929-941E.

A total of 115 features were identified in T3, primarily soil stains and post holes (see Appendix E for full descriptions). Many of the probable post holes, such as F43, F45, F47, F60 and F62 (Figure 46) did not become apparent until excavations reached about 60cm below F4, or at the L39 layer. These features contained the dark gray/black L37 soil, and extended to a depth of 1.4-1.5m with artifacts and charcoal in the fill. Many of these post holes may be the remnants of *ruka*, perhaps inhabited during the Spanish occupation. Features such as F38 (see above) may be the remains of fire pits related to these *ruka*. Other external features, such as F110 (see below) may be evidence of an external work area or animal corral. Noted in Chapter 2, each wife of an Araucanian man often had her own fire pit within the *ruka* and perhaps a small area for growing plants or raising animals. The multiple possible fire pits identified (F38, F107, and F120) may



Figure 46: View looking east of possible post holes in T3 as described in the text.

indicate this, and well as the F110 and F129 circular features. However, the disturbed nature of both the stratigraphy and features make positive identification difficult, though excavations in other areas of the Araucania suggest a similar pattern (Dillehay 1999).

A series of features, F48, F49, F50, F51, F52, and F56 appeared in 986N 925E at about 80cm (Figure 47). Of these, F48, F49, and F50 were profiled and excavated, revealing post holes extending to a depth of 1.3-1.4m (F48 and F49), and 1.2m (F50). F50 and F56 were only about 5cm deep, and F51 and F52 (which appeared in the north profile) remained unexcavated due to time constraints. For the sake of brevity and avoidance of redundancy, it is noted here that most of the features identified as post holes followed the same general pattern: identification between 40-70cm (the transitions between L37, L65, and L39); approximately 15-20cm in diameter; extending to a depth of 1.2-1.4m with dark L37 soil and artifacts throughout. Most had rounded bases

though one appeared square. Again, these possible post holes may correspond to a *ruka* constructed and occupied around AD 1100 as well as another around AD 1580.

Several other features were identified in L37. In 985N 922E a rectangular feature, F108, was identified diagonally across T3, roughly north-northwest (see Figure 48). It was composed of very fine-grained light gray soil (10YR 3/2), about 3cm thick and 25cm wide, with charcoal inclusions throughout. Its purpose is unclear, though it may be a modern intrusion similar to a ditch. Intersecting F108 to the west, first identified in 985N 921E, appeared F110, a series of 20 small round features running in a half-circle towards the northwest corner of T3 (Figure 49; see also Appendix D Figure 6). Two of the holes within F110 measured about 16cm in diameter and 25-30cm deep, the smaller holes measuring 5-7cm in diameter and 5-15cm deep. A similar series of holes, labeled



Figure 47: View of numerous features in T3, looking west. Also noted are the stratigraphic levels L37, L65, and L39 and their respective possible dates.



Figure 48: View, looking south, of rectangular and linear soil stain F108.

F129, appeared immediately east of and abutting F110 in 985N 918E. Numbering 11 in total, F129 extended north, parallel to F110, but with the smaller (5-7cm) diameter holes only. Both features contained the dark gray/black soil from the L37 layer, and may have been the remains of the abovementioned fence for an animal pen or similar small corral associated with the possible *ruka* to the east, though no dung or coprolites were positively identified to show animal use.

On the southern profile (985N 923E) a possible fire pit, similar in composition to F38, appeared at about 25cm. Labeled F107, this feature contained orange oxidized (2.5YR 4/8), dark gray/black (5YR 5/2) and brown/gray (5YR 5/2) soils, irregular in shape, measuring 81cm north-south by 63cm east-west (Appendix D Figure 6). Most of the orange oxidized soil appeared in the southern half of the feature. F107 was shallow, about 5cm deep, and irregularly shaped particularly in the southern half. Another possible

fire pit, labeled F120, was also composed of orange oxidized soil (2.5YR 4/8), appeared in 987N 921E at about 20cm, immediately west of F108. Like F38, F120 was oval in shape though much smaller, 40cm north-south by 45cm east-west and about 20cm deep. These features, F38, F107, and F120 may be the remains of fires built for a possible *ruka* or caused by the burning of the site upon at or near abandonment.



Figure 49: View of F110 (upper string line) and F129 (lower string line), the possible animal pens indicated in the text, looking east.

In the eastern section of T3, three possible post holes were identified in 985-986N 938E at about 60cm below the surface. Labeled F68, F69, and F158 (Figure 50), these circular features were about 20cm in diameter with a depth of around 30cm and separated from one another by about 40cm. Composed of the dark gray/black soil (5YR 2/1), these features appear related to the L37 occupation layer and may be the remains of

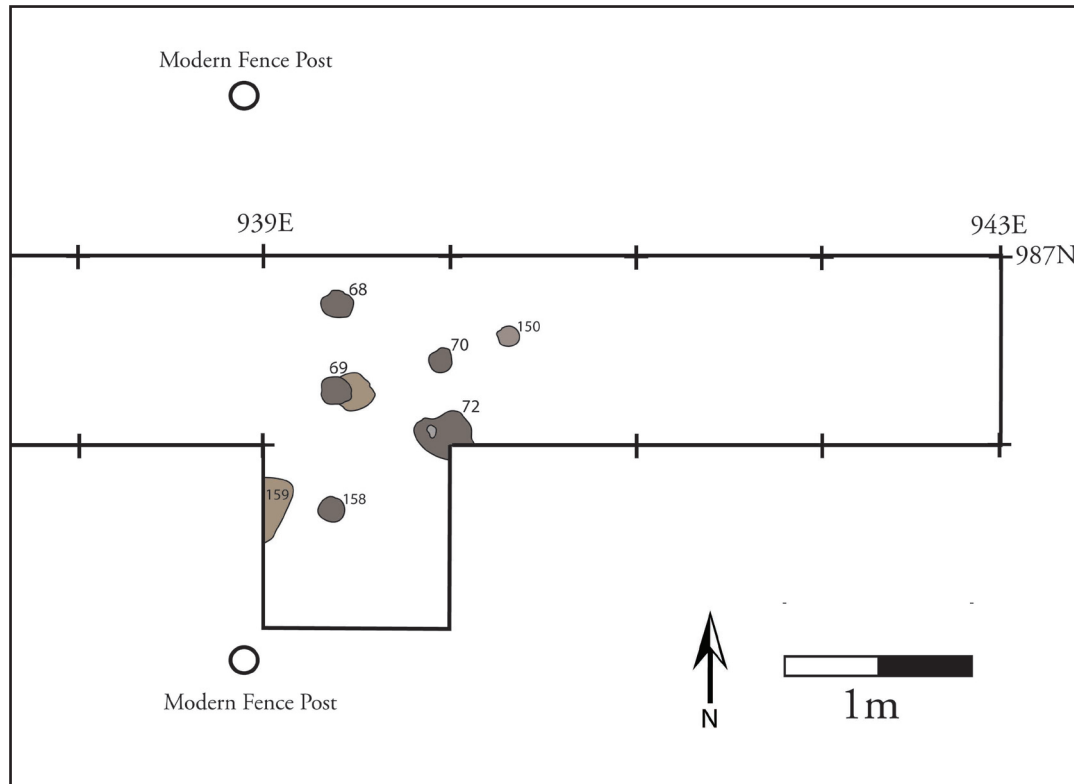


Figure 50: Plan view of possible post holes and fence line F68, F69, and F159 in T3.

a western fence or picket line from the Spanish occupation. This line may have separated the exterior area, likely occupied by Araucanians, from the interior area containing the Spanish complexes. This separation may be further indicated by no features being identified in the excavation units 986N 939-940E. As no features were seen, the area near this possible fence may have been a “buffer” zone without constructions or other activity zones. However, the proximity of the modern barbed-wire fence may also indicate that F68, F69, and F158 are more modern. Further excavations to the north and south may substantiate the hypothetical western picket line.

Three 1x1m test pits were appended to T3, noted as F130, F131, and F132 respectively. These tests were placed to widen the activity areas in this portion of Santa Sylvia. F130 was located 20m to the north of T3 at 1005N 922E to a depth of about 60cm. The profile continued the stratigraphy of the rest of T3, showing the same L37,



L65, and L39 layers (Figure 51), though no other features were identified. Ceramics, lithics, roof tile, ground stone, obsidian, and charcoal were recovered in the fill. F131 was excavated at 975N 919E (10m south of T3), and F132 was located 10m south of F131 at 965N 919E. Both were excavated to 60cm and followed the same stratigraphy of T3 and F130, with ceramics, lithics, obsidian, and roof tiles recovered in the fill. Time constraints limited placing another pit to the south, though it is estimated that cultural deposits likely extend for at least another 20m south of F132 and 20m north of F130. Two brief shovel

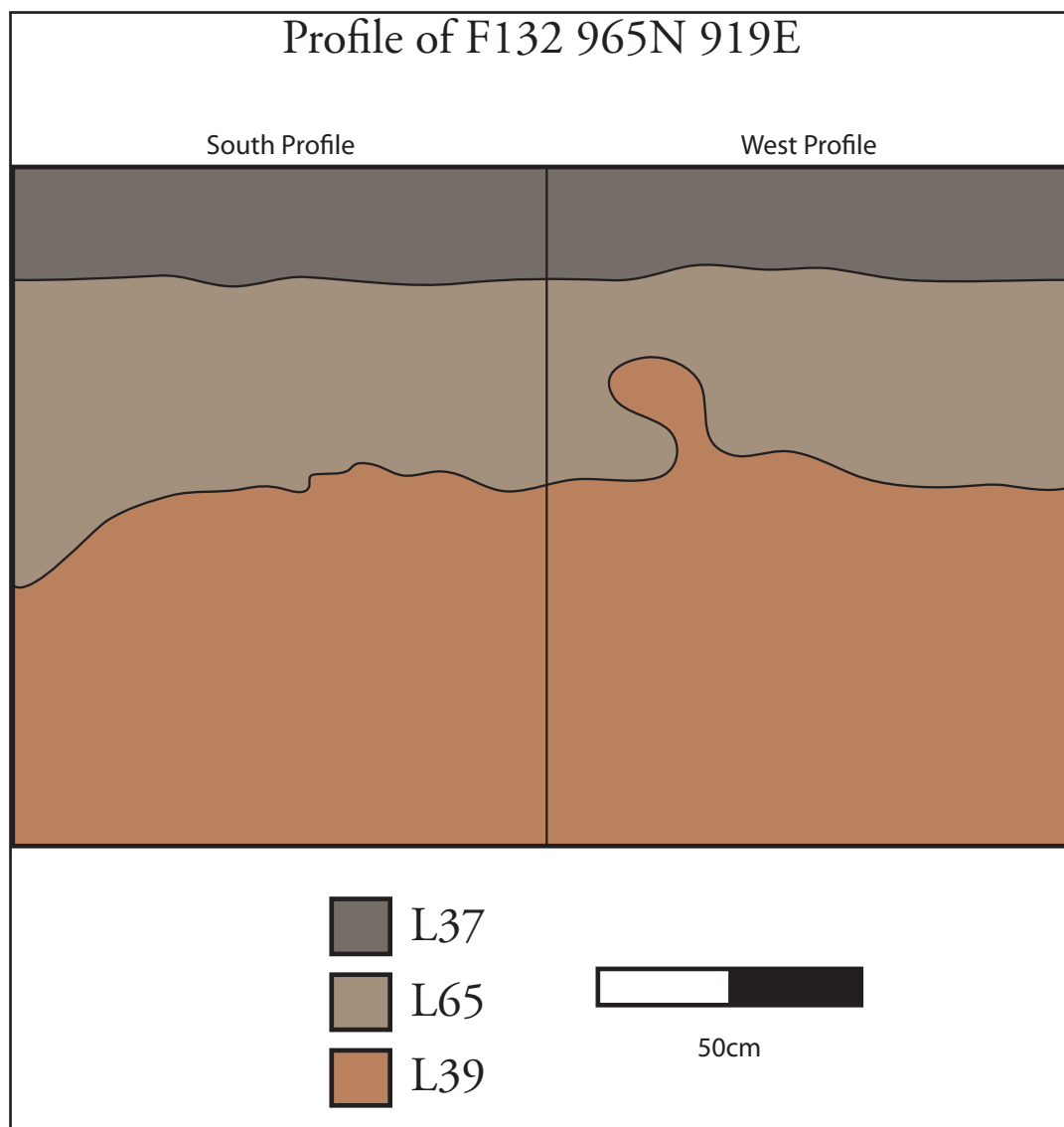


Figure 51: Profile of F132 with possible dates discussed in text.

tests west of T3 at 30m and 60m revealed ceramics to a depth of 20cm, which may indicate a continuation of cultural activity or erosion from the T3 activity area.

During excavation of T3 and appended areas, more than 8,000 ceramic sherds, 4,000 lithic fragments, 300 obsidian fragments, 8 projectile points, 5 pipe fragments, and 2,000 roof tile fragments were recovered. Along with the 115 features identified, this exterior area of Santa Sylvia appears to have had the most occupation and activity, both in pre-Hispanic and Hispanic times. It is hoped that more work can be carried out in T3 in the future to better define the nature of the features identified in the current research and firmly establish the possible occupational sequences.

#### *T4 (Trench #4)*

To conclude the 2009-2010 field season a fourth trench, labeled T4, was located at 875N 1054E after discussion with the project advisor as a possibility for an activity area based on visibility of and accessibility to the Liucura River located about 300m to the north. Investigations in other areas of the Araucania have indicated that the Araucanians tended to construct domestic sites in defensible areas above water sources and close to arable farmland (Dillehay 1990, 1999) to which T4 affords access. Excavations in this trench went to a depth of 60cm below F4 across 6 units, 875N 1054-1059E. Two stratigraphic layers were identified, L171 and L172. The former was composed of fine-grained, gray/brown soil (7.5YR 5/1), about 30-50cm thick (see Figure 52), with only about 50 ceramic sherds, 20 lithic fragments, and 1 piece of obsidian recovered in the fill. Charcoal recovered in this layer returned a date of AD 1812-1894, suggesting a brief occupation at the site near the arrival of the Chilean army near the end of the 19<sup>th</sup> Century (see Chapter 13). L172 was composed of slightly more compacted brown/yellow soil (10YR 6/6), generally 30cm thick, with no associated artifacts. The lack of materials and time constraints limited the depth of excavations and number of units opened in T4.

Nine possible post holes and one soil stain were identified in T4. Each was

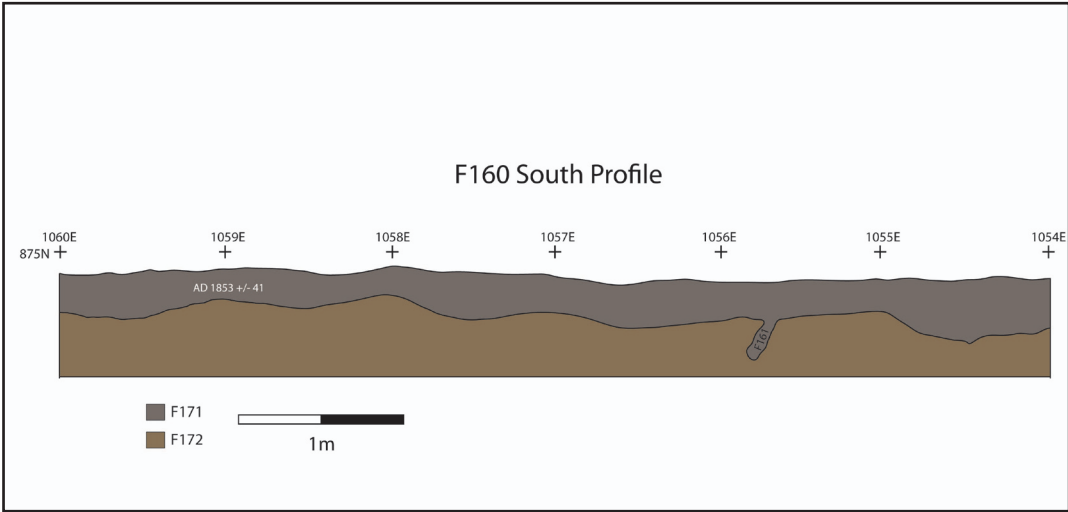


Figure 52: Profile of T4 noting two stratigraphic layers, feature, and possible date of occupation.

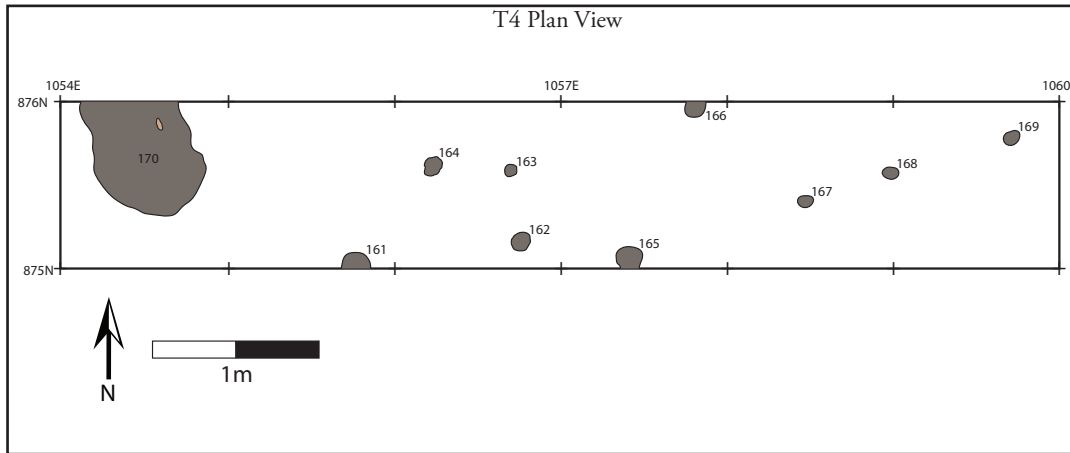


Figure 53: Plan view of T4 showing location of possible post holes and other features.

identified at about 30cm, or at the transition between the F171 and F172 layers. F161, F162, F163, and F164 were identified in 875N 1055 and 1056E, in a roughly equidistant square (see Figure 53). Three of these features, F161, F162, and F163 were 10-15cm in diameter and had a depth of 15-30cm and were rounded in shape. F161 angled to the east during excavation. F164 had a diameter of about 20cm and depth of 18cm, and square in shape. Another post hole, labeled F165, was identified in 875N 1057E at 30cm. This feature had a diameter of 25cm at the top, and angled to the west 30cm in profile, opposite of F161. The remaining features (F166, F167, F168, and F169) only had a depth of 5-10cm with no associated artifacts and may have been the result of root action (see Appendix E for further feature descriptions). Notably, no evidence of burning remained in T4, despite photographs from 1991 indicating that this area had been cleared by fire (see Figure 23), further substantiating the supposition that the L37 layer in T3 had been burned sometime in the past and was not darkened by modern activity.

### **Summary**

A total of 118m<sup>2</sup> were excavated across four areas (T1, T2, T3, and T4). Combined with the 600m<sup>2</sup> excavated by Gordon (2011) and a total of 5m<sup>2</sup> test pits placed by Dillehay in 1995 (Dillehay 2010), at least 723m<sup>2</sup> have been excavated at Santa Sylvania. Stratigraphy and dating suggest at least four occupation periods—two pre-Hispanic, one Hispanic, and one post-Hispanic. The principal occupation at the site appears to be during the Hispanic period ca. AD 1580, seen occupation layers L7 (interior, T1 and T2) and L37 (exterior, T3) from which were recovered the largest amount of artifacts. As will be further explored in Chapters 9 and 14, little evidence indicates that the Spanish had a major influence on Araucanian cultural patterns and practices, and that much of the Araucanian occupation corresponds to growth (the ca. AD 900 L39 occupation) and conservation phases (ca. AD 1100, L65, and ca. AD 1580, L7/L37) in the Araucanian

Resilience Cycle (ARC). Artifact styles show strong continuity from the two pre-Hispanic occupations, suggesting that growth was gradual between AD 900 and 1100 (stratigraphic layers L39 and part of L65, respectively). Additional survey in the region shows that populations and ritual activities increased during these times (via seen principally in settlement patterns and *kuel* construction, Dillehay 2010), and the L65 layer may be an occupation related to that increased sedentism and *kuel* construction. Importantly, though, the artifact styles remain relatively unchanged throughout, only a later incorporation of Valdivia-style indicating any significant change.

Few Spanish-style artifacts or materials were in use during the Spanish period occupation around AD 1580 based on C<sup>14</sup> dates, as the history indicates that the Spanish abandoned the area by AD 1598 (Tribaldos de Toledo 2009[1630]). This was seen in the T3 excavations that may be associated with the work zone of *indios amigos* assigned to the Santa Sylvania encomienda (Zavala, personal communication, 2010). Recovered materials may indicate that the Araucanians living at Santa Sylvania made a concerted effort to maintain pre-existing cultural practices and patterns without incorporating Spanish goods aside from the horse, cow, and pig seen in Gordon's excavations, as well as wheat and barley seen in both Gordon's excavations and the present research. Finally, the post-Hispanic occupation (stratigraphic layer L171 in T4) appears to have been a very brief or limited occupation episode, though the ceramics recovered show the same continuity in manufacture and style from previous centuries (see Chapter 13).

Additionally, these excavations, tests, and survey indicate that the size of Santa Sylvania is greater than represented in this small sample. The Spanish area (within the confines of the barbed-wire fence) encompasses about 6100m<sup>2</sup>, and associated materials to the west and south expand the limits of the site to about 20,000m<sup>2</sup>. There may be more associated materials to the south and northwest that have yet to be identified and studied systematically, including two *kuel* ritual mounds. At the very least, there are more, possibly related, occupation areas in the immediate area that need analysis to understand

their relationship to Santa Sylvia proper and other sites in the area.

*Possible ARC Phases: Growth Phase-AD 900 Occupation*

Given the above information, the following sections turn to the use of this data to describe the ARC phases based on the archaeological stratigraphy, chronology, and pattern identifications. Overall, the three occupations suggest growth and conservation phases in the Araucanian RC based on the artifacts recovered and the possible occupational sequences. The first occupation, L39 (AD 900) appears to have been a phase of growth for the Araucanians in the area. Pitrén ceramics had been introduced to the area around AD 300 (Navarro et al. 2012), and maize agriculture arrived sometime thereafter (Aldunate 1989). Pitrén styles appear at Santa Sylvia during this occupation, and continue through the subsequent levels. The use of ceramics suggests some degree of sedentism (Rice 1989), which may be a part of a growth phase in the ARC. The limited number of materials or features in the L39 occupation makes positive identification of particular activities difficult. Obsidian recovered in this area indicates trade occurring with Argentina, continuing the networks that had been in place since the Archaic Period (ca. 5000 BC; Navarro and Pino 1999; Stern et al. 2008). Some post holes may correspond to this occupation, also showing a shift to a sedentary settlement pattern. Overall, however, the evidence from Santa Sylvia coupled with research elsewhere in the area indicates that later Araucanian cultural structures were still in development during the AD 900 occupation: no ritual mounds or spaces have yet been identified, no materials indicative of agricultural activities have been determined, and the number of sites dated to this early period is limited. Further investigation is needed to more positively identify the breadth of occupation, which for now is hypothesized to be within a growth phase of the ARC.

*Possible ARC Phases: Growth and Conservation – AD 1100 Occupation*

The features identified and the artifacts and possible dates recovered from the L65 stratigraphic layer, dating to around AD 1100, may correspond to the end of the previous growth phase and the beginning of a conservation phase. The introduction of Liucura-style ceramics and the construction of ritual spaces in the area (Dillehay and Saavedra 2010) indicate that the base political, economic, social, and ideological structures of the Araucanian cultural system had been introduced and established as part of the Araucanian basin of attraction. Several of the features corresponding to this occupation, such as F100, are possible post holes. This suggests the construction of *ruka* or a similar semi-permanent dwelling indicating sedentary activities related to farming and animal husbandry, along with the use of Liucura ceramics, maize, and peppers (see Chapter 9). *Kuel* mounds studied in the area (Dillehay and Saavedra 2010) appear concurrent with this occupation, again indicating sedentism and suggesting leadership roles that drew upon networks and relations for the construction of mounds and other ritual spaces. Further investigations in the area on ritual spaces may push back the date of introduction, placing the L65 occupation firmly in the suggested conservation phase.

*Possible ARC Phases: Conservation Phase – AD 1580 Occupation*

The Spanish occupation, L7/L37, is by far the most intensive and artifact-rich and is hypothesized as part of conservation and release phases in the ARC. Most features appear to correspond to this layer, both in the artifact styles and soil composition. Previous occupations may have been more fluid or seasonal, limiting exploitation of land in one particular area (Dillehay 1999). The Spanish occupation, in contrast, appears heavily exploitative in Araucanian labor for the construction of the various complexes in the interior but also in Araucanian use of the occupation zone in T3. Through this occupation, though, the Araucanians limited the amount of Spanish material used,

appearing to actively perpetuate their own material culture. Wheat and barley were incorporated, and likely horses and cows (seen in Gordon's excavations), but the inhabitants did not appear to use metal tools or European-style ceramics. No direct evidence was recovered at the site or yet identified in the surrounding area to indicate a shift in political organization or settlement patterns, despite the imposition of a Spanish occupation. Thus, during this conservation phase, the Araucanians maintained their pre-Hispanic cultural practices and actively limited disturbance to those practices from the Spanish.

Additionally, the amount of charcoal recovered in the L7/L37 layers, the darkness of the soil, and the burned materials recovered by Gordon indicate a release phase. Historical accounts indicate that tensions built up between the Spanish and Araucanians throughout the Araucania and in area around Santa Sylvania in the late 16<sup>th</sup> Century. The amount of burned material indicates that Santa Sylvania was abandoned and destroyed, possibly around AD 1590 or 1599 (see Chapter 12; Gordon 2011). This appears to correspond to a release phase wherein the Araucanians directly confronted the Spanish, either at Santa Sylvania itself or part of a larger offensive that destroyed Villarrica (Gordon 2011; Gonzalez 1986; Rosales 1989[1674]; see also Chapter 12). In either case, this release phase appears to have transitioned to a reorganization/rebound phase, as the Spanish were expelled from the area and the Araucanians maintained autonomy until the late 19<sup>th</sup> Century (Bengoa 2003).

#### *Possible ARC Phases: Conservation Phase – AD 1850 Occupation*

This brief occupation seen in the date recovered from L171 in T4 appears to correspond to the conservation or early release phase of the Araucanian RC in the late 19<sup>th</sup> Century, just prior to or concurrent with the arrival of the Chilean army (Navarro 2008[1902]; Subercaseaux 1888). The limited artifacts are similar in style and manufacture to those recovered in the excavations in T3, and the few features may



indicate post holes for a *ruka*, though their size seems to suggest a smaller-size dwelling. Importantly, the continuity in artifact styles points to the active maintenance of the Araucanian culture system and materials since the late 16<sup>th</sup> Century. No direct evidence for destruction or abandonment suggests a transition to a release phase that may have occurred around AD 1883 with the arrival of the Chilean army (Navarro 2008[1902]) again pointing to a possible conservation phase noted above. Thus, it appears that this particular occupation may have been abandoned before incorporation into the Chilean state and the reorganization/exit phase into the new ARC.

The following chapter presents the results of the analysis of materials recovered at Santa Sylvia, how they correspond to those materials recovered by Gordon, and a how these materials may correspond to ARC phases together with the information presented above.

## CHAPTER 9

### ARTIFACT ANALYSIS FROM SANTA SYLVIA: MATERIAL CORRELATES OF CULTURAL CONTINUITY AND ARAUCANIAN RESILIENCE

Excavations yielded over 13,000 fragments of cultural materials related to both the Araucanian and Spanish cultures and occupations of Santa Sylvia. Most materials were recovered during excavations in T3 (Trench #3), which also yielded the majority of features (n=115; see Appendix E). All ceramics and lithics were washed and bagged in Pucón, Chile and are stored as of 2012 at the Museo Historico Mauricio Van de Maele at the Universidad Austral de Chile in Valdivia before final curation at the Museo Regional de la Araucania in Temuco, Chile. Both ceramics and lithics were analyzed in Pucón, Valdivia, and Nashville, Tennessee, using a 10x and 20x loupe, calipers, and other tools in standard laboratory techniques. Obsidian pieces were washed and bagged, and 25 samples were sent to the lab of Dr. Charles Stern at the University of Colorado-Boulder for chemical analysis (Appendix C).

Recovered charcoal was placed in aluminum foil envelopes and bagged, with four samples sent to Beta Analytic, Inc. and two to the University of Arizona Radiocarbon Lab for C<sup>14</sup> dating. Several groundstone samples were washed using distilled water, and the remaining materials were dried and bagged. Two samples, from T3, were sent to PaleoResearch Labs, Inc. for pollen, phytolith, and starch analysis (Appendix A). Twenty-five (25) float samples were taken from identified features, primarily from T3, and were floated at the Instituto de Geociencias of the Universidad Austral de Chile in Valdivia, dried, bagged, and sent to Claudia Silva of the Museo de Historia Natural de Concepción in Concepción, Chile, for carpological analysis (Appendix B).

The following chapter is a summary of the analysis of the materials recovered from the site during the 2009-2010 field season and their context within the broader

analysis of Araucanian resilience at Santa Sylvia. Discussed here are the results of radiocarbon, ceramic, lithic, microbotanical, and architectural remains at Santa Sylvia. Feature descriptions and analysis are found in Chapter 8 and Appendix E.

Much of the following analysis incorporates aspects of the previous research performed by Gordon and colleagues who have also worked in the area around Santa Sylvia. Gordon recovered more than 40,000 ceramic fragments and an unknown number of lithics, ground stone, arrowheads, and other materials during three seasons of work at the site (Gordon 1991, 2011). Although his work focused on the Spanish occupation area (the L7/L37 layers identified here) which dated to AD 1580, a limited number of Spanish or European style materials were recovered. This indicates that the Spanish may have used Araucanian materials as a way to ingratiate themselves with the natives, or due to the difficult in acquiring outside goods (see below). Additionally, Gordon found horse, cow, and pig bones, which were not recovered in the present study.

### **Dating**

Five samples, four charcoal and one maize from the original Gordon excavations were sent to Beta Analytic and the University of Arizona for C<sup>14</sup> analysis. The results are presented in Table 1. At the moment, there is little need for extensive dates as the periods of occupation at the site are generally known and appear to coincide with the artifact assemblage.

Three samples, Beta 288734, Beta 288735 and AA 92903, were recovered from T3. Sample AA 92904 was recovered from T4, and Beta 920655 was recovered from the Gordon excavations, apparently from one of the barrels in Complex B or about 20cm below F4 (Gordon 2011). The Beta 288734 and 288735 came from the L65 layer, which appears to date to about AD 1100 (see Figure 43). The maize sample provided a date of about AD 1580, indicating that the L7 and L37 stratigraphic layers likely date to that time

Table 1: Carbon-14 dates recovered from Santa Sylvania

	<b>Material</b>	<b>Depth</b>	<b>Date BP</b>	<b>Calibrated AD (2 Sigma)</b>
<b>Beta288734</b>	Charcoal	40cm	900 +/- 40	1030-1220
<b>Beta 288735</b>	Charcoal	45cm	900 +/- 40	1030-1220
<b>AA92903</b>	Charcoal	60cm	1114 +/- 42	856-1015
<b>AA92904</b>	Charcoal	30cm	97 +/- 41	1801-1938
<b>Beta290655</b>	Maize	20cm?	380 +/- 30	1440-1530 and 1560-1630

period which corresponds to the Spanish occupation. AA92903 was recovered at 60cm below F4 in T3, near to the feature F100 which appears to be associated with the L65 occupation dating to AD 1100. This may indicate an initial occupation at Santa Sylvania dating to about AD 900 associated with the L39 layer below L65. However, as noted in Chapter 8, the lack of features positively identified to L39 may indicate an “old wood” problem for the AA92903 sample, though the recovery of Pitrén ceramics at depths associated with L39 may strengthen the hypothetical AD 900 occupation (see below for Pitrén ceramic analysis). The final sample, AA92904, was recovered at 30cm below F4 in T4.

These dates and stratigraphy suggest that Santa Sylvania has experienced at least four occupation episodes. The earliest began sometime near AD 900, likely by Araucanians, and may be the occupation that used Pitrén-style ceramics in what is now the L39 layer. A subsequent Araucanian occupation with the L65 layer began around AD 1100, which introduced new pottery styles (see below) and perhaps long-term habitations evidenced by several possible post holes associated with L65. A third occupation corresponding to layers L7/L37 appears to have been initiated by the Spanish and Araucanians at around AD 1580. The lack of substantial deposits of Spanish-style materials may indicate that this occupation lasted no more than 5 to 10 years. A fourth and final occupation in the southern end of the site, seen in the L171 layer in T4, may have begun around AD 1850, perhaps just before the Chilean army entered into Pucón.

## Ceramics

The dates recovered from Santa Sylvia correspond in large part to the established ceramic sequences seen in south-central Chile. Ceramic analysis has been used in the past as a primary form of social or cultural identification; indeed, most cultural sequences in the past have been created based on particular ceramic styles associated with a specific group or culture (Krieger 1944; Steward 1942). Styles are generally transmitted from generation to generation in particular patterns, generally via guided variation (Boyd and Richerson 1985; see Chapter 5), or employing particular techniques in the fabrication and presentation of myriad vessels (Rice 1987; Sinopoli 1991). Though the identity of a particular individual or group can be debated based solely on a particular ceramic type (Schiffer 1999), ceramics still offer some of the best material record of cultural continuity and change (Janusek 2003; Skibo 1999).

For this study, ceramic artifacts were studied and classified based on the type patterns established by Dillehay et al. (2010) for the Purén-Lumaco Valley, namely “common attributes of surface treatment and paste” (ibid: 19; Rice 1987) and stylistic linkages between the two areas (e.g. Santa Sylvia and Puren-Lumaco) which were connected via kin and trade networks, particularly during the Spanish incursion, and who share many attributes such as kuel mound clusters and settlement patterns. Surface treatment includes slip, color, and decoration (incision, painting, corrugation, etc.), and paste includes clay color and temper (Rice 1987; Sinopoli 1991). Only 3 non-roof tile ceramic remains, of the more than 8,000 recovered, were securely identified as Spanish in style and are described below.

A total of 8,090 ceramic sherds were recovered in T1, T2, T3, and T4. All of the ceramics recovered from T1 (n=184), T2 (n=546), and T4 (n=110), were analyzed, and an arbitrary sample of ceramics from T3 (n=2,117) were studied (Vanpool and Leonard 2010) for a total of 2,957 or 36% of the total assemblage. Most of the recovered sherds

appear to be a style known as El Vergel (AD 1100-1600; see Chapter 10), as they were recovered between 0-60cm and date to the L65 (AD1100) and L7/L37 layers (AD 1580). However, the paucity of comparative collections from elsewhere around Santa Sylvia, as well as the misplacement of most of Gordon's materials mentioned in Chapter 7, led to the present study labeling the ceramics as "Liucura" style, named for the main river below Santa Sylvia. This Liucura style was given rather than attempting to force the various types into a specific classification such as El Vergel. Liucura style, in general, appear composed of local clays with very fine to fine-grained sand temper and made by coiling, rather than wheel-thrown. The exception to the general Liucura classification can be seen where a particular style, known as Valdivia or Pitrén, could be identified with certainty, based on specific stylistic markers such as painting and slip. Further analysis with samples from the region around Santa Sylvia, and compared with elsewhere in the Araucania, may allow for a more direct identification with Pitrén and El Vergel styles. For the purposes of the present analysis, though, the various styles will be identified as Liucura except where noted.

Many of the Liucura style ceramics in this analysis may overlap with those identified by Gordon, who initially classified his recovered ceramics into 9 "Santa Sylvia" types, as well as Valdivia style and "*Gorbea Aplicado*" (Gordon 2011). The Santa Sylvia types included smoothed, polished, slipped, incised, painted, and anthropomorphic (ibid:35). However, the available information from Gordon's work is not clear as to the factors that went into his ceramic analysis or how he defined different typological factors such as color and surface treatment. Gordon himself noted that it was "impossible to realize a typological classification" at the time, around 1994, and that he was limited to "a general description of the ceramics, provisional in nature and subject to eventual modifications" (ibid).

In total, eleven ceramic styles were identified by surface color, treatment, and decoration, analyzed in Pucón, Valdivia, and Vanderbilt University (Appendix F). Colors

given in parenthesis are from the 2000 Munsell Soil Color charts. All appear to have been hand-made or coiled rather than wheel-thrown. The Liucura types have seriation graphs provided in the figures to chart the percentages of types by depth and general stratigraphic layer. Graphs are not provided for the Valdivia and Spanish styles, as all materials from these two types were found above 30cm, indicating use limited to the L7 and L37 layers, or to around AD 1580.

*Type 1: Liucura Red*

Approximately 32% of the analyzed assemblage (n=942) was made up of Liucura Red, which was found in all excavation units (Figure 54). Most was recovered from 0-50cm, and it appears that the few recovered from below 50cm may be from intrusive features (Table 2). Liucura Red is distinguished primarily through a red (2.5YR 3/6 or 4/6) or red/orange (2.5YR 4/8 or 5/8) slip with a smoothed exterior and interior treatment, though numerous examples of unslipped and smoothed red were recovered (Figure 55). Wall thickness was generally thin, ranging from 3.5mm to 12mm with an average of 6.1mm. All contained sand temper, very fine to fine grain, though some of the thicker wares (greater than 9mm) had medium-grained temper with blocky quartz inclusions.

Table 2: Seriation graph of percentages of Liucura Red ceramics by depth and stratigraphic layer

Liucura Red			
Depth	Layer	%	Frequency
0-10cm	F37	26	
10-20cm		30	
20-30cm		21	
30-40cm	F65	12	
40-50cm		8	
50-60cm	F39	2	
60-70cm		1	
70-80cm		1	
>80cm		1	



Figure 54: Examples of slipped Liucura Red ceramics recovered from Santa Sylvia.



Figure 55: Unslipped Liucura Red ceramics from Santa Sylvia.



The paste was generally made of fine-grained clay, reddish brown (5YR 5/6) in color and likely locally procured. Most rims were straight or everted, with a few inverted. Bases were generally flat with a few rounded examples. Most handles were rounded though several flat examples were also recovered. This style is probably what Gordon called “Santa Sylvia bañada roja” (Gordon 2011:35) and corresponds particularly to El Vergel.










Several fragments of Liucura Black-on-Red (n=6) were recovered, 1 from T1 at about 30cm and 5 in in T3 from 10 to 30cm (see Figure 56a-d). These vessels appear to



Figure 56a-d: Examples of Liucura Black-on-Red recovered at Santa Sylvia.

have been first slipped with the same red pigment as the others, then painted with black bands/stripes and geometric designs, though the fragmentary nature of the samples makes it difficult to discern precise patterns. One piece exhibited a different style of painting, previously unseen. The painted lines are thinner, interspersed with small, parallel calligraphic marks (see Figure 56d), possibly a transitional stage between Pitrén and El Vergel (Dillehay, personal communication, 2011). Liucura Red appears to have been

Table 3: Frequency seriation of Liucura Brown by depth and layer

Liucura Brown			
Depth	Layer	%	Frequency
0-10cm	F37	26	
10-20cm		39	
20-30cm		18	
30-40cm	F65	7	
40-50cm		7	
50-60cm	F39	2	
60-70cm		1	
70-80cm		1	
>80cm		1	

first used at Santa Sylvia during the second occupation around AD 1100, corresponding to the L65 layer in T3. It is possible that Liucura Red was used during the L39 layer, around AD 900, based on the few fragments recovered below 60cm but it seems more likely that these sherds were translated from upper layers. Eight percent (8%) of the Liucura Red assemblage comes from the L65 layer, though mixing between the upper L7/L37 and this layer likely occurred which may increase the overall use of Liucura Red during the earlier occupation. The L7/L37 occupation of AD 1580 indicates the greatest use of Liucura Red. In any case, the Liucura Red style remains consistent through both occupations and exhibits no obvious Spanish influences or incorporation of Spanish elements.

*Type 2: Liucura Brown*

Approximately 32% of the analyzed assemblage (n=953) was classified as Liucura Brown (Figure 57). Like Liucura Red, brown ceramics were found at all depths throughout each excavation unit, though clustering occurs in the 10-30cm levels (Table 3), which, as with Liucura Red, indicates that the main occupation of Santa Sylvia occurred around AD 1580. The colors range among reddish brown (10YR 5/4) and light reddish brown (10YR 6/4), possibly as a result of using the same red clay as Liucura Red.



Figure 57: Unpolished and unslipped Liucura Brown ceramics from Santa Sylvania.



Figure 58: Polished Liucura Brown ceramics from Santa Sylvania.

Liucura Brown exteriors and interiors are both smoothed and generally undecorated. A few examples (n=20) of exterior polishing were recovered (Figure 58), though these are in the minority. The aforementioned paste appears to be the same red/brown clay used for Liucura Red, with sand temper. The temper is generally very fine to fine-grained, with some large quartz inclusions. Wall thickness ranges from 4mm to 12mm, an average of 6.4mm, slightly thicker than Liucura Red. Rims were primarily straight with a few everted examples, and bases were flat. Handles were rounded.

The limited decoration of Liucura Brown may indicate that these types may have been more “utilitarian” than Liucura Red. Four examples of decorated Liucura Brown were recovered (Figure 59), which were smoothed with very fine-grained sand temper and decorated with small clay “lentils” on the exterior, found between 10-20cm.

Like Liucura Red, Liucura Brown shows consistency in style and use through the various occupations. Liucura Brown may have been introduced in the earliest L39 occupation (AD 900, ca. 45-60cm), along with Pitrén style, and increased in use during the L65 occupation (AD 1100, ca. 30-45cm), and then its greatest use during the L7/L37 (AD 1580, ca. 0-30cm). The “lentiling” appears to have been introduced during the Spanish occupation, though not an obvious trait adopted from the Spanish. Gordon also found several examples of this type of Liucura Brown, which he likely called “Santa Sylvia Común” (Gordon 2011:35, Figure 23). Liucura Brown fragments were also found during the excavations of T4 with the same temper, clay, and unslipped decoration as the majority of Liucura Brown from the occupations in T1, T2, and T3. Taken together, the Liucura Brown shows the strongest continuity through time, suggesting that this type was continuously used with limited modification during Araucanian occupations at Santa Sylvia.

### *Type 3: Liucura Gray*

Following Liucura Brown, 24% of the analyzed ceramics (n=723) were classified



Figure 59: Examples of “lenticled” Liucura Brown from Santa Sylvia.

as Liucura Gray (Figure 60), which is likely a part of the same “Santa Sylvia Común” category defined by Gordon (2011:35). This style, like Liucura Red and Brown, was found in T1, T2, and T3 to a depth of 80cm, though clustering appears around 10-30cm (Table 4). The color ranges from light to dark gray (Gley2 4/10b to 5YR 6/1) and is often mottled with black, red, or brown. Most are undecorated, though a few examples of slipped and polished were recovered. All contain the same sand temper as the other styles, very fine to fine-grained, with some large quartz inclusions. The paste is generally composed of gray/brown clay, different from Liucura Red or Brown, though still likely locally procured. Wall thickness is comparable to the others ranging from 3.5 to 10mm with an average of 6.1mm. Rims are primarily straight or everted, handles are rounded, and no bases were recovered.

This also appears to be a “utilitarian ware” like Liucura Brown, evidenced by the lack of decoration as well as several examples of interior and exterior burning that transpired after the vessel itself was completed. This type, like Liucura Brown, may

Table 4: Frequency seriation of Liucura Gray by depth and layer

Liucura Gray			
Depth	Layer	%	Frequency
0-10cm	F37	29	[Bar chart showing frequency distribution]
10-20cm		34	[Bar chart showing frequency distribution]
20-30cm		18	[Bar chart showing frequency distribution]
30-40cm	F65	7	[Bar chart showing frequency distribution]
40-50cm		3	[Bar chart showing frequency distribution]
50-60cm	F39	1	[Bar chart showing frequency distribution]
60-70cm		1	[Bar chart showing frequency distribution]
70-80cm		1	[Bar chart showing frequency distribution]
>80cm			



Figure 60: Liucura Gray ceramics recovered from Santa sylvia.

have been in use since the possible L39 occupation around AD 900, and like the Red and Brown types, was used during the L65 (AD1100) occupation and received the greatest use during the L7/L37 occupation around AD 1580. Like Liucura Brown, the Liucura Gray style appears to have been modified only limitedly through time.

*Type 4: Liucura Black*

About 7% of the analyzed assemblage (n=211) was classified as Liucura Black (Figure 61). These range from black (Gley1 2.5/N) to very dark gray (Gley1 3/N) slipped vessels, found throughout the excavation units and relatively continuous through the L7/L37, L65, and L39 levels (Table 5). Liucura Black has the same very fine to fine-grained sand temper with quartz inclusions, though the incidence of large inclusions is less than in Liucura Red, Brown, or Gray styles with no decoration outside of the black or very dark gray slip. Paste is composed of the same gray/brown clay as Liucura Brown. The wall thickness runs between 4mm to 12mm, averaging slightly smaller than the other styles at 5.9mm. Rims are straight with a few everted examples, and no bases were recovered. One handle found was flat and appears to have belonged to a small vessel (Figure 62). Gordon (2011; see also Gordon 1978) stated that this style was also found near Padre Las Casas, 90km (55 miles) northwest. This style appears to have been in consistent use since the earliest L39 occupation (ca. AD 900, 40-60cm) increasing in use through to the L7/L37 occupation (0-30cm, ca. AD 1580), also showing consistency in manufacture and style through the various occupations, like Liucura Red, Brown, and Gray.

Table 5: Frequency seriation of Liucura Black by depth and layer

<b>Liucura Black</b>			
Depth	Layer	%	Frequency
0-10cm	F37	12	████████████████████
10-20cm		26	██
20-30cm		22	████████████████████████████████
30-40cm	F65	15	████████████████████████████████
40-50cm		15	████████████████████████████████
50-60cm	F39	5	████████
60-70cm		2	██
70-80cm		1	█
>80cm		1	█



Figure 61: Examples of Liucura Black recovered from Santa Sylvania.

*Type 5: Liucura Corrugated*

Slightly less than 4% of the assemblage (n=104) was classified as Liucura Corrugated (Figure 63), which are found primarily in the upper layers (Table 6). These appear to be the result of coiling manufacture without the exterior smoothing (though the interiors are smoothed), and are brown (10YR 5/4) or gray (Gley2 4/10b) in color. These are thin-walled, 4.5 to 6.5mm thick with an average of 4.8mm. Temper is composed of the same sand, though grainier, (fine to medium-grained), than the other styles. Only one angled rim was recovered, and no bases or handles were seen. Based on stratigraphy of the recovered sherds, it appears that the L39 occupation (ca. AD 900, 40-60cm) used corrugated wares, while the L65 occupation (ca. AD 1100, 30-40cm) did not or did in a limited fashion, and that the L7/L37 occupation (ca. AD 1580, 0-30cm) returned to using corrugated in greater numbers. It is also possible that corrugated wares found their primary use during the L7/L37 occupation, and lower-level recoveries of this type







Figure 63: Handle fragment recovered from a Liucura Black vessel.



Figure 64: Valdivia Red-on-White recovered at Santa Sylvania.

are due to translation from upper levels over time. More corrugated ceramics need to be recovered and analyzed in the area to establish stronger temporal affiliation. This corrugated style does not have an obvious correlate to the styles defined by Gordon.

*Type 6: Valdivia Red-on-White*

Less than 1% of the assemblage (n=27) was classified as Valdivia Red-on-White (Figure 64), explicitly identified based on the white slip with red painted lines on the exterior, which style has been found south to Reloncavi Bay (Adán et al. 2001) and across the Andes in Argentina (Beron 2006) and in decreasing frequency north towards Purén-Lumaco (Dillehay 2007; Dillehay, personal communication, 2011). Valdivia-style ceramics appear to be found primarily south of the Malleco River, infrequently appearing to the north. Notably, all Valdivia Red-on-White fragments were recovered above 30cm, indicating that this style and related Valdivia styles (see below) was a late introduction to the site and perhaps the area, just before or at the same time as the L7/L37 occupation around AD 1580.

Valdivia Red-on-White are decorated with a white slip on the exterior, then painted with red linear patterns, with zig-zag, parallel, and perpendicular lines, though without geometric patterns. Line thickness is variable, between 1.14mm to 2.23mm. These ceramics are noticeably thicker than the other styles, between 5mm and 8.5mm with an average thickness of 7.1mm. The paste is composed of red clay with sand temper, which temper is much coarser than the Liucura styles, fine to medium-grained sand with large, blocky inclusions of quartz. Rims are straight or everted, and no handles or bases were recovered. As noted above, all Red-on-White ceramics were found between 0-30cm, indicating that this style was introduced during the L7/L37 occupation (ca. AD 1580), though Valdivia style first appeared elsewhere in the Araucania around AD 1200 (see Chapter 10).

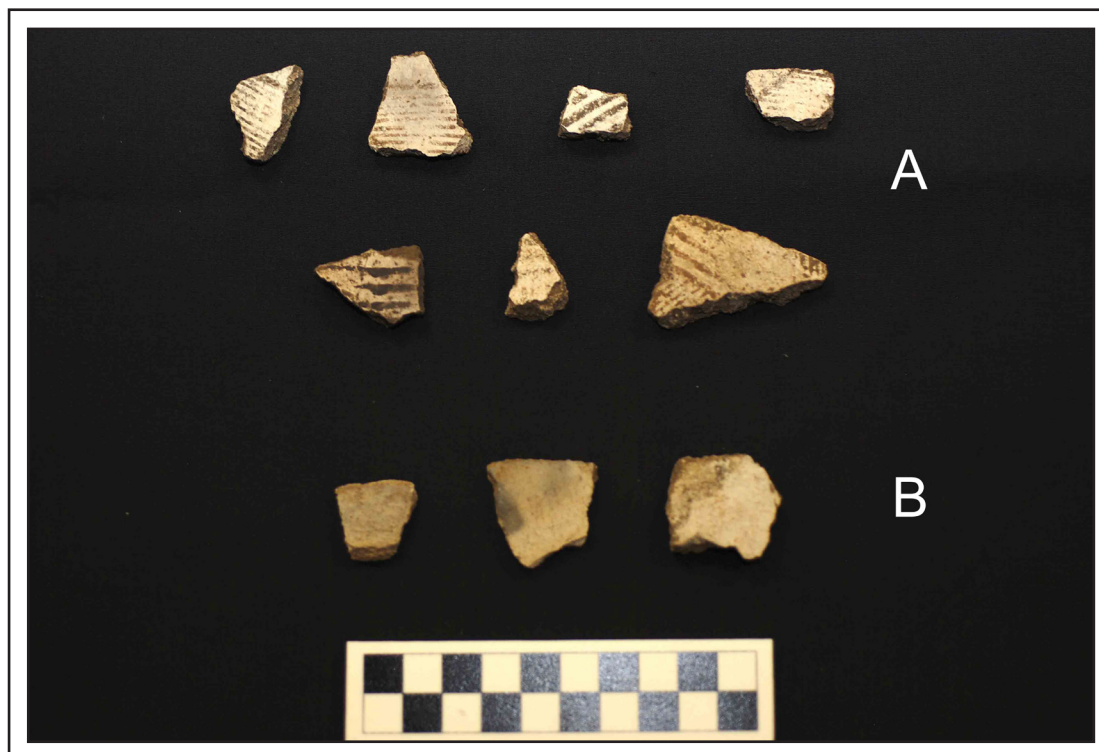


Figure 65a-b: Examples of Valdivia Black-on-White recovered from Santa Sylvia. Sherds in row B, though not exhibiting painted black lines, are likely from black-on-white vessels.

*Type 7: Valdivia Black-on-White*

Several fragments (n=10) of Valdivia Black-on-White were recovered, accounting for less than 1% of the total assemblage (Figure 65a-b). Included with these are three sherds that do not have black paint, but exhibit the same type of white slip as on other painted fragments and are probably unpainted sections of black-on-white vessels (Figure 65b).

Like their Red-on-White relatives, no Black-on-White fragments were recovered below 30cm throughout the site, or exclusively to the L7/L37 occupation layer dated to AD 1580. These appear to be first given a thin white slip, then painted with black zig-zag, parallel, and perpendicular lines. Line thickness varies between .66mm to 2.23mm, the same maximum thickness as with the Red-on-White. Wall thickness varies between 7mm

to 8mm, with an average thickness of 7.75mm, the largest average thickness of any type. In contrast to Red-on-White, the Black-on-White contain a gray paste with very fine-grained sand temper and limited large quartz inclusions. The paste is also chalkier than any other type, which may indicate that this particular vessel style is foreign to the region, perhaps coming from Neuquén in Argentina (Berón, personal communication, 2011). No rims or bases were recovered.



Figure 66: Two examples of Valdivia Red-on-Gray recovered at Santa Sylvia.

*Type 8: Valdivia Red-on-Gray*

Six (6) examples were classified as Valdivia Red-on-Gray (Figure 66). Red-on-Gray, like Red-on-White and Black-on-White were also recovered only above 30cm or during the L7/L37 occupation around AD 1580. These fragments were first given a gray slip, and then painted with thin red lines like their Red-on-White and Black-on-White counterparts, which lines measured 1.22mm in thickness. Wall thickness ranged from

Table 7: Frequency seriation of Pitrén style by depth and layer

Pitrén Ceramics			
Depth	Layer	No.	Frequency
0-10cm	F37	12	████████████████████
10-20cm		26	██
20-30cm		22	████████████████████████████████
30-40cm	F65	22	████████████████████████████████
40-50cm		24	████████████████████████████████████
50-60cm	F39	24	████████████████████████████████
60-70cm		0	
70-80cm		0	
>80cm			



Figure 67: Pitrén ceramics recovered from Santa Sylvia.

5.5mm to 10mm, with an average of 7.1mm. Paste was composed of the red/brown clay with fine to medium-grained sand temper with blocky quartz inclusions. Perhaps as a result of erosion, the interiors of the sherds appeared to be poorly smoothed. One recovered rim was everted, and no bases were seen. It is possible that these Red-on-Gray

examples were imported from Argentina, though more investigation needs to be done on this style (Dillehay, personal communication, 2012).

*Type 9: Pitrén*

Slightly less than 1% of the assemblage (n=72) was classified as Pitrén Red (Figure 67). They were classified as Pitrén based on a red slip, darker (10R 3/3) and more polished than Liucura Red. Additionally, Pitrén fragments were recovered below 50 cm, dating to the earliest occupation of the site. No specific corollary appears for Pitrén style in the definitions provided by Gordon. Wall thickness was generally thin, between 4.5mm to 6mm with an average of 5.3mm. Paste was composed of brown/red clay with very fine-grained sand temper. No rims or bases were recovered. It is believed that these represent the oldest ceramic tradition in the Araucanía, having started at around AD 300 and influencing later styles (Adán et al. 2001; Aldunate 1989; Dillehay 1990). Pitrén was introduced to Santa Sylvia during the earliest occupation in L39, ca. AD 900, and appears to have lasted as a tradition into late pre-Hispanic times and may, in this instance, be indicative of the permanence of an older tradition. This is seen in the relative consistency in the recovery of Pitrén style through the various layers, shown in Table 7, showing that Pitrén style remained in use throughout the occupations of Santa Sylvia with limited change. This sort of consistency through time seems to show an active perpetuation of a cultural style, even through the introduction of new styles such as Liucura and Valdivia. For whatever reason, Pitrén style may have been seen as an important cultural marker that craftspeople maintained through the centuries (Dillehay 2010; Quiroz and Sanchez 2005).

*Type 10: Spanish Ceramics*

Only 3 ceramics were securely identified as Spanish in style (see Figure 68a-c), surprisingly small number<sup>1</sup> considering the quantity of Spanish-style and manufacture

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<sup>1</sup> Gordon did find more Spanish-style ceramics during his excavations, though the exact number is unknown. He refers to the number as “very few” and notes a “very limited” Spanish influence on

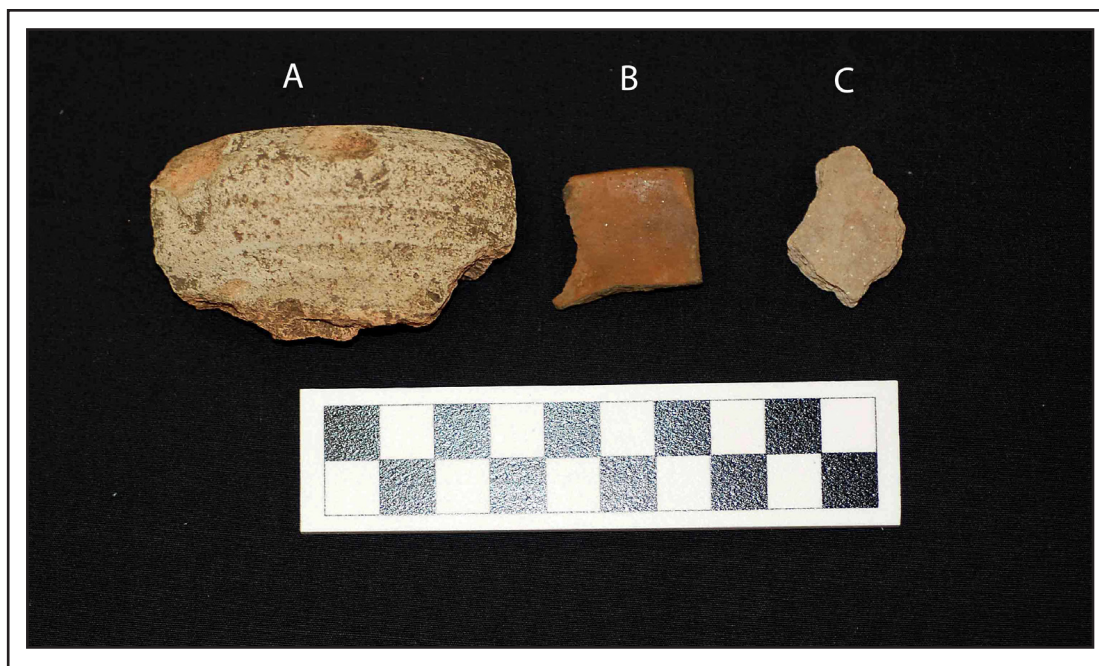


Figure 68a-c: Spanish-style ceramics identified at Santa Sylvania.

ceramics recovered from excavations at the Villarrica fort on the other side of Lake Villarrica (Harcha and Vásquez 2000; Saavedra and Sanzana 1991). Gordon did find more Spanish-specific types during his excavations, though the exact number is unclear. All three appear to be different types. Type A is a thick-walled vessel, likely a storage container, and very similar to styles seen in Peru (Dillehay, personal communication, 2011). This may be a *tinaja*, or large jar about 40-50cm in height, similar to fragments discovered by Gordon (2011:37). The paste is orange/red (2.5YR 7/8) with very fine-grained sand temper, and appears to be the same material as that of roof tiles (see below). If locally made, the difference in paste color compared to other ceramics may be a result of differential oxidation from the firing process, or it may be a style brought in from outside the site. Type B is a brown-slipped ware with a flat rim edge, with a dark gray, almost black paste with very fine-grained sand temper. The temper, in fact, may be mostly volcanic ash, or temper taken from the shore of Lake Villarrica, which has the same appearance of black sand. Type C is a fragment of a vessel with a gray/white

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indigenous ceramic styles (Gordon 2011:36)



(10YR 4/2), almost chalky exterior treatment, smoothed but not slipped. It is similar to styles seen in Neuquén, Argentina (Berón, personal communication, 2011). Overall, there may be a greater amount of Spanish influence on the ceramics at Santa Sylvia elsewhere in the Araucania, but are likely very subtle and difficult to identify (Dillehay, personal communication, 2012).

As stated in previous chapters, the lack of Spanish-style ceramics may be indicative of the Santa Sylvia *encomendero* endeavoring to ingratiate himself with the local Araucanian population by “eating like an indian” (Rodríguez-Alegria 2005) and using local ceramics rather than imported European styles which may also been difficult to obtain. The indigenous females at the site, based on the burials in the chapel/mausoleum (Complex A; Gordon 2011) may have also been the driving force behind the perpetuation of Araucanian styles. However, it is hypothesized here that the limited amount of Spanish-style ceramics is more indicative of an Araucanian avoidance or rejection of these materials, rather than the inability of the *encomendero* to import such materials. Gordon, during his excavations, found an unknown sum of Spanish ceramics, apparently greater percentage of the overall assemblage, though still very small, than in the current research.

Since Gordon found these Spanish-style ceramics in the main Spanish occupied zone, the *encomendero* may have used at least some number of Spanish-style vessels. Excavations at the Villarrica fort have found numerous Spanish ceramics, including several examples of a green glazed ware that was also recovered at the site of San José de Mariquina near Valdivia (Saavedra and Sanzana 1991). Though distant, Santa Sylvia was still close enough to Villarrica to allow for the import of at least some European ceramics for consumption. Roof tiles, for example, were likely imported to the site. Yet in the Araucanian occupation zone, only three fragments were recovered and no other examples include glazes, wheel-thrown, or other European stylistic markers. Thus, the Araucanians actively chose not to use Spanish style ceramics, instead perpetuating their own styles

and manufacturing methods.

*Type 11: Roof Tiles*

Roof tiles of likely Spanish manufacture were the most abundant ceramic material on site, with over 9,000 fragments recovered, not counting the amount scattered throughout the site surface. As noted in Chapter 7, only Complex B, the “*casa del encomendero*,” had a tile roof, and the largest concentrations of surface tiles are found near that structure (see Figure 69). It is probable that in the centuries subsequent to the occupations, erosion has been the primary factor causing disbursement of tile fragments throughout the site<sup>2</sup>, though some may have come about from looters as well as scatters

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<sup>2</sup> Notably, based on the number of tiles erupting from the northern portion of the site where Gordon placed the backfill from his excavations, at some point he apparently stopped collecting tiles apart from a sample for study.



Figure 69: View of ground surface near Complex B, showing quantity of roof tiles on present day ground surface scattered from the roof of the complex.

from Gordon's excavations.

The tiles were all made of the same reddish yellow clay (5YR 6/8), approximately 22.5mm in thickness (which appears to be the standard) with very fine-grained sand temper. No complete tiles were recovered, but the length of a tile could reasonably be estimated at about 50cm. According to informants, the tiles were fabricated by a worker molding wet clay over the thigh, then firing the molded clay to produce the tile. The paste composition appears to be slightly different than that used for the other ceramics, which may indicate that the tiles were not locally produced but manufactured elsewhere, possibly in Villarrica.

In sum, the ceramic assemblage at Santa Sylvia indicates **1)** a predominance of indigenous styles in material procurement, manufacture, and decoration through time and **2)** a limited Spanish or European influence even during the AD 1580 occupation. The Pitrén style in particular was seen through all three possible occupations, and the Liucura styles also show relative homogeneity. Valdivia styles appear have been introduced during the L7/L37 occupation, perhaps transported by *indios amigos* arriving with the Spanish, or as a result of increased trade or interaction with other Araucanian groups to the west and east. In any case, it appears that the Araucanians living at Santa Sylvia maintained previous cultural traditions rather than incorporating or adopting different methods of manufacture or style. This continuity in style, hypothetically, is indicative of a conservation phase in the ARC. This will be discussed below.

### **Lithics**

A total of 2,427 lithic fragments were recovered during the course of excavation (Appendix G). Of these, an arbitrary sample of 1,304 fragments, or 53% of the total assemblage, was analyzed for material, color, and section. The only identifiable or diagnostic tools recovered were a limited number of arrowheads and grinding stones.

Table 8: Lithic percentages by section and type

	Section						
		Core	Primary	Secondary	Tertiary	Shatter	Biface
Material	Andesite	0.05	0.01	0.19	0.61	0.14	0
	Basalt	0.18	0.17	0.30	0.18	0.16	0
	Chert	0.00	0.00	0.18	0.73	0.10	0
	Granite	0.07	0.07	0.20	0.41	0.25	0
	Quartz	0.00	0.00	0.00	0.50	0.00	0.50
	Sandstone	0.13	0.00	0.33	0.20	0.33	0

Five types of material were recovered: andesite, basalt, chert/chalcedony, granite, quartz, and sandstone, as identified by myself. Andesite is a fine-grained and non-porous rock intermediate to basalt and dacite, very similar to chert, which was separated from the more porous basalt for this study. Granite composed the largest percentage, 65%, of the recovered materials. Andesite followed at 24%, basalt at 7%, chert/chalcedony at 3%, sandstone at 1%, and quartz last at less than 1%.

Table 8 breaks down the various types by the section<sup>3</sup> (primary, secondary, tertiary, shatter, and biface). Because these lithic materials are not relevant to chronology or cultural patterns, they are not given more in-depth analysis here. Future publications will examine the lithic assemblage more fully.

As Table 8 shows, granite and andesite appeared most frequently in tertiary and shatter flakes, which may indicate a reduction area of large cobbles brought up from the river. These large cobbles may have been worked down in the vicinity of T3, particularly in the case of the granite cobbles which were used to construct the bases of the complex walls. The andesite may have been used for tools to perform these reductions, as well as larger granite cobbles. Chert also appeared primarily as tertiary flakes, possibly indicating that this material was brought in from an outside source and further reduced on-site into usable tools as no cores or primary flakes were identified. It is interesting to note, though,

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<sup>3</sup> Cores are defined as having more than 75% cortex; Primary: 50-75% cortex; Secondary: 25-50% cortex; Tertiary: 1-15% cortex; Shatter: no cortex but not bifacially flaked; Biface: flaking on both sides of a generally tertiary flake.

that very few tools or artifacts exhibiting use wear were actually recovered. This may be due to the use of metal tools, which the Spanish took with them or were recovered by Gordon, or tool fabrication took place in the excavated area and use and discard elsewhere.

The recovered lithics indicate that the Araucanians continued to use stone-based tools for their daily activities, rather than acquiring metal tools from the Spanish. No metal was found during the present investigations, though Gordon found a few iron nails and one harquebus ball. Again, the avoidance of metal tools may have been an active choice on the part of the indigenous inhabitants of Santa Sylvania, similar to the choices made by Araucanians elsewhere. Rosales (1989[1674]) states that the Araucanians he encountered did not use metal, other than as adornments or spoils of battle as a form of prestige, as utilitarian objects. This changed along the frontier in the 18<sup>th</sup> and 19<sup>th</sup> Centuries as many Araucanians became more acculturated to Spanish/Chilean materials (Bengoa 2000; Berger 2006), but at Santa Sylvania it appears that metal objects were avoided in deference to known stone tools and manufacture methods. It is also possible that the workers were not given metal tools as decided by the *encomendero*, or that the number of *indios amigos* were fewer in number than previously suggested by Gordon. Again, this continued use of stone over other, European-style materials, is suggestive of the active maintenance of Araucanian culture through time, or what this research considers to be a conservation phase in the ARC.

### *Obsidian*

Obsidian is a volcanic glass that can be used in a variety of functions, primarily as tools such as projectile points, knives, lancets, and others requiring a sharp edge (Green 1998). Importantly, obsidian can also be sourced to specific volcanos as each volcano has a specific chemical signature based on its location, mineral content, and other typological factors (Glascock et al. 1998; Schakley 1998; Seelenfreund et al. 1997; Stern et al. 2008,

Table 9: Percentages of obsidian sections by type

		Section %				
		Primary	Secondary	Tertiary	Shatter	Biface
Type	Black	1	3	62	33	1
	Black/Red	0	29	14	57	0
	Gray	0	1	27	55	1
	Red	0	0	33	50	17

2009, 2012). Analyzing the trace elements in obsidian samples can allow researchers to identify sources and track the distribution and exchange, and has recently been used in south-central Chile to locate several sources in both Chile and Argentina (Lopez et al. 2008; Stern et al. 2009, 2012). Notably, these sources have led to the identification of samples used from the Argentinian Patagonia to the Chilean coast by as early as 5,000 years BP (Dillehay personal communication 2011; Navarro and Pino 1999; Stern et al. 2008).

Over 350 fragments of obsidian were recovered during the course of excavation, in each trench, and with the majority of samples and types coming from T3. Of these, 92% were black, 3% gray, 2% red, and 2% black/red (black with red bands; see Table 9). Dr. Charles Stern of the Department of Geology at the University of Colorado-Boulder performed a chemical analysis of a sample of each color type (Appendix C). From this analysis, it was revealed that the black and gray obsidian is sourced to the Nevados de Sollipulli, a dormant volcano approximately 45 km (26 miles) north-northeast of Santa Sylvania. The red and black/red samples are sourced to an area known as Portada Covunco in the Neuquén province in Argentina, approximately 150km (75 miles)<sup>4</sup> northeast of Santa Sylvania. Less than 1% of the recovered obsidian was in the form of arrowheads (see below).

It is argued here that Santa Sylvania may have acted as a node along long-

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<sup>4</sup> Note that the distance is measured directly on a map, not accounting for elevation and passes across the Andes which increases the distance and travel time.

standing trade networks between Argentina and Chile. These obsidian samples serve as the most obvious materials traded, and perhaps for the longest period of time, but other information indicates that ceramics, salt, and other objects were used along these networks (Beron 2006; Harcha and Castro 2002; Quiñenaó, personal communication, 2010). Thus, these long-distance trade networks indicate that indigenous communities were in contact long before the arrival of the Spanish. These networks may have been simple barter, or part of a broader kin-based exchange network that eventually created, or built up to, Araucanian individual and ethnic identity. Maintenance of these networks from the earliest archaic period likely required considerable negotiation and skill, predecessor to the negotiation required by *lonko*, *toqui*, and other leaders in their various *lof* and *rehue*. Eventually, these long-standing networks would be made a part of *ayllarehue* and *butanmapu* spatial organization, or to facilitate their creation. In essence, the development of the Araucanian culture system has its base in these networks of trade and communication, of which Santa Sylvania may have acted as an important nexus. As Smilde (2007:94) points out, “Networks are simply concrete social relationships that provide the base units of social structure.” Thus these networks that were created several millennia ago provide the “base units” of Araucanian social structures that in turn developed the social relationships that would come to be known as “being Araucanian” (see Chapter 4).

Overall, the lithics recovered from Santa Sylvania are fragmentary in nature, suggesting a reduction zone at the site. The number of flakes of granite, obsidian, chert, and andesite indicate that tools were being manufactured, used, and maintained at the site. These tools likely had numerous uses, including construction of the Spanish complexes, food processing, hunting, defense, and others. The lack of whole tools, however, is interesting. Why no tools were recovered is unclear, though it may be attributed to the bias in the locations of T1, T2, T3, and T4 and the materials recovered. Despite these concerns, the overall lithic assemblage indicates, like the ceramics, continuity in use

Table 10: Summary of arrowheads recovered at Santa Sylvania by material and size

Material	Thickness (mm)	Length (mm)	Width (mm)	Notch														
Obsidian	4	27	12	N/A														
Obsidian	3.5	27.5	12	Basal														
Quartz	3.5	55	Corner	Quartz	3	38.5	16.5	Corner/Basal	Quartz	3.5	31.5	11	corner	Obsidian	4.5	19	14	corner
Quartz	3	38.5	16.5	Corner/Basal														
Quartz	3.5	31.5	11	corner														
Obsidian	4.5	19	14	corner														

of materials through the AD 900, AD 1100, and AD 1580 occupations with limited incorporation of outside materials.

*Arrow Points*

Six arrow points were recovered during excavation (Figure 70). Notably, all points were recovered in the F7/F37 layer during the AD 1580 occupation, or above 30cm. Table 10 provides a summary of the various types and measurements. No specific



Figure 70: Arrowheads recovered at Santa Sylvania.



pattern emerges to projectile point styles or patterns, and no chronological or typological sequence yet exists for arrow points in the region or in all of the Araucania. It is likely that styles are dependent on the manufacturer and not on preconceived, cultural styles that are found elsewhere, such as in the southwestern United States (Baer and Sauer 2003). The lack of projectile points suggests that the site, when occupied by the Spanish, was not attacked directly by the Araucanians. This may be alluded to in the historical record if Santa Sylvia a documented fort known as Antelepe (see Chapter 12). According to Ovalle (2003[1646] and Rosales (1989[1674]), The Spaniards left Antelepe to fight the Araucanians around AD 1588, thus avoiding a battle at the site itself. This avoidance of direct conflict may have limited the number of arrowheads and other military objects. Gordon's excavations found only one harquebus ball made of lead (Gordon 2011:28), also indicating that the site, though defensive in nature, did not experience much direct conflict, if any.

### *Groundstone*

Numerous fragments (n=47) of ground stone *manos* were recovered (none complete, and no grinding slabs were identified), the majority (n=37) recovered in T3, six (n=6) in T2, and four (n=4) in T1. These materials were recovered at all depths, centered, like the ceramics, in the 0-30cm levels, corresponding to the intensive Spanish-era occupation. Two samples, one from 10-20cm (AD 1580 occupation) and 40-50cm (AD 1100 occupation) were sent to PaleoResearch Institute for phytolith, starch, and pollen analysis (Appendix A). Results indicate that during the pre-Hispanic occupation, the inhabitants of Santa Sylvia were exploiting maize, peppers, wild strawberries, and other wild plants, including some medicinal plants.

Pollen signatures also show that the area was heavily forested in pre-Hispanic times, which forests appear to have been cut down or burned at the time of Spanish occupation. During the Spanish occupation, the site inhabitants were consuming

maize, wheat and/or barley, peppers, and medicinal plants in order to assist at least one individual with a tapeworm (*Diphylobotrium*). This tapeworm likely came from freshwater fish, either from the river, Lake Villarrica, or Lake Caburgua. The people at Santa Sylvania ate fish, which bones did not survive, in addition to unknown herbivores whose intestines had been processed on the same ground stone.

The recovery of these materials shows a mixed economy of domesticated animals and plants as well as wild, staples in the diet of the Araucanians from early pre-Hispanic times. Gordon's excavations recovered horse, cow, and pig bones, which may have been consumed during the Spanish-era occupation and thereafter entered into Araucanian material culture in the region, also indicated in the samples recovered in my excavations. Within RT, the Araucanians incorporated the "disturbance" of these European domesticates (horse, cows, sheep, wheat, barley) quite quickly, likely because of their utility and later markers of prestige (Dillehay 2007).

### **Flotation Remains**

As noted in Chapter 8, 25 4-liter flotation samples were taken from various features to look for microbotanical remains such as seeds, phytoliths, and other materials. Samples were floated in the Instituto de Geociencias at the Universidad Austral de Chile in Valdivia. The flotation process involves separating cultural and natural materials from the soil matrix in which they are recovered. The soil is dispersed through a large volume of water, during which process heavy materials (known as the "heavy fraction") float to the bottom of the float machine and are caught on a narrow screen. Lighter materials (the "light fraction") float to the top of the water and are caught in another narrow screen. The recovered materials are dried, bagged between heavy and light fractions, and sent for analysis.

Claudia Silva Díaz of the Museo de Historia Natural de Concepción in

Concepción, Chile performed the analysis of the float samples (see Appendix A for the full report). Perhaps most notably for this study, no domesticated plants were found in the analysis. Though maize was recovered in Gordon's excavations, no evidence for European domesticates were found in the present analysis (though maize, oats, wheat, and barley were identified in the groundstone analysis). This may be due to the sample size or the portions of the site from which the samples were taken, yet may also indicate that, at least at Santa Sylvania during the time of occupation or shortly thereafter, the use of European foodstuffs was limited, as well as the use of previously-domesticated maize used elsewhere by the Araucanians prior to the arrival of the Spanish. However, several plants were identified as introduced types, including wild blackberry (*Rubus ulmifolius*), goosefoot (*Chenopodium album*), and pigweed (*Portulaca oleracea*). Wild blackberry in particular may have been cultivated in the past at Santa Sylvania, as the site today is encumbered by the descendants of those introduced plants. Also notable is the lack of pine nuts from the Araucaria tree, a staple food for Araucanians living elsewhere along the Andes.

The apparent paucity of domesticated plants may indicate that the Araucanians living in and around Santa Sylvania, before and during the Spanish occupation, may have relied heavily on gathering wild comestible plants rather than focusing on intensive agriculture. It may also be that the European domesticates (maize, wheat, barley) were stored and consumed primarily during the Spanish occupation, as indicated by the materials recovered in Complex B by Gordon (2011; Rossen 2011). The quantity of maize and wheat/barley recovered in the barrels beneath the complex suggests major exploitation, at least on the part of the Spanish. The Araucanians may have been consuming these products in large quantities as well, which evidence may be seen in other portions of the site yet unexcavated.

A reliance on wild plants over domesticates may suggest greater Araucanian mobility, which has been seen elsewhere among Araucanian populations (Dillehay 1992,

1999; see also Pamerter 2010). Prior to the Spanish, the Araucanians at Santa Sylvia harvested maize and peppers, but may not have used them as absolute staples of their diet while living in the area. Only after the Spanish left did intensive agriculture take hold with the cultivation of maize, wheat, barley, and other European domesticates which are still harvested today (Pucón 2009).

### **Architecture**

There is little to be said here that has not been mentioned in previous chapters and in Gordon's report regarding the architecture/constructions of Santa Sylvia (Gordon 2011). During recent excavations, only two units (985N 1008 and 1009E) were opened containing architectural features, the western wall of Complex C (F17; see Chapter 8). Like the construction of Complex B, the wall of Complex C was composed of three rows of worked granite river cobbles on either side of compacted *tapia* clay. The single possible post hole (F12) on the exterior in 985N 1008E may be from the construction of the walls. According to sources (Guarda 1984; Márquez de la Plata 2009), after placing the layers of worked stone into a clay matrix, a framework of branches would be erected along either side to a height of about 2m, which would then be filled with *tapia* and allowed to harden, thus creating the walls. As Gordon emphasized, only Complex B was roofed with tiles—Complex C thus roofed with thatch (Gordon 2011). Later destruction and erosion would then account for the layer of apparent “wall melt” (F11) seen extending east and west from the wall of the complex.

Márquez de la Plata (2009) notes that the layout of “*casas de campo*” (country houses) followed a pattern very similar to Santa Sylvia. These houses would be constructed with several “arms” around a central patio/plaza area, each arm extending perpendicular or parallel to the others. Most “arms” would contain dormitories, storage areas, and other rooms, and at the end of one “arm” a chapel would be constructed.

Walls would generally be thick, to (according to Márquez de la Plata) “withstand various earthquakes” (ibid:35). The open nature of the constructions would allow for sufficient air and light to circulate throughout, and each “arm” would be attached to another by a roof of branches creating a “canyon [hallway] of rooms” (ibid:36). This seems to be the case with the layout of Santa Sylvania. More excavations in Complexes A, B, C, D, and E may reveal more on the patterning suggested by Gordon, as the architecture discovered during this project was limited.

### **Metalwork**

No metal was recovered during excavations. Gordon found few metal fragments, apparently limited to a rusted nail found beneath one of the burials in Complex A (chapel/mausoleum), three or four nails in Complex B, and a single harquebus ball found near Complex E (Gordon 2011:20, 28,34). It is likely that, as Gordon attests, the price of iron and steel was high enough to inhibit the import of metal or the use of metal tools at Santa Sylvania during the Spanish occupation. In other areas of the Araucania, sources suggest that the Araucanians themselves limited their use of metal to some copper tools along the coast (Campbell 2005) and female adornment (ibid), but there are no indications that the Araucanians, before or after the Spanish, employed metalwork in their material culture apart from the abovementioned use as spoils of war and markers of prestige (Rosales 1989[1674]. I argue that this may indicate another aspect of resilience through the active avoidance, rather than the incorporation (like with animal and plant materials) of European products and material culture.

### **Features**

Briefly, a total of 143 features were identified in the course of excavation. Of

these, 115 were defined in T3, 8 in T1, 11 in T2, and 9 in T4. The majority appear to be indigenous in nature, related to the L7/L37 and L65 occupations seen in T3. Several features, such as F42, F43, F45, and F47, may be related to the construction of a *ruka* or similar dwelling. Associated with this possible *ruka* may be the remains of firepits such as F38, and the F110 suggested animal pen. More excavation is needed around T3 to further define these possible dwellings. The limited features identified in T2 (F25, F28, F29) may be the remains of a fenceline associated with the AD 1580 occupation, though a modern construction is also possible. Finally, the 9 features identified in T4 (F161-169) suggest a *ruka* or similar construction, though the limited number of artifacts indicates that this construction may have been temporary. Each feature is described more fully in Appendix E.

### Summary

In brief summary, the material culture recovered at Santa Sylvia indicates: **1)** a long sequence of occupations by the Araucanians at the site; **2)** consistency in Araucanian artifacts with very limited incorporation of Spanish materials or styles; and **3)** evidence of long-standing networks (trade or social) between Argentina, Santa Sylvia, and the coast. The first occupation began around AD 900, corresponding to a growth phase in the ARC wherein Pitrén-style ceramics arrived at the same time as a possible increase in sedentism and use of domesticated plants and animals (seen elsewhere in the area; Dillehay 2010; Navarro et al 2012). A second occupation, around AD 1100, incorporated Liucura style ceramics (which may be related to El Vergel) as well as Pitrén, with maize and pepper horticulture and consumption as part of an increase in sedentism, construction of ritual space, and likely population increase. This occupation, suggested here, straddled between growth and conservation phases. It may be that at the beginning of this occupation, some structures of the Araucanian culture system, such as ideological (beginning of *kuel*

construction) had not yet been fully established. Towards the end of said occupation, these structures may have been fully in place, part of the Araucanian basin of attraction and culture system, and the area was a part of a conservation phase within the ARC.

A third occupation, and the most intrusive, appears to have begun around AD 1580 with the construction of the Spanish architecture at Santa Sylvania. The Spanish had considerable portions of the forest cleared, seen in the changing pollen counts in the ground stone, and introduced horses, cows, wheat, and barley. The Araucanians at the site, apparently adapting to this disturbance, incorporated these materials into their toolkit. They may have intentionally avoided other aspects of Spanish material culture such as ceramics and metalwork while perpetuating their own traditional material culture. The Spanish occupation of Santa Sylvania was short, likely less than 10 years based on the quantity of materials recovered. Had the occupation been longer, such as the 40 years suggested by Gordon, it is argued here that the number and diversity of artifacts would have been greater and likely included more European materials. The incorporation of some and avoidance of other Spanish materials corresponds to what this research indicates as a conservation phase, which shifted to a release phase sometime between AD 1588-1598<sup>5</sup> with the abandonment and destruction of the site.

The Spanish-era occupation area appears to have remained uninhabited, and a fourth, small occupation occurred to the south of the Spanish complexes sometime in the mid-19<sup>th</sup> Century based on the C<sup>14</sup> dates and materials recovered. These Araucanians in this late occupation appear to have utilized the same sort of toolkit as their ancestors, creating the same ceramic types as before with little change or influence from outside. This occupation is likely part of the last conservation phase of the long-term ARC argued for in this research, or may be part of the last release phase before the Chilean occupation of the area. In total, the artifact and feature assemblage supports Araucanian incorporation of some aspects of Spanish disturbance, while apparently avoiding others, for 350 years

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5 If Santa Sylvania is Antelepe, then the abandonment and destruction occurred around AD 1588. If not, then (as Gordon suggested) the site was abandoned and destroyed sometime around AD 1598.

as part of a longer cultural sequence of development and resilience that lasted for 1,000 years at Santa Sylvania (AD 900-1883) and in the surrounding area.



## CHAPTER 10

### ARCHAEOLOGICAL BACKGROUND TO ARAUCANIAN CULTURE AT SANTA SYLVIA: ARAUCANIAN GROWTH AND CONSERVATION PHASES, AD 300-1475

The following chapters present the broader Araucanian context in which Santa Sylvania was and is located. The four possible occupations at Santa Sylvania, AD 900, AD 1100, AD 1580, and AD 1850 were part of long-term processes of cultural history and development influenced by events elsewhere in south-central Chile. Additionally, Santa Sylvania acts as a localized view of the broader cycles of the Araucanian Resilience Cycle (ARC), seen through the framework of RT. How do the growth and conservation phases suggested in the previous chapters relate to the rest of the Araucania? What can be learned from the archaeological and historical record of Santa Sylvania as compared to events and evidence in other areas of Chile and Argentina? Additionally, the information provided from Santa Sylvania illustrates the long-slow and short-fast processes of Panarchy within RT (see Chapter 5). In other words, the links between Santa Sylvania and the broader Araucania can show both the similarities and differences in Araucanian cultural development through time and space, and the varied effects of interaction with outside groups on Araucanian material culture, settlement patterns, social organization, economic activities, and religious practice.

A significant problem for researching Araucanian resiliency and the material correlates of the ARC in the Santa Sylvania area and elsewhere lies in the limited amount of systematic archaeological work in south-central Chile, particularly at sites dating to the colonial period (c.f. Gordon 1985, 2011; Harcha et al. 1989; Harcha and Vásquez 2000; Mera et al. 2004; Saavedra and Sanzana 1991). Limited research has been carried out in projects examining the formation of Araucanian society from various empirical and theoretical perspectives (c.f. Dillehay 2007; Dillehay and Saavedra 2005, 2010).

This chapter is a summary of the research carried out on pre-Hispanic Araucanian archaeology, as well as a descriptive analysis of those results seen through the phases of the ARC through the RT framework. Included are many aspects of cultural evolution and development seen in Dual Inheritance (DI; see Chapter 4).

### **Investigations into Araucanian Prehistory**

Few attempts at outlining Araucanian prehistory existed prior to the efforts of Latcham in the early 20<sup>th</sup> Century (Latcham 1904, 1908, 1928). Generally an ethnographer, Latcham published *The Social Organization and Religious Beliefs of the Ancient Araucanians* in 1924, marking the first scientific effort at an archaeological analysis of Araucanian culture (Latcham 1924). Latcham argued that the Araucanians derived mostly from an “invasion” of foreigners from Argentina in the past, based on the relationship of words like “Nahuelbuta” (the mountain range along the coast south of Concepcion) and “Nahuelhuapi” (a lake along the eastern Andean flanks of Argentina). He also pointed to early chroniclers and travelers who wrote that the indigenous inhabitants between the Bio Bio and Tolten Rivers had a “different attitude” than others farther north and south (ibid:23). Latcham’s research was centered on ethnographic and ethnohistorical work with limited forays into archaeological excavation and analysis. Nonetheless, his work provides a baseline for later anthropological research amongst the Araucanians.

At the same time, Chilean historian Guevara was conducting ethnohistorical and ethnographic work among the Mapuche (1904, 1908, 1911), Joseph (2006 [1920]) investigated settlement patterns and household construction, Moesbach (1936) analyzed the customs of the Mapuche from the last half of the 19<sup>th</sup> Century, and Medina (1887, 1959, 1960, 1961, 1963, 1965, 1983) compiled historical documents related to Spanish colonization efforts in south-central Chile. The compendia have been particularly

useful in this research. Though not explicitly archaeological, these researchers collected important documentary evidence that were useful to later archaeologists and historians (Bengoa 2000; Boccara 2007; Dillehay 2007; Gordon 1985, 1991, 2011; Mera et al. 2004; Peri 1989; Retamal 2000, 2001; Zavala 2008).

The work of German-Argentinian archaeologist Menghin in the 1950's and 60's documented the first professional excavation and analysis-based research on Araucanian history and prehistory (Menghin 1962). Drawing upon the earlier works of Latcham, Medina, and Guevara, Menghin criticized the archaeological record of the day, stating that "Little research has focused on the whole of Araucanian archaeology, in both Chile and Argentina, and those that have commonly offer only summaries" (ibid:52). This criticism can still be applied today, to some degree. Menghin was particularly critical of Latcham, stating that the lack of "scientific" analysis of archaeological materials made most of Latcham's results either inconclusive or outright incorrect. Menghin set out to provide a culture-historical analysis of Araucanian society from prehistory to the present day. He established the first ceramic typologies and artifact sequences, based on research done between Concepcion and Temuco. Menghin's work is still serves as the basis for typologies used today (Adán and Mera 2004). At the same time, Bullock (1955, 1958) identified a ceramic complex he named "El Vergel," a type found particularly in funerary and cemetery contexts seen first in the area around Angol, and then identified throughout the Araucania. These typologies and sequences were later built upon by Berdichewsky (1975), Berdichewsky and Calvo (1971), and Madrid (1965) in the areas of the so-called Araucanian *Estado*, or "state," and added to by van de Maele (1968) in and around Valdivia.

Beginning in the mid-1970's, the work of Dillehay, students, and colleagues developed, systematized, and augmented the previous research of Menghin. Working extensively in the Puren-Lumaco river valley and at various other sites throughout south-central Chile, Dillehay, pushed the antiquity of humans in the Americas back to 14,500

BP at the site of Monte Verde (near Puerto Montt) and gradually created sequences of occupations and activities to the present day (Dillehay 1976, 1981, 1985, 1990a, 1990b, 1992a, 1992b, 1999, 2000, 2007; Gordon 1985, 1990, 2011; Ocampo 2004). In particular, research in and around Purén-Lumaco determined that Araucanian culture had a greater integrity and chronology than previously indicated by historians and anthropologists. Dillehay has argued that evidence suggests the formation of modern Mapuche culture was not due to Inka, Spanish, and Chilean influence or control, but rather the result of many centuries of local and non-local development, interaction, and expansion (Dillehay 1981, 1990, 2007). These developments occurred in Pucón-Villarrica and the area around Santa Sylvia at the same time (Dillehay 1976; Navarro et al. 2011), and were likely the result of guided variation through the generations, and biased transmission through interactions via trade networks and other relationships (Boyd and Richerson 2005).

In addition to his excavations at Santa Sylvia, Gordon initiated research at numerous sites in the 1970's, often at sites containing burial contexts (Gordon 1975, 1978) and another Spanish fort near Lake Carilafquen (Gordon 1985). These excavations, particularly at the cemeteries, revealed a degree of regional variability in funerary practices through time, including burials placed in bark canoes (Gordon 1978) and large ceramic urns (Gordon 1975).

Continuing work in south-central Chile has focused on further definition and refinement of cultural sequences. Numerous investigations (Adán 1999, 2004; Adán and Mera 1997; Aldunate 1989; Mera et al. 2004; Harcha et al. 1988; Quiroz and Sanchez 2005a, 2005b; Reyes et al. 2005; Saavedra and Sanzana 1992; Sanchez 2005) have analyzed ceramic sequences from the Pitrén (AD 300-1100), El Vergel (AD 1100-1500) and Valdivia (AD 1200-1600) ceramic complexes (Alvarado and Adán 1999; Adán et al. 2011). Other research has refined data for the pre-ceramic Archaic period (7000 BC-AD 300) seen particularly in occupations along the coast and Andes (Adán et al. 2004; Navarro and Pino 1999; Quiroz and Sanchez 2005a). Other studies have

analyzed the historic Araucanian-Spanish interactions from an archaeological perspective (Harcha et al. 1988; Saavedra and Sanzana 1992), among other research. Several interdisciplinary research projects have examined various aspects of modern Mapuche society with correlates extending back into the archaeological record. Garcia (2006, 2008, 2010) investigated ceramic creation by modern Mapuche and hypothesized how past Araucanians may have acquired materials, constructed, and consumed ceramic vessels. Dillehay's work in Purén-Lumaco mentioned above has included extensive ethnographic interviews with living Mapuche in the area, as well as documenting ritual practice, household construction, and oral history (Dillehay 2007, 2010). Godoy and colleagues (Godoy 2010; Godoy and Lira 2010) have examined Mapuche use of modern forests near Valdivia and Villarrica, as well as the modern construction and use of canoes on the montane lakes, with comparisons to the archaeological record. These investigations have indicated continuity in material use and construction techniques from pre-Hispanic era to recent times.

Despite these efforts, the amount of strong, theory-based archaeological research in south-central Chile for all time periods is limited still (Adan and Alvarado 2000; Dillehay 1976, 2007), and still needs to be built up to better establish the long human occupations and cultural developments that have transpired over the last 15,000 years. However, based on these works and the current research, a general outline of cultural development at Santa Sylvia and the wider Araucania can be hypothesized. This development is charted through possible phases of the ARC.

### **Resilience in the Pre-Hispanic Archaeological Record**

#### *First Humans and Cultural Beginnings: ~12,500 BC to AD 300*

The humans in southern Chile arrived by about 12,500 BC, likely via a land route across the Bering Strait, through North America, and into South America (Dillehay

1989, 2000, 2008). People may have made their way across the land bridge as early as ~33,000 years ago<sup>1</sup> (Dillehay 1989). General consensus amongst researchers places entry by ~20,000-15,000 years ago, based on linguistic, genetic, biological, and archaeological evidence (Adovasio and Page 2002; Bonatto and Salzano 1997a, 1997b; Cavalli-Sforza et al 1988; Dillehay et al. 2008; Greenberg et al. 1986; Hurtado de Mendoza and Braginski 1999; Lavallée 1995; Lepper and Bonnichsen 2004; Meltzer 1995, 2004; Nettle 1999; Nichols 1990, 2008; Silva et al. 2002). This migration southward took place over land through ice-free corridors extending from eastern Alaska into the central United States, and possibly by boat along coastal routes (Dillehay 2008; Storey et al. 2007) The subject of early humans in the Americas is still contested somewhat among archaeologists and other researchers (Adovasio and Page 2002; Orellana 1992), though the discovery of new sites and refined dating and analysis techniques continues to add more information that has confirmed a strong human presence in the Americas for at least the last 15,000 years (Meltzer 2009; Pitblado 2011).

These early migrants were broad spectrum hunters and gatherers, exploiting late Pleistocene megafauna such as mammoths, mastodons, giant sloths, and other now-extinct animals, as well as intensive collection of native plants (Dillehay 1997, 2002, 2003; Madsen 2004; Meltzer 2004). They likely lived in small, nuclear-family groups with limited aggregation into larger mobile populations (Dillehay 2008). Sometime before ~12,500 BC, these hunter-gatherers populated south-central Chile, most notably at Monte Verde. Extensive excavation carried out over 10 years by an interdisciplinary team of researchers directed by Dillehay uncovered the remains of a campsite containing numerous artifacts, including bola stones, spear points, preserved mastodon meat, tent stakes tied with fiber, seeds and plant material (Dillehay 1989, 1997, 2002; Dillehay et al. 2008). Among the finds were plant remains from “distant beaches” along the Pacific coast brought to and utilized by the inhabitants of Monte Verde, indicating either long-distance

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<sup>1</sup> The lower layer of MV-1 at Monte Verde has a tentative date of ca. 33,000 ybp, though further confirmatory dates are needed (see Dillehay 1989, 1997, 2000).

trade or migrations from other areas, perhaps throughout south-central Chile and across the Andes into Argentina (Dillehay et al. 2008:784).

Retreating glaciers and a gradual increase in temperature after 10,000 BC precipitated the extinction of megafauna in North and South America, favoring smaller animals (Madsen 2004; Villagrán 1991). Environmental changes led to increased rainfall as well, creating the montane lakes and rivers that characterize the “Lake Region” of south-central Chile as well as the fertile soils of the central valley running from the Maipo River (near Santiago) to the Tolten River (Adán et al 2004; Aldunate 1989; Navarro and Pino 1999). During this time human populations likely continued to hunt and gather, perhaps following the yearly migrations of animals while exploiting marine and montane resources, particularly piñon seeds that would become important in Araucanian society (Dillehay 1990, 2008).

Little is known about cultural development in southern Chile between 9,000 BC and AD 300 during the Archaic Period (Dillehay 1981, 1990a; Navarro et al. 2012). Available evidence suggests that existing human populations probably continued to hunt, gather, gradually increase in size, and spread out across the landscape. Some populations may have become increasingly sedentary, practicing incipient agriculture by about 6,000 BC in Central America and in northern Peru, leading to greater population densities, the development of cities, monumental architecture, and differentiated governmental organization (Dillehay et al. 2012; K. Jones 1999; Lavalee 2000).

These same changes did not appear at the same time, as far as is currently known, among the ancestors of the Araucanians in southern Chile. These early peoples continued to hunt, fish, and gather for several centuries more. This is not to say that changes did not come and that Araucanian ancestors did not develop their cultural system during this time. As noted before, the Archaic period in southern Chile is poorly understood, due to the limited archaeological research conducted on the time period. Further the problems of site preservation in the wet, acidic soils and the lack of ceramic materials have also

limited Archaic period research (Dillehay 1990a; Navarro and Pino 1999). However, the few identified Archaic sites have yielded notable information, particularly at Chan Chan on the Pacific coast, El Marifilo-1 located about 35km (22 miles) southwest of Pucón, and Pucón-VI, located 16 km west of Santa Sylvania (Figure 71; Adán et al. 2004; Dillehay 1981; Navarro and Pino 1995, 1999; Navarro et al. 2012; Valdes et al. 1982; Velasquez and Adán 2004).

Chan Chan-18, first excavated in the 1990's, is located approximately 35 km (22 miles) northwest of Valdivia. Part of a larger series of sites along the Pacific coast (see Dillehay 1981; Navarro and Pino 1995, 1999), Chan Chan-18 consists of two archaic occupation layers dating to ca. 4470 BC and 3410 BC, composed primarily of lithic remains, a burial, and several firepits (Navarro and Pino 1999; Pino and Navarro 2005; Stern et al. 2009). Importantly, several black obsidian fragments were provenanced to the Nevados de Sollipulli, an obsidian source located 38km (23 miles) northeast of Santa Sylvania (Stern et al. 2008, 2009). The presence of this particular obsidian indicates long-distance trade or travel between the coast and the mountains by 4400 BC, if not earlier. The same obsidian has been found at sites elsewhere in the central valley and along the coast from archaic times into the historic period (Stern et al. 2009, 2012). Rarer red obsidian, like the samples found at Santa Sylvania, was also recovered at Chan Chan-18. This obsidian was provenanced to Portada Covunco in western Argentina, 150km northeast of Santa Sylvania (Stern et al. 2009). The presence of red obsidian strengthens the argument for long-distance and trans-Andean trade networks established in the early Archaic, which remained in use into the historic period.

The inhabitants of Chan Chan-18 exploited marine resources, particularly shellfish, and gathered plant materials from the ocean and the costal interior (Navarro 1994). Palsson (1987, cited in Navarro and Pino 1999:66) argues for specialization to recover marine resources (i.e. knowledge of plants and animals, how to hunt or gather the same, etc.). This argument led Navarro and Pino to posit the possibility of a new,





Figure 71: Map of Archaic-period sites identified in southern Chile as mentioned in the text.

differentiated social organization beginning during this time period. If differentiation was occurring, some individuals may have achieved status akin to *ülmen* or perhaps *lonko* at this time or laid the foundation for these future positions as these Archaic societies continued to develop.

Another archaic site, Quillen-1, was located 36 km (22 miles) northwest of

Temuco, and contained two occupations dating to 2725 BC and 80 BC, respectively, though the site may be older (Valdes et al 1982; Sanchez et al. 1984). What is notable about Quillen-1 is the presence of the same black obsidian from the Nevados de Sollipulli (Stern et al. 2009). Like Chan Chan- 18, Quillen-1 suggests long-distance trade networks or travel during Archaic times and the exchange of goods across distances. These networks appear to have continued into protohistoric and historic times.

The site of El Marifilo-1, south of Santa Sylvia along the northeast bank of Lake Calafquen was dated to 7540 BC at the lowest level (Level 6, approximately 2 meters below the present ground surface), with a second Archaic occupation dating to around 3000 BC (Level 4) and a final occupation (Level 1 & 2) dating to AD 1360 (Adán et al. 2004). The earliest Archaic occupation of the site was revealed from firepits, lithic fragments, animal bones, and burned plant materials (Velásquez and Adán 2002). The number of animal bones recovered is low enough to indicate that the people living at Marifilo-1 primarily exploited wild plants for sustenance, particularly piñon (*Araucaria araucaria*), which was supplemented infrequently with Pudú (*Pudu pudu*, a small type of deer), fox, and several species of bird (Adán et al. 2004; Mera et al. 2010; Velásquez and Adán 2002).

About 15km west of Santa Sylvia, Dillehay and Gordon (Dillehay 1975-1976; Navarro et al. 2012) excavated the site Pucón VI, located in a rockshelter on the Pucón peninsula. Excavations identified several occupations, the oldest dating to 8440 BC. Subsequent occupations extended up through time to the ceramic complexes of Pitrén and El Vergel (see below). These occupations were not contiguous, but do demonstrate long-term human presence in the area around Santa Sylvia since the early Holocene. At the same time on the west side of the Andes, hunters and gatherers exploited similar resources in the valleys, rivers, and lakes in the Pampa and Patagonia (Berón 1999, 2006, 2010; Cardich 2003; Gonzalez 2005; Goñi 1987; Politis 2002). These foragers likely utilized perennial passes to cross the Andes to follow migrating animals, exploit

resources, and trade (García 2009; Goñi 1987). As mentioned above, obsidian from sources in Argentina (Portada Covunco; see Figure 71) have been found along the Pacific coast as early as 5,000 years ago, again indicating that long-distance trade networks and routes connected various parts of the Araucania before the arrival of the Spanish (Goñi 1987; Navarro and Pino 1999; Stern et al. 2009)

Though the number of archaic sites is limited, at least as analyzed archaeologically, a limited idea of human activity in the region of Santa Sylvania can be postulated for the time period between 9000 BC and AD 300. Without contradictory evidence, it is hypothesized that these groups inhabiting the region continued to live as their ancestors had for previous centuries, hunting wild game and gathering abundant wild plant resources from the coast to the mountains and across to the Pampa and Patagonia (Adán et al. 2004; Gonzalez 2005). The use of red obsidian at Chan Chan-18 from sources in Argentina along the coast indicates that long-distance trade existed or began in the Archaic period, with montane resources making their way to the coast, possibly through Pucón-Villarrica, and marine resources perhaps moving back (Stern et al. 2012). It is yet to be determined what items, if any, were traded from the coast to the Andes. It is possible that during this time that some areas experienced an increase in population and subsequent nucleation with the introduction of domestic agriculture and ceramic technology, though more research is necessary to further define the Archaic Period and the transitions into the Formative Period.

*Resilience Cycle: Growth Phase—Pitrén Complex, AD 300*

The earliest identified ceramic complex in south-central Chile is known as Pitrén, first defined by Menghin in the 1960's<sup>2</sup> (Adan and Alvarado 1999; Aldunate 1989; Dillehay 1990b; Menghin 1962). In the framework of RT, this may constitute the

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2 Earlier, Bullock (1955) identified the first ceramic culture as the “Kofkeche,” following data from Latcham. Menghin (1962) disputed this denomination, and the name is no longer used being substituted for the later El Vergel complex.

beginning of a “growth” phase in the beginning of the ARC, or a period of initial cultural development and population increase. The introduction of ceramic technology appears to have coincided with the development of domesticated plants, particularly maize, and the beginnings of a shift towards sedentism (Aldunate 1989). In other parts of the world, the introduction of ceramics generally coincides with sedentary habitations, incipient agriculture, and population growth (Bellwood 2005; Keeley 1995). The same likely transpired in the Araucania, as agricultural activities may have led to food surpluses and larger families. Agricultural surpluses may have also permitted ceremonial feasting, positions of prestige, and new political relationships (Dietler 2001). Dillehay (2007) suggests that this may be the case for the Araucanians as well, particularly with the later *nguillatun* festivals that may have had their prototypic beginning in the Pitrén period. These shifts in technology and settlement may have been influenced by an immigrant population or via trade, though this is unclear. The shift to sedentism in particular likely led to the creation of wider kin-based social networks than existed previously, and may have initiated the development of political and social organization and incipient religious practice. These aspects would continue to be developed over the coming centuries during this growth phase.

Dillehay (2007:98) indicates that the Pitrén complex probably has roots or influences in northern “pre-Inka Andean” cultures such as the Molle, Lolleo, and possibly Diaguita, which in turn received influence from central Andean groups such as Tiwanaku (Ampuero 2007; Berdichewsky 1968; Dillehay 1990b; Dillehay et al. 2007; Menghin 1962; Quiroz and Sanchez 2005). Aldunate (1989; see also Correa 2010) argues that Pitrén shares characteristics with Lolleo, which arose in central Chile around the same time, if not slightly sooner. To date, it is difficult to tell when and to what degree this influence occurred, some researchers placing it by AD 300 (Adán and Mera 2011). Other sites, such as Alero Quino (Mera and Munita 2006) and Talcahuano 1 (Quiroz 2010) have thermoluminescence dates of Pitrén ceramics to around AD 130, indicating

an even earlier adoption of this technology. It is unlikely, though possible, that ceramic development was the result of independent invention and may be tied to a migration of Mapudungun-related speakers that further influenced and developed Araucanian culture during this growth phase (Dillehay 2007; Key 1978). It is also possible that the introduction of ceramics and some agricultural materials came across the Andes from Argentina (Berón 1997, 2006; Latcham 1920; Hajduk 1981, 1984).

The introduction of ceramic technology around AD 300 began what is referred to as the Formative Period in south-central Chile and western Argentina. This period lasted until the Spanish arrival in AD 1535 (Aldunate 1989; Adan and Alvarado 1999; Berón 2010; Dillehay 1999; Gonzalez 2005; Ocampo et al. 2003; Politis 2002). Sometime before AD 500, domesticated plants such as maize, quinoa, peppers, and beans were introduced (Dillehay 1990a; Rossen 2011), primarily from interactions with populations living to the north<sup>3</sup>. It is less likely, as in the development of ceramic technology, that agricultural activities were the result of independent development (Dillehay et al. 2007; Torrejon and Cisternas 2002).

To date, the Pitrén complex has been recognized at sites in the north near the Bio Bio delta, along the Pacific coast to the north side of Lake Llanquihue (near modern-day Puerto Montt) and across the Andes to Neuquen in Argentina (Adan and Alvarado 1999; Aldunate 1989; Gordon 1986; Hajduk 1981; Quiroz 2001; Quiroz and Sanchez 2003). For the purposes of this research, it is important to note the interactions and exchanges with groups living in western Argentina. As noted before, these networks were in place before the Formative period through obsidian exchange, and likely amplified during the Formative and Historic periods (Navarro and Pino 1999; Stern et al. 2009). Pitrén was initially seen in cemetery contexts, making initial identification in the domestic sphere

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3 There may have been trickle-down trade from Andean groups such as Tiwanaku, which influenced northern indigenous groups like the Diaguitas in northern Chile and Argentina (Bengoa 2004; Berenger and Daulesberger 1989; Uribe 2004). These northern groups then interacted with northern Araucanians (*Picunche*) living around the Maipo River (present-day Santiago). Gradually, the domesticated plants and animals made their way into southern Chile (Dillehay et al. 2007)

difficult, but subsequent excavations have identified Pitrén in domestic contexts (Adan et al. 2007; Ocampo et al. 2003) including at Santa Sylvia in the present research. Most studies of Pitrén, however, have come from isolated cemeteries, located near lakes and rivers. These sites appear related to seasonal collection of wild plants and migratory animals, indicating a continuation of hunting and gathering activities into the Formative Period. The few domestic sites containing Pitrén ceramics indicate that agriculture was just beginning and focused on potatoes and some maize. Additionally, these sites indicate the beginnings of animal domestication, notably the *chiliweke*, a camelid species related to the llama and alpaca (Aldunate 1989).

Pitrén ceramics come in myriad shapes and sizes (18 types based in 8 categories;



Figure 72: Pitrén style zoomorphic vessel.

Adán 2000; Mera and Munita 2006), including spherical and conical jars, pots, bottles, bowls, cups, and zoomorphic figures of animals and people (Figure 72; Alvarado and Adán 1999). Vessels are generally smoothed with a polished dark red slip, with some negative black-on-red, brown, red/brown, and solid black with variations in-between (see Alvarado and Adán 1999; Dillehay 1990b). Other artifacts found at Pitrén-related sites include grinding stones (manos and grinding slabs), projectile points, pipes, and lithic materials (Dillehay 1990a; Hajduk 1978).

The use of ceramic technology, mortuary practices, and the incorporation of domestic plants likely corresponds to either the beginnings of or an increase in sedentism, which may have led to the beginnings of Araucanian domestic settlement patterns and population growth in this ARC growth phase (Aldunate 1989). This may also indicate the initial formation of the Araucanian basin of attraction (see Chapter 5. Though no evidence yet exists of ideological or ritual practices earlier than AD 1000, it is possible that the prototypes of these later practices began or continued their development at this time. Pitrén thus corresponds to a “growth” phase in the ARC: population appears to be increasing, political and ideological practices are likely beginning, and economic activities may be expanding. Social relationships strengthened, settlement patterns were established, trade networks continued and perhaps amplified, and religious actions developed. The introduction of ceramics and domesticated crops, along with the shift to sedentism, may have been influenced by populations from the outside (biased transmission in DI), though lack of evidence of direct outside influence suggests these changes are the result of guided variation across the centuries.

It is difficult to say with precision the political and demographic organization of these Formative Period peoples. It is likely as agricultural activities increased, the need for defined boundaries between sections of arable land between communities also increased. Some individuals may have been given positions of status to negotiate for access to lands and water, or to bring together warriors to fight for access, prototypes for

later *lonko* and *ülmen*. Land access may have become inherited, leading to recognition of particular ancestors related to tracts of land and the furthering of kin and trade networks. This recognition of particular ancestors may have sparked the beginnings of later Araucanian religious practice, though this is speculative. Demographically, communities likely developed along kin lines as extended families increased in size both individually and spatially.

Excavations at Santa Sylvia revealed Pitrén ceramics at the site by AD 900, during the first possible occupation of the site. As stated in Chapter 8, the date from this occupation may be from old wood and not indicative of a larger habitation. This early use of Santa Sylvia does not appear to be extensive, though much of it may have been destroyed by the subsequent occupations in AD 1100 and AD 1580. Notably, Pitrén-style ceramics continue through to the Spanish occupation, which suggests that ceramic styles may have been used much longer than previously believed (Adán and Mera 2004). This early occupation may have also exploited maize, quinoa, and pepper cultivation and llama domestication, though analyses point to a continued use of wild plants over domesticates (Silva 2010).

Overall during this growth phase, archaeological evidence around Santa Sylvia and elsewhere in the Araucania suggests an increase in sedentism, agricultural activity, ceramic production, and population growth. Social organization likely focused on the *ruka* (household) level. As populations increased so did kin relations and networks, precursors to the later Araucanian social organization. Politically, the inhabitants Santa Sylvia may have been more egalitarian, as cemetery excavations thus far do not indicate status symbols or particular grave goods, although the dispersed, heterarchical political structures may have their roots in an egalitarian past (Berdichevsky 1968; Gordon 1975, 1978). As noted above, agricultural surplus may have led to commensal feasting and related activities, coinciding with increased prestige for certain individuals or kin groups (Dillehay 2007). Religious specialists such as *machi* shamans may have existed, though it



is difficult to discern if *lonko*, *ülmen*, or other leaders were named as such in this phase.

*Resilience Cycle: Growth to Conservation Phases—El Vergel and Valdivia Complexes, AD 1100*

Possibly developing out of Pitrén, the El Vergel ceramic complex was first identified by Bullock (1955) as *Kafkeche*, and later re-defined by Menghin (1962) as El Vergel, which definition remains to the present day. The introduction of El Vergel appears to occur at the same time as an increase in religious activity, agriculture, and settlements in various river valleys in the Araucania, such as Purén-Lumaco and near Pucón (Bahamondes 2010; Dillehay 1990a, 2007; Quiroz 2001, 2010). The type site is located near the present-day town of Angol, through excavation of a funerary urn associated with a bark canoe (Bullock 1955). Subsequent excavations have identified El Vergel at numerous sites to the north of the Bio Bío River near Cauquenes, and throughout the Araucania (Adan et al. 2003; Aldunate 2003; Gaete and Sanchez 1995; Quiroz 2010; Quiroz and Sanchez 2005; Sanchez 2005). El Vergel is particularly known for “large funerary urns sometimes associated with a few bicolor vessels” (Dillehay 1990a:61), though more research has yielded interesting results.

Important to the El Vergel period is the consolidation and expansion of farming activities and demographic patterns, a continuation of the previous growth phase in the ARC that gradually transitioned to a conservation phase, or the phase where the major structures of a cultural system are established and maintained while continuing to develop. Delineating between these two phases can be tricky, but evidence indicates that no new major structures came into being after about AD 1200, seen in the introduction of new archaeological materials such as ritual spaces or material culture. In other words, the Araucanians appear to have established a general pattern of political, economic, social, and ideological practices that would remain, with minor modifications (e.g. “conserved”), for the centuries to come.

By the arrival of El Vergel styles, domesticated plants such as maize (*Zea mays*), quinoa (*Chenopodium quinoa*), potatoes (*Solanum tuberosa*), and peppers (*Capsicum*) were cultivated throughout south-central Chile. Agricultural activities coincided with an increase in population and sedentary activities including animal domestication (Aldunate 1989; Dillehay 1990b, 2007; Quiroz and Sanchez 2003). Though no large villages, hierarchies, or bureaucracies appear to have developed during this time, people likely limited their migratory activities<sup>4</sup> and began to construct what Dillehay (2007) refers to as “proto-Araucanian culture.” Most domestic sites were constructed in river valleys, taking advantage of fluvial deposits for agricultural activities (Aldunate 1989). These changes may reflect an influx of Mapudungun-speaking peoples from as far away as southern Bolivia or western Brasil, though more research is needed on this topic (Dillehay 2007).

This cultural period included the construction of *kuel* ritual mounds, particularly in the valleys of Puren-Lumaco and Pucón-Villarrica. From Santa Sylvia several of these mounds can be seen, which mounds may have been constructed as early as AD 1200 (Dillehay 2007; Dillehay and Saavedra 2010). Mound construction in such geographically distinct areas indicates the possibility of a pan-Araucanian religious practice with increased interaction and collaboration that continued into the historic period. Later Spanish *cronistas* wrote of strong interaction between Araucanians in Purén and Villarrica, which, indicated by the contemporary construction of *kuel*, may have begun by at least AD 1200 (Dillehay and Saavedra 2010). Though mound construction began around the same time in Purén and Pucón, there exists some argument about the expansion of El Vergel ceramic styles as not reaching to the Andean foothills. Instead, a continuation of Pitrén style is argued for near Pucón (see Becerra and Reyes 2005), though this is subject to debate (Aldunate 2005).

It is still not clear who, why, or what was the impetus behind the construction

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<sup>4</sup> Some migration still transpired, though at a limited scale. At the site of Salado, excavations revealed that house construction (*ruka*) gradually moved over time, indicating that individuals or families may have moved in a sort of seasonal round, returning to previous locales on a yearly basis (Dillehay 1999)

of these mounds or the increase in sedentism, if there even is a particular reason. Dillehay states that these changes may be a reflection of interactions with or population migrations from the northern Chilean Andes, perhaps as a result of trade or an influx of the abovementioned proto-Mapudungun speakers from Bolivia around AD 1000. This may have caused a domino effect of peoples, materials, and practices pushing southward (Dillehay 2007; Kay 1978). In any case, the base structures of Araucanian society likely had their beginnings and consolidation during the El Vergel period.



Figure 73: Examples of El Vergel style ceramics. From the collections of the Museo Regional de la Araucanía

El Vergel ceramics are seen in two types: plain and painted wares, and are likely the same type as the Liucura styles found at Santa Sylvia described in Chapter 9 (Figure 73). The plain wares are most typical, found in domestic, funerary, and ritual contexts, and are similar to Pitrén styles (i.e. polished; red, black, or brown slip; some incising).

The large funerary urns generally contain one burial (Aldunate 1989; Quiroz 2010; Quiroz and Sanchez 2005). Painted wares come most often in red-on-white, though some black-on-white does appear. The painting takes the form of geometric patterns, usually a zig-zag on the necks and bodies of pots, pitchers, vases, and similar vessels (Figure 72; Adan et al. 2005). These are similar to the concurrent or slightly later Valdivia style.

Closely associated with El Vergel, a complex known as Tirua has been identified along the coast around Concepción (Dillehay 1990b; Quiroz 2001; Quiroz and Sanchez 2003; Sanchez 2005). This style, coming after Pitrén, is composed of red-on-white or black-on-white painted vessels with geometric hatched designs, similar enough to El Vergel as to be considered a subtype of the same (Adan et al. 2005). This style, like others, likely has its basis in central Chilean styles from Aconcagua or Diaguita (Dillehay 1990a, 2010; Dillehay and Saavedra 2010).

One interesting development during the El Vergel period is the possibility of trans-Pacific contacts between populations in south-central Chile and Polynesia (Kehoe 2010; Ramírez 2010). Chicken bones discovered at the site of El Arenal-1, located about 82km (50 miles) southwest of Concepción, have been dated to between AD 1300-1450, and mitochondrial DNA (mtDNA) comparisons with chickens in Tonga, Samoa, and other islands indicate that the chicken populations in Polynesia and Chile are related<sup>5</sup> (Storey et al. 2007, 2008). Ramírez (1992) argues for linguistic similarities between Mapudungun and Southeast Asian languages, as well as artifact similarities that suggest connections between Pacific islanders and Chile. However, in these cases the evidence is based on a small sample (i.e. one site, such as El Arenal-1) and more information is needed to further establish trans-oceanic connections (see Ramírez 1992, 1994, 2010; Sanchez and Quiroz 2005; Quiroz 2003).

The Liucura style ceramics recovered from Santa Sylvania appear to begin during the L65 layer radiocarbon dated to around AD 1100, likely associated with the El Vergel

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5 Gongora et al. (2008) dispute the mtDNA analysis of Storey et al (2007), stating that their results indicate that the chicken populations in Chile are the result of European contact, not Polynesian.

period. Though heavily disturbed, materials recovered from this layer indicate that the Araucanians at Santa Sylvia were consuming maize and peppers while continuing to exploit wild plants. Intrusions from the upper layers, L7/L37, made identification of habitational structures difficult, though one or more likely existed (Gordon 2011; see also Appendix D Figure 6). This occupation may also be related to the *kuel* construction in the area, initiated at about the same time (Dillehay and Saavedra 2010). What sort of relationship Santa Sylvia had with these *kuel* is yet to be determined. Dillehay (2007) has shown that in Purén-Lumaco the Araucanians oriented themselves spatially with reference to known *kuel*. Santa Sylvia and other domestic sites may have used the surrounding *kuel* for much of the same purpose.

In the wider Araucania and at Santa Sylvia, these growth and conservation phases are linked to the development and establishment of ritual practices (primarily *kuel* and *nguillatun*), further increases in population, expanding settlements, kin ties, and social networks, as well as continued farming and animal husbandry (Aldunate 1989, 1996; Dillehay 1990, 2007). With an increase in population and larger settlements, the *lof* and *regua* (and perhaps *ayllarehue*) organizations may have been established and maintained along with *lonko* and *ülmen* authority figures. The religious practices at *kuel* likely led to the rise of the *boquiboye* ritual specialists and *machi*, furthering the development of the heterarchical, disbursed nature of political structure. By at least AD 1300, the political, economic, social, and ideological structures were in place, though still subject to further development by Araucanian agents. Thus, at around AD 1300 the Araucanian basin of attraction, based on these cultural structures, was in place and exerting influence on the development of the culture and the ability of agents to act. This conservation phase appears to have lasted at least up to the arrival of the Spanish at Santa Sylvia, while to the north of the Bio Bio the Inka expansion may have prompted a release and reorganization/rebound phase for those Araucanian communities (Bengoa 2000; Dillehay 2007).

### *Valdivia Complex*

The Valdivia ceramic complex began around AD 1200 and is closely related to El Vergel. In fact, some arguments call for calling the two styles Vergel I and Vergel II diagnostically separated through geography, some stylistic variation in geometric patterns, and the possibility of influences from northern Chile (Dillehay 1990, 2007; Dillehay and Gordon 1986; Sauer and Dillehay 2012). Aldunate (1989) places Valdivia style as a late-prehistoric/early colonial creation, heavily influenced from the Inka and later Spanish colonizers, following the work of Menghin (1962) and van de Maele (1968). Recent work by Dillehay (2007) affirms the possibility of Inka influence on Valdivia styles, but notes that some aspects are probably pre-Inkan in origin, influenced heavily by central Chilean societies such as the Molle and Llolleo. Initially found near the eponymous city of Valdivia, this particular style, like El Vergel, is noted for red-on-white and black-on-white painted vessels in numerous shapes and sizes in geometric patterns (Adán et al. 2005). Importantly, Valdivia-style ceramics have been found in the Argentine province of Neuquén as early as AD 1200 (Berón 2006), indicating that the style was well-established before the arrival of the Inka or Spanish.

Dillehay and colleagues (Dillehay, personal communication, 2011) have done recent work at *parlamento* sites, locations for negotiations and treaties between the Araucanians and Spanish, near the Spanish-Araucanian frontier, as well as work in the Puren-Lumaco valley and surrounding area (Dillehay 2007, 2010). These investigations have indicated a lack of Valdivia-style ceramics, generally north of the Malleco River, which apparently limits Valdivia style to the southern reaches of the Araucania and over the mountains into Argentina (Berón 1997, 2006). This may indicate that what is termed El Vergel is a northern ceramic form (north of the Malleco River) and Valdivia is the southern form of the same artifact complex in the same temporal context.

The use of Valdivia style may indicate some changes in Araucanian society, perhaps from the same sort of influx of peoples as with El Vergel as part of the

conservation phase in the AR. Northern Chilean Andes influences may have made their way down from the north into central Chile and the Argentinian Pampa by AD 1200 (Berón 1997; Dillehay 1990a, 2007). These influences are not limited to ceramic styles, but are also seen in the inclusion of Quechua-related words into the Mapudungun lexicon (Catrileo 1998; Key 1978; Medina 1975), possible socio-political organization (Dillehay and Gordon 1998), and religious practice, particularly the construction of *kuel* ritual mounds (Dillehay 2007).

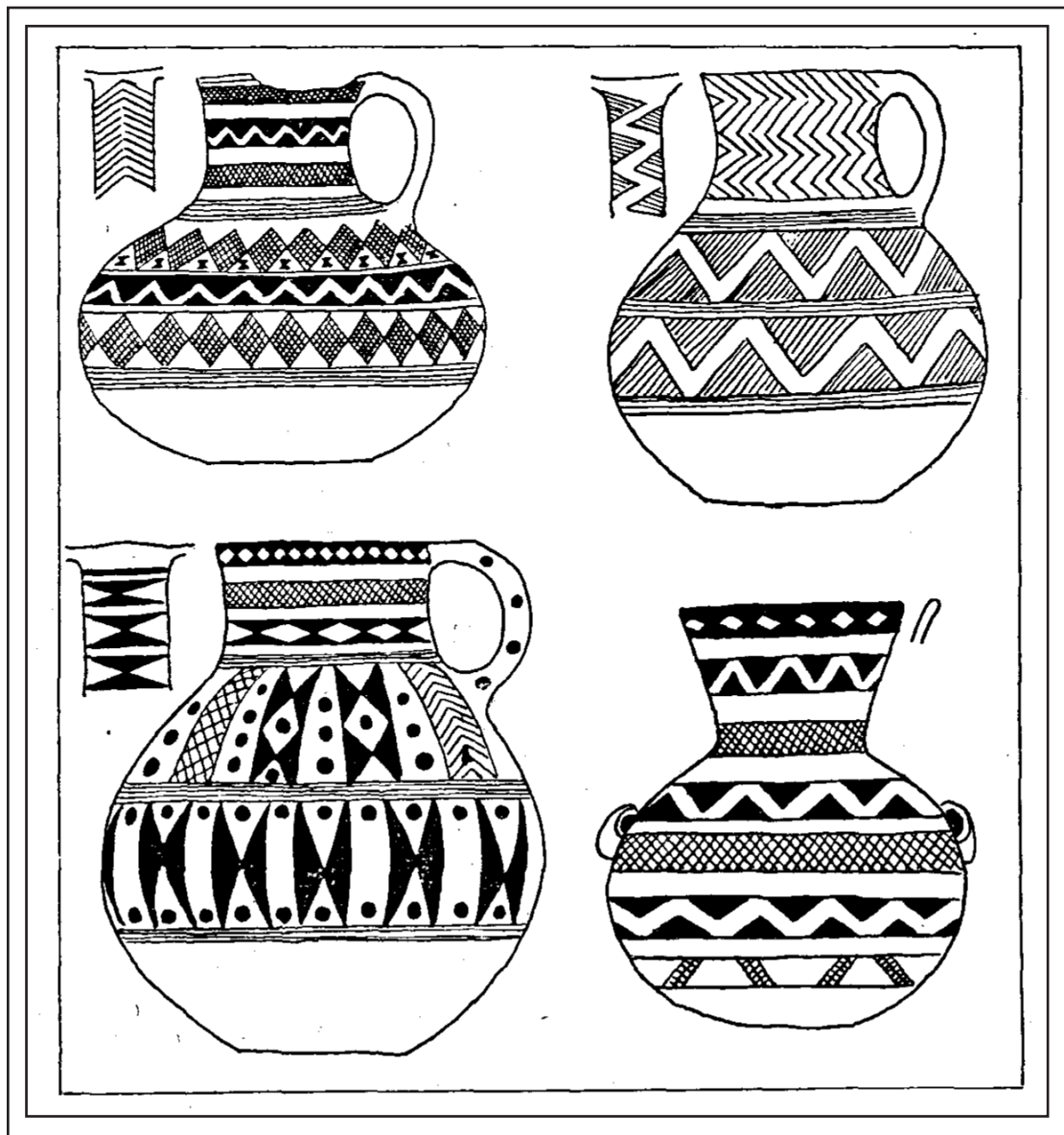


Figure 74: Drawings of Valdivia style ceramics. From Menghin 1962.

Numerous fragments of Valdivia-style ceramics were recovered at Santa Sylvia, though all were found within the context of the AD 1580 occupation (see Chapter 9). This may indicate that the Spanish brought Valdivia-style ceramics with them, perhaps with *indios amigos*, rather than the Valdivia style being incorporated into the extant material culture beforehand. Other sites in the area, such as Pucón VI (Navarro et al. 2012) also lacked Valdivia-style ceramics, furthering the possibility that Valdivia style did not make its way to the area around Santa Sylvia until the arrival of the Spanish. What this means for Araucanian cultural development in the area is unknown, though it suggests that Santa Sylvia in particular and Pucón-Villarrica in general may have been isolated from other Araucanian communities living to the east and south, or from areas where Valdivia-style ceramics have been found dating from AD 1200.

For the broader Araucania, evidence suggests that some influence made its way into the Araucania after AD 1000, affecting religious activity, artifact styles, settlement patterns, and other aspects of the Araucanian cultural system. No material indicates that this change was dramatic, such as an invasion from outside, but rather another phase in Araucanian cultural development, perhaps via gradual incorporation (i.e. biased transmission) from outside groups. This may have strengthened the Araucanian basin of attraction, but did not create a new one. However it came to pass, by the mid-15<sup>th</sup> Century the Araucanians in Pucón-Villarrica and elsewhere were probably well-established in a what this research defines as a conservation phase in the ARC. The political structures of *lof* and *regua*, headed by a semi-hereditary<sup>6</sup> *lonko*, appear to be in place and likely the primary sources for economic structures of local and long-distance trade relationships. Social structures focused also on the *lof* and *regua*, localized around individual *rukas* where men lived with their wives and children and interacted with their local kin, growing maize, beans, peppers, and raising llamas. Religious structures likely focused on *kuel*, *nguillatun*, and other ritual activities headed by *boquibuye* priests and other

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6 See Chapter 2 for a discussion on the nature of political heredity.



religious specialists, assisted by *machi* shamans and healers (Dillehay 1995, 2007). El Vergel and Valdivia may be a part of the same development, and likely correspond to the same conservation phase of the ARC at Santa Sylvania (Bengoa 2003; Boccara 2007; Zapater 1973; Zavala 2008).

### Summary

In brief summation, human history in south-central Chile is long, storied, and in need of further investigation, particularly from the late Pleistocene to early Formative periods. Humans in the region subsisted in the Archaic and early Formative periods through hunting and gathering the abundant wild plants and animals, gradually building up the population and exploiting resources and connections from the ocean to across the Andes, as well as to the north and south. By AD 300, ceramic technology had been introduced from northern societies probably in the form of trickle-down trade, which included maize, beans, quinoa, peppers, and other domesticates. Despite these interactions, the early Araucanians did not immediately adopt a purely sedentary society. In fact, gathering of piñon seeds remained a vital staple well into the historic period. At Santa Sylvania, the introduction of Pitrén-style ceramics suggests a growth phase in the ARC. Excavations at nearby sites such as Pucon VI (Navarro et al. 2012) indicate that Pitrén ceramics, accompanied by sedentism and agriculture, arrived in the area by about AD 600.

Near AD 1100, the introduction of El Vergel ceramics at Santa Sylvania appear to mark an increase in sedentism and interaction, particularly with geographically separated groups. This corresponds to a period of growth and transition to a conservation phase in the ARC. At the same time, Araucanian religious activity in the form of *kuel* ritual mounds and related *nguillatun* fields began, among other important developments, which has been maintained to the present day. The influx of new ceramic styles, though possibly

an outgrowth of the earlier Pitrén complex, may indicate the migration of a substantial population speaking Mapudungun or related languages from as far away as the Bolivian Amazon and northern Argentina. These groups may have mixed with the existing population, maintaining trade routes and long distance interactions. This may be a part of the previous growth phase at Santa Sylvania, with the incorporation of El Vergel into the material toolkit and connections between the site and the newly-constructed *kuel* mounds. The transition to the conservation phase came later, perhaps around AD 1300 after *kuel* construction, settlement patterns, and other activities were well established, though no evidence has yet been found for a Santa Sylvania occupation at this time.

By AD 1400, Araucanian society with its basin of attraction was well established around Santa Sylvania and the wider Araucania, with patrilineal kin-based relationships as far north as the Maipo River (present-day Santiago), south to Reloncavi Bay (modern day Chiloe), and across the Andes into western Argentina. The most substantial Araucanian populations lived in between the Bio Bio and Bueno Rivers in Chile. Araucanian culture continued to develop throughout the Araucania, and diversity in subsistence strategies between the coast, central valley, and Andean foothills (along with lack of organized hierarchy or bureaucracy) may have instigated later Spanish and Chilean definitions of geographically-distinct groups such as the *Picunche*, *Pehuence*, and *Huilliche* (see Chapters 11 and 13), which archaeological evidence indicates are not separate but rather regional variations of the same Araucanian culture system and structures. These groups are part of a “socio-geographic region” (Jones 1997), sharing the same attitudes, beliefs, and material culture with limited distinctions (Faron 1962). Araucanians at Santa Sylvania likely continued to interact, exchange wives, plants, animals, and other cultural materials across great distances, and form strong kin-based ties that would be important parts of their cultural resiliency, which was tested by the expanding Inka Empire near the close of the 15<sup>th</sup> Century.

## CHAPTER 11

### SEEING ARAUCANIAN CULTURE THROUGH ARCHAEOLOGY AND HISTORY: HISTORIOGRAPHY OF GROWTH, CONSERVATION, RELEASE AND REORGANIZATION PHASES

The Araucanians are real enough, with a real history, and they continue to challenge the Chilean state to acknowledge and deal constructively with their reality. A demythologized, honest historical treatment of the Araucanians' past is therefore one of the keys to guaranteeing the Araucanians a viable future.

– Stephen Lewis (1996:137)

Before delving into the ethnohistoric record of Araucanian interactions with the Inka and Spanish, this chapter analyzes, and critiques the state of historiography on the Araucanians in general. This is done through the hypothetical lens of RT, tracking the development of Araucanian historiography through possible correlating phases of the ARC defined by this research. The reason for this critique is due in large part to the written record taking transcendence over other investigative disciplines in research related to the Araucanians. Documentary transcendence colors most research, placing the written accounts made by Spanish *cronistas* and their later interpretation by Chilean historians in a place of infrequently-critiqued primacy (Zavala 2008). To say so does not mean that the historic record is neither important nor essential in Araucanian studies, but rather that the past Araucanians at Santa Sylvania are in an opportune position for interdisciplinary research. This view is based on **1)** pre-Hispanic Araucanian occupation of the area providing long-term cultural sequences, **2)** a known location of Araucanian/Spanish interaction at Santa Sylvania and **3)** a post-Hispanic and modern occupation with strong cultural ties to and oral history of the area. Without looking at the available avenues of study (in this case, combining archaeology, ethnohistory, and ethnography),

investigators are left with only a fraction of a greater picture that, when left alone, can lead to the marginalization of certain groups based on faulty or incomplete data. Many historians, as well as Chilean law (Ley N° 19.253 1993; see also Heise 2001; Nesti 2001), treat the modern Mapuche as a historical accident lacking long-term cultural viability (Boccaro 1996a, 1999b, 2002; Goicovich 2006, 2007; Villalobos 1989; Villalobos et al. 1982; c.f. Dillehay 1990, 2007; Zavala 2008). Thus, to ensure that formulations of identity, agency and cultural continuity at Santa Sylvia within the framework of RT are not based on limited views of the past, archaeology, history, and ethnography need to work together in complementary and critical ways. Each discipline has particular data sets that can be useful to the other disciplines, explored more below.

### **History and Archaeology**

The related disciplines of archaeology and history have had a long and contentious past, largely due to the nature of the respective disciplines (Trigger 1996). History, with its emphasis on analysis and exposition of the written word, has been seen as “superior” to archaeology with written text seen as concrete, less abstract, and “active,” allowing for richer understandings of past peoples and cultures (Moreland 2001). Writing was and continues to be seen as evocative of “civilization” (Vansina 1995). Archaeology was initially used as a means to “justify” or “expand” on historical facts already known, acting in a subordinate role to the greater history and historiography. This is in some ways true, as major archaeological developments grew out of application of written text to material remains, particularly Biblical archaeology in the Middle East (Moreland 2001, 2006; Trigger 1996).

As archaeology continued to develop as a discipline, its subordinate role decreased when divisions between “history” and “prehistory” became apparent as archaeologists studied the cultural remains of groups without any form of writing. It

was seen by some that archaeology could link groups with and without written records, often working backwards from written records into the past in the Cultural-Historical method or direct historical approach, which is of particular use in this study (Ascher 1961; Dillehay 2002, 2007; Orser 1996; Peregrine 2001). Archaeology and history could therefore operate as separate, if not equal, entities, each with separate methodologies and practices that could inform one another, though little interdisciplinary collaboration actually transpired (Comaroff and Comaroff 1992; Lightfoot 1995; Orser 2010; Voeglin 1954b).

This changed towards end of World War II. Whether a directly related or not, the collapse of European colonial prowess and the subsequent development of colonial and postcolonial studies (see Chapter 3) prompted historians and anthropologists to recognize the need to fuse documentary records with material culture in order to better understand the development of native societies during and after European colonization. In Europe, this attempt at a holistic approach was seen in the new *Annales* School, which sought to understand human social, cultural, and historic process across long time frames (the “*longue durée*”) through multiple sources of information, including anthropology, history, geography, political science, and others (Braudel 1980; Knapp 1992).

In the United States, influences from European social scientists and growing interest in combining historical and anthropological approaches to the study of Native Americans became known as ethnohistory, and led to the establishment of the American Society for Ethnohistory in 1954. These new “ethno-historians” recognized the lack of communication between historians and ethnographers on subjects of mutual interest and sought to specialize in a holistic subfield that would draw upon both historical and anthropological methods, using the documentary record with modern ethnography and archaeological analysis (Voeglin 1954a). Ethnohistory was thus defined as “the study of identities, locations, contacts, movements, numbers, and cultural activities of primitive peoples from the earliest written records concerning them, onward in point of time”

(Voeglin 1954b:168). In short, ethnohistory as a subdiscipline, primarily of history, can be seen as the efforts of researchers trained in historical methodology to employ anthropological data in their analyses without in-depth use of anthropological methods.

At the same time, archaeologists interested in the more recent human past began to use documentary evidence in their research. Outside of the United States, using documents as part of archaeological investigation had been going on for many decades, as most of the “classical” civilizations under study (Egypt, Mesopotamian societies, Greece, Rome, etc.) had some form of writing that could be used to guide archaeological research (Trigger 1996). No apparent division existed between a “historic” or “prehistoric” archaeology, though some researchers began to examine more closely those groups that did not have documentary materials in Europe and the Middle East (Andr n 1998). In the United States, however, a division existed between “history” and “prehistory” as the majority of indigenous cultures in North and South America did not have identifiable writing. Thus, AD 1492 was given as a dividing line between history and prehistory, or “Columbian” and “Pre-Columbian,” marking the advent documentary sources related to indigenous societies (Hall and Silliman 2006; Moreland 2006).

These approaches drew upon the “Direct-Historical Approach” in archaeology, whereby researchers examined the patterns and practices of living or recent, historically known societies, and extrapolate backwards based on that information (Steward 1949; Trigger 1996). In this way, archaeologists developed long sequences of material culture, primarily through ceramics, that, coupled with stratigraphic sequences from numerous excavations, could chart the development of myriad cultures and identify previously unknown societies that were related to the indigenous groups seen today (Ford and Steward 1952; Krieger 1944; Trigger 1996). At the same time, many researchers relied on “ethnographic analogy,” in which the practices of modern indigenous groups were viewed as analogous to what would be seen in the past (Ascher 1961; Comaroff and Comaroff 1992; Mortensen and Hollowell 2009; Peregrine 1996, 2001). Both the direct historical

approach and ethnographic analogy influenced the research done on the Araucanians, and continues to do so (Bengoa 2003; Joseph 2006[1920]; Menghin 1960).

Both the direct historical method and ethnographic analogy were criticized by archaeologists, particularly beginning in the 1970's (Peregrine 1996). The "New" Archaeology that advocated strong scientific approaches to the interpretation of cultures viewed the above methods as "inappropriately limiting the possible range of interpretations" and would lead to "complete removal from empirical analogy" (Peregrine 2001:3). In other words, as researchers extended their studies back in time the divergences between living and past cultures would become so great as to render analogies meaningless, particularly if the analogies looked at distinct, unrelated cultures (Wylie 2002). Despite these concerns, the use of ethnographic analogy or the direct historical approach is useful in this research, as it deals with a known culture with a material record extending back to at least AD 300 (Aldunate 1989). Before the introduction of ceramics the analogies become more difficult as the material record in the Archaic period is poorly known and analogies with similar Archaic cultures may break down. Despite this, ethnographic analogy is a useful tool that can be employed in many research avenues, albeit sparingly (Peregrine 2001).

In the 1950's and 60's, archaeologists interested in early United States history began to employ written sources to help identify, excavated, and reconstruct sites, most notably at places like Colonial Williamsburg and Jamestown in Virginia (Orser 2004). As Andr n (1995) points out, early archaeology in the United States and elsewhere in the Americas focused on indigenous groups as "the other." The beginning of historic archaeology in the 1950's brought the focus to the European past in the Americas, though to many researchers archaeology continued to be a "tool" rather than distinct methodology able to critique the historical record (see also Deagan 1982; Orser 2004). The formation of the Society for Historical Archaeology in 1968 provided a professional forum for practitioners of historical archaeology in the United States, which gradually

expanded into include members in the rest of the Americas and worldwide (Cleland 1993). From this, historical archaeology as a sub-discipline took shape and expanded into Latin America and the rest of the world (Funari 2001; Funari et al. 1999; Orser 1996, 1997, 2010).

### **Historiography of the Araucanians during the Hypothetical ARC**

The present research illustrates the need for interdisciplinary work. This section outlines the various stages and major works of Chilean history, particularly with regards to the resilience of the Araucanians at Santa Sylvia, and what aspects of identity, ethnicity, and agency can be gleaned from these records. Though extensive, this is not an exhaustive treatment as it highlights the influential works over the last 500 years. Numerous articles, books, and presentations are available (Antei 1989; Arellano and Holzbauer 2006; Aylwin 2002; Braun 1973; de la Cuadra 1982; Delgado 1987; Góngora 1979; Grebe 1993; Jara 1971; Leiva 1982; Mellafe 1995; Orellana 2006; Peri 1989; Pinto et al. 1991; Pumar 1990). However, the works below are the most cited works that have built Chilean historiography and defined how researchers view and interact with the documents, artifacts, and peoples related to Araucanian culture. Again, when talking about the Araucanians, many of these works, particularly the Spanish *cronistas*, are speaking particularly of the Araucanians living in “El Estado” in the region around Purén, Angol, Tucapel, Paicaví, and Arauco (Figure 75; Dillehay 2007; Medina 1975) and generally of those living between the Bio Bío and Bueno Rivers, or the traditional Araucania (Villalobos et al. 1982).

#### *Spanish Cronistas during Conservation, Release, and Reorganization/Rebound Phases: 16<sup>th</sup>-18<sup>th</sup> Centuries*

The majority of what is written, said, and interpreted about the Araucanians is



derived from the Spanish *cronistas* and government officials who wrote extensively in the mid-15<sup>th</sup> and 16<sup>th</sup> Centuries, during what this research considers to be the ARC phases of conservation, release, and reorganization/rebound (see Chapters 9 and 12). Documents include official government, church and individual correspondence with the Spanish crown, journals, memoirs, and specific histories. These works constitute the primary source material from which other historical treatments of Araucanian/Spanish interaction derive (Bengoa 2000). Early sources also color the later interpretations of that interaction, as many of the authors had specific agendas in mind when writing, which included spreading Catholicism, requests for Coronal favors and subsidies, and justifications for actions. For example, Spanish soldiers such as Vivar (1979[1558]) and Gonzalez de Najera (1889[1614]), who fought in numerous battles, appear more inclined to call for the eradication and/or enslavement of the Araucanians. Missionaries, such as Rosales (1989[1674]) and Luis de Valdivia (1615), attempt to show the positive aspects of Araucanian culture. Government leaders, such as Pedro de Valdivia (1929[1552]) or Rodrigo de Quiroga (1577 in Medina 1963), emphasized their actions against the Araucanians in defense of the crown in order to receive favors and monies. Because of this, researchers “need to maintain a cautious and healthy skepticism when weighing the relevance and veracity of colonial-era documents against the archaeological record and other cultural evidence”(Chacon and Mendoza 2007:240). Though full of valuable information, documents should be treated as artifacts of the period in which they were created.

The first early source comes from the letters written by Pedro de Valdivia to various individuals, primarily royal functionaries in Peru and Spain and to the Spanish Emperor Charles V (Valdivia 1929 [1550], [1552]). These letters recount the state of affairs in *Nueva Extremadura* (the early name for Chile), the expansion of the Spanish empire, battles with indigenous groups from north of Santiago down to the city of Valdivia, land divisions into *encomiendas*, and no small amount of braggadocio on the

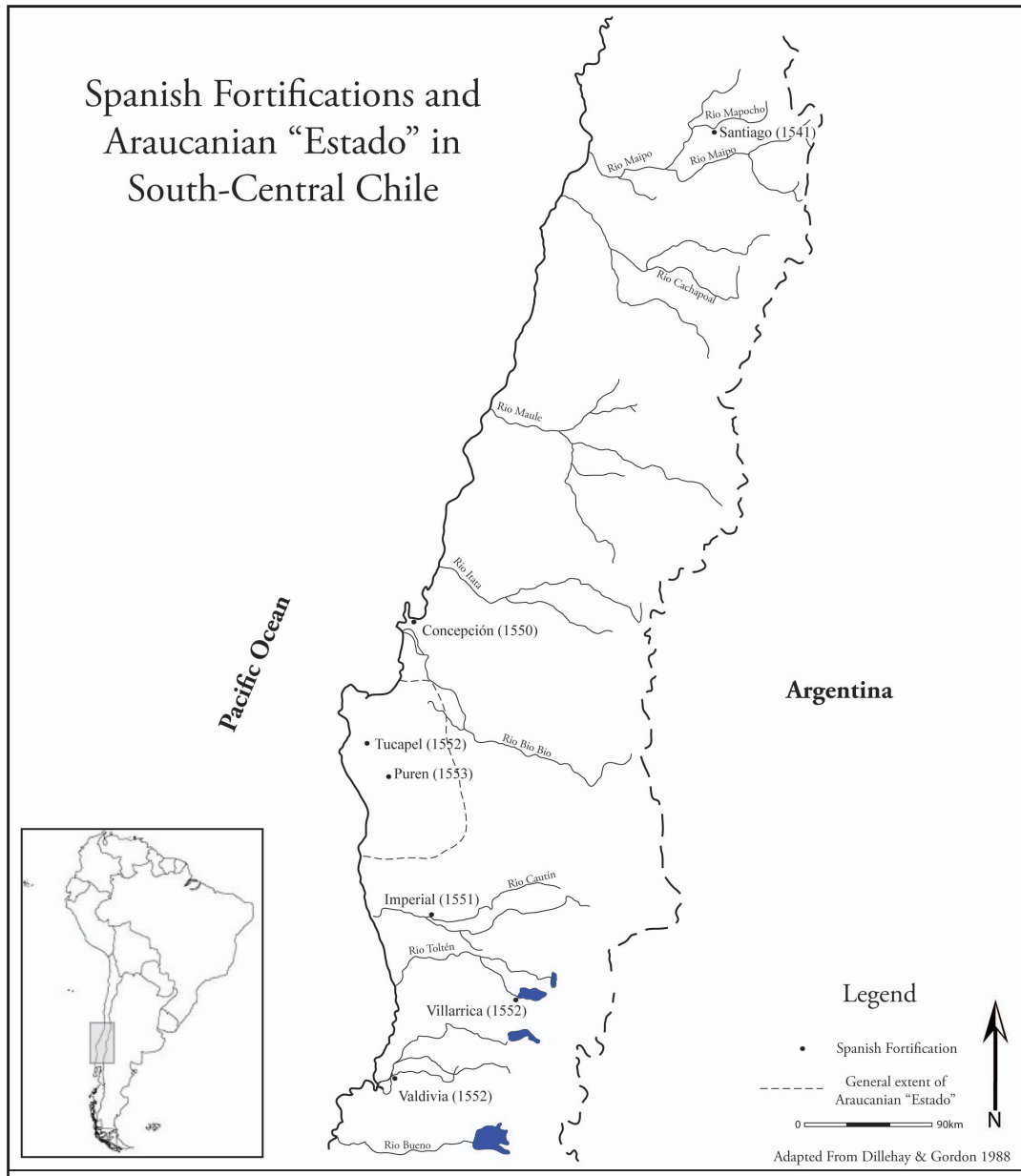


Figure 75: Map of south-central Chile showing several of the major Spanish fortifications and the limits of the Araucanian “Estado.”

part of Valdivia in order to gain favor with the crown (ibid). Importantly, Valdivia’s letters are the first documentary evidence of what this research considers the introduction of the Spanish basin of attraction, which exerted considerable pull on the Araucanian culture system throughout the Araucania, including the general area around Santa Sylvia

for many years. Valdivia also provides information about the Araucanians, calling them “barbarians” in need of “civilization” and Christianity, with a grudging admiration for their prowess in battle (Valdivia 1929[1552]). Valdivia himself did not spend very much time amongst the Araucanians before being killed and offers little by way of ethnographic information apart from general statements used to illustrate the difficulties in Spanish attempts to colonize Araucanian lands (Hidalgo 2008).

The earliest memoir related to Spanish/Araucanian interaction was written in 1558 by Geronimo de Vivar, a soldier who came down from Peru with Valdivia and wrote of his experiences in the 1550’s (Vivar 1979[1558]). Vivar’s chronicle is one of the most cited and influential in later memoirs and chronicles in the contact period, directly influencing the most famous epic poem/chronicle, *La Araucana* by Alonso de Ercilla (Cordero 2001). Vivar takes a decidedly religious bent in his chronicle, noting often the “pagan” nature of the indigenous groups in Chile with descriptions of some religious activities directed by *boquibuye* and *machi* (Vivar 1979[1558]:183). These activities were often describes to demonstrate the need to convert the Araucanians to the Catholic faith. Vivar’s chronicle reads like a personal journal, recounting in great detail the events that transpired from about AD 1546 to 1558, including the death of Valdivia, the Araucanian attacks on and destruction of all settlements south of the Bio Bio River, and subsequent quelling of the First Araucanian General Offensive (AD 1553-1558; see Chapter 12). Other ethnographic information can be gleaned from Vivar, including Araucanian settlement patterns, household organization, and religious practice, though these are limited. Vivar’s chronicle has been the most-referenced, cited by later Spanish writers in Chile, and critiqued of any of the *cronistas* (Cordero 2001; Orellana 1988, 2006). His work is particularly useful in describing the events around what this research interprets to be the initial release and reorganization/rebound phases in the ARC (Chapters 8 and 12).

The publication of the epic poem *La Araucana* by Alonso de Ercilla (2003[1569]), in AD 1569, added romance and poetic license to Araucanian/Spanish interactions and

greatly influenced later histories. It was the first widely-known accounts of the “War of Arauco,” used by extensively later writers in the 17<sup>th</sup> and 18<sup>th</sup> Centuries in their own histories (Lerner 2008). Though Ercilla did draw upon sources such as Valdivia and Vivar, as well as his own experiences in Chile, he is rarely clear on how he comes by much of his information, particularly the first-hand accounts of Araucanian councils (*cahuin*) and other specific events from the Araucanian point of view. The possibility exists that his poem is mostly fact-based and as such should not be dismissed, though treated carefully. Ercilla’s poem describes in detail, like Vivar, what are interpreted in this study as aspects of Araucanian resilience during the release and reorganization/rebound phases between AD 1553 and 1569. In particular, *La Araucana* suggests that a plan was in place before the Spanish crossed the Bio Bio to incorporate aspects of European culture while avoiding others, indicating goal-oriented actions on the part of Araucanian agents (see also León 1971). As stated before, *La Araucana* influenced later early historians, such as Ignacio Molina (2000[1788]), Barros Arana (1999[1885]), Gay (1885), and Medina (1887). To counterpoint the information in *La Araucana*, governor Hurtado de Mendoza commissioned viceregal scribe Pedro de Oña to write *Arauco Domado*, an epic poem that told the story of Hurtado de Mendoza’s term as governor, along with the history of Araucanian/Spanish interaction (Oña 1917[1596]; DeLeonardis 2008). This poem has been criticized as highly sycophantic, as it calls Hurtado de Mendoza “Caesar” and other titles, and is not historically accurate (Castillo 1995; Rodriguez 1981).

Following *La Araucana*, Alonso de Gongora Marmolejo published his *Historia* in 1577, which recounted “all that had transpired” in Chile between AD 1536 and 1575(Gongora 1990 [1577]; Silva 2008), corresponding to the Araucanian conservation, release, and reorganization/rebound phases in this thesis. Like Vivar, Gongora drew upon his own experiences, having arrived in Chile in AD 1551, with some information gleaned from letters, Vivar, and Ercilla. Gongora begins his chronicle with a brief natural history of Chile, describing the lands, flora, fauna, and peoples before recounting the Spanish-

era history. His prose is more direct, with limited editorial comments, apart from calling the Araucanians “barbarians,” and offers more of a direct history. Contemporary with Gongora was Pedro Mariño de Lovera, who arrived in Chile in AD 1552 and published his *Cronica* in AD 1595 (Mariño 1960[1595]; Hidalgo 2008b). Though useful, Mariño’s chronicle was heavily edited by Bartolomé de Escobar, who modified the chronicle to reflect very favorably upon the former governor of Chile, Hurtado de Mendoza, and no pre-edited manuscript has been found (Hidalgo 2008b). Despite this, Lovera writes in the same vein as Gongora, drawing upon Vivar and personal experience though more editorializing transpires.

Additionally, numerous letters, orders, and other correspondence between Chile, Peru, and Spain offer essential information in understanding the Spanish perspective on the attempted conquest of southern Chile, and early views on the Araucanians from the Spanish point of view (see Medina 1959, 1960, 1961, 1963, 1966, 1983). This correspondence along with the aforementioned chronicles, are the foundation of and greatest influence on later Chilean historiography and analyses of Araucanian/Spanish interaction, including those writing in the 17<sup>th</sup> century. Within the context of this project, numerous letters, memoirs, and other correspondence reference the general area of Santa Sylvia, particularly the Villarrica Fort (Gonzalez 1986). Villarrica was one of the first “cities” established by the Spanish<sup>1</sup> south of the Bio Bio River, built and inhabited primarily for mining activities and to provide a redoubt for the passes across the Andes (Valdivia 1929[1552]; Vivar 1979[1558]). First constructed in AD 1552, Villarrica was abandoned and destroyed in early 1554 during the First General Offensive of the Araucanians, or part of a possible release phase defined by this research. After denouement of the Offensive in AD 1557, the fort was rebuilt in 1558 during reorganization/rebound and conservation phases presently defined, and occupied

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1 Villarrica was one of the “seven cities” south of the Bio Bio River inhabited by the Spanish, the others being Valdivia, Imperial, Osorno, Arauco, Millacoy, and Angol. These cities served as symbols for the Spanish and, after their destruction (particularly Villarrica) for the Araucanians.

continuously until 1598. It was besieged for three years by the Araucanians during the Second Major Offensive, also another release phase defined in this work, until its abandonment and destruction in AD 1602 (Rosales 1989[1674]).

These early writers indicate that the Araucanians often acted deliberately and strategically to maintain their traditional cultural system from the outset of contact, exercising agency in the perpetuation of their culture. Though tending to focus on one geographic area (the so-called *Estado*), these documents suggest that the Araucanians were culturally united to some degree from the coast to the Andean foothills, operating far-flung networks that were used for trade, warriors, religious activity, and other practices. Ercilla's description of a *cahuin* that brought together numerous *lonko* and *ülmen* for the election of the *toquis* Caupolican and Lautaro suggests that some leaders, such as one named Colo Colo, were able to bring people together through networks and alliances before the Spanish incursion. Olaverria (1594 in Medina 1960) indicates that *ayllarehue* had increased in importance by the end of the 16<sup>th</sup> Century, with leaders drawing upon disparate communities. These networks were likely in place before the Spanish arrival and remained in use throughout the ARC. It is possible that the initial *cahuin* described by Ercilla brought *lonko* and *ülmen* from Santa Sylvia or Villarrica. An attack on the fort/city of Villarrica soon after the death of Valdivia in AD 1553 indicates coordination across distances, perhaps employing *ayllarehue* and *butanmapu* spatial organization and connections.

Overall, these early chronicles indicate that the political, economic, social, and religious structures of the Araucanian cultural system appear centered in the *lof* and *regua* at the Spanish arrival (Valdivia 1929[1552]). Religious activities such as *nguillatun*, which Góngora (1990[1575]) and Mariño (1960[1595]) call *borracheras* appear to happen frequently, directed by *boquibuye* and "priests" (*sacerdotes*). Each chronicler speaks to leaders, often mixed between *lonko*, *ulmen*, and *toqui*, calling upon thousands of warriors when battling the Spanish. Though the numbers may be inflated,

they indicate that leaders were nonetheless able to draw upon considerable forces, likely across distances and utilizing kin and social networks. Importantly, none of these early chronicles indicate what the Araucanians called themselves. Boccara (1996, 2008) argues for the name *reche*, meaning “true people” and Sanchez (2007) argues for *che* or “person” at the end of the 16<sup>th</sup> Century. Other terms such as *Promocaes* are mentioned, as in Vivar’s chronicle (1979[1558]:89) though this is in reference to indigenous groups living around Santiago. Despite this lack of a specific name, the communication and coordination among communities across the Araucania, indicated in numerous sources (Anonymous 1580 in Medina 1959; Ercilla 2003[1569]; Mariño 1960[1595]; Quiroga 1577 in Medina 1960) suggests that the Araucanians had an identity that was recognized across distances. Identity as “being Araucanian,” individual and community agency in actions against the Spanish, and strategic use of the cultural system can be discerned, and the phases of the ARC can be defined amongst the Araucanians in these early chronicles.

*Conservation Phase: Frontier Establishment and Détente, AD 1602-1700*

The beginning of the 17<sup>th</sup> Century marked a change in Chile in several ways. First, the expulsion of all Spanish colonizers south of the Bio Bío River in AD 1602 again sparked a change in colonial attitudes toward the conquest, culminating in the peace treaty at Quillín in AD 1642 (Abreu y Bastidias 1740). The treaty between the Spanish crown and the Araucanians, dictated in large part by the Araucanians, “ceded” lands south of the Bio Bío River, which was established as the southern frontier of the Spanish empire in Chile (Bengoa 2003). Second, the arrival of Franciscan Father Luis de Valdivia began a period of “defensive war” on the frontier, which was intended to maintain the Bio Bío while sending missionary parties south. This campaign lasted for about 20 years before the removal of Father Valdivia and resumed hostilities between the Araucanians and Spanish. These hostilities culminated in attacks on Spanish settlements north of the Bio Bio, including the destruction of Chillán in AD 1655 (Foerster 1996; Zapater 1992).

Only one chronicle exists from the early part of the 17<sup>th</sup> Century, which this research defines as the beginning of a long-lasting conservation phase, and most information on the epoch of the “defensive war” is derived from later chronicles, letters, official correspondence, and journals (Medina 1966). The chronicle, *Desengaño y Reparación de la Guerra de Chile (Disillusionment and Fixes for the War in Chile)* was written by Alonso Gonzalez de Najera, who arrived in Chile in AD 1601, left in 1608, and wrote a scathing indictment of the process of the conquest of Chile in 1614. Gonzalez argued not that the Spanish were treating the Araucanians poorly, but that they did not do *enough* to break the Araucanian spirit and bring them under Spanish control. He viewed the “defensive war” strategy as useless and that if the Spanish would enslave and wreak havoc on the Araucanians, the war would end quickly (Gonzalez 1889[1614]). This did influence some Spanish authorities in Chile, who allowed soldiers to carry out raids along the frontier and enslave as many Araucanians as possible (Calderón 1599 in Medina 1963). Gonzalez’ account does describe ritual practices such as *nguillatun*, which he calls *borracheras*, and the activities of *machi*. He also notes that the Araucanians did not live in “cities” but rather had disbursed settlements throughout the numerous valleys in the Araucania (Gonzalez 1889[1614]: 48). Gonzalez points out that all the Araucanians “speak the same language” with some variations in the different “provinces” (Ibid: 49). Despite being extremely negative towards the Araucanians and perhaps leaning towards hyperbole, Gonzalez provides what may be considered the first ethnographic description of the Araucanians.

In the mid-17<sup>th</sup> Century, several new chronicles were published that recounted the history of Araucanian and Spanish interaction from the efforts of Almagro to the peace treaty at Quillin. These histories relied on earlier *cronistas* such as Vivar, Marmolejo, and Ercilla for the 16<sup>th</sup> Century information, then drew upon their own experiences for most events in the 17<sup>th</sup>. The first of these was written in AD 1646 by Alonso de Ovalle, a Jesuit missionary born in Chile in 1601 and who attempted to preach amongst the Araucanians



in the *Estado* region for several years (Ovalle 2003[1646]). Ovalle's history draws primarily on Ercilla for the events of the 16<sup>th</sup> Century, then his own experiences until the early 1640's. Ovalle calls for the necessary conversion of the Araucanians and makes particular reference to the "martyrdom" of numerous missionaries as justification for taking over Araucanian lands. Ovalle, like Gonzalez, first provides a general ethnography of the Araucanians, noting their social customs in *nguillatun* and other festivals, spatial divisions in river valleys, political organization around *lonko* and *toqui*, and connections between communities from the coast to the Andean foothills (Ovalle 2003[1646]).

Another missionary, Diego de Rosales, published *Historia General del Reino de Chile, Flandes Indiano* in 1674, after travelling extensively in southern Chile and western Argentina (Rosales 1989). His chronicle provides extensive treatments of custom, social and political organization, and history throughout, based on his personal travels throughout the Araucania, not just in *El Estado*. Rosales mentions the importance of *lof* and *regua*, and is among the first to describe the increasing importance of *ayllarehue* and *butanmapu* (Rosales 1989[1674]). He also breaks down more completely the distinctions between *lonko*, *ülmen* and *toqui*, paying particular attention the role of the latter in the ability of the Araucanians to defeat the Spanish (Ibid:117). The work of Rosales, compared to earlier works, also delineates some of the changes that came about in the Araucanian system, particularly the emphasis on broader spatial organizations, the aforementioned *ayllarehue* and *butanmapu*, and the incorporation of horses into the creation of the Araucanian cavalry. Of note is his attention to detail, particularly regarding Araucanian custom in *kuel* construction and *nguillatun* ceremony, which has been utilized extensively by later historians, anthropologists, and in the present research (Bengoa 2000; Cooper 1946; Dillehay 2007; Titiev 1951).

Around the same time as Rosales, Francisco Nuñez de Pineda y Bascuñan published *Cautiverio Feliz (Happy Captivity)*, his story of seven months of captivity among the Araucanians in 1629 (Nuñez 2001[1673]). Like Rosales, Nuñez' account is

largely ethnographic in nature, detailing the customs, rituals, and social organization of the Araucanians he witnessed. Though he argued for the humane treatment of the Araucanians and advocated for their rights, Nuñez believed that the Spanish had the obligation and right to rule, thereby modifying his account to reflect the need for that rule and that the Spanish atrocities were the reason for their failures. Despite some probably editorial license, Nuñez and Rosales provide some of the best and most detailed first-hand accounts and descriptions of Araucanian social, political, and economic organization within the first 100 years of interaction.

The last of the 17<sup>th</sup> Century chronicles was *Memorias de los Sucesos de la Guerra de Chile* (*Report of the Events of the Chile War*) published in 1677 by Jeronimo de Quiroga, a soldier who participated in numerous campaigns in the mid-1600's and wrote of his experiences as the *maestro de campo* (camp master) in the Spanish military (1979[1677]). Though referenced by several early historians (Carvallo 1875; Barros Arana 1885), Quiroga's manuscript was lost until the 1960's, when it was found in the University of Indiana library (Quiroga 1979). Quiroga's *Memorias*, unlike other soldier accounts, contains descriptions of Araucanian history and society before recounting the history from the time of Almagro in AD 1536. Like others, he uses Vivar and Ercilla for the early history, and then draws upon his own experiences in later chapters, which are denser or more descriptive than their predecessors.

Though useful and necessary for analysis of early Araucanian and Spanish interaction and to see glimpses of pre-Hispanic Araucanian society, the abovementioned works should also be viewed through a critical lens as products of a particular era with each writer having a subjective point of view, bias, and agenda. Many later historians have tended to simply repeat what these early histories say, without offering critical comparisons or drawing upon archaeology and ethnography for complementary information.

In sum, these early chronicles, though flawed, provide essential insights into

understanding Araucanian identity agency, political, economic, social, and religious structures, and evolution through contact with the Spanish, which can then be compared to the archaeological record. These chronicles show that Spanish colonial effort in Chile was not a monolithic enterprise, but a process as the Spanish employed different methods to subject the Araucanians without long-lasting success. Additionally, the Araucanians themselves are shown to be composed of competing factions and with varied interests, such as the distinctions between *indios amigos* and *indios enemigos*. Rosales (1989[1674]) indicates that some *indios amigos* readily broke agreements with the Spanish, shifting alliances when deemed necessary to protect the interests of the *lof* or *regua*.

From the mid 16<sup>th</sup> into the 17<sup>th</sup> Centuries these chronicles suggest that the Araucanians became more united across distances, under the direction of *lonko* and *toqui* (Rosales 1989[1674]; J. Quiroga 1979[1677]; R. Quiroga 1577 in Medina 1960). Overall, this period is defined by this research as a conservation phase in the ARC. The Araucanian cultural system, after passing through phases of release and reorganization/rebound, had been strategically restructured by Araucanian agents to reflect the needs of maintaining cultural continuity in the face of continued hostilities with the Spanish. The importance of the *ayllarehue* and *butanmapu* as aspects of social organization make their first appearance in the Spanish chronicles in the late 16<sup>th</sup> Century (Olaverria 1594 in Medina 1960). This indicates that, along with a semi-permanent war footing, Araucanian agents again strategically restructured their cultural system towards broader social networks (Rosales 1989[1674]; see also Goicovich 2006; Silva 2001; Silva and Tellez 2001). At the same time, the Araucanians continued to incorporate and develop Spanish materials for their own use. By the early 17<sup>th</sup> Century, the Araucanian cavalry was seen as equal to, if not superior, to that of the Spanish (Lewis 1996), and wheat and barley were cultivated to great effect in the area surrounding Santa Sylvia (Harcha and Vásquez 2000). Other materials, such as metal, did not enter the general Araucanian toolkit; rather,

metal objects were used as markers of prestige captured in war, rather than utilitarian objects (Rosales 1989[1674]).

*Conservation Phase: Early Historians, 18<sup>th</sup> and 19<sup>th</sup> Centuries*

The publication of Quiroga's *Memorias* coincided with what appears to be a gradual easing of overt, direct hostilities between the Araucanians and Spanish in the Araucania, a continuation of the conservation phase defined by this research. Since the destruction of Villarrica in AD 1602 the main interactions between Araucanians and Spaniards in the general area around Santa Sylvia during the 17<sup>th</sup> and 18<sup>th</sup> Centuries came in the form of Catholic missionaries (Olivares 1874[1793]; Treutler 1958[1863]). The last major Araucanian offensive north of the Bio Bio River in AD 1655 gave way to a generalized frontier détente, with an increase in trade and exchange between the two groups and sporadic offensives (Berger 2006; Villalobos et al. 1982). None of these events along the frontier appear to have affected the area around Santa Sylvia directly, though the Araucanians there may have provided material support for the prolongation of the war as they had during the previous decades (Olaverria 1593 in Medina 1960; see also Bengoa 1986; Berger 2006; Villalobos 1982). Instead of direct battles, the Araucanians engaged in small-scale raids, or *maloca*, into Spanish-controlled territory north of the Bio Bio River and across the Andes into Argentina (Leon 1989, 1991). This allowed the government in Santiago to dedicate more time and resources to building up the northern infrastructure while keeping a wary eye on the southern frontier into the 18<sup>th</sup> Century. The primary European efforts in southern Chile involved the missionary work of the Jesuits and Dominican orders in the 17<sup>th</sup> and 18<sup>th</sup> Centuries, which had little success (Hanisch 1974; Olivares 1760 in Barros Arana 1874)

At this time, general “natural histories” of Chile were published that would be used by later historians and anthropologists. The first was by Miguel de Olivares titled *Historia de la Compañia de Jesus en Chile (History of the Company of Jesus in Chile)*,

who wrote in the 1760's and died before complete publication.<sup>2</sup> Olivares' work provides information about the state of Araucanian lands in the late 17<sup>th</sup> Century and early- to mid-18<sup>th</sup> Century. Olivares history focused on the activities of Catholic Jesuit missions throughout Chile, paying particular attention to missionization efforts between the Bio Bio and Bueno Rivers (Olivares 1760 in Barros Arana 1874). He notes the difficulty in evangelizing the Araucanians, the inability of the missionaries to place them on reservations, and describes some Araucanian practices and beliefs such as *kuel* rituals and *nguillatun*. The work of Olivares influenced the work of Juan Ignacio Molina in 1789, who published *Compendio de la Historia Geografica, Natural y Civil del Reyno de Chile* (Summary of the Geographic, Natural, and Civil History of the Kingdom of Chile). In addition to recounting the history of Chile from the time of Almagro, Molina also described the flora and fauna of the country, including numerous previously unknown species (Molina 2000[1789]). Soon after Molina, Vicente Carvallo Goyeneche wrote *Descripcion Historico-Geografico del Reino de Chile* (Historical-Geographic Description of the Kingdom of Chile) in AD 1792, which, like Molina, recounted the history of Chile from the arrival of Almagro in 1535 to the mid-18<sup>th</sup> Century. Carvallo also included much of the social organization and practices of the indigenous inhabitants<sup>3</sup>, though much appears to be a reiteration of previous work by Rosales, Gonzalez, and Ercilla (Carvallo 1875[1792]).

The works of Olivares, Molina, and Carvallo served as the first pre-republican histories of Chile and were used, along with Ercilla, by revolutionary and early Republican leaders in their efforts against the Spanish crown. In particular, the portrayal of the Araucanians as fierce, honorable warriors was used as a rallying standard against Spain, even though most Araucanians, calling themselves Mapuche in the 18<sup>th</sup> Century,

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2 Olivares manuscript was stolen by the viceroy of Peru, who was ordered by the king of Spain to return the documents, though Olivares died before they arrived. The complete manuscript was not published until 1870 by Chilean historian Diego Barros Arana (Figuerola 1897).

3 Interestingly, Carvallo's work, like Olivares, was lost for a time, remaining unpublished until 1875. Despite this, Carvallo's work influenced historians in the early 19<sup>th</sup> Century.

sided with Spain in the revolution between 1818 and 1824 (Lewis 1994).

*Conservation and Release Phases: First Chilean Historians in the 19<sup>th</sup> Century*

Chilean historiography has its basis and greatest influences in the works of the early Republican historians who wrote after Chilean independence from Spain, during the Pacific War between Chile, Peru, and Bolivia from 1870-1875, and after the “Pacification of Arauco” in 1885. The early Republican period is defined in this research as a conservation phase in the ARC, as the Araucanians sought to maintain much of their previous cultural system while confronting the changes coming about in the political organization of Chile.

Limited historical work transpired during the earliest portion of the Republican period between 1810, Chile’s official independence year and about 1840, as numerous intrigues, civil wars, and international troubles between Chile, Peru, and Bolivia constrained the publication of Chilean histories (Collier 2003). In 1844, French-born naturalist Claudio Gay published the first volume of *Historia Fisica y Politica de Chile* (*Physical and Political History of Chile*) which, over several volumes, provided an update to the previous natural histories of Molina and Carvallo (Gay 1846, 1847, 1852, 1856). Gay’s works provided in-depth treatments of Mapuche society, gleaned from his experiences travelling the country and from previous histories, and were influential on later historians.

The undisputed father of Chilean history, Diego Barros Arana wrote his multi-volume *Historia de Chile* (*History of Chile*) over the course of 20 years, publishing the whole in 1902 (Barros 1999[1887]). Barros Arana also compiled a *Colección de Historiadores de Chile* (Collection of Chilean Historians) with other historians such as Tomas Guevara, and Benjamin Vicuña Mackenna. This multi-volume compendium of most, if not all, Spanish *cronistas* and other historical works included chronicles, letters, official correspondence, and other materials such as the rediscovered Olivares and the

newly discovered Carvallo (Carvallo 1792 in Barros Arana 1875 ; Olivares 1760 in Barros Arana 1874). Heavily involved in politics, Barros Arana wrote during the War of the Pacific, and the subsequent “pacification” of south-central Chile. His attitudes towards the Mapuche are forceful in his works. Though extremely detailed, the writings of Barros Arana reflect extreme bigotry against the Mapuche, considering them “filthy,” “barbaric,” “uncivilized,” and in need of either subjugation or eradication (Barros 1999[1875]; Lewis 1994).

This attitude was not unique. At the same time as Barros Arana, Tomas Guevara published several books specifically on the Araucanians, such as *Historia de la Civilización de la Araucanía* (History of Araucanian Civilization) in 1869 (Guevara 1902), and *Costumbres Judiciales Enseñanzas de los Mapuches* (Judicial Customs of the Mapuche; Guevara 1904). Guevara’s work can be seen as the first attempt at a more modern ethnography of Mapuche customs, yet maintained a biased underpinning. As Lewis (1994) points out, at the time Chile had just won the War of the Pacific, and with the military now focused on conquering Mapuche lands Guevara, Barros Arana, and others wrote that the Mapuche were “thieves” and “barbarians” and that the atrocities committed by the army were justified (or ignored) in order to make the country “whole.” This attitude colored not only the histories written, but the attitudes of Chileans in general which often persist to the present day.

#### *Reorganization/Exit and Growth Phases: Late 19<sup>th</sup> and Early 20<sup>th</sup> Century*

The end of the 19<sup>th</sup> Century brought about changes in Chilean historiography, though most of these new historians were students of Barros Arana, Guevara, and others, perpetuating many of their biases. By this time, the Chilean army had successfully incorporated the Araucanía into the Chilean state. The ARC, suggested in this research, thus entered a reorganization/exit phase which transitioned quickly into a growth phase, as the Araucanians sought to perpetuate their identity while confronting the realities of

political and economic control by Chile. This phase lasted until the mid-20<sup>th</sup> Century (see Chapter 13).

Foremost among these new historians was José Toribio Medina, who wrote numerous histories of Chile and Latin America, as well as compendia of documents and writings (Medina 1957, 1959, 1960, 1961, 1963, 1983). In 1887 Medina published *Los Aborijines de Chile (Aborigines of Chile)*, one of the first histories of Chilean natives from prehistoric times after the Biblical flood, according to Medina, to the late 19<sup>th</sup> Century. Though ostensibly about all the indigenous groups in Chile, Medina focused on the Araucanians and uses numerous sources such as craneometry, in vogue at the time, the nascent field of anthropology, and other historians (Medina 1887). Medina's prose is somewhat less biased than his predecessors and contemporaries, but still treats the Araucanians as "uncivilized" and "degenerate" (ibid).

Many Chilean historians in the early 20<sup>th</sup> Century, contemporaries of Medina, also endeavored to use anthropological and archaeological methods in their research and publications. In some sense these authors were proto-ethnohistorians. Ricardo Latcham (referenced in Chapter 7) published several history-cum-ethnography works in the first half of the 20<sup>th</sup> Century in Spanish and English, paving the way for later archaeologists and ethnohistorians through his example of specific fieldwork, not just "armchair anthropology" (Latcham 1911, 1924, 1936). Manuel Manquilef published several volumes, including *Comentarios del Pueblo Araucano (Commentaries on the Araucanian People)* a multi-volume work that looked at various aspects of Araucanian-Mapuche culture, including folklore, exercise, household structure, and social organization (Manquilef 1911, 1914). H. Claude Joseph published *Plateria y Vivienda Araucana (Araucanian Silverwork and Dwellings)*, which provided the first in-depth analysis of *ruka* household organization (Joseph 2006[1930]). These authors avoided much of the bias of their predecessors and spent considerable time in the field amongst the people about whom they wrote, but traded the word "barbarian" for "savage" as was typical of



anthropological work in that time period (Trigger 1996).

The end of World War II saw a florescence in Chilean historiography, particularly from outside the Chilean academy. Louis de Armond, an American historian, published “Frontier Warfare in Colonial Chile” (1954) which built upon a chapter in the *Handbook of South American Indians* by John Cooper (1946). Cooper’s work provided an overview of Araucanian-Mapuche culture from an ethnographic and ethnohistoric perspective, perhaps the first to be published in English or at least available to a wider audience. Armond’s work looked specifically at the warfare between the Araucanians and Spanish, and notes that the social organization of the Araucanians is what allowed them to defeat the Spanish, but also was the cause for their inability to completely remove the Spanish from Chile (Armond 1954:126).

Mischa Titiev published *Araucanian Culture in Transition* in 1951, which described the transformations of Araucanian culture from Spanish times to the 1940’s, divided up into Prehispanic, Hispanic, Republic, Pacification, and Reservation Periods (Titiev 1951:8). These periods were implicit before, but this explicit formulation influenced later Chilean historians and constitutes the general divisions that are used today. In 1954, anthropologist Louis Faron published the first of several articles and books on the Mapuche. Faron was particularly interested in Mapuche social and religious organization, comparing the Mapuche to the “Omaha” patrilineal social organization first developed by Louis Henry Morgan (Faron 1954; Morgan 1871). Faron’s later works described and interpreted Mapuche religious belief, particularly his major work *Hawks of the Sun* (Faron 1964). Faron, unlike many others, is highly critical of past scholarship, pointing out the strengths and weaknesses of colonial sources as well as many of the assumptions made about Araucanian culture (Faron 1962, 1963, 1968). In particular, Faron argues that the divisions between the various *-che* groups (i.e. *Pehuenche*, *Huilliche*, *Picunche*) are geographical terms that aid in orientation, not a “fixed political [or] ethnic division” (Faron 1963:1163). This is important, as these various

divisions and classifications obfuscate the relationships between geographically and economically-separated groups that may actually be closely related via kin ties and other cultural aspects. These same groups are often treated as separate ethnic groups based on incomplete or misunderstood identity terms employed by the Araucanians-Mapuche themselves.

#### *Conservation Phase: Historians in the Mid-20<sup>th</sup> Century*

Several important works were published in the late 1960's and early 1970's by Chilean historians exploring various aspects of Araucanian history and culture, which this research suggests is a conservation phase in the ARC. Alvaro Jara published *Guerra y Sociedad en Chile (War and Society in Chile)* in 1971, which explored the interactions and exchanges between Araucanians and Spanish during the 16<sup>th</sup> and 17<sup>th</sup> Centuries (Jara 1981). This was the first book-length treatment of the war between the Araucanians and Spanish, focusing, in Jara's view, on the Spanish efforts to enslave Araucanians and the effects that enslavement had on the prolonging of hostilities and on later Chilean society. Mario Góngora published *Encomenderos y Estancieros (Landowners and Ranchers)* in 1970, which analyzed the land divisions given out by the Spanish crown and authorities in Santiago, which created the aristocratic class in colonial and republican Chile. What is important about Góngora's work is the in-depth treatment of the *encomienda* system and its effects on Chilean and indigenous society. Horacio Zapater published *Los Aborígenes Chilenos a través de Cronistas y Viajeros (Aboriginal Chileans According to Chroniclers and Travellers)*, a summary of the natives of Chile, particularly the Araucanians, as written by Spanish *cronistas* and travelers in the 16<sup>th</sup> and 17<sup>th</sup> Centuries (Zapater 1973).

The mid-20<sup>th</sup> Century also saw the first publications of two highly influential Chilean historians, Sergio Villalobos and Osvaldo Silva, who have published extensively on Araucanian-Mapuche history and society despite having little or no anthropological or archaeological training. Villalobos' work has focused on general histories of Chile

and on the frontier between the Araucanians and Spanish (Villalobos 1985, 1989, 1995; Villalobos and Pinto 1985; Villalobos et al. 1974a, 1974b, 1981). These works and others are important syntheses of Spanish *cronistas* and early historians, but lack necessary criticism and use of complementary sources (notably ethnography and archaeology) to strengthen arguments rather than rote reinforcement of attitudes and biases in the historic record. Zavala (2008:25) suggests that much of Villalobos' work "reaffirms a vision of progress and domination underlying the idea of the [Araucanian] frontier" that treats the Araucanians as peripheral to the Chilean state. Silva has also been prolific in writing on Araucanian-Mapuche social organization, religious practice, cultural interaction, and related topics (Silva 1981, 1983, 1990, 1994, 2005) Like Villalobos, Silva relies almost exclusively on written documents, ignoring or avoiding in-depth treatment of ethnographic and archaeological sources, and also lacking a critical view of the historic sources themselves.

In the 1980's, numerous researchers wrote about early Araucanian/Spanish interaction, as well as the frontier. Ricardo Ferrando Keun published *Y Asi Nacio la Frontera... (And So the Frontier was Born...)* in 1986, an overview of events from 1550-1900 along the frontier broken down by which governor was ruling at the time (Keun 1986). Gregorio Antei wrote one of the first critiques of colonial history with *La Invencion del Reino de Chile (The Invention of the Kingdom of Chile)* that analyzed the works of Vivar and other *cronistas*, and how their writings went into the creation of the mythos surrounding Chile and the Araucanians (Antei 1989). In the early part of the decade, London-educated Chilean historian Leonardo Leon started the Association of Chilean Historians with its journal *Nueva Historia*, wherein were published numerous articles until 1990 (Leon 1981). Leon continued to publish articles and books, many dealing with the earliest contacts between Inka/Araucanians and Spanish/Araucanians (Leon 1983, 1985), and later treatments of the frontier (Leon 1990), *malocas* in Chile and Argentina (Leon 1991), and Araucanians living along the Andes (Leon 2005).

Attempting to bridge the gap between history and archaeology, Mario Orellana Rodriguez published several volumes of Chilean archaeology as well as colonial history, including critiques of Vivar and other *cronistas*, and *Chile en el Siglo XVI (Chile in the 16<sup>th</sup> Century)* that looked at the “processes of acculturation” between some indigenous groups and the Spanish (Orellana 1988, 2004). Though trained in archaeology, much of Orellana’s historical work lacks archaeological information. The primary researcher to emphasize interdisciplinary approaches to understanding Araucanian history as well as interaction with the Spanish has been Tom Dillehay. His work in the Purén-Lumaco valley and elsewhere in south-central Chile beginning in the late 1970’s has resulted in numerous publications on Araucanian prehistory, history, social organization, religious practice, and has influenced other researchers in the area (Dillehay 1976, 1982, 1986, 1990a, 1990b, 1992, 1999, 2000, 2002, 2007, 2010, 2011).

#### *Conservation and Release(?) Phases: Araucanian History Today*

The mid-1990’s to the present has seen a marked increase in Araucanian scholarship from historians, who in some instances have brought in ethnographic data but rarely work outside of the historic documentation. José Bengoa has written extensively on the Araucanians-Mapuche, publishing two volumes of history from pre-Hispanic times to the present, as well as a compendium of research on indigenous groups in the whole of Chile (Bengoa 2000, 2003, 2004). Bengoa’s work has been highly influential, containing one of the few overarching modern treatments of Araucanian-Mapuche history across time. However, his work lacks in-depth archaeological, linguistic, and ethnographic information that can be useful in understanding more fully Araucanian-Mapuche social organization and culture history. French-trained historian Guillaume Boccara has written on numerous aspects of the creation of Araucanian ethnicity, in many instances arguing that the Araucanians-Mapuche as an ethnic group came into being (ethnogenesis) as a result of Spanish interaction (Boccara 1996a, 1996b, 1999a, 199b, 2002, 2007). But, like

others, Boccara ignores or uses very lightly the available anthropological information that could strengthen arguments about Araucanian ethnic identity.

Chilean ethnohistorian/anthropologist José Manuel Zavala has investigated the Araucanians-Mapuche in the 18<sup>th</sup> and 19<sup>th</sup> Centuries, particularly on the dynamics of resistance in these later centuries (Zavala 1999, 2008, 2010). His work has brought in ethnographic accounts and is critical of other historians who limit their use of ethnographic information, but his own work often lacks archaeological information that can aid in building up the long-term processes illustrated in his research. The works of Chilean anthropologist Rolf Foerster have focused extensively on Mapuche ritual practice and patterns, as well as the historical interactions between Araucanians and catholic missionaries though these investigations also lack complementary archaeological data (Foerster 1993, 1996; Foerster and Gundermann 1996).

Several students of Osvaldo Silva have written about the colonial period. Foremost among these is Francis Goicivich, who has worked on delineating the different temporal periods of Araucanian-Spanish interaction, as well as aspects of Araucanian spatial organization (such as the *butanmapu*; Goicivich 2002, 2006, 2007, 2009). Eduardo Téllez has worked with Silva on several articles (Silva and Téllez 2001, 2002; Tellez 2004) on the same spatial organization aspects (*ayllrehue*, *butanmapu*) from a historical perspective, but again without employing archaeological and ethnographic information to bolster their arguments and strengthen conclusions.

### **Summary**

These and many other works not detailed here illustrate the wide range of activities and interactions in the area of Santa Sylvania and the wider Araucania, from the earliest Spanish arrival in southern Chile into the modern era. The myriad *cronistas*, historians, and anthropologists provide essential information on Araucanian agency,

cultural structures, practices, actions, demographics, and other data. Coupled with archaeological data from Santa Sylvania and other sites in the region, these works can show the long-term processes that went in to the creation of Araucanian identity and culture, the effects of Spanish and Chilean interaction on the Araucanians, and how Araucanian actors were able to use their pre-existing cultural structures to actively incorporate useful aspects of external cultures and strengthen their existing system with minor changes.

The history and historiography of the Araucanians-Mapuche is long and complex and is illustrative of the need for interdisciplinary approaches to see the complex processes and dynamics that went into Araucanian resilience, resistance to the Spanish, maintenance of traditional practices from the 16<sup>th</sup> Century to today. By taking all of the above-mentioned works, particularly the works of early Spanish *cronistas*, and employing available archaeological information from excavations and research at the site and the work of colleagues in the region, a general outline of events that transpired in the wider Araucania and their relationship to the proposed history of Santa Sylvania suggested in Chapters 8 and 9, from pre-Hispanic to modern times, can be explored. This will be shown in the following chapters.

## CHAPTER 12

### IMPERIAL EXPANSIONS INTO CHILE AND THE CONSTRUCTION/ ABANDONMENT OF SANTA SYLVIA: ARAUCANIAN CONSERVATION, RELEASE, AND REORGANIZATION/REBOUND PHASES, AD 1475-1700

Chapter 10 charted the development of Araucanian culture in the area of Santa Sylvania and the wider Araucania. Evidence presented in Chapter 9 suggests that Santa Sylvania itself was first occupied around AD 900, during what this research defines as a growth phase of the ARC. In the wider Araucania, and perhaps around Santa Sylvania, Araucanian groups appear to have become more sedentary, relying on agriculture and animal husbandry while increasing in population (Dillehay 1990a, 2007). It is possible that agricultural surpluses during this time may have led to the development of *nguillatun* and positions such as *ülmen* or *lonko*, or their prototypes, though more research is needed to define these changes as they are not obvious at Santa Sylvania or in the surrounding region

In the broader Araucania, the introduction of new ritual spaces (*kuel* and *nguillatun*), ceramic styles (El Vergel or Liucura in this work), and population growth around AD 1100 (Aldunate 1989; Dillehay 1990a), coincided with a second occupation at Santa Sylvania. This research suggests this new occupation included a transition from growth to a conservation phase, based on the apparent continuation of material culture and cultural structures with limited changes, as well as the creation of an Araucanian basin of attraction (see Chapter 5). Evidence elsewhere in the Araucania indicates that by AD 1300 the political, economic, social, and ideological structures within the wider Araucanian cultural system appear to have been in place (Dillehay 2007). No evidence has yet been found to indicate a new population migration or the introduction of revolutionary structures or changes to the fundamentals of the traditional Araucanian cultural system at Santa Sylvania or elsewhere. Individuals and communities may have

viewed themselves as “being Araucanian” but within the context of their own local *lof* or *regua* (Boccaro 2007). Trade networks from the Andes to the coast appear to have continued as in previous centuries, wives and goods were exchanged, and the disbursed heterarchical authority of *lonko* and *ülmen* continued to develop (Dillehay 2007). The “potentiality” (Padden 1993) of Araucanian culture to absorb, adapt, and be strategically restructured was embedded in the cultural system and may have been employed in communities or kin networks rather than the broader Araucania, until the mid-15<sup>th</sup> Century.

### **The Inka in Southern Chile: ca. AD 1475-1535**

#### *Resilience Cycle: Conservation and Release Phases—AD 1475*

This research argues that the first documented test of the resilience of the wider Araucanian system to outside invaders and influence did not begin with the arrival of the Spanish, but at least 75 years before with the imperial expansion of the Inka Empire. No evidence has been found to indicate that the Inka arrived as far as Santa Sylvia, but their southward expansion into central Chile likely had some indirect effect on the Araucanians living in the Santa Sylvia region (Dillehay and Gordon 1998). Archaeologically, very little is known about Inka and Araucanian interactions south of the Cachapoal River (Figure 75; see Stehberg et al. 1985 ), and the written history is largely derived from Spanish *cronistas* working with Inka *kipucamayoc* (knotted-cord record keepers) and other Inka officials writing in the mid-16<sup>th</sup> Century (Betanzos 1996[1557]; Cieza 1984[1553]; de la Vega 2003[1609]; Guaman 1980[1615]; Sarmiento 1999[1572]). Some of the second-hand accounts of Spaniards in Chile also reference Inka expansion into Chile (Valdivia 1929[1550]; Vivar 1979[1558]). The following section is an attempt to synthesize the varied accounts into what may have happened and the effect it had on the



Araucanians, north and south of the Bio Bio River within the context of RT (Dillehay and Gordon 1998; Sauer and Dillehay 2012).

As noted above, prior to the Inka arrival north of the Bio Bio River the Araucanians at Santa Sylvia and the wider Araucania remained in the hypothetical conservation phase of the ARC as in the previous two centuries. Evidence suggests that settlements were established, *kuel* constructed, trade networks established and/or maintained, relationships with individuals and communities were made and lost, and population grew (Aldunate 1989). In other words, the Araucanians in general and their leaders, particularly *lonko* at this time, maintained the system in a general sense, i.e. the traditional base structures were “conserved” without much apparent change, though more research is needed on the late prehistoric period (Dillehay 1976, 1990, 1992). Archaeological and ethnographic information north of the Bio Bio is also limited, as very little systematic investigation has been performed to date between the Bio Bio and Maipo Rivers. From the little data at hand it can be inferred that the Araucanian population in the region, called *Promocaes* or *Picunche* by the Spanish and later historians (Vivar 1979[1558]; see also Bengoa 2003; Berger 2006; Dillehay 2007; Faron 1962; Leon 1985, 1991, 2005; Silva 1990; Villalobos 1989) was less dense and apparently did not have the *kuel* constructions or settlement patterns like that of some areas south of the Bio Bio (Gaete and Sanchez 1995). It is likely that long-distance relationships existed, but to what degree remains to be investigated.

Most credit for Inka expansion into Chile is given to the 10<sup>th</sup> *Sapa Inka* (or Inka ruler), Tupac Inka Yupanki, who ruled from ca. AD 1471 to 1493 (D’Altroy 2003). Most chronicles claim that Yupanki himself led the invasion of Chile, though this is highly unlikely. Instead, it was probably a captain such as Apo Capac Inga (Guaman 1980[1615]). Regardless, after quelling rebellions in various parts of the empire, Yupanki sent troops from Bolivia into northwestern Argentina and then across the Andes into Chile, crossing near Copiapó (Betanzos 1996[1557]; Cobo 1956[1653]). The Inka forces



Figure 76: Map showing possible southern military extent of the Inka empire.

went into battle with indigenous groups, allegedly “defeating all” and bringing them under Inka rule (Betanzos 1996[1557]; Sarmiento 1999[1572]). This indicates that, within RT and the context of this research, Araucanians in the extreme north between the Maipo and Maule Rivers entered a reorganization/exit phase<sup>1</sup> in their previous RC

<sup>1</sup> These Araucanians in the extreme north may have entered a brief release phase as they confronted the Inka, though all the accounts present the Inka as quickly subduing these northern groups without much resistance. It would seem, then, that they went from conservation directly to reorganize/exit phases.

as they became subject to the Inkas. They then reorganized their political and economic structures into a new RC wherein these structures passed from local autonomy to Inka authority.

Marching to the Maule River south of present-day Talca<sup>2</sup>(see Figure 76), the Inka met a large indigenous army, including “the valiant Araucanos” (Cobo 1956[1653]:85), who engaged the Inka in a protracted battle (six days, according to Vega 2003[1609]:524). This army was likely composed of northern Araucanians residing between the Maule and Bio Bio Rivers, assisted by refugees from the extreme north and perhaps kin living south of the Bio Bio (Sauer and Dillehay 2012). Recognizing the bellicosity of the Araucanians, the Inka fortified lands north of the Maule River (Stehberg 1976; Stehberg et al. 1985) and began extracting gold, silver, and tribute from the northern indigenous groups, primarily Diaguitas and Araucanian groups living in and around present-day Santiago. No evidence has been found to indicate that the Inka conquered explicitly south of the Maule (Betanzos 1996[1557]; Cieza 1984[1553]; Sarmiento 1999[1572]). Inkan control north of the Maule has been seen archaeologically in fortresses, ceramics, and other cultural influences (Dillehay 2007; Stehberg 1976).

With the confrontation with the Inka the northern Araucanians, and perhaps to a lesser degree the southern Araucanian including those at Santa Sylvia, entered what this research defines as a brief release cycle. In this phase decisions were made and tensions released to confront the Inka directly and the introduction of the Inka basin of attraction. In Chapter 5 it was argued that a release phase is a “crossroads moment” where a cultural system and its attendant structures, under the direction of the actors within, come to a moment of decision: will the system be maintained, often through direct confrontation, or will it be modified into something new? In this instance, evidence indicates that the northern Araucanians between the Maule and Bio Bio Rivers successfully resisted Inka

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2 Cobo (1956) claims that the Inka went to the Mapocho River, near present-day Santiago, and not the Maule. Historian Osvaldo Silva (1983; see also Goicovich 2001) repeats this claim, though the majority of *cronistas* and other sources indicate the Maule.

authority, as no archaeological evidence exists to suggest the Inka exerted any form of direct control south of the Maule or into the wider Araucania. Overall, this research suggests that the Inka basin of attraction did not mark a regime shift for the Araucanians, south of both the Maule and Bio Bio Rivers, but did for those in the extreme north. Through trade, the Inka basin continued to exert influence on the Araucanian cultural system (Dillehay and Gordon 1998), but could not overcome the attractive strength of the Araucanian basin.

*Resilience Cycle: Reorganization/Rebound and Conservation Phases—Interstitial Period, AD 1475-1535*

Though the Inka did not have direct political or social control of Araucanians living south of the Bio Bio River, or even south of the Maipo River according to Silva (1983, 1985), some degree of economic interaction and cultural influence appears to have existed. How much is not yet clear, as few archaeological studies have looked at Inka influences south of the Bio Bio River (see Dillehay 2007; Dillehay and Gordon 1998; Sauer and Dillehay 2012). What is indicated, however, is that a political frontier between the Araucanians and Inka existed between the Maipo and Maule Rivers<sup>3</sup>, and an extended contact (e.g. economic) frontier existed between the Maule and Bio Bio (Dillehay and Gordon 1986; Zapater 1974). Ceramic designs seen south of the Bio Bio and vessel forms in Tirua and El Vergel styles suggest northern Chilean or Inka influences (Dillehay 2007:102; Quiroz and Sanchez 2005). Possible architecture such as the *kuel* as a type of Andean *huaca* may also be from Inka influence, though *kuel* construction began near Santa Sylvia and in the Araucania well before the rise of the Inka state. This suggests connections with northern Chilean Andes groups in pre-Inka times (Dillehay 2007; Sauer and Dillehay 2012). Also, Dillehay notes some influences, such as the *kipu* knot records, political organization, Quechua-influenced words, and oral histories of Inka interaction

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<sup>3</sup> The Inka fortification farthest south is located near the Cachapoal River, 100 km south of Santiago (Stehberg 1976).

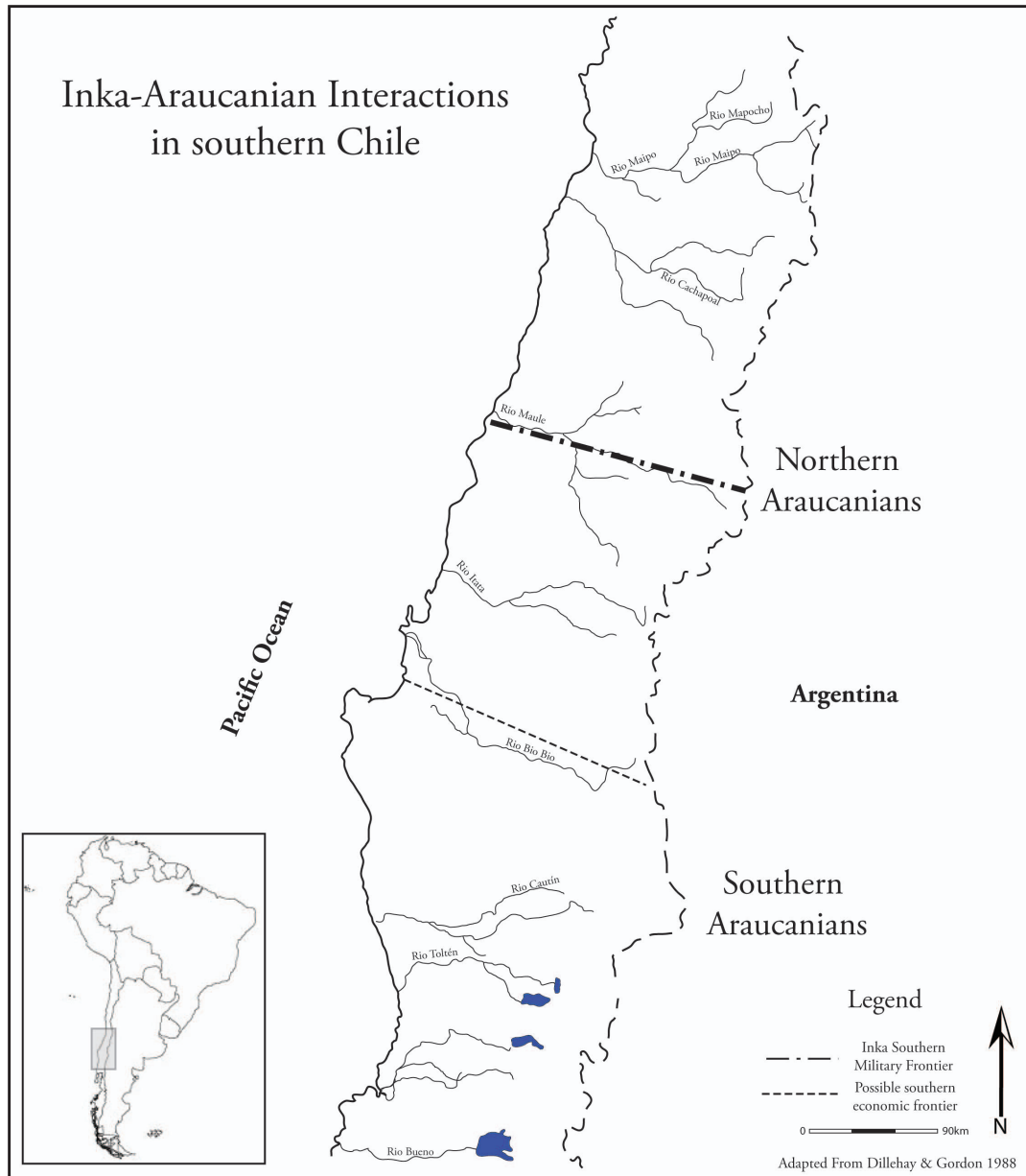


Figure 77: Map showing possible southern extension of economic or influential frontier between Inka and Araucanians, according to Dillehay and Gordon 1998.

(Dillehay 1990, 2007). Some of this may have come about from direct Inka influence before the arrival of the Spanish, or may have been incorporated into Araucanian society via Peruvian *yanacona* servants brought south from Peru by the Spanish. Many of these *yanacona* deserted the Spanish and joined the Araucanians, perhaps influencing the Araucanian cultural system at Santa Sylvania and the broader Araucania (Dillehay 2007).

Investigations at Santa Sylvia indicate that Inka influence was extremely limited there, if at all extant<sup>4</sup>.

Dillehay and Gordon (1986) argued for the concept of a “dual frontier” in central Chile: one military, another economic or cultural (see Figure 77). As noted above, the military frontier of the Inka extended to just south of Santiago, evidenced by fortifications near present-day Rancagua, with no presently known fortifications or other military installations identified farther south (Stehberg 1976). Some *cronistas*, such as Vivar, claim that the Inka military made it farther south than the Bio Bio and exerted a greater influence on the Araucanians than presently seen (Vivar 1979[1558]; see also Medina 1975). The economic or cultural frontier probably extended much farther south, at least to the Bio Bio River and possibly to the Imperial River (Sauer and Dillehay 2012). Through this space, Inka influence was transmitted, perhaps through biased transmission, in artifact styles, Quechua loan words, and oral histories. These may have also been brought in by Araucanian refugees escaping Inka dominance or Peruvian *yanacona* mentioned above, all of which were incorporated in Araucanian culture (see Dillehay 2007). Inka and Araucanian interactions in the years leading up to the Spanish arrival may have served to initiate an increase in Araucanian social and political interaction across space, or amongst different communities and regions. Inka influence may also mark a turning point in Araucanian identity formation, wherein individuals and communities began to see themselves more as “being Araucanian” in the face of outside influences on their traditional way of life (Boccaro 2008; Jones 1997). This in turn affected agency, or the ability of leaders to modify the system and call upon military action, and the overall resilience of the cultural system.

The present research argues that this period before the arrival of the Spanish corresponds to reorganization/rebound and conservation phases within the ARC. The transition from the release to reorganization/rebound came about due to the retreat of the

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<sup>4</sup> Some informants in Villarrica indicated the possibility of Inka *pukaras* made of stone near Lake Villarrica.

Inka military and the decisions by Araucanian individuals and communities over what to absorb into the system and what to change. The above evidence suggests that Araucanians south of the Bio Bio, including the region near Santa Sylvania, incorporated limited aspects of Inka or northern Andean culture, such as loan words, decorative motifs, and perhaps social and political organization such as the important *allyarehue* organization. Refugee populations fleeing Inka domination to the north likely had considerable influence on the system, but overall no evidence indicates major changes to political authority, religious practice, economic patterns, or social patterns. Some leaders may have gained more prestige from fighting or otherwise interacting with the Inka, new kin and trade networks may have been initiated, but all within the context of the traditional cultural system and structures. While likely continuing to incorporate influences from the north, this research hypothesizes that the overall ARC rebounded back into a conservation phase. The system continued to be maintained via pre-existing networks and practices, through the actions of the Araucanians themselves.

Inka control in northern Chile was short-lived. The death of the 11<sup>th</sup> *Sapa Inka* Huanya Capac in 1523 threw the empire into disarray, as two of Capac's sons, Atahualpa and Huascar, brought about civil war on the eve of Spanish arrival (D'Altroy 2003; Sarmiento 1999). This allowed Francisco Pizarro to arrive and quickly take control of the Inka in 1532 with limited resistance (Betanzos 1996[1557]; Guaman 1980[1615]; Sarmiento 1999[1572]). Soon, squabbles between leaders in Peru and the desire for "gold, glory, and god" set Spanish eyes on the "Kingdom of Chili" based on information from Inka informants (Vega 2003[1609]:521).

In sum, the amount of Inka influence among the Araucanians south of the Bio Bio River in general and at Santa Sylvania in particular is not well known and in need of further analysis. Interaction and influence did take place, seen in artifacts, loan words, and oral tradition, but to what degree remains to be investigated. The same oral traditions suggest that the Inka warned the Araucanians about the Spanish (Dillehay 2007), which may

have provided some time for plans to be made before the first European would set foot in Araucanian territory (Ercilla 2003[1569]).

### **The Araucanians and Spain, AD 1536-1700**

#### *Resilience Cycle: Conservation Phase--Diego de Almagro, AD 1536*

The first recorded European entrance into Chile that included interactions with the Araucanians occurred around AD 1535 with the expedition of Diego de Almagro during the conservation phase of the ARC suggested above. Second in command to Francisco Pizarro, rivalries between the two *conquistadores* led to a falling out and Almagro's journey south into Chile, ostensibly to conquer his own kingdom of riches (Villalobos et al. 1974). With 500 Spaniards and at least 2,000 Peruvian *yanacona*, Almagro left Peru, marched south into Bolivia and crossed the Andean cordillera at the Paso de San Francisco above Copiapó (Izquierdo 1989). The expedition continued to the Coquimbo Valley (388km/241mi northwest of Santiago), reaching and setting up an encampment in mid-1536 (Gongora 1990[1577]). To this point, the Spaniards had received help in the form of food, water, and animals from the indigenous groups along the way, but noticed a marked change in the inhabitants of Coquimbo who hid provisions and other materials from the Spanish and often attacked the caravan (Rosales 1989[1674]).

Almagro sent Gomez de Alvarado to explore farther south. Almagro had learned from the Inka of the "richness" of the land in precious minerals, lands, and people (Izquierdo 1989). According to Mariño, Gomez de Alvarado and 100 mounted troops made it to the Bio Bio River, where they were confronted by an "excessive number" of *Picunche* or northern Araucanians (Mariño 1887[1595]:34). Other historians place the battle between Alvarado and the *Picunche* at the Itata River near present-day Chillan at a battle called Reinohuelén in 1536. In this battle 200 Araucanians were killed in a one-sided Spanish victory (Izquierdo 1989; Rosales 1989[1674]). Not finding any obvious



deposits of precious minerals, Alvarado returned to Coquimbo. Almagro, disillusioned with the lack of supposed riches in Chile, abandoned his efforts at colonization and returned to Peru. Upon their return, Almagro and his men found themselves in the midst of a civil war between Pizarro and Royal loyalists. Siding with the crown, Almagro battled with Pizarro and was defeated at the battle of Las Salinas in 1538. Almagro and many of his followers were later executed by Pizarro's order (Izquierdo 1989; Vega 2003[1609]).

The failure of the Almagro expedition placed a stigma on Chile, many Spaniards believing it to be bereft of riches and inhabited by purely bellicose Indians (Villalobos et al. 1974). After the Spanish retreat, it is possible that northern Araucanian refugees informed kin living farther south about the battle with the Spanish, and escaped Peruvian *yanacona* may have warned of inevitable Spanish encroachment. Dillehay notes that, to this day, Araucanians in Purén-Lumaco speak of Atahualpa who, according to the accounts, warned the Araucanians of the impending Spanish arrival and helped in the preparations. These stories may have been passed from *yanacona* escapees to the Araucanians (Dillehay 2007:113). In any case, information about the battles with the Spanish as well as the previous Inka confrontation and subsequent exchange noted above, probably spread across Araucanian lands and likely initiated preparations to resist Spanish incursion, though to what degree is not clear. Evidence indicates that the majority of the Araucanians living south of the Bio Bio, including Santa Sylvania, were unaffected by this early Spanish foray and remained in the same conservation phase of the ARC as no materials have been found in the Araucania to indicate Spanish influence at this early date. No major changes appear to have transpired within the structures of the cultural system, though preparations for strategic reorganization may have been initiated (Ercilla 2003[1569]).

The present research suggests that this hypothetical conservation phase may have been a time of consolidation and preparation for the Araucanians, including those near Santa Sylvia. Most of the events described below are Spanish-centric as they are based on historical accounts of Araucanian and Spanish interactions written by Spaniards in the latter half of the 16<sup>th</sup> Century. As noted above, oral histories in Purén-Lumaco suggest that Inka refugees may have been warning the Araucanians south of the Bio Bio of the impending arrival of more Spaniards as well as their intent to extract minerals and subject the Araucanians to Spanish authority (Dillehay 2007). The initial Spanish basin of attraction was as yet too small to exert real influence until AD 1550.

Despite the bad associations many Spaniards had for Chile, in AD 1539 Pedro de Valdivia, convinced that Chile contained unfound riches to make him wealthy and famous, prepared a new expedition. Valdivia had been a soldier in the Spanish army and came to the Americas in 1535 (Gongora 1990[1577]). After participating in the conquest of Venezuela, Valdivia fought for Pizarro against Almagro in Peru, receiving an *encomienda* for his efforts (Valdivia 1929[1541]). Valdivia later petitioned Pizarro and received permission to conquer “Nuevo Toledo” (the name given to the lands south of Peru--see Nauman 2000; Izquierdo 1989:36). After selling his *encomienda* and finding other investors, Valdivia left Peru with no more than 20 Spaniards and approximately 3,000 Peruvian *yanacona*. In December 1540, the expedition arrived in the valley of the Mapocho River and established the city of Santiago del Nuevo Extremo in early 1541 (Santiago 1541 in Barros Arana 1861:67; see also Gongora 1990[1577]; Vivar 1979[1558]).

Initially, the Spaniards and the northern indigenous groups (Promocoes or Picunche) near Santiago interacted peacefully, exchanging food, animals, and other goods, though this peaceful exchange was short-lived. An offensive led by Michimalongo and Tanjalongo in mid-1541, a few short months after the Spanish arrival (Rosales

1989[1675]; Vivar 1979[1558]). Fortunately for the Spaniards, the Promocoes were unprepared for Spanish arms, armor, and military tactics. A short battle led to the death of several hundred natives and the capture of Michmalongo, with promise that the Indians would show the location of gold mines likely used previously by the Inka (Dillehay 2007:114; Rosales 1989[1674]:360; Vivar 1979[1558]). Peace between the Promocoes and Spanish lasted until Valdivia left to defend Spanish interests in Aconcagua (about 55mi/89km northeast of Santiago) in early September 1541. An alleged force of between 10,000 and 20,000 Promocoes attacked Santiago on September 11 (Nauman 2000; Rosales 1989[1674]). The Indians set fire to the city and besieged the outer walls, killing several Spaniards along with horses and other animals. The Spanish managed to capture seven leaders of the Promocoes, holding them hostage until Inés de Suárez<sup>5</sup>, Valdivia's lover, entered the prison and, according to several accounts, decapitated each one, throwing the heads over the city walls (Mariño 1960[1595]:60; Rosales 1989[1674]:365; Vivar 1979[1558]: 70). The Promocoes retreated, leaving the Spanish to rebuild.

Valdivia returned from Aconcagua to govern Santiago, as well as establish the cities of Valparaiso to the west and La Serena to the northwest, while dividing lands between Coquimbo and the Maule River into *encomiendas* and *repartimientos* (Valdivia 1929 [1545]). Limited fighting between 1542 and 1544, and a pledge of peace from Michimalongo in 1545 allowed for exploration south of Santiago, Valdivia himself arriving at the Bio Bio River in 1546 (Vivar 1979[1558]). As with Alvarado 10 years before, the Spanish were attacked by a large force of Araucanians and, though victorious

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5 The story of Doña Ines de Suarez has been popularized in such books as *Ines of My Soul* by Isabel Allende, which treats the conquest of Chile from the perspective of Suarez. She came to the Americas in the 1530's looking for her husband who had left some years before, and eventually made her way to Peru where she and Valdivia became lovers. Later, she went with him to Chile and played a major role in the creation, defense, and governing of the nascent colony, though her role in the founding of Chile is generally ignored by most Chilean historians.

It is most likely that Valdivia returned to Santiago for other reasons, including the need to strengthen his position as "Lieutenant Governor" against Sancho de Hoz, who had been fighting with Valdivia for political control for several years, and due to his recall to Peru to answer for his efforts in Chile and his adulterous affair with Inés Suárez.

after a two-day battle, Valdivia retreated back to Santiago after receiving word that the Promocaes were massing to attack. The soldiers with Valdivia also requested return to the safety of the north<sup>6</sup> (Nauman 2000; Valdivia 1929[1550]). With the arrival of Valdivia in the south, it is suggested here that the full strength of the basin of attraction began exerting influence and pull on the Araucanian cultural system within the Araucanian basin of attraction (see Chapter 5). The Spanish basin would remain until AD 1820.

During this journey south in 1546 or soon thereafter, an Araucanian orphan joined the Spanish party, though how or why is not precisely known<sup>7</sup>. Called Felipe (Echaiz 1971) or Alonso (Góngora 1990[1577]; Nauman 2000), this Araucanian child came to Santiago and became Valdivia's groom (*criado*), caring for Valdivia's horse and living in his house. Felipe/Alonso learned to ride the horse and speak Spanish, he watched military drills, and appeared to become acculturated to the Spanish way of life (Góngora 1990[1577]; Vivar 1979[1558]). This was not the case, as later events suggest that Felipe/Alonso came to the Spanish as a spy, learning their ways in order to return south at a later date to inform his people as to Spanish strengths and weaknesses and would play a major role in the destruction of Spanish settlements south of the Bio Bio as the *toqui* Lautaro in 1553 (León Echaiz 1971). Again, this research argues that the possibility that Lautaro was sent to live among the Spanish as a spy indicates a strategy was in place to resist the Spanish, further suggesting a possible broad coordination among Araucanian leaders that does not appear to exist before AD 1546. This will be explored more below.

Valdivia left Chile for Peru in 1548 to ask for assistance and respond to complaints about his leadership in Chile (Valdivia 1929[1550]; Vivar 1979[1558]). In the meantime, few efforts were made to colonize south of Santiago. Efforts focused on

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7 Chilean historian Benjamin Vicuna Mackenna argued that Lautaro was the son of a *lonko* and was a prisoner, brought to Santiago as spoils of war (Mackenna 1876:7). How Mackenna comes by this information is not apparent in his writings.

building up the port at Valparaiso and in maintaining settlements in La Serena which was sacked and destroyed by the Promocaeas in 1548 and rebuilt later that year (Mariño 1960[1595]). Coquimbo, and Copiapo were fortified to protect overland routes back to Peru (Gongora 1990[1577]), and the Spaniards suffered from famine and disease due to a lack of sufficient supplies from Peru and failed crops (Mariño 1960[1595]).



Figure 78: Map showing location of several early Spanish fortifications, including Santa Sylvania.

When Valdivia returned in 1549, he immediately travelled south to the Bio Bio River and established Concepción (also known as Penco) and Talcahuano along the coast near the Bio Bio delta in 1550 (Figure 78; Rosales 1989[1674]; Valdivia 1929[1550]). The Araucanians in the region attacked and were defeated by the Spanish at Andalién in February of the same year (Gongora 1990[1577]). After strengthening Concepción, Valdivia travelled south by boat to the mouth of the Calle-Calle river and established the eponymous settlement of Valdivia in 1551, while at the same time sending Jeronimo de Alderte by land through the interior, who established La Imperial along the Cautin River in 1551 (Rosales 1989[1674]; Vivar 1979[1558]).

Establishing these three settlements, Concepcion, Imperial, and Valdivia, gave defensive leeway for more settlements or fort/cities to be built between 1551 and 1553, including the forts of Arauco (1551) and Tucapel (1552) south of Concepcion, San Juan Bautista (1553) in the valley of Purén-Lumaco, and, importantly for this research, Villarrica (1552) along the western Andean foothills, among others (see Figure 77; Guarda 1973; Krumm 1972). Villarrica protected precious mineral shipments from the Andes down the Toltén River to Imperial and the coast, and had strategic importance protecting passes into Argentina, though the initial occupation was short-lived (Mariño 1960[1595]; Rosales 1989[1674]; see also Harcha and Vásquez 2000). It is possible that Santa Sylvia was also constructed at this time as an outlying support to Villarrica (Harcha and Vásquez 2000), though due to the initial occupation at Villarrica lasting only about 1 ½ years, it is unlikely.

Throughout these events, Spanish *cronistas* recorded their impressions of the Araucanians during the possible conservation phase mentioned above and in Chapter 12. From these accounts, researchers have gleaned information on demography, settlement structure, political organization, social interaction, and other facets of Araucanian culture. The earliest records indicate that the Araucanians were living in relatively large, nucleated settlements (Valdivia 1929[1550]; Quiroga 1978[1677]), not as

disbursed across the landscape as some historians have argued (Cooper 1946; Izquierdo 1989; cf Dillehay 2007). Kin relationships and networks were seen by the Spanish as wide-ranging, from the coast to the Andes and into Argentina, which relationships leaders likely called upon for ritual activities and warriors (Vivar 1979[1558]; Rosales 1989[1674]).

During this conservation phase, many Araucanians became *indios amigos*, actively siding with the Spanish and assisting in the construction of the various forts and settlements. However, overall tensions between the Araucanians and Spanish increased (Vivar 1979[1558]). The two sides engaged in several battles on a small scale, the Araucanians attacking the areas around the various fort/cities like Villarrica and disrupting supply trains from the north (Mariño 1960[1595]). Tensions likely arose between those Araucanian *amigos* actively cooperating or colluding with the Spanish and those who fought against the Spanish (*indios enemigos*) from the outset of contact. But as more Araucanians were enslaved, forced to work on *encomiendas*, and otherwise mistreated at the hands of the Spaniards, tensions increased until reaching a boiling point (Gongora 1990[1577]; Lovera 1960[1593]; Vivar 1979[1558]). It is hypothesized here that the Araucanians around Santa Sylvia and the wider Araucania transitioned from the conservation phase to a release phase of the ARC in 1553 that encompassed the whole of the Araucania and led to the temporary expulsion of the Spanish.

#### *Resilience Cycle: Release Phase—First Major Offensive AD 1553-1557*

It is argued in this research that Araucanian leaders, confronted with the depredations of the Spanish and at the behest of their followers (Góngora 1990[1577]; Rosales 1989[1674]), had to make important decisions that would affect the future of the Araucanians themselves and their cultural system at the beginning of this release phase. A *cahuin*, or council, was called in 1552 or 1553 by *lonko* Colo-Colo, attended

by numerous *lonko*<sup>8</sup> from throughout the Araucania, perhaps including leaders from as far away the Santa Sylvia area. After debate and discussion, a *lonko* by the name of Caupolican was elected *toqui* (or *gentoqui*, commander-in-chief; Ercilla 2003[1569]; see also Dillehay 2007). According to Ercilla, Felipe/Alonso, again known as Lautaro, left Santiago sometime around 1551 and began to aid in the preparations for confrontation with the Spanish by teaching horsemanship, military tactics, Spanish language, and other aspects of European culture he had learned during his time as Valdivia's groom. Lautaro was also elected to *toqui*, serving under Caupolican, at the same *cahuin* in 1552-1553 (Ercilla 2003[1569]).

Based on the actions of Lautaro, as well as those of the other *lonko*, evidence suggests that a strategic plan was in place well before the *cahuin* of 1553, which this research suggests points to an intentionality of action amongst Araucanian leaders throughout most of the Araucania. Ercilla's (2003[1569]) account implies that Lautaro planned to live amongst the Spanish to act as a spy, returning at a designated time to inform his compatriots of what he had learned. This, argued here, indicates that Araucanian leaders, particularly highly-esteemed *lonko*, were in greater communication than first recognized by ethnographers and historians well before the arrival of the Spanish (Boccaro 2007; Silva 1994).

Upon the conclusion of the *cahuin*, Caupolican and Lautaro began to prepare for a general offensive against the Spanish, likely calling upon interrelated *lof*, *regua*, and perhaps *ayllarehue* from the Pacific coast to the Andes. Leaders gathered troops and weapons, and prepared warriors for battle against Spanish horses, armor, and guns. Lautaro or another *toqui* appears to have initiated training on horsemanship, inventing a

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8 It is important to note that much of what is known about this *cahuin* comes from the epic poem *La Araucana* by Ercilla. Though he did draw upon personal experience, much of the poem takes license with actual historic events, as criticized by the Ercilla's contemporary Mariño de Lovera, but who agrees with the historical basis for the poem (1960:331). Góngora (1990) relies somewhat on Ercilla for his account of the same events, though they both speak from personal experience. How they received the information regarding the *cahuin* is unknown, and it is of note that Vivar, the earliest *cronista*, says nothing about this event.



lighter saddle than that of the Spanish that allowed two Araucanian warriors to ride the same horse, one guiding the animal and the other shooting arrows (Jara 1971:61). Also, the Araucanians constructed long pikes, used for both stopping a cavalry charge from the Spanish through impaling horses, and, with a rope attached to the end, bringing down soldiers on horseback (Ibid). By 1570 the Araucanian cavalry was considered by many observers to be the equal of the Spanish, if not better (Wachtel 1971:195).

The present research argues that these war preparations may mark a point wherein Araucanian leaders strategically restructured aspects of the cultural system onto a semi-permanent war footing, which became more entrenched as time went on. A war footing does not mean that the system changed into something new. Instead, it is hypothesized that the pre-existing “potentiality of...Araucanian culture” (Padden 1993:72), organized as it was, structured how leaders could modify the existing system in a broader way (Bourdieu 1977; Giddens 1984). War was nothing new to the Araucanians, internecine fighting having transpired for centuries (Gonzalez de Najera 1889[1614]; Rosales 1989[1674]). Rather, it is argued that this modification meant, rather than fighting amongst themselves (which still transpired) Araucanian leaders inspired their kin and networks to fight the Spanish and called upon warriors from greater distances than local *lof* or *regua* (Dillehay 2007). At the same time, *toqui* achieved greater status than before as they came to preside over *ayllarehue* and later *butanmapu* spatial and social organizations to a degree that does not appear necessary before the arrival of the Spanish. These broader organizations became more important as an adaptive mechanism to protect and maintain the cultural system, as well as the lives of the Araucanians themselves (Olaverria 1593 in Medina 1960).

The First General Offensive<sup>9</sup> against the Spanish began in late 1553 with the destruction of the Tucapel fort (present-day Cañete; see Figure 78) by Caupolican and

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9 Villalobos (1985) created a diagram of the major phases of “war and peace” in south-central Chile. This diagram was modified in this research (Figure 79) and indicates major offensives against the Spanish began in 1553, and 1598 respectively, the second offensive in 1598 leading to expulsion of the Spanish and the eventual recognition of the Bio Bio as the southern frontier (Bengoa 2003).

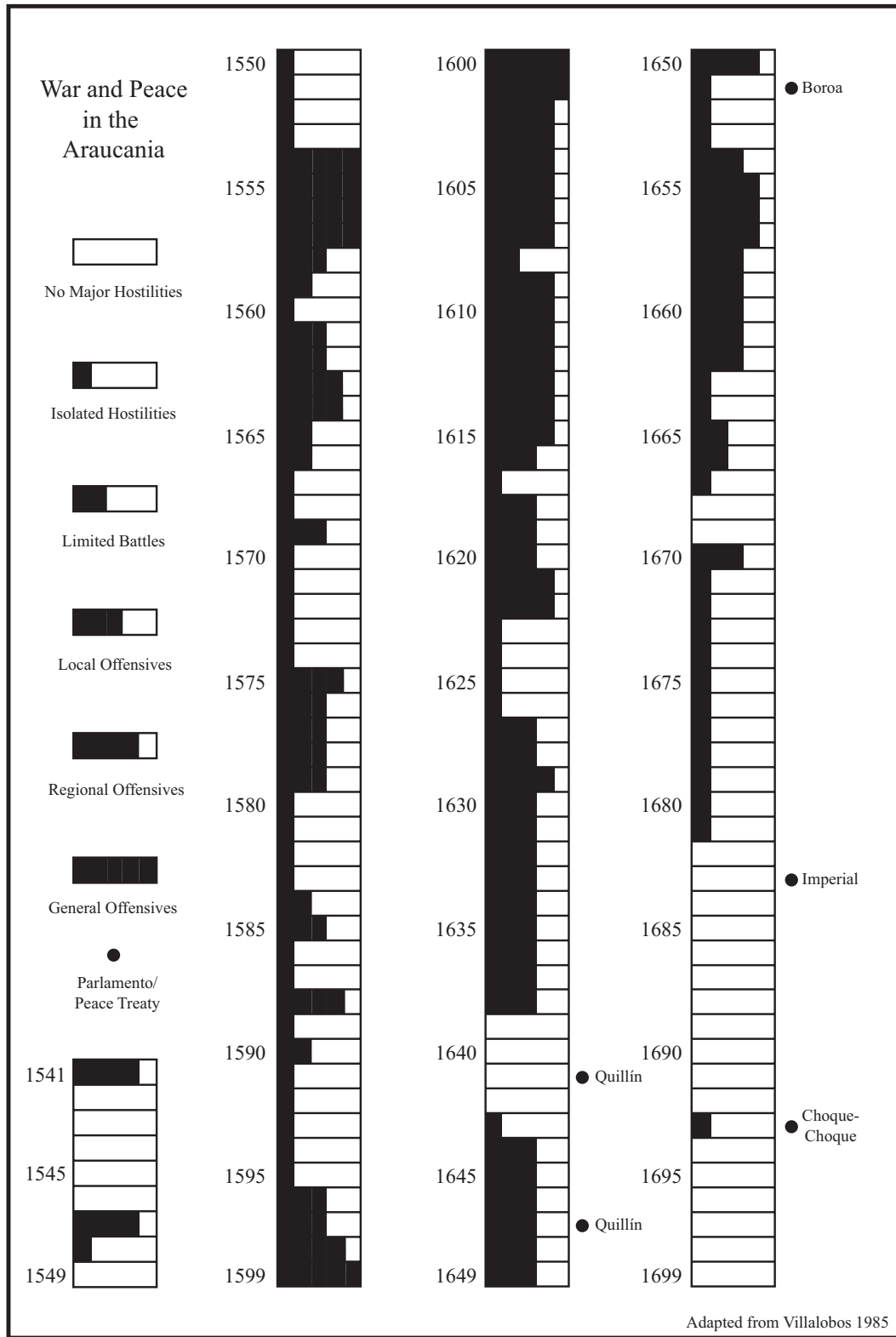


Figure 79: Diagram charting periods of hostility in the Araucania from AD 1541 to 1699. Adapted from Villalobos 1985.

Lautaro. Word reached Valdivia in Concepcion of the attack, perhaps through Araucanian allies, and he left on December 25 with 40 soldiers to quell the “rebellion” (Vivar 1979[1558]). A force of several thousand Araucanians<sup>10</sup> ambushed the Spanish north of Tucapel, killing all except Valdivia. He was brought before Caupolican and Lautaro, the latter revealing himself to Valdivia who was unaware of his true identity (Ercilla 2003[1564]; Vivar 1979[1558]). According to some accounts, the Araucanians then cut the muscles from Valdivia’s arms and legs, cooked and ate the meat in front of him, then cut out his heart and removed his head<sup>11</sup>, which allegedly became a drinking vessel for the *toquis* (Gongora 1990[1577]; Rosales 1989[1674]).

Word reached the Spanish in the other forts south of the Bio Bio and north to Santiago of the death of Valdivia (Santiago 1554 in Barros Arana 1861; Vivar 1979[1558]). Francisco de Villagra, acting as interim Governor, attempted to fight with *lonkos* Petreguelen and Colo-Colo at Angol, but the Spanish were overcome and Villagra fled north, reaching Concepcion. He called for a general evacuation of the city north to Santiago, essentially leaving the southern settlements to fend for themselves (Mariño 1960[1595]; Góngora 1990[1577]; J. Quiroga 1979[1677]). This “general uprising” (Gongora 1990[1577]:135) led to attacks on Valdivia, Imperial, Villarrica, Arauco, and the remains of Concepcion, which were destroyed and burned to the ground (Rosales 1989[1674]).

Over the next two years of this release phase (AD 1554-1556), Araucanians attacked every settlement, including a new effort to rebuild Concepcion which had been commanded by the Real Audiencia in Lima (Mariño 1960[1595]) and forced the retreat of all Spanish settlers north to Santiago. At the same time, disagreements arose

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10 Each *cronista* has a different number of Araucanian warriors for the Battle of Tucapel—Rosales: 67,000; Mariño: 150,000; Olivares: 10,000; Vivar: 50,000. Chilean historian Diego Barros Arana, writing in the 1800’s, claims all numbers are inflated and the actual amount was around 6,000, though where he got this number is unknown (see Echaiz 1971:40).

11 Some legends told in south-central Chile recount that the Araucanians poured molten gold down Valdivia’s throat and cut out his heart, which was then eaten, though no contemporary documents support this conclusion. Because there were no survivors of the battle between Valdivia and Caupolican, there is no reliable information on where exactly the ambush took place, or what exactly happened to Valdivia.

between Villagra and Francisco de Aguirre over who should be governor, adding more confusion to an already precarious situation for the Spanish (Mariño 1960[1595]; Rosales 1989[1674]).

Lautaro took advantage of Spanish discord, marching on Santiago with 1,000 warriors in early AD 1556 (Rosales 1989[1674]). The Araucanians marched as far north as the Claro River located near the present-day city of Curico, only 100 mi/176 km south of Santiago (Vivar 1979[1558]). According to Keun (1986:47) the Promocoes in the area did not have the same bellicose spirit of the southern Araucanians and were unwilling to join Lautaro's forces. This led Lautaro to punish and kill numerous Promocoes, which caused "resistance and hate" against him and would lead to his later betrayal (León Echaiz 1971).

Villagra sent Diego Cano to confront Lautaro at Matiquito in early 1557, but Cano's smaller force was defeated (Rosales 1989[1674]; Quiroga 1979[1677]). A larger army headed by Pedro de Villagra, cousin of Francisco de Villagra, confronted Lautaro closer to the Andes at Peteroa, initially gaining the upper hand and forcing an Araucanian retreat. At the same time, Lautaro's warriors began to advocate returning south, seemingly disillusioned with his leadership and questioning the need to attack Santiago (Leon Echaiz 1971). Retreating south of the Maule River, near Reinohuelén, site of the first confrontation between Spaniards and Araucanians in AD 1536, Lautaro regrouped for another surge north. His forced return to the Claro River at Matiquito in early 1557. There, the Araucanians confronted a Spanish force directed by Francisco de Villagra, who was no longer governor. The post had been given by the Real Audiencia in Peru to 22-year-old Garcia Hurtado de Mendoza who was en route to Chile. Villagra's soldiers were guided to Lautaro's camp by the local Promocoes (Rosales 1989[1674]). On April 1, 1557, Villagra attacked and in the ensuing battle Lautaro was killed "by the lances of the Spanish and the auxiliary Indians that accompanied Villagra" (Keun 1986:49). The remaining Araucanians fought for five more hours, finally succumbing to the Spanish

forces with more than 600 Araucanian deaths (León Echaiz 1971).

It is argued here that Lautaro's death marked the highwater point of this release phase in the ARC, but did not stop the efforts of Caupolican and others in the south to continue to fight. Hurtado de Mendoza arrived in Chile in AD 1557 with between 300 and 500 soldiers, weapons, and other supplies (Mariño 1960[1593]; Rosales 1989[1674]). He marched south to Concepción to buttress the rebuilding efforts initiated a few months before, then marched across the Bio Bio River to re-take lost Spanish forts (Mariño 1960[1593]). According to Rosales, Caupolican convened another *cahuin*, wherein Tureupichun was elected *toqui* to take the place of Lautaro, directing action against the Spanish (Rosales 1989[1674]:479). Spanish and Araucanian forces met at Millapoa in September 1557, the Spanish emerging victorious against a supposed force of 20,000<sup>12</sup> Araucanians (Mariño 1960[1595]; J. Quiroga 1979[1677]). The battle facilitated Hurtado de Mendoza's access south--forts were rebuilt at Tucapel, now called Cañete, Imperial, Angol, and Villarrica. Hurtado de Mendoza also established Osorno in 1558, and sailed to Chiloe after several battles with Araucanian forces directed by Caupolican (Gongora 1990[1577]; Rosales 1989[1674]; J. Quiroga 1979[1677]). It is possible that Santa Sylvia was built at the same time as the re-establishment of Villarrica in 1558, again to manage ore extraction operations along the western Andean foothills, to protect the passes across the mountains into Argentina, and as support to Villarrica (Gordon 2011). Other accounts indicate that the aforementioned series of support fortifications were constructed beginning in AD 1583 (see Harcha and Vásquez 2000; Vidal et al. 1981).

Hurtado de Mendoza returned to Imperial from Chiloe in mid-1558, and upon his arrival received word that the Araucanians had built a fort to the north of Cañete called Quiapo with 8,000 warriors under the direction of Caupolican (Mariño 1960[1595]). Hurtado de Mendoza marched on Quiapo in December 1558, defeating the Araucanians<sup>13</sup>

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12 As with most Spanish accounts, the number of Araucanians is likely highly inflated.

13 According to Rosales (1989) and Valderrama (1927), the Araucanians used captured canons against the Spanish, though to little effect due to their inexperience with firearms. If this is the case, the battle at Quiapo is the first example of the Araucanians using Spanish arms.

and capturing the fort (Mariño 1960[1595]; Valderrama 1927). Shortly thereafter, an Araucanian prisoner told the Spanish where to find Caupolican, who was captured and executed (Rosales 1989). Though small skirmishes and battles continued after the death of Caupolican, his execution marks the end of the First General Offensive. In this thesis, this marks a transition from the release phase to a reorganization/rebound phase described below. Though colonization south of the Bio Bio was by no means easy or without conflict thereafter, the Spanish did have initial success in building and maintaining fortifications in Imperial, Cañete, Angol, Purén, Valdivia, Osorno, and Villarrica for the next 40 years.

For this research, the First General Offensive throws into relief some of the changes that transpired in Araucanian society during this release and the subsequent reorganization/rebound phases. As noted before, though the traditional structures of the Araucanian cultural system were already in place and had been for several centuries, confrontation with the Spanish required augmentation of pre-existing political and social conditions and a strategic restructuring to a permanent war footing (Dillehay 2007). This included the strengthening or creation of kin ties between *lof*, *regua*, and *ayllarehue* separated across space, evidenced by the ability of *toqui* such as Colo Colo, Caupolican, and Lautaro to call upon large numbers of warriors from across the Araucania. It is suggested that the calling of *cahuines* to elect *toqui* and make plans for war may have come about with a concurrent increase in or appropriation of *nguillatun* festivals and *kuel* construction in particular areas, such as those found near Santa Sylvia and in Purén-Lumaco. These ritual and social activities likely served to strengthen ties and create new alliances. Rosales (1989[1674]) in particular mentions an increase in *cahuin* and the election of *toqui* in the late 16<sup>th</sup> and early 17<sup>th</sup> Centuries. The construction of *kuel* may have increased at this time as well, due primarily to the death of numerous important *lonko* and *toqui* (Dillehay 2007).

As Boccara (2007) and Dillehay (2007) point out, the contact period between

1550 and 1602 saw a rise in the importance of ritual specialists, the shaman *machi* and *boquibuye* oracles, though Dillehay indicates they are probably one and the same. These ritual specialists served as a part of a heterarchical political and social structure along with *lonko* and *toqui*, and probably directed *kuel* construction and ritual activities such as the *nguillatun* festival. The delineation of these “heterarchical peer groups” (Dillehay 1992:387), important before the Spanish, appear to be further defined and strengthened in the mid- to late-16<sup>th</sup> Century (Bengoa 2003). Leaders continued to rely on rhetoric and skill rather than a priori authority. The case of Lautaro, whose warriors advocated for a return to the south, illustrates the quasi-democratic nature of Araucanian society that looked more to ability rather than title (Wachtel 1977).

In sum, political and social activities provided the opportunity for *lonko* and *toqui* to call upon distant groups to come together to exchange wives and goods, make war preparations, and solidify linkages that would become increasingly important in the coming decades after the end of the First General Offensive. This period is defined by this research as reorganization/rebound and conservation phases in the ARC described below. Though the Araucanians continued to adapt their cultural system, the base political, economic, social, and ideological structures appear to have remained the same (Goicovich 2006). The Araucanian cultural system at Santa Sylvia and the wider Araucania came to the cusp of a shift into the Spanish basin of attraction during the First General Uprising and the hypothetical release phase. However, the actions of the Araucanians during this release phase kept this regime shift from happening.

*Resilience Cycle: Reorganization/Rebound and Conservation—Spanish Resettlement south of the Bio Bio, AD 1558-1587*

Though the death of Caupolican in AD 1558 marked the end of the First General Offensive, the return of the Spanish south of the Bio Bio does not mark a reorganization/exit phase to a new ARC at Santa Sylvia or the wider Araucania within the suggested

framework of RT. No evidence indicates that the Spanish exerted any new forms of authority more than they had in the previous years. Rather, it is argued here that the Araucanians managed to maintain the autonomy throughout the Araucania (Goicovich 2006). Once again, “accommodation, cooperation, and collusion” (Liebmann and Murphy 2011) likely happened to facilitate Spanish return, but tensions continued and inhibited the Spanish ability to exercise effective and long-lasting colonial control.

The reorganization/rebound phase suggested by this research appears to have included the incorporation of refugees from various parts of south-central Chile, particularly to the north of the Bio Bio River, resettlement in some areas previously abandoned to avoid the Spanish, and an increased emphasis on higher levels of social organization (Olaverria 1594 in Medina 1960). Many *lof* and *regua* likely replaced *lonko* and *toqui* killed during the Offensive, which would have probably created new kin relationships and networks. Overall, evidence suggests that the Araucanian cultural system at Santa Sylvania and in the wider Araucania rebounded from the release phase structurally intact, continuing to build upon on broader spatial organizations and establishing new networks of alliance and trade. However, these changes operated under the traditional structures already in place. No archaeological or documentary materials yet found suggest a switch to a new political or economic system, nor the introduction of new social and ideological patterns. After a period of reorganization, it is argued that the Araucanians transitioned back to a conservation phase that lasted for several decades, at least to the end of the 16<sup>th</sup> Century. During this phase, the abovementioned aspects of reorganization were maintained or “conserved” while experiencing direct interaction with the Spanish. This interaction included the construction of Santa Sylvania itself.

Governor Hurtado de Mendoza rebuilt forts lost during the Offensive and created new *encomienda* grants beginning in AD 1558 (Izquierdo 1989). The Araucanians fought in smaller battles throughout the Araucania, but not in the same generalized fashion as under Caupolican and Lautaro (Keun 1986; Rosales 1989[1674]). As noted above,



this facilitated the Spanish construction of fortifications, mining of precious minerals, and agricultural activities (Góngora 1990[1577]). Small battles gave way to localized offensives (according to Villalobos<sup>14</sup>). One in 1563 was limited to the coast near Arauco, Cañete, Purén, and Angol and lasted until 1565 (Keun 1986; Villalobos 1985). These same areas corresponded to what the Spanish called the *Estado de Arauco* or “Araucanian State” mentioned previously (see Figure 74; see Dillehay and Zavala 2010; Medina 1975).

Villarrica was re-built in 1558 as one of the “Seven Cities of the South” by Hurtado de Mendoza near to the foundations of the previous fort (Gonzalez 1986; Saavedra and Sanzana 1991; Rosales 1989[1674]), again with the intention of extracting minerals and trade with Argentina (J. Quiroga 1979[1677]; see also Harcha and Vásquez 2000). Beginning in AD 1583, several outlying fortifications were constructed around Lake Villarrica to serve as defense and support to the larger settlement, which may have included Santa Sylvia (Guarda 1973; Krumm 1973; Vidal et al. 1981)

Santa Sylvia itself may have been constructed sometime around 1565, if not before. Gordon (2011:8) argued that the site was constructed around 1558 and abandoned near the beginning of the Second General Offensive in 1598. As noted in Chapter 7, Gordon’s chronology is based on the radiocarbon dates recovered from his excavations and suggested by the number of burials unearthed in the chapel (Complejo A). The burials, according to Gordon, indicated that perhaps two generations lived at the site (ibid). As discussed further in Chapter 8 and 9, the excavations conducted in this research indicate that the occupation of Santa Sylvia was shorter, perhaps only 10 years, indicated by the limited amount of material recovered in the fort interior. It is argued here that

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14 That this was a “general uprising” is debatable, as the duration (1563-1565) was very short and by most accounts was limited to a smaller geographical area, primarily along the coast or in the *Estado*. Additionally, the majority of Spanish settlements did not return to Araucanian hands, nor was there the scale of battle similar to the uprising of 1553-1558 or the later uprising 1598-1602, which included almost all of the Araucanians living south of the Bio Bio. Some historians (Harcha et al. 1988) do not consider 1563-1565 as an uprising; instead, this research argues that the uprising of 1599-1602 is the Second General Offensive, and 1655-1657 may be a Third General Offensive.

had the Spanish occupied the site for 40 years, as Gordon suggested, the occupation stratigraphy on the interior would have been thicker with an increase in the number of artifacts recovered, particularly of Spanish origin or design.

The possibility exists, based on documents from the period, that Santa Sylvia was constructed around AD 1585 by Cristobal Aranda Valdivia, unmarried first-born son of the one-time mayor of Villarrica and later Valdivia, Pedro de Aranda Valdivia (Espejo 1967:91). The abovementioned series of Villarrica support construction began in AD 1583, leading to several *encomiendas* in the area, many of which had initially given out by Hurtado de Mendoza after the end of the 1553-57 Offensive. These *encomiendas* were granted to Juan de Oviedo, Ramirañez de Saravia (Ejecetoria 1582:153), and in 1585 to Cristobal Aranda Valdivia, which took part of the lands of Saravia (Gonzalez 1986:87). This *encomienda* contained the “valley of Antelepe” (also called “Antetepe” by Valderrama or “Antepepe”/“Antelupu” by Krumm) and a “new fort” was constructed by Cristobal Aranda Saravia in 1585, with indications that he himself lived there (Rosales 1989[1674]:633). Cristobal’s father, Pedro, may have given his son the *encomienda* while serving as mayor of Villarrica at the same time (Espejo 1967). Ovalle (2003[1677]) recorded that the Antelepe fort was constructed “7 leagues” from Villarrica, or roughly 29.4km. Though Ovalle does not indicate the direction of Antelepe, Santa Sylvia does lie roughly 30km east of Villarrica, which suggests the possibility that Antelepe and Santa Sylvia may be one and the same.

However, it should be noted that research by Vidal et al. (1986) and Harcha et al. (1988) has shown that forts existed along the Toltén River to the west of Villarrica, as well as around Lake Villarrica (see also Krumm 1976). Thus, the fort mentioned by Ovalle may be one of the other outlying support fortifications constructed in the 1580s near Villarrica (Harcha and Vasquez 2000). More investigations are needed to confirm that Santa Sylvia is the fort mentioned in the historic documents.

*Resilience Cycle: Release Phase?—Janequeo's Offensive and Possible Destruction of Santa Sylvia, AD 1588*

If Santa Sylvia is, in fact, Antelepe, then the initial occupation was during a conservation phase in the ARC argued in this research. Recovered C<sup>14</sup> dates from the site indicate an occupation around AD 1580, corresponding to the possible construction of the site as part of one of the outlying support forts mentioned above (Vidal et al. 1986). This occupation may have lasted for about 8 years or from AD 1580 to 1588. If it is Antelepe, then the occupation was a shorter 3 years from 1585 to 1588. In either case, evidence suggests that Peruvian *yanacona* and Araucanian *indios amigos* may have helped with the construction of the various complexes, with at least some Araucanians living in a *ruka* to the west of the Spanish residences (see Chapter 8). Some Spanish materials, such as horses, cows, pigs, wheat, and barley were utilized at the site and likely entered into the Araucanian toolkit. Evidence presented in Chapters 8 and 9 suggests a pointed avoidance of Spanish ceramics, ideology, metal, and other materials in deference to Araucanian-style materials. Historical records indicate that tensions in the surrounding area remained high, stirred up by Araucanians living in Purén who had maintained direct confrontation with the Spanish since 1558 (R. Quiroga 1577 in Medina 1957; Olaverria 1594 in Medina 1960).

Historical records indicate that in 1588, Araucanian warriors under the direction of female *toqui* Janequeo (Antuquepu in Rosales' chronicle) initiated an offensive against the Spanish, generally localized to the foothills near Santa Sylvia and Villarrica. This offensive, argued in this thesis, shifted the Araucanians in the region into a release cycle in the ARC. As in the First General Offensive, tensions increased to a breaking point, and leaders such as Janequeo acted to expel the Spanish. Had this offensive failed, the Araucanians in the region may have experienced a change in the political and economic structure of their cultural system, one dominated by the Spanish.

Advised of the Araucanian march, Aranda Valdivia led his soldiers out of the fort

to meet the Araucanians, where, outnumbered, the Spanish were defeated and Aranda Valdivia was killed (Rosales 1989[1674]:634). The Antelepe fort is never mentioned again, suggesting that any survivors living therein fled to Villarrica shortly after the death of the *encomendero* (Tribaldos de Toledo 2009[1630]).

It is difficult to say with certainty that Santa Sylvania is in fact Antelepe fort, as no further records have yet been found affirming its existence, nor of corroborating maps or toponyms designating the area around the site as the “valley of Antelepe.” Only DNA testing of the remains unearthed by Gordon (which whereabouts are unknown) and testing them against descendants of Pedro Aranda Valdivia alive today would conclusively show that Santa Sylvania and Antelepe are one and the same. For now, **1)** the C<sup>14</sup> dates recovered from Santa Sylvania that correspond to the Spanish occupation aligns with the historical timeframe offered on Antelepe (see Chapter 9); **2)** the short occupation time argued here of less than 10 years at Santa Sylvania appears to coincide with the short occupation of Antelepe during the same time period, and **3)** the lack of evidence for a direct conflict (in the form of arrowheads, crossbow bolts, and other military hardware) at Santa Sylvania may indicate that no direct confrontations transpired at Santa Sylvania. This may be similar to Aranda Valdivia leaving Antelepe to fight the Araucanians, thereby avoiding battle at the site proper. It is argued here that the overall inability of the Spanish to establish settlements in the area for extended periods of time indicates that the occupation of Santa Sylvania may be similar to that of Antelepe, if they are not the same site.

*Resilience Cycle: Reorganization/Rebound Phase—Increasing Tensions in the Wider Araucania, AD 1589-1598*

Santa Sylvania’s occupation, long or short, was during a time of generalized conflict throughout south-central Chile. Numerous letters and correspondence between governors and other functionaries to Peru and Spain between 1565 and 1598 describe continuous

battles between Araucanians and Spanish (Anonymous 1580 in Medina 1959; Gálvez 1579 in Medina 1957; Obregón 1566 in Medina 1956; Ruiz 1579, 1580 in Medina 1957; Quiroga 1566 in Medina 1956; Toledo 1569 in Medina 1956; Torralba 1569 in Medina 1056; Torres 1571 in Medina 1956). Several letters are of particular note for this research. Writing of events in 1576, Rodrigo de Quiroga recounts the state of the “war of Arauco”, mentioning that the Araucanians in Purén were the “most obstinate rebels of this land” and were “persuading and inducing” the Araucanians living in Villarrica and Valdivia to “rebellion” (Quiroga 1577 in Medina 1960) Though briefly mentioned, this letter indicates the large-scale intercommunication transpiring between distant Araucanian groups, from the coast to the mountains. Modern Mapuche informants in Pucón told stories of trading trips to relations living in Purén. These relationships, as indicated in Quiroga’s letter, may extend as far back as at least 1576 if not before. A similar letter written by Ruiz de Gamboa states that the Araucanians living in Purén were “joining together” with other groups and fighting around “Imperial, [Villa]Rica and Angol” (Ruiz 1593 in Medina 1960:308).

A second letter, written by an unknown author, describes a general “state of rebellion” of Araucanians in Villarrica, and notes that the “war” extended from the Cautín River as far north as the Itata River, which northern extreme threatened Santiago in 1580 (Anonymous 1580 in Medina 1959). Fighting between the Araucanians and Spaniards, then, extended farther north than the Bio Bio at this time, though Rosales indicates that the northern Araucanians (*Picunche*) may have been pacified and incorporated<sup>15</sup> into *encomiendas* and *repartimientos* around this time with the establishment of Chillan in 1581 (Rosales 1989[1674]:601). These and other letters serve to demonstrate the

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15 Very little demographic, ethnographic, and archaeological work has been done between the Maule, Itata, and Bio Bio Rivers, making analyses of the status of the northern Araucanians difficult. It may be that the Araucanian population north of the Bio Bio was small enough that those who could not escape to live with kin farther south were brought under Spanish control towards the end of the 16<sup>th</sup> Century, leading to direct Spanish control of all lands north of the Bio Bio by 1602 with the establishment of the Bio Bio frontier. However, fighting between the Araucanians and Spanish from 1655-1657, would indicate that the population between Santiago and Conoception was not as “pacified” as previously thought.

argument in this research that the Spanish occupation of south-central Chile, or at least south of the Bio Bio River, was tenuous at best despite successes at consolidation to the north. Mining operations began to fail by 1590 (Keun 1986), leading to less investment by both the Spanish crown and private entrepreneurs in the southern half of the country and further isolating the existing Spanish population, ill-equipped to continuously fight the Araucanians. To make things more difficult for the Spanish, Francis Drake and other corsair captains began raiding up and down the Pacific coast (Gálvez 1579 in Medina 1957; Gárnica 1579 in Medina 1957; J. Quiroga 1979[1677]; R. Quiroga 1579 in Medina 1057). A series of natural disasters including massive earthquakes, one in 1570 that destroyed Concepcion with a tsunami (Arias 1570 in Medina 1956; Rosales 1989 [1674]), and another in 1575 that severely damaged Valdivia and Villarrica, also impacted the Spanish ability to engage the Araucanians and successfully colonize (ibid).

The Araucanians in the area around Santa Sylvania, after the possible abandonment of the site by the Spanish in 1588, appear to have continued to build up their population, weathering outbreaks of smallpox, typhus (known in Mapudungun as *chivilango*) and other illnesses in the latter half of the 16<sup>th</sup> Century like their kin elsewhere in the Araucania (Bengoa 2003; Rosales 1989[1674]). This research argues that the Araucanians were in a conservation phase for 10 years, AD 1588-1598 if Santa Sylvania is Antelepe, or that had continued since AD 1558. This conservation phase was punctuated by small, localized releases, such as Janequeo's offensive, that may not have directly impacted the site itself.

The possible localized release, reorganization/rebound and conservation phases around Santa Sylvania suggested above illustrate the variability and scalar nature of the RC known as Panarchy. This research suggests that generally throughout the Araucania, the ARC remained in a conservation phase from AD 1558 to 1598, in a large/slow process overall. In more localized contexts, such as Santa Sylvania/Antelepe during the Spanish occupation or the coastal offensive in 1563 (see above), the ARC phases started in

conservation (AD 1558-1587), evidenced by the maintenance of the traditional system, incorporation of some Spanish materials such as wheat and barley, and avoidance of others. Conservation transitioned to release, possibly AD 1588 with Janequeo's offensive and the abandonment of Antelepe and possibly Santa Sylvia, and then to reorganization/rebound phase in AD 1588-1598 after Spanish abandonment. In this case, this research suggests that the Araucanians at Santa Sylvia remained in the reorganization/rebound phase during the 1590's, not entering into a specific conservation phase before the beginning of another possible release phase in AD 1598, due to the limited amount of time to rebound before entering a new release phase in 1598 described below.

More broadly in the Araucania during the conservation phase of AD 1558-1598, evidence suggests that *kuel* construction and ritual activity continued, particularly in Purén-Lumaco and around Santa Sylvia, while communication and interaction with kin groups on the east side of the Andes in the Argentinian pampa and Patagonia increased as well (Dillehay 2007, 2010; Leon 1989; Silva 2005). *Ayllarehue* are first noted explicitly by the Spanish in 1594 (Olaverria 1594 in Medina 1960), and *butanmapu* had possibly become more important as well by the end of the 16<sup>th</sup> Century (Silva 1996). It also appears that the Araucanians continued to refine their military tactics, improving on the cavalry skills and guerilla fighting that had served well over the previous decades (Bengoa 2000).

#### *Resilience Cycle: Release Phase—Second Major Offensive, AD 1598-1602*

Though fighting between the Araucanians and Spanish was relatively continuous from 1565 to 1598, in the latter year Governor Oñez de Loyola received notice that Araucanians near Angol were “rebellious,” leading the governor to march from Purén in December<sup>16</sup> (Quiroga 1979[1677]). In a valley west of Angol called Curalaba (“broken

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16 Rosales (1989) states that the Governor received a letter from his wife in Villarrica asking him to come visit, and that Oñez de Loyola and his party left Puren on their way to Imperial, not Angol. Curalaba may in fact be near present-day Lumaco.

stone” in Mapudungun, near present-day Los Sauces), 400 mounted Araucanian forces under the direction of *toqui* Pelantaro<sup>17</sup> attacked on December 23, killing all but two Spaniards (Gonzalez 1889[1614]; Rosales 1989[1674]:685). In early 1599, Pelantaro and other *toquis* joined in *cahuin*, thus initiating what this research defines as the Second General Offensive against the Spanish. This offensive soon spread throughout most of south-central Chile (Ibid: 688). Within the context of this research, the Second General Offensive signifies a transition from conservation to release phase of the ARC. Like the previous release phase in AD 1553, Araucanian leaders actively decided to confront the Spanish on a broad scale. If they won, then the traditional Araucanians cultural system could be maintained. If Spanish won, the Araucanian system would likely come under Spanish political, economic, social, and religious control. Within RT, Spanish victory would correspond to a reorganization/exit phase into a new ARC and a shift into the Spanish basin of attraction.

Pelantaro and others quickly marched on all Spanish settlements south of the Bio Bio, forcing thousands of Spaniards and indigenous allies to flee to the coast and north to Santiago (Cabildo 1599 in Medina 1961; Tribaldos de Toledo 2009[1630]). The Spanish attempted to fight back, requesting and receiving support from Peru via 500 soldiers (Vizcarra 1599 in Medina 1961), though the Spanish crown was slow to send any official support (Rosales 1989[1674]). Spanish leadership in Santiago went so far as to call for the complete enslavement of the “rebellious Indians” in order to pacify them once and for all, going expressly against the wishes and decrees of both the king and the Catholic leaders<sup>18</sup> (Boccaro 1999b; Calderón 1599 in Medina 1961; Korth 1968; Lizárraga 1599; Vascones 1599). Enslavement was ineffectual, only serving to increase anger, and the Araucanians continued to defeat and remove the Spanish from the south, forcing the

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17 Also mentioned by Rosales is an older *toqui* Anganamón, who may have had overall command while Pelantaro directed the actual battle, in a relationship similar to Caupolicán and Lautaro 40 years before.

18 It is interesting to note that many of the documents declaring the need for enslavement came from Catholic priests; see Korth (1968) for an interesting, though biased, treatment of the calls for enslavement, as well as Jara (1981).



complete evacuation of at least 12 settlements by early 1600 (Alvarez 1600 in Medina 1961).

In 1599, Araucanians around Villarrica, possibly including former inhabitants of Santa Sylvia, laid siege to the fort/city. If Santa Sylvia is not Antelepe, y the beginning of the siege in 1599 Santa Sylvia had probably been evacuated (Gordon 2011; Tribaldos de Toledo 2009[1630]), any remaining inhabitants escaping to Villarrica in the hopes of making their way west to Imperial and the coast (Rosales 1989[1674]). As there is no evidence of battle at the site, it is possible that the escape transpired before the Araucanians came and burned the remains of the complexes (Gordon 2011; see also Chapter 7). The siege of Villarrica lasted for three years, in which the Spanish attempted several times to send aid and allow for the escape of the inhabitants, each effort repulsed by Araucanian forces (Gonzalez 1986; Rosales 1989[1674]; J. Quiroga 1979[1677]). The evacuation of La Imperial in 1601 further isolated Villarrica from support. Finally, in February 1602, the *toqui* Cuminaguel called for the surrender of the remaining Spaniards in Villarrica. Rebuffed, the Araucanians attacked and destroyed the fort, killing all survivors (Rosales 1989[1674]:758).

*Resilience Cycle: Reorganization/Rebound and Conservation Phases—Frontier Establishment, AD 1602-1700*

The destruction of Villarrica, while not the end of overt hostilities, marks a turning point in the “War of Arauco” and the ARC within this research. Governor Alonso de Ribera began in 1603 to build a series of forts along the northern bank of the Bio Bio River, moving towards a “defensive war” against the Araucanians (Keun 1986; L. Valdivia 1897[1615]). The arrival of Jesuit friar Luis de Valdivia in the same year initiated a few ecclesiastical calls for a different sort of “pacification” through conversion to the church (another form of “defensive war”—see Foerster 1996; Nuñez 2001[1673]; Ovalle 2003[1646]; Zapater 1992). These activities were supported by the Spanish king,

marking the only time in the Americas that the Spanish recognized a specific frontier with an indigenous group. This recognition was not formalized, however, until 1642 at the Paces de Quilin (Abreu y Bertodano 1740; see also Bengoa 2003; Ovalle 2003[1646]; Rosales 1989[1674]). Despite this defensive strategy, battles continued, extending as far north as the Maule River (Nuñez 2001[1673]; Rosales 1989[1674]). Most fighting, though, was localized along the Bio Bio frontier (Ovalle 2003[1646]). Luis de Valdivia attempted several missionary forays into Araucanian lands with little success, though he did manage to engage in *cahuin* with Araucanian *toquis* Paicavi and Anganamon in 1610 (Rosales 1989[1674]). In 1612, Horacio Vechi, Martin de Aranda and Diego de Montalbán, priests sent by Valdivia into the Araucania, were preaching in Elicura (northwest of Purén). Captured by warriors under the orders of *toqui* Anganamon, the priests were stripped, killed, mutilated, and their remains sent back to Concepción (Ovalle 2003[1646]). The death of the priests led to the disgrace and removal of Luis de Valdivia and the end of major conversion efforts south of the Bio Bio. The “defensive war” was left in the hands of the military (Pinto et al. 1991; Rosales 1989[1674]).

As fighting increasingly localized around the Bio Bio frontier and to the north, the southern populations, such as those living in the general area of Santa Sylvia, continued to grow and began to expand across the Andes into the Argentinian Pampa and Patagonia. This coincides with what this research considers to be a reorganization/rebound phase of the ARC. This reorganization/rebound included the incorporation of populations of refugees who may have settled in the area of Santa Sylvia or crossed the Andes in Argentina (Harcha and Vásquez 2000), or who were otherwise incorporated by lonko and toqui into their lineage groups (Dillehay 2007). Contact with the Pehuenche and Tehuelche living along the eastern flanks and into the pampas increased (Mandrini and Ortellì 2002). This migration eventually drew the whole of south-central Argentina into the Araucanian sphere of influence through trade, wife, exchange, and cultural commonalities (Dillehay 2007; Escalada 1949; K. Jones 1999; Villalobos 1989). This

included both the expansion of Araucanian culture and a larger population to draw upon for warfare and defensive purposes, allowing for maintenance of the Bio Bio frontier and sporadic forays north of the river (Leon 1990). Importantly, leadership decisions placed the “center” of the war in the valley of Purén-Lumaco (Olaverria 1593 in Medina 1960), a strategic location where the war had been centered by default since about AD 1553 (Vivar 1979[1558]). The Purén-Lumaco area served to stage Araucanian *maloca* parties that harassed the Spanish along the nearby Bio Bio frontier and perpetuated the conflict. To this end, other areas of the Araucanian pledged material support, particularly in the form of foodstuffs such as maize, wheat, and barley, and warriors (Olaverria 1593 in Medina 1960). Araucanians near Santa Sylvia likely provided aid in this way, as no direct conflict transpired in the general area of the site after the destruction of Villarrica, until the arrival of the Chilean army in the late 19<sup>th</sup> Century.

From about AD 1620 on, the majority of the Araucanians south of the Bio Bio were left generally alone as the Spanish were relegated to trade rather than colonize. The Araucanians around Santa Sylvia may have interacted with Catholic missionaries who achieved very little success in their evangelization efforts, and no military incursions were attempted in the region (Treutler 1958[1861]). In 1641, the Bio Bio frontier was formally recognized at a peace treaty (*parlamento* in Spanish) between delegations of Araucanians and Spanish at Quilin (Bengoa 2003). In this treaty, largely dictated by the Araucanians, the Bio Bio was recognized as a formal frontier and the Araucanians as an independent, autonomous group (Abreu y Bertodano 1740). Peace was by no means certain, as numerous *parlamento* took place over the next century as both sides jockeyed for position, lands, and power (Villalobos 1985; Zavala 2005; Zavala and Dillehay 2010). Sporadic fighting continued, a final major offensive<sup>19</sup> by Araucanians north of the Bio Bio led to a siege of Concepcion as well as the evacuation and destruction of Chillan in 1655

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19 The fighting between the Araucanians and the Spanish was generalized north of the Bio Bio and led to the evacuation of most Spanish settlements south of Santiago, particularly between the Maule and Bio Bio, as well as some of the efforts at resettlement in the Tolten river valley.

(Harcha et al. 1988; Keun 1986; Villalobos 1985). Towards the end of the 17<sup>th</sup> Century, a gradual détente occurred at the frontier as hostility gave way to what some scholars have argued to be mutually-beneficial trade relations (Berger 2006; Leon 1991).

It is argued there that by the beginning of the 18<sup>th</sup> Century, the southern Araucanians had extensively developed and consolidated kin ties as well as political and social relations throughout south-central Chile (largely between the Bio Bio and Toltén Rivers) and into Argentina (K. Jones 1999; Leon 1991). This came to pass during what is hypothesized as a long-lasting conservation phase in the ARC wherein the Araucanians continued to conserve traditional social, political, and economic norms and conditions, fortifying the identity of “being Araucanian.” This conservation phase strengthened the attractive strength of the Araucanian basin into the 18<sup>th</sup> and 19<sup>th</sup> Centuries.

Sometime in the mid-1700’s the name *Mapuche* (“people of the land”) came to reference the independent Araucanian peoples living in Chile and Argentina, eschewing the former distinctions between *Picunche*, *Huilliche*, *Pehuenche*, *Tehuelche*, and other *-che* groups, at least in official correspondence and histories<sup>20</sup> (Boccaro 1999a, 2007; Sanchez 2007). The Araucanians/Mapuche in the area of Santa Sylvia appear to have continued to raise horses, sheep, pigs, and cows, grow wheat, barley, maize, peppers, and other crops for consumption, trade, and for warriors in Purén (Bengoa 2000). This phase also saw the maintenance of older and the construction of new *kuel* mounds and *nguillatun* festivals, in the Purén-Lumaco and Santa Sylvia areas into the 1800’s (Dillehay 2007). The Latin American liberation movements of the early 19<sup>th</sup> Century, however, would irrevocably change Araucanian society both politically and economically, and how they would be perceived by the newly autonomous Chileans and Chilean law.

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20 As noted before, the distinctions of the different *-che* names is likely derived from geographical locations, not from a specific self-identification as being part of a particular or separate group (see Faron 1960).

## CHAPTER 13

### THE AREA OF SANTA SYLVIA AND THE WIDER ARAUCANIA IN RECENT HISTORY AND ETHNOGRAPHY: ARAUCANIAN CONSERVATION, RELEASE, AND REORGANIZATION/EXIT PHASES, AD 1700-PRESENT

Though the Spanish crown recognized the Bio Bio River as the frontier and did not provide more material support for colonization to the south, historical records indicate that interaction, conflict, and change continued throughout the Araucania for both the Araucanians and the Spanish. It is argued in this research that the Araucanians in the general area of Santa Sylvia and in the wider Araucania remained in the conservation phase described in the previous chapter until the early 19<sup>th</sup> Century. No documentary, archaeological, or ethnographic evidence suggests that any major changes came to the Araucanian culture system in the 18<sup>th</sup> or early 19<sup>th</sup> Centuries. Lacking any contradictory information, it is likely that the Araucanians continued to construct and maintain *kuel*, carry out *nguillatun* and other socio-religious activities, trade, intermarry, and interact with Europeans along the frontier. However, it is noted that very little archaeological investigation has been carried out on Araucanians sites dated to the 18<sup>th</sup> and 19<sup>th</sup> Centuries.

A possible exception to this conservation may be seen in Araucanian expansion into the Argentinian Patagonia in the 18<sup>th</sup> and 19<sup>th</sup> Centuries (see Figure 4; Mandrini and Orelli 2004; Zavala 2008). Zavala (2008:24) describes the Araucanians of the Pampa as more mobile than their Chilean kin, living in tent-like dwellings made of animal hides without hunting and gathering. These may be seen as “autonomous groups, converted or in the process of conversion to being Mapuche” (Ibid). In time, however, these migratory Araucanians settled into agriculture and animal husbandry in the 19<sup>th</sup> Century, taking advantage of the rich pastureland of the Pampa (Mandrini 1987; Mandrini and Ortelli 1995, 2002; Zavala 2008).

This chapter provides a summary of some of the major events that transpired in the area around Santa Sylvia and in the Araucania in general in the 18<sup>th</sup> and 19<sup>th</sup> Centuries described by Zavala as a centuries of “transition in the history of the interethnic relationships in Hispano-America” (Zavala 2008:21). These events provide the context for the changes within the Araucanian cultural system. The present research argues that many of these changes, such as a breakdown in networks and relationships along the frontier that reverberated out into the Araucania and continual interactions with the Spanish and later Chileans led to shifts in traditional political, economic, social, and economic structures. These shifts, argued here, influenced a transition from the conservation phase suggested previously to a reorganize/exit phase in the ARC around AD 1885.

The creation of the Chilean Republic in the early 19<sup>th</sup> Century and the effects of the industrial revolution, within the context of RT, introduced a new basin of attraction that exerted more pull on the Araucanian cultural system than the previous Spanish basin (Figure 79). Additionally, documentary sources indicate that the actions of leaders and communities along the frontier contributed to the defeat of the Araucanians in AD 1883 with the occupation of Villarrica and the area around Santa Sylvia by the Chilean Army (Bengoa 2000; Zavala 2008). The Araucanians were then placed on *reducciones* (reservations) in various parts of south-central Chile and became subject to the Chilean state (Medina 1887). Within the ARC presented in this research, the Araucanians lost political, economic, and some social autonomy, and thus entered a new ARC with different structures dictated by the Chileans and not the Araucanians themselves. These and other events, directly or indirectly, placed the modern Mapuche on the cultural trajectory they find themselves in today (Hernandez 2006; Luna 2007; A. Saavedra 2006).

## The 18<sup>th</sup> and 19<sup>th</sup> Centuries

*Resilience Cycle: Conservation Phase Continued: Tensions and the End of Spain in Chile, AD 1700-1820.*

The uneasy détente between the Araucanians and the Spanish in the late 17<sup>th</sup> and into the 18<sup>th</sup> Centuries resulted in skirmishes and limited battles between the respective military forces, primarily along the Bio Bío frontier (Molina 2000[1788]; Olivares 1874). Berger (2006) argues that this time was a period of mutually-beneficial trade, with goods and services, such as Araucanian ponchos and blankets traded for Spanish metalware, being exchanged and trickling into trade routes to the north, south, and east. As stated in Chapter 12, most interactions between Araucanians and Europeans in the 18<sup>th</sup> Century were through Catholic missionary efforts. Principally carried out by the Jesuit order in the 17<sup>th</sup> and 18<sup>th</sup> Centuries, missionaries sought to establish parishes and convents in areas previously held by the Spanish, such as around Santa Sylvania and Villarrica (Foerster 1996; Olivares 1874). Despite the effort, conversion was limited, due in large part to unsuccessful attempts to place the Araucanians on reservations (*reducciones*) to better instruct and evangelize. Foerster refers to this incipient *reducción* system as an attempt at “baptismal conquest” (1996:370). Overall, it was decisions by Araucanian individuals and communities not to convert to or accept Catholic authority that curtailed missionary success (Rosales 1989[1674]). The Jesuit experience in southern Chile ended in AD 1767, ceding evangelization efforts to the Capuchin order. The Capuchins did not place as much emphasis on missionization as the Jesuits or prior Franciscans (Arellano et al. 2006; Hanisch 1974)<sup>1</sup>.

In this research, for the Araucanians living in the area around Santa Sylvania and the wider Araucania the late 18<sup>th</sup> Century was a time of continuation and expansion of

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<sup>1</sup> Bengoa (1986) argues that the failure on the part of Catholic missionaries was in large part due to the refusal of the Araucanians/Mapuche to give up the practice of polygyny, a prerequisite for baptism. Polygyny was, according to Bengoa, necessary for the establishment of far-reaching kin ties that fortified the whole of Araucanian society.

the Araucanian cultural system within the ARC conservation phase that had begun in the mid-17<sup>th</sup> Century (see Chapter 12). As noted above, no evidence has been found to suggest that outside disturbances disrupted the Araucanian cultural system or introduced new practices. The traditional structures directed by *lonko*, *ülmen*, *machi*, and *toqui* and through the approval of the general Araucanian population appear to have been “conserved” during this phase (Carvallo 1875[1792]; Molina 2000[1794]). One change that distinguishes this conservation phase from previous phases is in the emphasis on higher-level social organizations like the *ayllarehue* and *butanmapu* (Olaverria 1594 in Medina 1960). Evidence suggests that prior to the Spanish the *lof* and *regua* were the focal points of Araucanian social structure (Silva 2001; Silva and Tellez 2001). In the late 16<sup>th</sup> and early 17<sup>th</sup> Centuries, *lof* and *regua* remained important but *ayllarehue* and *butanampu* were used to organize military action against the Spanish and to incorporate displaced populations (Dillehay 2007). While still within the traditional structures of the Araucanian cultural system, the conservation of these forms of organization distinguish this particular conservation phase from that of the early 16<sup>th</sup> Century mentioned in the previous chapter.

By the end of the century the name “Mapuche” came to indicate those Araucanians living south of the Bio Bío to the Calle Calle River, and from the coast east to the eastern flank of the Andes in Argentina<sup>2</sup> (Boccaro 1999; Zavala 2008). Documentary information indicates that trading fairs increased along trade routes from Argentina to the coast, and along the frontier *maloca* raiding parties increased on Spanish settlements (León 1991). Continuing within this hypothesized conservation phase, there was a likely maintenance and perhaps construction of new *kuel* in the area around Santa

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2 Villalobos (1989) and many others contend that the Pehuenche (the “People of the Pine” living in and near the Andes) should be considered a separate, though related, ethnic group to the Araucanian/Mapuche. His argument is based on accounts from Spanish *cronistas* who differentiated between the Araucanians living along the mountains and those living along the coast. However, no archaeological or ethnographic evidence shows a major distinction, apart from a linguistic dialect, between Araucanians along the coast and in the mountains (Faron 1962; Zavala 2008). Excavations at Santa Sylvia, which would lie in Pehuenche lands, has material culture similar to, if not the same, that found elsewhere in Araucanian lands.



Sylvia and elsewhere in the Araucania (Dillehay 2007; Dillehay and Saavedra 2010), continuation of *nguillatun* festivals that drew on relationships from the coast to Argentina (Quiñanao, personal communication, 2010), and population increase (Bengoa 2000). This period appears to mark an overall sustention of traditional Araucanian practices (Bengoa 2000; Gonzalez 1986; Dillehay 2007; Zavala 2008), though more archaeological investigation is needed for the late 18<sup>th</sup> and early 19<sup>th</sup> Centuries.

Relations with communities in Argentina appear to have increased during this time as well. The Argentinian pampa proved good forage for the raising of horses and cattle, and numerous Spanish officials in Buenos Aires complained of “aucaés Indians” crossing the mountains to “plunder and rob” and generally disrupt colonization operations (Zapater 1982:92). The Chilean Araucanians introduced new weapons and military tactics to the Argentinian Araucanians (Olivares 1864) which grew out of a concurrent increase in trade relations and communication as well as human migration (Mandrini and Ortelli 1995, 2002; Zapater 1982). This expansion is particularly important as no other indigenous group in North or South America expanded culturally while maintaining independence from Spain<sup>3</sup>. By doing so, the Araucanians increased the number of warriors available, increased kin ties, and drew upon the Pampa for animal forage (Mandrini and Ortelli 2002).

#### *Resilience Cycle: Reorganization/Rebound Phase--Chilean Independence and Early Republic, AD 1820*

The Latin American independence movements of the early 19<sup>th</sup> Century was a time of convoluted change for the Chileans and a series of shifting alliances<sup>4</sup> that led to

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3 The Iroquois nations of northeastern North America expanded culturally while maintaining independence from England and France (Parmenter 2010) as did the Cherokee in the southwest United States (Himmelen 2000; see also Witgen 2012).

4 Depending on the political situation in Spain, at some points the Chilean government sided with the crown, then against the crown (Collier and Sater 2004). Chile declared independence in 1810 as a form of protest against the Spanish puppet king placed by Napoleon, which gradually morphed into total independence during the next decade. Spain managed to re-control Chile from 1814 to 1817, but the Chilean army led by Bernardo O’Higgins finally overthrew the Royalists in 1818. Thereafter, the Chilean

complete independence by 1824 (Barros Arana 1999h; Collier 1967; Collier and Sater 2004; Gay 1874; Izquierdo 1989). The Araucanians became somewhat of a *cause célèbre* not only for the nascent Chilean republic but for other Latin American revolutionaries.

Simón Bolívar, in a letter written in 1815 stated:

The kingdom of Chile, with its 800,000 souls, is resisting the enemies who seek to dominate it; they seek in vain, because those who previously stopped the Spaniards in their tracks, the free and indomitable Araucanians, are now their neighbors and fellow patriots. Their sublime example is sufficient to prove to them that a people who love their independence will end up winning it. (Bolívar 2003[1815]:14)

The Chileans themselves “rediscovered”, or quoted heavily from, Ercilla’s *La Araucana* and cited the famous *toquis* Caupolican, Colo Colo, Galvarino, and Lautaro to exemplify the independent spirit felt by the revolutionaries (Bengoa 2000; Collier 1967; Lewis 1992). Leaders such as Bernardo O’Higgins saw themselves as the “sons” of the Araucanians, waxing poetic and substituting “Araucanian” for “Chilean” (see Collier 1967:212-214). Importantly, this research suggests that the liberation movements in Chile introduced a new stability domain and basin of attraction that exerted influence on the Araucanian cultural system (Figure 80). This new basin, argued here, would affect the ARC in the coming decades (see Chapter 5) through the introduction of new military tactics, weapons, and other technologies, as well as from the structure of the Chilean state. Discussed more below, the Chileans, in contrast to the Spanish, exerted direct governmental effort and material into the “conquest and pacification” of the Araucania (Subercaseaux 1883). In prior centuries, the Spanish and Araucanian domains dominated the stability landscape, but the new Chilean basin, initiated in about AD 1810 and increasing in influential strength after 1820, entered into the stability landscape.

It is suggested here that these political changes amongst the nascent Latin American nation/states affected the Araucanians around Santa Sylvia and the

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junta worked to liberate Peru (Barros Arana 1999). At a battle in Ayacucho, Peru, in 1824, the Spanish empire in the Americas was finished (Collier and Sata 2004).

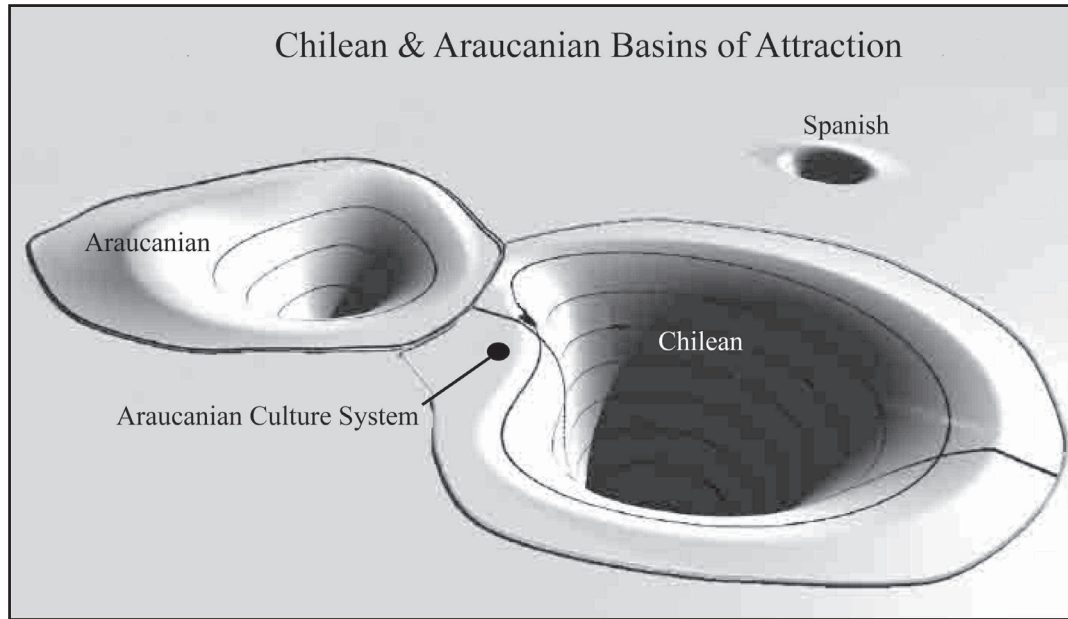


Figure 80: Diagram showing the Chilean stability domain with the Araucanian and Chilean basins of attraction. The Chilean basin exerted enough “pull” that the Araucanian cultural system (black dot) shifted away from the Araucanian basin in the early 1800’s.

wider Araucania somewhat indirectly, but may still hypothetically be a transition to a reorganization/rebound phase in the ARC. This is argued in the sense that the Araucanians, though not initially participating in the revolutionary efforts, had to nonetheless adapt the ending of Spanish interaction to the north of the Bio Bio and the introduction of the new Chilean influences. Documents indicate that Araucanian leaders and their followers adapted to the new Chilean state in myriad ways. Most continued as they had before, maintaining traditional cultural structures and overall independence, while some along the coast and frontier began to associate more closely with Chileans than with their previous Araucanian networks and were labeled *indios amigos* or *indios de paz* (Domeyko 1845; Gay 1854; see also Bengoa 2000; Zavala 2008). This research argues that these *indios amigos* introduced fractures into the previous networks that would later affect the ability of leaders to gather sufficient warriors to fight the Chileans.

Perhaps ironically, many Araucanians living in the Araucania sided with Spain during the Chilean independence movement, a fact ignored by the revolutionary leaders

in their hyperbolic uses of the “noble savage” myth transcribed onto the Araucanians (Lewis 1994). Why some Araucanians chose to fight on the side of Spain is not entirely clear, though Bengoa (2000) suggests a “devil you know” pragmatic approach, as well as fulfilling the terms of *parlamento* treaties. Spanish royal envoys restated the terms of these treaties, in that the Mapuche would retain their lands and independence if they would fight for Spain. Thus many *lonko* and *toqui* may have encouraged their *lof*, *regua*, and *ayllarehue* to side with Spaniards with whom they had long associated, particularly in those communities along the frontier that had already been influenced by Spaniards over the previous centuries (Zavala 2008). The Chileans, on the other hand, saw the whole of Araucanian lands as part of the overall Chilean Republic which would stretch from the Atacama Desert to Tierra del Fuego. By becoming independent from Spain the Araucanians would receive the same rights and privileges as any other Chilean citizen (Bengoa 2000; Ellis 1956; Marimán 2006).

Apparently unwilling to accept the assurances of the revolutionaries, documents indicate that most Araucanians appear to have sided with the royalist Spanish (Domeyko 1845). Some communities did side with the revolutionaries, particularly north of the Bio Bio and in the south near Valdivia, and those who had worked with O’Higgins in the past (Bengoa 2000:148). Most of the fighting between Araucanians allied with the royalists took place around the frontier, particularly near the city of Los Angeles, and the overall fighting was marked by “cruelty” on both sides (Vicuña 1868b). Vicuña called this a “War to the Death”, particularly after 1817. This statement was not quite literal but illustrated the viciousness that transpired between the royalists and independents (*ibid*). The Chileans defeated the Spanish and expelled them from the northern portions of the country by 1812, but Spain, perhaps by virtue of alliances with the Mapuche, retained most of the south. Mapuche allies on the coast by the Toltén and Cautín rivers helped the Spanish land more troops in a successful bid to re-take control of Chile in 1814, causing O’Higgins and other revolutionary leaders to flee to Argentina or engage in guerilla

warfare (Collier 1967; Collier and Sater 2004; Mariman 2006).

Another *parlamento* was held near Concepción in 1815 between the Araucanians along the frontier and the Spanish, which reiterated the Spanish position on previous treaties and continued Araucanian independence (Bengoa 2000). Spain held control of the south until 1817, when Argentinian General José de San Martín led a successful crossing of thousands of troops, mostly Argentinian, across the Andes near Mendoza to engage the royalists (Barros Arana 1999; Guevara 1852; Mackenna 1868b). Spanish forces were defeated at the Maipó River in 1818, which secured Chilean independence north of the Biobío (Collier and Sater 2004). However, royalist forces and their Araucanian allies continued in guerilla warfare under the direction of Vicente Benavides, who led raids on Chilean settlements and military forces between Chillán and Los Angeles between 1818 and 1822 (Bengoa 2000; Mackenna 1968). When Benavides was captured and executed in 1822, his death marked the end of Spanish military action in Chile but did little to solve the volatile situation still raging in Araucanian lands between the Mapuche and the now fully-independent Chile<sup>5</sup>.

Overall, this research argues that Chilean independence and the early republic period did little to change the fortunes of the Araucanians in the area around Santa Sylvia or the wider Araucanía outside of the frontier. No evidence has been found to indicate that the traditional culture system was changed dramatically, or that new practices were introduced. However, it is hypothesized here that the new Chilean basin of attraction began to exert influence on the Araucanian culture system, and its attractive strength increased dramatically in the decades after independence. Reorganization within the ARC reorganization/rebound phase mentioned above that was actually necessary in the area of Santa Sylvia may have been limited to a breakdown in some networks, particularly along the frontier those who sided with the Chileans and became *indios amigos*. Other networks

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5 After the death of Benavides, most of Chile's military forces were dedicated to liberating Peru, which occurred in 1824 and ended the Spanish empire in South America. During this time, the Araucanía was left generally alone (Bengoa 1986; Collier 1967).

may have broken down the Andes into the new Argentinian nation-state (Mandrini 1984; Mandrini and Ortelli 2002). This possible reorganization/rebound phase was likely short, and the Araucanian culture system rebounded back into the ARC and transitioned to a conservation phase wherein the practices and structures of the previous conservation phase remained, modified with regards to the Chileans rather than the Spanish.

*Resilience Cycle: Conservation Phase--Chilean Civil War and "War of Extermination"*

This period is labeled in the present thesis as a conservation phase, as most of the Araucanians in the area around Santa Sylvia and the wider Araucania appear to have worked to maintain the traditional practices from the previous centuries. Documentary evidence suggests that the Araucanians in the interior of the Araucania continued to live as they had with limited change from the events along the frontier and Chilean independence (Domeyko 1845). Again, no archaeological evidence has been found to indicate that major changes came about in the Araucanian culture system, though historical sources point to a continuation of the breakdown of relationships along the frontier between Araucanian communities (Gay 1852; see also Bengoa 2000, 2004). Notably, this research has had difficulty in finding references to individuals given the title of *toqui* in the 19<sup>th</sup> Century. This may reflect a bias in the record, or may be suggestive of a change in the Araucanian system wherein *toqui* did not have the same responsibilities as before. More investigation on this is needed.

After helping liberate Peru, the successful Chilean revolutionaries returned to Santiago and began the task of forming the new nation. Part of this included a *parlamento* with Mapuche *lonko* in 1825 at Tapihue, near present-day Los Angeles. In essence, the Treaty of Tapihue maintained the *status quo* between the Mapuche and the Chileans—that lands south of the Bio Bio were to remain in Mapuche hands, the Mapuche would be mostly left to their own devices, and no attempts would be made to colonize between the Biobío and Toltén Rivers (Bengoa 2000; Ellis 1956; Gay 1852; Jara 1956). The Chileans

would have their “Army of the Frontier” stationed between Concepción, Chillan, Los Angeles, and along Andes in order to sustain the frontier and protect the interests of both the Chilean government and the Mapuche (Barros Arana 1999h).

The present research argues the Treaty of Tapihue may mark a turning point in the ARC, which led to the gradual Araucanian subjection to the Chilean state in 1883 and cultural shift into a new stability domain and basin of attraction. This treaty, unlike those with the Spanish, was not dictated by the Araucanians, which suggests that the Araucanians were losing negotiation power or were insufficiently united to dictate the terms of the treaty. It also curtailed Araucanian territory, which previously ranged from the Bio Bio River to Reloncaví Bay, but was not limited to the area between the Bio Bio and Toltén Rivers. Because of this, it is argued that at some point between 1850 and 1883 the Araucanian culture system, already precarious, shifted into the Chilean basin of attraction, from which it would not be able to recover (Figure 79). The Araucanian cultural system eventually transitioned to a reorganization/exit phase and into a new RC (see below).

From 1827 to 1850, the new Chilean government went through several iterations (federalist, liberal, conservative, etc.) without substantial time or resources to dedicate to the “Arauco problem” (Barros Arana 1999h[1888]; Mackenna 1868b). During the same time, the Mapuche in the area of Santa Sylvia and the wider Araucania experienced considerable change, for both good and bad. The good related to an apparent increase in animals, agricultural yields, and some population increase (Bengoa 2000). The bad, derived from the years of the war for Chilean independence, included population displacement along the coast which may have drawn refugees to the Andean foothills, gradual and subtle Chilean encroachment, population nucleation with attendant increase in disease, and an increase in discord between various *lof*, *rehue*, and *ayllarehue* (Domeyko 1845; Gay 1852). This discord would be exploited by the Chileans to great effect (Bengoa 2000).

Along the frontier, the Mapuche and Chileans traded amicably in most cases, though *maloca* raiding continued (León 1991). For some years, the area between Talca and Chillan was home to “bandits, thieves, and robbers” (Domeyko 1845) and most trade between northern and southern Chile took place along the coast (Barros Arana 1999h[1888]). Documents indicate that frontier trade increased the wealth of some *lonko* and *ülmen* along the frontier, who also began selling lands to the Chilean government and entrepreneurs starting in the 1840’s against the wishes of their communities and networks. As noted above, this change in attitude of these *lonko* and *ülmen* may signify a major shift in the social structures that reverberated in the economic and social networks throughout the Araucania. In some instances, the same parcel of land would be sold more than once (Jara 1956). By about 1860, Bengoa (2000:159) indicates that most of the land between the Bio Bio and Malleco rivers had been “bought, occupied, almost completely usurped, and most of the [Mapuche] population dispossessed and displaced,” though this may be an exaggeration.

In the region of Santa Sylvania, however, Araucanian activities appear to have continued much as in previous centuries during the conservation phase described above. However, it is suggested here that the present conservation phase began to experience increasing disturbance from the Chilean state in the mid-19<sup>th</sup> Century. The steady encroachment by Europeans particularly German and Dutch settlers from the south in Valdivia (Perez 1852; Tuetler 1958[1863]) and Chileans was limited in the area and no major efforts appear to have been made to engage in land speculation or resettlements near Santa Sylvania as had transpired in areas to the west and north (Gonzalez 1986). This may be due to geographic isolation of the region, as any attempts by Chileans or others to settle near Villarrica or Santa Sylvania would be met by hostile forces the length of the Toltén River. Villarrica came to be seen as a “symbol” of Araucanian/Mapuche independence and would be the last “conquered” place in the Araucania (Bengoa 2000). Materially, the Araucanians around Santa Sylvania grew maize and increasing amounts of



wheat and barley, raised horses, sheep, cattle, and pigs, the llama apparently disappearing by the 18<sup>th</sup> Century (Molina 2000). They also traded with kin to the west as well as in Argentina (Quiñanao, personal communication, 2010), and perhaps sent warriors to fight with allies elsewhere in the Araucania (Bengoa 2000). Presented in Chapters 8 and 9, Santa Sylvia itself appears to have been briefly reoccupied at this time, ca. AD 1850, to the south of the previous Spanish occupation. Post holes indicate a possible *ruka*, and recovered ceramics suggest a continuation of material culture from the earlier occupations (AD 1100 and 1580, respectively). This particular occupation appears to have been short and not very intensive, and may indicate a seasonal habitation (see Chapter 8).

*Resilience Cycle: Conservation Phase Continued—Increasing Tensions, AD 1850*

Overall, between 1827 and 1851, this research suggests that the flexibility of the Araucanian system began to work against them. In essence, the previous century of conservation phase and the actions of leaders may have placed the system into a “rigidity trap” (Holling et al. 2002) that limited the amount of disturbance the system could take going forward, and how what it could incorporate. These disturbances, described more below, included the direct efforts of the Chilean government to “pacify” the Araucania and the use of new technologies and military practices related to the industrial revolution, such as repeating rifles, trains, and telegraph communication (Barros Arana 1999h[1888]; Medina 1887).

The inroads made by the Chileans were different than that of the Spanish, due to the differences in who migrated (individual Spaniards vs. Chilean families) and the support they received from the central government (Casanueva 2002; Treutler 1861). The Spanish colonizers generally arrived after procuring their own funds from entrepreneurs and business interests with some, though limited, patronization from the Crown itself (Bengoa 2003). In other words, the government itself did not have as

much of a vested interest as other parties. Now, however, the Chilean government had a controlling interest in “pacifying” southern Chile and expended considerable effort in both money and manpower to bring this to pass (Saavedra 1870). This also allowed capitalist entrepreneurs to take advantage of the frontier situation (Bengoa 2000). It is suggested here that the initial “accommodation and cooperation” (Liebmann and Murphy 2011) that had functioned in the past appears to have worked against many Araucanian communities, particularly along the frontier (Zavala 2008). In large part, as will be shown below, this accommodation and cooperation turned into collusion on the part of numerous *lonko* and their communities along the coast and frontier, eroding the chances of successfully uniting to confront the Chileans (Bengoa 2000).

During this time the Araucanian culture system, through the actions of military leaders, would be seen to be *not flexible enough* to confront the rapid changes of the industrial revolution. A strength of the Araucanian cultural system noted previously was the ability to incorporate and apply useful European goods while maintaining traditional system structures. For example, the adoption of the horse led to the creation of a cavalry equal to, if not better than, the Spanish cavalry (Padden 1996; Wachtel 1977). This aided in defeating the Spanish in the late 16<sup>th</sup> Century and horses accounted for a new source of prestige and trade throughout the Araucania and into Argentina (Bengoa 2000; Mandrini 1986). It is argued here that because Araucanian leaders did not adopt other European goods, particularly metalwork, guns and gunpowder, the changes made in military technology in the early- and mid-19<sup>th</sup> Century impacted a Mapuche military system unable to confront repeating rifles and a modernized military. In particular, a military composed of professional soldiers sent expressly by the Chilean state, and one readily supplied by a growing train network and telegraph system. In sum, evidence indicates that the Araucanian/Mapuche system, while by no means static or unchanging in the 19<sup>th</sup> Century, could *not adapt quickly enough* to Chilean encroachment and the spread of new technologies (Collier and Sater 2004).

This came to a head in 1851, after a presidential election wherein the runner-up, General José Maria de la Cruz, staged a brief rebellion against the president-elect Manuel Montt (Collier and Sater 2004; Guevara 1908). Bengoa argues that “internal divisions” amongst the Mapuche led to the recruitment of “thousands of warriors” or *indios amigos* from the area of Arauco south of Concepción to fight with Cruz (Bengoa 2000). This “rebellion” was short-lived and quickly quashed by northern forces, but did considerable damage to the popular Chilean perception of the Araucanians. In fact, there is a marked increase in the amount of rhetoric against them. Political and civic leaders editorialized about the “drunk,” “savage,” “dishonest,” “thieving,” Araucanians and the need for measures to finally bring the whole of the Araucania under Chilean control (El Mercurio 1859; Saavedra 1860). These attitudes gained significant traction in the minds of most Chileans, and which in large part remain to the present day (Bengoa 2004; Guevara 1908; Lewis 1994; Vicuña 1868a; Millamán 2006; Navarro 2008[1890]).

*Resilience Cycle: Release and Reorganization/Exit Phases-- “Pacification” of Araucania, AD 1860-1885*

The turbulent years of 1850-1859 were marked by struggles between different Chilean political parties (Collier and Sater 2004) and steady encroachment on Araucanian lands (Bengoa 2000, 2004; Navarro 2008[1890]). In early 1859, the majority of Araucanians between the Bio Bio River and Valdivia (with the exception of those living closest to Valdivia and some living near Purén—see Bengoa 2000:169) engaged in the penultimate general offensive against invasion, which offensive would devolve into a state of general warfare for the next 24 years (Villalobos 1985). This research suggests the 1859 offensive marks a transition to a release phase in the ARC, as direct military confrontation against the Chileans engulfed most of the Araucania, including the area around Santa Sylvia. This general offensive destroyed many of the Chilean settlements between the Bio Bío and Toltén Rivers, but did little else to halt buildup of the Chilean

military and plans to eventually “pacify” the Araucania (Bengoa 2000; Millamán 2006; Navarro 2008[1890]; Vicuña 1868a).

The plans to invade and conquer the Araucania became the work of Chilean Colonel Cornelio Saavedra, who drew up strategies beginning in 1859 (Navarro 2008; Saavedra 1870). Saavedra’s plan was, in brief, one of attrition though extremely sanguine. Instead of a direct invasion or assault, Saavedra planned to take the lands more or less already in Chilean hands between the Bio Bio and Malleco Rivers (see Figure 81) from the coast to the Andes and build forts all along this new frontier. Then, once controlled, colonize the new area while preparing for the next advance to the Traiguen or Cautín Rivers. Saavedra planned to eventually arrive at the Toltén River and then march east and take Villarrica, Pucón, and the area around Santa Sylvania (cited in Bengoa 2000; Navarro 2008[1890]; Saavedra 1861; Vera 1905). The plan, presented in 1861 to the Chilean congress, was fiercely debated amongst politicians and others in the military. Saavedra went ahead with plans and established the cities of Mulchen and Angol while sending troops south from Concepción to Arauco and elsewhere along the Nahuelbuta range (Vera 1905). The Chileans found success on both fronts, due to numerous *indios amigos* that had converted to Christianity and regularly interacted with the Chileans (Navarro 2008[1890]).

Again, this research argues that the number of *indios amigos* impacted the ability of Araucanian leaders to effectively mount a resistance to Chilean encroachment, as described above, and contributed directly to the breakdown in networks and the overall resilience of the Araucanian cultural system. Internal strife between previously-allied Mapuche groups caused severe problems in resisting the Chilean advance. Numerous *lonko* along the frontier had been receiving payments from the Chilean government for land use, peace treaties, and other reasons, which in turn caused a breakdown in communication and cooperation with *regua* and *ayllarehue* elsewhere in the Araucania (Bengoa 2000). Because of these payments, these *lonko* felt allied with the Chileans and



Figure 81: Map showing Saavedra's plan for invasion and conquest of the Araucania.

declared “neutrality” during the uprising of 1859 and while Saavedra made plans for the invasion (ibid; Coña 2002).

Into this mix around 1862 came a Frenchman named Orélie-Antoine of Tounens who declared himself “King Aurelio” of Araucania and Patagonia. Orélie-Antoine began to seek support amongst the Mapuche and, inexplicably, found several lonko willing

to ally with him, perhaps under the belief that France would side with the Araucanians against the Chileans (Braun 1973; Guevara 1913). The “reign” of Orélie-Antoine was very brief, as he was soon captured by the Chilean military and sent back to France<sup>6</sup> (Collier and Sater 2004). Though somewhat odd, the story of “King Aurelio” serves to illustrate the divisions that existed amongst the Mapuche at this critical time. That even some *lonko* were willing to support such an individual reveals apparent desperation in the face of considerable changes to Araucanian society. Again, disunity amongst previously allied *regua* and *ayllarehue* irreparably harmed the chances for the Araucanians to confront the Chileans and maintain independence over the next two decades (Millamán 2006).

The 1860s and 1870s saw some of the bloodiest and most vicious campaigns, particularly on the part of the Chileans, compared to the previous 300 years of conflict. Despite initial success, Saavedra’s plan was rejected by the Chilean congress, leading Saavedra to announce his resignation and return to Santiago (Navarro 2008[1890]; Vera 1905). Military forces in place continued to occupy Angol and Mulchen, while coastal forces controlled Lebu. Several *parlamentos* were held, both amongst Mapuche and between Mapuche and Chileans. On the Mapuche side, Quilapán was elected *toqui* and endeavored to unite various bickering *ayllarehue* from the coast to the Andes, seeking to gather sufficient troops for an offensive against the Chileans in 1865 (Gay 1913; Vera 1905). A *cahuin* near Budi Lake held by numerous coastal *lonko* declared neutrality, which would last until 1881. This neutrality allowed Chilean naval forces the unopposed ability to land soldiers for the interior fighting (Bengoa 2000; Navarro 2008[1890]).

It is suggested here that for these Araucanians and based on the actions of these *lonko* and other leaders, the Araucanians along coast the transitioned to a reorganize/exit phase in the ARC, entering a new RC wherein the political and economic structures appear to have come under the authority of the Chilean state. Though the documentary

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6 Orélie-Antoine tried to return to his “kingdom” on subsequent occasions without success, eventually dying in Buenos Aires (Collier and Sater 2004; Navarro 2008).

evidence suggests that these coastal Araucanians did not anticipate losing autonomy, they nonetheless made decisions that permitted the Chileans to establish control (Coña 1999; Guevara 1902; Navarro 2008[1890]). This, argued here, may have had a domino effect on the rest of the Araucania in the subsequent decades.

Saavedra's replacements had limited success in advancing the frontier, generally confined to control of interior holdings and coastal establishments. Overcoming opposition to his original 1861 plan, Saavedra was again given control of frontier military operations in 1867, quickly calling for more troops to spread out across the Malleco frontier line to establish permanent control (Navarro 2008[1890]). The so-called "War of Extermination" began in 1868 (Lara 1889b; Vicuña 1868). According to Bengoa, between November 1868 and April 1869 the Mapuche had over 400 casualties, 100 prisoners taken, and lost more than 11,000 heads of cattle, sheep, and other animals (2000:222). Newspapers in Santiago, Valparaiso, and elsewhere decried the "massacre" of the Araucanians but little was done by the Chilean government to detain the "Scorched Earth" policy enacted by Saavedra and his subordinates (Bengoa 2000; Navarro 2008[1890]). Attempts at *parlamento* failed in 1870, though the viciousness and strength of the fighting did diminish, or at least did not achieve the same levels as 1869 (Lara 1888; Vera 1905). Though initial fighting was centered along the Malleco River frontier, it is possible that Araucanians in the area of Santa Sylvia sent warriors and foodstuffs to aid in the fighting, and incorporated refugees into local *lof* and *regua* as they had in the past (Dillehay 2007), though this is speculative.

In 1870, Saavedra was named Secretary of War and returned to Santiago, leaving General José Manuel Pinto in charge of the war. Pinto was the initial architect of the "scorched earth" policy, permitting countless depredations and unchecked pillaging by his troops (Bengoa 2000; Guevara 1913). In 1871, Pinto was replaced by General Basilio Urrútia due to increasing hostilities between Chile and a Peru/Bolivia alliance (Navarro 2008[1890]). Urrútia, directed by the government in Santiago, suspended most

frontier operations between 1871 and 1877 as full-scale war erupted between Chile and Peru/Bolivia in 1877 (Collier and Sater 2004). Even through limited operations, Urrútia managed to establish a new frontier line through Traiguén, carried out with limited fight from the Araucanians in the area, including from the northwest in Purén-Lumaco (see Chapter 8; Bengoa 2000; Lara 1888b; Navarro 2008[1890]). The establishment of the Traiguén line resulted in several thousand settlers moving into the area. It seemed that, at least to many Chileans the occupation of Purén marked the complete pacification of the Araucania (Medina 1887).

Such was not to be, though not directly from the efforts of the Mapuche. Though the efforts to control Araucania continued, a considerable number of the front line troops were moved north to fight Peru/Bolivia, depleting the ability of the Chileans to continue their march south (Izquierdo 1989b). The removal of troops precipitated increased hostilities, which included the murder of *lonko* Domingo Melín near Traiguén (Bengoa 2000). Angered over the murder of a *lonko* and the continued depredations by the Chilean forces, the Araucanians committed to a final general offensive against the Chileans in 1881, beginning with two attacks on Traiguén in the spring and summer, respectively (Bengoa 2000).

This offensive was met by a fully-modernized army, by late 19<sup>th</sup> Century standards, composed of troops with several years of experience fighting in the War of the Pacific. The Chilean forces now had with repeating rifles, train support (the new line reaching as far south as Angol), and telegraph communication against which the Araucanians, still fighting with lances and arrows, could not adapt quickly enough (Bengoa 2000; Navarro 2008[1890]). In essence, it was a massacre. Though Araucanians from the coast (Cañete, Budi, Toltén) in the interior (Purén -Lumaco, Collipulli) and the mountains (including near Santa Sylvia) finally united in late summer 1881, it was too late (Coña 2002). The Araucanian attack began with the destruction of Nueva Imperial and a march on Tirua and Traiguén, but major losses at Ñielol near Temuco broke



the offensive (Lara 1888b). By the end of November 1881, it was over. The Chilean commander, Gregorio Urrutia, demanded the surrender of all Araucanian troops and subjection to the Chilean government at a *parlamento* in 1882 (Bengoa 2000; Coña 2002; Vera 1905). Countless Mapuche warriors fled to the mountains to engage in guerilla warfare, but information indicates that the majority of Araucanians became subject to the Chileans and were placed on reservations (*reducciones*) scattered throughout the Araucania<sup>7</sup> (Navarro 2008[1890]; Vera 1905).

With the central valley under Chilean authority, plans began to march up the Toltén River and consolidate Pucón-Villarrica and the surrounding area into the Chilean republic (Bengoa 2000). Urrutia and his troops first marched to the south of Villarrica, establishing Cunco in late 1882 with limited resistance. A related force marched north of Villarrica and founded Curacautín at the same time (Guevara 1908; Lara 1888b; Navarro 2008[1890]; Subercaseaux 1883). Only Pucón-Villarrica remained as the last symbol of Araucanian resistance. On 1 January 1883, Urrutia sent the Minister of War in Santiago a telegram, stating that he had “taken peaceful possession of the fort where was founded the city of Villarrica” (Navarro 2008[1890]:356). Later, the army marched east towards Pucón (Pukong, in Subercaseaux’s account), founding a fort near the Palguín River about 13km/8mi from Santa Sylvia, built to protect a pass into Argentina (Subercaseaux 1883). It may be that most of the warriors from the area around Santa Sylvia may have gone to the battle at Traiguén, which would account for the peaceful occupation of Santa Sylvia in 1883, though this is speculative. After a little over 400 years (from the arrival to the Inka in about AD 1475 to 1883), the Araucanians/Mapuche in Chile were finally defeated and subjects to a system not their own.

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7 Unlike in other areas of the Americas, the reservation system in Chile did not generally include depopulations and movements of people. Instead, certain (considerably smaller) territories were given to *rehue* and *ayllarehue*, under the supervision of the Chilean government.

*Resilience Cycle: Reorganization/Exit Phase, AD 1883-1900*

Chilean control over the area around Santa Sylvia began what this research hypothesizes to be a reorganization/exit phase in the ARC. In previous phases, as argued in previous chapters, the Araucanians were able to successfully rebound to the same RC, from release to reorganization/rebound, and conservation, while perpetuating the same political, economic, social, and ideological structures. Upon their “defeat” by the Chileans, political and economic structures came under the control of the Chilean state. Though *lonko* maintained some measure of authority over their *lof*, *regua*, and *ayllarehue*, the final say in political and economic matters lay not with these leaders but with authorities in Santiago. Socially, some practices such as polygamy were ended and trade networks were curtailed though not completely eradicated, and Catholicism and evangelical Christian groups experienced conversion success (Cooper 1946; Faron 1968; Foerster 1996; Guevara 1909; Latcham 1924; Titiev 1951). Socially, the Araucanians around Santa Sylvia were placed on nearby *reducciones*, curtailing the trade previous trade and kin networks and limiting settlement patterns (Pucón 2004). By the end of the 19<sup>th</sup> Century, this research argues the Araucanian culture system was firm in the Chilean basin of attraction and had entered into a new RC<sup>8</sup>. This cycle coincided with new issues of identity and ethnicity that would affect Araucanian reactions to the new political, economic, social, and ideological structures of their cultural system in the coming century.

### **The Mapuche Today**

*Resilience Cycle: Reorganization/Exit Phase Continued and Growth Phase—The Early 20<sup>th</sup> Century*

The period after the “pacification” of the Araucanians is argued here to be a phase

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8 This may be called a Mapuche Resilience Cycle, or MRC.

of reorganization/exit that transitioned into a new RC and growth phase. Growth appears to have come about in the new ways in which the Araucanians adapted to the Chilean government, including the use of the Chilean peso, capitalist business practices, and political organization (Bengoa 2007). How would the Araucanians adapt to these new systems? What aspects of prior political and economic structures might be maintained? What new methods for resilience might be employed by Araucanian agents and communities? Growth may also be seen in population increase during this time (Millalén 2006) though perhaps most important to this research are the changes that came about in the political, economic, social, and religious structures of the Araucanian cultural system in the 20<sup>th</sup> Century, described below.

With the Araucanians finally “pacified,” movements of Chileans and foreigners into the Araucania began in earnest. As during the Chilean conquest, the train and telegraph played important roles in transporting soldiers, families, and materiel for the establishment of new cities and towns between the Malleco River and Valdivia (Bengoa 2000). Linking Santiago with Valdivia via telegraph allowed for immediate communication and the train network provided speedy movement of people throughout the territories previously held by the Araucanians. This helped solidify state control throughout the Araucania. Not all colonization came from Chileans—indeed, many southern cities such as Valdivia were founded or populated by Germans, Dutch, Swiss, and other European immigrants. These settlers, coupled with their Chilean neighbors, caused a gradual decrease in Araucanian lands (Bengoa 2007; Treutler 1885)

Initially, Chilean law indicated that **1)** the Mapuche should be granted specific, set parcels of land they should use to “cultivate and civilize” like elsewhere in Chile (Bengoa 2007; Marimán 2006), and **2)** those lands could not be sold to by individual Mapuche to outsiders (Bengoa 2000). The law was ostensibly on the side of protecting Araucanian interests while trying to integrate them more fully into Chilean society (Guevara 1908). By limiting the ability to sell lands, the government sought to protect the Araucanians

from speculators and business interests that would take advantage of business practice, Chilean law, and even the Spanish language ignorance. Those people dispossessed by the war would receive lands, colonizers would acquire non-populated areas owned by the state, and both citizens and indigenous would build up Chilean society (Medina 1887).

Reality, however, was a different story. The creation of *reducciones*, as noted before, did not generally involve the movement of large groups of people. Rather, *regua* and *ayllarehue* identified by the government were given set parcels of land, which were then subdivided amongst the families already living therein (Haughney 2006). Those dispossessed by the war, or who crossed into Chile from Argentina, were placed on small *reducciones* during a period of *radicación*, or “localizing”, scattered throughout the Araucania which would last from 1883 to 1930 (Bengoa 2006; Haughney 2006). Though the government identified these *reducciones* as “grant titles” (*titulos de merced*) and were intended to be seen as humanitarian, *radicación* nonetheless constricted Araucanian pastoral lands and migratory ability (Hernández 2003; Marimán 2006), and many Araucanians received no land at all<sup>9</sup> (Haughney 2006). In addition, colonizers would often illegally squat on *reducción* land, place their fences over the actual borders, or find other inventive ways to gradually decrease Mapuche holdings (Bengoa 2000). Lack of Spanish fluency, the tangled web of bureaucracy, and the overall bigotry against the Mapuche left many families and communities with little or no recourse against the usurpation of their lands that continued well into the 20<sup>th</sup> Century<sup>10</sup> (Bengoa 2006).

As would be expected, the imposition of the *reduccion* system and incorporation into the Chilean state caused change in Araucanian society in the general area of Santa Sylvia and in the wider Araucania. Where some degree of migratory ability existed previously, the Araucanians were forced into strict agro-pastoralism on circumscribed

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9 According to Bengoa (2006), under the *radicación* system, each Mapuche was granted an average of 6 hectares of land, with about 500,000 total hectares throughout the Araucania. This is in contrast to foreign colonists who were granted “up to 500 hectares per head of family” and Chileans “received 50 hectares per head of family” (Haughney 2006:23).

10 And, argued here, continues to the present day, despite renewed efforts by the government to curtail encroachment on Mapuche lands.

lands, which included the imposition of the Capitalist market and the Chilean peso (Bengoa 2007). Kin ties remained essential for trade, marriage, and ritual practice, but lessened as the decades progressed and as business-centered relationships increased. Haughney (2006) points out that through the loss of autonomy, many *lonko* also lost prestige, further eroding kin ties and leading to Mapuche complaints to the Chilean government instead of to their traditional leaders. Oral histories indicate that *nguillatun* festivals and *kuel*-related ceremonies also diminished in frequency outside of areas such as Purén-Lumaco, and even there the number of *kuel* constructed and other ceremonies were reduced (Dillehay 2007). The imposition of the capitalist system, coupled with dispossession and alienation, destruction of land, and the loss of countless livestock, increased dramatically the number of impoverished Araucanians. These individuals and families drifted to the larger cities such as Temuco and Los Angeles and eked out a living through begging and charity (Bengoa 2007).

The early 20<sup>th</sup> century also marked the beginning of serious anthropological and archaeological investigation in the Araucania and amongst the Mapuche described in Chapters 7 and 11. While laying the foundation for future anthropological work, these investigations also sought to **1)** document for posterity the “vanishing” practices of the Mapuche (Guevara 1913), and **2)** describe the Mapuche for a wider, worldwide audience for comparison to other indigenous groups under investigation by “western” anthropologists (Latham 1909). In theory, the documentation of Mapuche social practice, organization, and belief would have the added effect of educating the Chilean populace and strengthening the Mapuche position with the government in Santiago. Instead, the opposite seems to have transpired—long-held beliefs about Mapuche barbarity, drunkenness, and overall lack of civilization (due in no small part from the abovementioned penurious circumstances of many Mapuche) seems to have increased or become more entrenched, along with concurrent clamors from businessmen and landowners for the repeal of laws prohibiting the sale of *reducción* lands (Haughney

2006).

The year 1930 saw the end of *radicación* and the creation of new *reducciones*, but also saw new attempts to privatize most *reducciones* into individual, family-owned plots that, if they were not used productively, could be sold to individuals willing to invest (Bengoa 2006; Haughney 2006; Stuchlik 1974). These attempts mobilized numerous Mapuche into community organizations that objected to attempts to change the law and further usurpation of *reducción* lands and sought protection through direct political means. For the next 30 years, a continuous back-and-forth between numerous Mapuche organizations, private interests, and the Chilean government sought to increase Mapuche land holdings, halt the acquisition (both legal and illegal) of *reducción* lands, and place *reducciones* within the grasp of privatization advocates<sup>11</sup>. Overall, despite the best efforts of their advocates, Mapuche lands eroded further, leading to greater poverty, displacement, and frustration.

*Resilience Cycle: Conservation Phase—Before the Dictatorship, AD 1960-1973*

This frustration led to an increase in the number of organizations seeking redress of grievances and protection of Mapuche interests, many of which were left-leaning. Though not specifically communist, these organizations were nonetheless seen as “radicalized” and “unpatriotic” (Haughney 2006; Hernandez 2003). Organizations in this vein became, to some degree, substitutes for previous social organization such as *regua* and *ayllarehue*. No longer were kin ties and relations of utmost importance. Rather, information suggests that political and economic interests came to the fore and defined the associations between individuals and communities (Bengoa 2007). Increased inflation and poverty nationwide brought poor Chileans and Mapuche together in common cause, and attempts at agrarian reforms in the 1960’s only exacerbated the tensions between

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<sup>11</sup> For further details see, Foerster and Montecino (1988), Hernandez (2003), and Luna (2007), as the debates during this time period are too extensive to summarize here.

landholders and impoverished workers (Haughney 2006). It is hypothesized here that new Araucanian culture system in the area around Santa Sylvia and the wider Araucania had entered into a conservation phase. Political and economic structures remained under the purview of the Chilean state though subject to some modification by Araucanian actors. The reorganization of the early 20<sup>th</sup> Century had given way to an establishment of methods and organizational patterns amongst the Mapuche and in deference to the Chilean state, or a conservation phase that would continue for several decades.

Ethnographers and archaeologists continued working throughout the Araucania despite the tense circumstances, as outlined in Chapters 7 and 11. Faron published numerous articles on Araucanian kinship organization (1954) with comparisons to Native American groups in the United States (1961b), ancestor worship (1961a), origin myths (1963) and overall social and religious organization (1968). Archaeologists working in the Araucania began to delineate the historical-cultural sequences (Berdichewsky 1954) and overall archaeological background for south-central Chile and western Argentina (Menghin 1962; see also Chapter 7). Numerous ethnohistorical accounts were published, particularly on the colonial period (Góngora 1970; Jara 1970; Medina 1972). Much of this work, though important, did little to change the social, political, and economic problems confronting the Araucanians.

The election of Salvador Allende in 1970 offered hope for changes between the Araucanians and the Chilean government, and indeed the Chilean congress debated new indigenous laws (Collier and Sater 2004). However, most plans were to provide assistance, both technological and educational, in order to make individuals and lands more productive, rather than give back stolen lands or deal with the tension between Chileans and Araucanians, and amongst the Araucanians themselves (Correa 2005; Haugney 2006). But before new laws could be passed, the government of Allende was overthrown in September 1973, replaced by the 17-year dictatorship of army general Augusto Pinochet.

*Resilience Cycle: Reorganization/Rebound Phase--Pinochet AD 1973-1990*

Informants living in the area around Santa Sylvia indicated that for the Araucanians in the region, if not all Chileans, the Pinochet dictatorship could be labeled as “repressive.” Thousands of so-labeled communists, rebels, and other dissidents were executed or “disappeared,” with thousands more imprisoned and tortured particularly between 1973 and 1978 (Caniqueo 2006; Collier and Sater 2004). Pinochet and his followers, supported by the United States and other like-minded governments, sought to stamp out socialism/communism (particularly prevalent during the Allende administration) while enacting socially conservative and neo-liberal economic reforms. This included the privatization of previously-nationalized businesses and land sales to multi-national corporations, while at the same time enacting draconian social measures such as curfews, military patrols, and the suppression of even suspected dissidence (Caniqueo 2006; Haugney 2006; Luna 2007).

For the Araucanians around Santa Sylvia and other areas of the Araucania, the dictatorship imposed conformity to Chilean “norms.” These norms included forced education at government schools, often by removing children from their families, the suppression of Mapudungun as a spoken language, and the repression of religious practice not condoned by the state, i.e. Catholicism or Protestantism (Quiñanao, personal communication, 2010; Gundermann et al. 2010). This research suggests that the Pinochet dictatorship, perhaps more than anything, obliged major reorganization in Araucanian social, political, and economic practice, more broadly in the Araucania but also in the area around Santa Sylvia (Quiñanao, personal communication, 2010). In many areas, such as Purén-Lumaco, previous cultural patterns appear to have been retained but diminished significantly (Dillehay 2007).

Neoliberal reforms during the dictatorship also sought to strip collective rights to *reducción* lands and place particular parcels in private hands, which may be the case for Santa Sylvia. Previous Chilean law, which prohibited the individual sale of Mapuche



land, was seen as “anti-free market” and that the Araucanians were impoverished because market forces could not work on Mapuche lands (Hernandez 2003). Decree Law 2568 was enacted in 1978 which laid out a framework for subdividing *reducciones* into individual parcels, and by 1986 nearly 60 percent of all *reducciones* had been subdivided (Haughney 2006:56). To ease the transition to private ownership, the law stipulated that each land parcel could be freely sold or bought in 20 years. This law, coupled with a propaganda campaign, limited the amount of protest that erupted when the law was enacted in 1978, as most Araucanians accepted to the idea of individual ownership so as not to lose their lands by direct government acquisition as many feared (Haughney 2006; Luna 2007).

Perhaps most importantly, and somewhat paradoxically, the Pinochet regime denied the actuality of the existence of indigenous groups. All people in Chile, Pinochet argued, were Chileans—there were no Aymara, no Diaguita, and no Mapuche. Ergo, no law could be passed specifically protecting the rights of indigenous groups because there was no such thing (Hernandez 2003; Luna 2007). This legal mentality would have important repercussions for the recognition of Mapuche rights, and has influenced Chilean law to the present day.

For its numerous faults, the dictatorship did heavily invest in national infrastructure, funding universities that led to the creation of new departments of anthropology and a concurrent increase in archaeological, ethnographic, and ethnohistoric investigation among the Araucanians described in Chapters 7 and 11. Dillehay initiated projects in several areas of south-central Chile and western Argentina, particularly in the area of Purén-Lumaco (Dillehay 1976, 1985, 1990a, 1990b, 1992, 2007), and directed students in future investigations. Gordon excavated colonial-era sites near Calafquen Lake (Gordon 1985), cemeteries (1978, 1984), and Santa Sylvia (2011). Historians such as Villalobos, Silva, Retamal, and Bengoa wrote extensively on Araucanian ethnohistory and influenced students to the present day (Goiciovich 2002, 2006; Tellez 2008). Despite

denying their existence, the Pinochet regime influenced greatly investigations into indigenous groups throughout Chile.

The 1980's saw the easing of the repressive measures enacted in the previous decade, permitting some public protests and the airing of general discontent with the government (Collier and Sater 2004). In 1988, Pinochet called for a general plebiscite, allowing the people to decide whether or not he should remain in power. In a close vote (55% against Pinochet, 44% in favor), the dictatorship ended with a general election in 1989 wherein center-left candidate Patricio Alwyn was elected to a six-year term<sup>12</sup> (Haughney 2006). Oddly, and despite the repression under Pinochet, the majority of the Araucanians who voted (55% to 44%, the inverse of the general population) did so in Pinochet's favor. This may be similar to siding with the Spanish during Chile's independence, going with a devil-you-know pragmatic approach. Many Araucanians may have believed that siding with Pinochet would be the best way to protect their land interests and personal protection (Bengoa 2007).

#### *Resilience Cycle: Conservation Phase--The Mapuche Since 1990*

The last two decades, perhaps more than any time before, has brought to the fore the idea of what it means to "be Araucanian," and the role of the Araucanians in the overall Chilean state. During this period, it is argued that the Araucanians entered into a conservation phase in every sense of the word: a renewed desire to conserve those aspects of the past that had created the Araucanian culture system and provided Araucanian identity and ethnicity. This phase also included the conservation of the new cultural system structures developed in the 20<sup>th</sup> Century, including the ways in which Araucanians

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12 Haughney (2006) points out that, despite losing the election, the Pinochet regime ensured continued power by stacking the Supreme Court with allies, making prosecution of the military for human rights violations in the 1970's illegal, ensuring a majority of conservative members of the congress, and placing representatives from each branch of the military in positions to dictate policy and vote on congressional measures. Thus, despite the leftist parties coming into presidential power, considerable power remained in the hands of Pinochet allies and remains so today.

communicated with the government, as well as trade and social interactions amongst themselves and the Chileans.

The election of a new left-leaning government seemed to indicate, in the beginning, a change in the relationship between the government and all indigenous groups in Chile (Hernandez 2003). In 1990, the *Consejo Nacional de Pueblos Indigenas* (National Council of Indigenous Peoples, or CONAPI) was formed to press for “reform of indigenous policies” which organization was closely allied with national and international human rights commissions (Haughey 2006:69). At the same time, Araucanian political groups, such as *Consejo de Todas las Tierras* (All Lands Council), began taking back usurped lands and called for political and social self-direction and autonomy. These efforts were coupled with an increase in the number of non-governmental organizations (NGO’s) that arrived in an effort to improve the Mapuche condition and advocate for increased rights (Ray 2007; A. Saavedra 2010). Though not widespread, these movements had the side effect of worrying Chilean political leaders who, under normal circumstances, sided with the Mapuche requests for recognition and reform, but balked at the idea of granting autonomy (Millalén 2006). Many movements were seen as being “subversive” and “dangerous” (El Mercurio 1992). Additionally, numerous Chilean leaders reiterated the belief that the Araucanians were not actually an “indigenous” group because historical sources suggested they came from other areas and were not “native” (Chuecas 1992, cited in Haughey 2006:72; see also Dillehay 2002).

Over the objections by the Araucanians, the new *Ley Indigena* (Indigenous Law) passed in 1993. The law attempted to define what would be considered “indigenous,” such as through ancestry percentages, how those indigenous groups so defined would be treated by the Chilean state, the roles and responsibilities of the state-defined indigenous groups and vice versa, and in what direction those roles and relationships would go into the future (Ley N° 19.253). The new law created the *Consejo Nacional de Desarrollo Indigena* (National Council for Indigenous Development, or CONADI), which would

oversee the implementation of the law and act as the intermediary between the central government and indigenous groups<sup>13</sup> (Castro 2005; Haughney 2006). It seemed, to some observers, that the Chilean government was making an honest attempt to deal with a difficult situation and make genuine reparations to the Araucanians through Ley N°. 19.253, with funds set aside for infrastructure development, education, and resource management (Heise 2001; Ray 2007).

Despite these efforts, many Araucanians remained suspicious of the government motives and dissatisfied with the lack of legal recognition of the Araucanians as a specific “people” (Castro 2005; Ray 2007). Divisions arose between conciliatory communities and individuals, who looked to take what the government was offering without making a fuss in order to make a living, and those who saw the government overtures as disingenuous and advocated for Mapuche autonomy (Castro 2005; Haughney 2006; Hernandez 2003; Quiñanao, personal communication, 2010). To further exacerbate the problem, several hydroelectric projects were initiated in the southern portion of the country that directly affected Mapuche lands (Nesti 2001; Ray 2005). These projects coincided with an increase in logging efforts throughout the country (Haughney 2006). Conflict began to erupt in the mid-1990s between logging companies, government officials, engineers, and the Mapuche over the aforementioned projects, most times peaceful, many times violent, which conflict continues to the present day (Hernandez 2003; Ray 2007).

One side-effect of these events has been resurgence in “indigeneity” (Figure 82). In other words, the fights over what it means to be Araucanian has led to an increase, in many places, of “being Araucanian” or practicing ancient customs in an effort to maintain both Araucanian identity and the cultural past (Bacigalupo 2009). In some cases this has been seen in renewed practice of *nguillatun* festivals, such as near Santa Sylvia, and reinforcing kin ties (Quiñanao, personal communication, 2010). In other cases, the

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13 The relationship between the Mapuche and CONADI has been, at best, tenuous.

placement of Araucanian cultural symbols, such as the painting of a giant *kueltrun* drum in the plaza of Purén, or in traditional dance troupes touring the country and the world presenting Mapuche culture through dance have served to highlight the desire on the part of many people to protect the Araucanian cultural past. This has the benefit of placing emphasis on “saving” Araucanian culture for posterity, something highly important to anthropologists, but at the same time this “nativist revival” has the tendency to glorify



Figure 82: Graffiti on a wall in Concepción declaring “Resistance” and “Autonomy” for the Mapuche.

the past, ignore what may be considered “lesser” details, or outright invention of new practices passed off as “traditional.”

### **Summary: Araucanian Resilience in the Araucania**

In brief summation, from a historical perspective through the framework of RT, the Araucanian cultural system in the wider Araucania and in the area around Santa Sylvania remained strong through the 16<sup>th</sup>, 17<sup>th</sup>, and 18<sup>th</sup> Centuries, apparently able to “absorb” the Spanish disturbance with limited immediate effect. In the area around Santa Sylvania, the Araucanians adopted horses, sheep, cows, wheat, and barley, likely expanded the importance of *ayllarehue* social organization and became incorporated into a larger *butanmapu* along the western flanks of the Andes (Goicovich 2006). No evidence thus far recovered indicates persistent direct contact with Spaniards living north of the Bio Bio frontier. Thus the effects of prolonged contact, as opposed to the frontier, appear to be minor along the foothills. The Spanish basin of attraction did not have the strength to fully shift the Araucanian cultural system away from their own basin of attraction, the Araucanian basin having enough resistance and latitude to allow for incorporation of useful Spanish goods without a shift to another stability domain (see Figure 16a; see Chapter 14)

Therein, however, lay the “problem.” Continued contact with the Spanish and later Chileans along the frontier led to gradual changes in the political, economic, and social structures along the frontier, which seem to have reverberated to the area surrounding Santa Sylvania. Those Araucanians living in the region seem to have remained enemies (*indios enemigos*) to the Spanish and later Chileans, while many of their relations to the northwest and along the coast slowly became *indios amigos* through converting to Catholicism, selling *lof* and *regua* lands, and generally allying themselves with the Spanish and Chileans. Thus, the structures of the Araucanian social system were

changed insomuch that it could not adapt to or absorb the disturbances from within and without. The Araucanian system along the frontier exited the ARC that had lasted for over 400 years, entering into a new cycle with changed structures within the cultural system first, before the rest of the Araucania. The Chilean basin of attraction, then, had sufficient pull to bring the Araucanian system to a precarious place on the stability landscape, which, with the occupation of Villarrica in AD 1885, shifted the Araucanian system towards the Chilean basin of attraction, from which it could not return.

For those living in the Santa Sylvania area, the exit from the ARC appears to have been less dramatic though still inexorable. With the breakdown in the political structures to the northwest, the Araucanians in the Santa Sylvania region do not appear to have been able to draw upon previous relationships for warriors and war materiel in order to successfully defend themselves against the Chilean army. Warriors possibly called upon to fight in the central valley prior to AD 1883 may have returned to the Santa Sylvania area few in number and unable to contend with the repeating rifles and military tactics of the Chilean army. Thus, when Urrútia moved up the Toltén River and marched to Pucón, little resistance from the Araucanians was forthcoming. The cultural system had already shifted stability domains and exited the resilience cycle that had endured for centuries.

## CHAPTER 14

### DISCUSSION AND CONCLUSIONS: ARCHAEOLOGICAL, ETHNOHISTORIC, AND ETHNOGRAPHIC SIGNATURES OF ARAUCANIAN RESILIENCE AT SANTA SYLVIA

The following chapter is intended to synthesize the information from the previous chapters into a holistic narrative that combines the archaeology, ethnohistory, and ethnography of the Araucanians at Santa Sylvia presented in this research through the theoretical framework of RT. As stated before, the intent of this research was to explore, from an interdisciplinary perspective, aspects of the Araucanian culture system that may have structured the rejection and expulsion of the Spanish. At the same time, those structures were used by Araucanian agents to maintain traditional cultural patterns with only limited incorporation of useful materials and effects from the Spanish. The Araucanians stand the only indigenous group in North or South America to **1)** successfully confront the Spanish from the outset of contact in the mid-16<sup>th</sup> Century; **2)** receive recognition as an independent people from the Spanish crown; **3)** incorporate useful European goods while actively avoiding others and limiting the hybridization and syncretism that affected so many indigenous groups in the Americas; and **4)** maintain political, economic, social, and ideological independence for more than 350 years. This feat was accomplished on Araucanian terms and not those of a foreign power.

Composed of a heterarchical “peer-group polities” (Dillehay 2007), this research has suggested that the disbursed, context-specific authority of this heterarchical social organization informed how Araucanian agents strategically restructured aspects of their society to confront the Spanish, incorporate and avoid goods and practices, and maintain the overall system structures that were developed several centuries prior to Spanish arrival (see Chapter 10). Drawing upon those peer-groups and other social networks, the Araucanians living at and around Santa Sylvia and the broader Araucania constructed



a cultural identity and ideology that became synonymous with anti-colonialism (*sensu* Loomba 2005) and independence, rejecting first the Inka and later the Spanish (Dillehay 2007). It is that identity or sense of “being Araucanian”, this research argues, that united geographically separated communities against the Spanish, formulated resilience and maintenance of the Araucanian culture system, and structured the ability of Araucanian actors to largely dictate the terms of their cultural development.

The flexibility of the Araucanian cultural system and the individuals therein also allowed for initial accommodation and cooperation. The Araucanians and Spanish interacted directly for some stretches of time in the Araucania in general and at Santa Sylvia in particular, during which the Araucanians incorporated useful materials, such as the horse, wheat, and barely (see Chapters 8 and 9), which were incorporated into overall cultural toolkit. Conversely, most aspects of Spanish culture, such as metallurgy, social organization, religious practice, were actively avoided. This accommodation also allowed the Araucanians to learn about the Spanish, particularly their military tactics, strengths, and weaknesses which would then be used against the colonizers until their complete evacuation and removal from south of the Bio Bio River.

Many of these points are elaborated upon below, based on the evidence recovered from investigations at Santa Sylvia, ethnographic interviews with informants in the region, and analysis of available documentary information through the framework of RT and the ARC. Then, RT is applied to the wider Araucania and how Santa Sylvia may fit with broader Araucanian history. Argue in this research, RT has the potential to show how this model can illustrate or outline the how a culture such as the Araucanians develops over time and how individuals within a cultural system can use identity, agency, and system structures to effectively perpetuate their culture over time and in the face of external disturbance or pressure.

## **Araucanian Resilience at Santa Sylvia**

As stated previously, this research has been guided by RT, which can provide a framework for understanding the development of the Araucanian culture system at Santa Sylvia both diachronically and synchronically. Cultural resilience, as used in this research, “is the capacity of a [cultural] system to absorb disturbance and reorganize[rebound] while undergoing change so as to still retain essentially the same function [and structural controls]” (Walker et al. 2004:5). As noted in Chapter 5, the base structures of a cultural system are political, economic, social, and ideological, and it is the process of development, maintenance, and autochthonous control of those structures by agents within the system that provides both stability and transformability, or resilience (*sensu* Thompson and Thurck 2009). A change in control to any one or a combination of these structures, or in the internal power relationships, signifies a shift in or change to the cultural system itself as this research argues. For example, Araucanian-related communities in central Chile were incorporated first into the Inkan and later Spanish empires, losing political and economic autonomy.

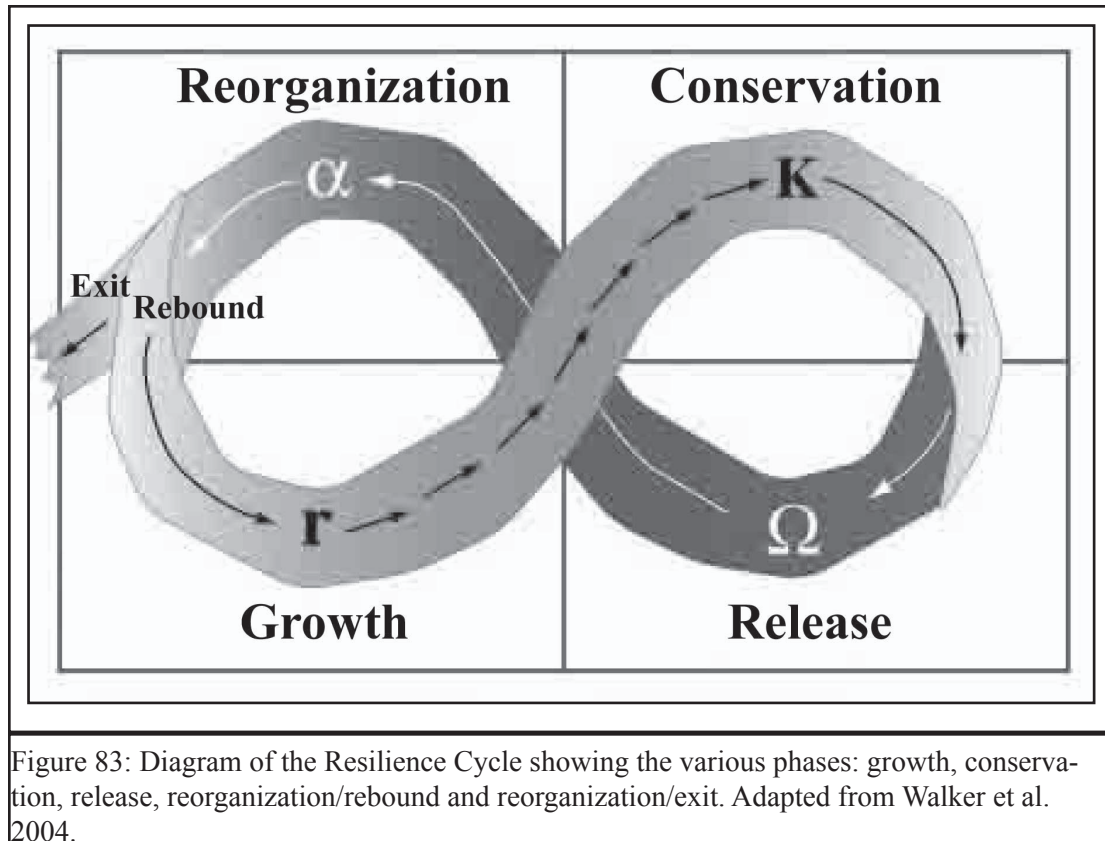
Power relationships within the structures of their cultural system changed from local to foreign control which created a new cultural system (Rosales 1989[1674]). These northern Araucanians, often called Promocoes or Picunche in the literature (León 1991). Even if one of the structures remains relatively unchanged (e.g. if a religious system continues while the political order is modified) the system itself is changed and is no longer resilient. The ability of these structures to be both stable and flexible, absorbing disturbance without experiencing a fundamental shift or change to the base structures, indicates that the system is resilient. Thus RT can incorporate the interplay between identity, agency, and power in the evolution of a cultural system as actors, utilizing their knowledge of self, those around them, and the system itself, either maintain or abdicate control over their culture and future development.

Archaeologically, system changes can be seen in various ways. This research suggests that if a system shifts from local to outside control, material culture will often reflect an increase in outside products such as non-local ceramics, foods, animals, burial goods, and other materials. Settlement patterns often change to reflect attempts at control by the foreign power, such as nucleation in cities or *reducciones*, or changes in household construction and structure. Different iconography can be introduced, reflecting a change in ideology or religious practice, and often a new genetic population, both foreign and mixed, can be seen.

Conversely, if a society is resilient to outside control or influence, in the framework of RT limited changes can be incorporated or “absorbed.” Some animals and foods may be utilized while ceramic styles and other material culture remain the same. Settlement patterns may change to reflect common defense, but not nucleation for control such as in a *reducción*. Traditional iconography may be augmented to reflect an increased recognition of “being” a part of a particular group in order to distinguish from the “other” or outside power. Overall, hybridized or syncretized patterns or practices appear limited through time and across space. The decisions to incorporate some things and avoid others devolve on the actions of individual agents within the cultural system.

### *Review of Resilience Theory*

Resilience is illustrated in the Resilience Cycle (RC; Figure 83). To review, cultural systems can pass through four phases of development at various speeds, times, and circumstances: growth, conservation, release, and reorganization/rebound or reorganization/exit. The phases need not be even or linear—a system can jump from growth to release, for example, according to what is happening and the actions of individuals—and if the system is unable to reorganize sufficiently, it loses flexibility and cannot “rebound” back into the cycle. It then “exits” into a “new” system and RC, within what is known as a stability domain (Figure 83; Gunderson and Holling 2004; Walker et



al. 2004). Stability domains contain basins of attraction, which this research defines as the sum of the variables that can constitute a system (see Chapter 5). In other words, a basin of attraction can be seen as an “ideal” or the way in which the individuals within a system perceive it to function and how they want it to function. This ideal encompasses the whole of the political, economic, social, and ideological structures within a cultural system. The actual system itself does not function perfectly, as systems are “continuously buffeted by disturbances...and decisions of actors that tend to move the system” away from the basin (Walker et al. 2004:1). Thus, as illustrated in Figure 84, a cultural system can be found on a stability landscape, affected by different basins of attraction. The actions of individuals within the system and their perceptions of it, affect which stability domain a system will be found based on the “attractive strength” of the basin (Walker et al. 2006).

To “reorganize” and “rebound” back into a RC does not mean that the

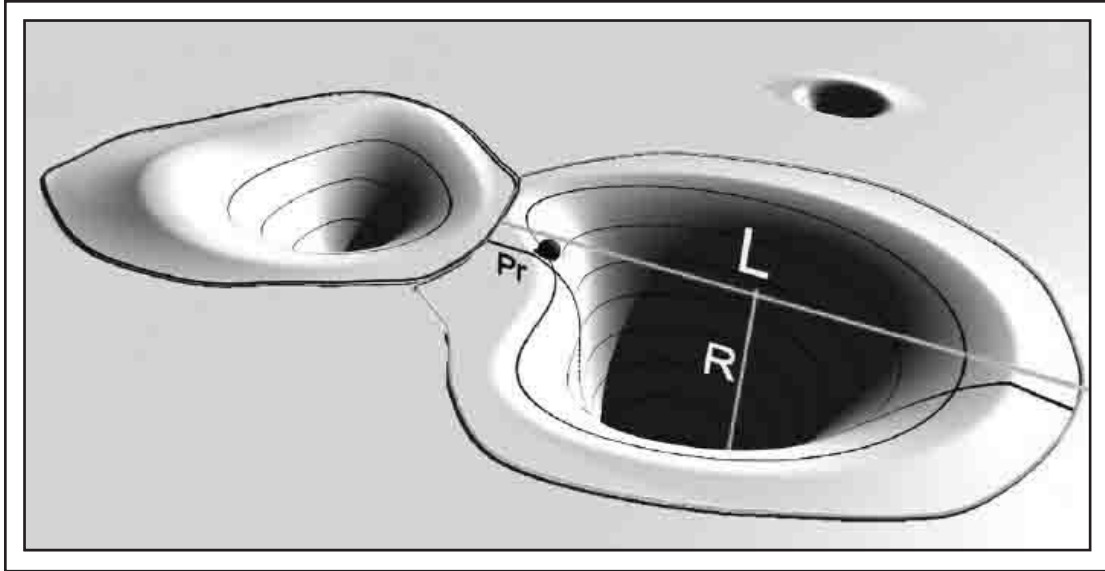


Figure 84: Diagram showing a stability landscape with two basins of attraction. L indicates the “latitude” of a basin, or the range of “pull” it can exert. R indicates the “resistance” of the basin, or the strength of pull--the deeper the basin, the stronger the pull. Pr indicates “precariousness” or the area in which a cultural system (black dot) runs the risk of being pulled into a new basin of attraction.

procedures and practices are exactly the same, or that a new phase is exactly the same as its predecessor. An important facet of RT, mentioned above, is the ability to “absorb” or incorporate outside disturbance. Thus, the incorporation of disturbance necessarily changes aspects of the RC phases. Fundamentally, however, this research argues that the underlying structures to the system remain. The modifications to the system do not introduce a “transformation” but rather illustrate the “adaptability” of the system (ibid:3). Thus, in one iteration of an RC the conservation phase will be distinct from another—some practices may be changed, or new materials may be incorporated—but the underlying structures that direct how actors incorporate those changes and maintain the system are largely unchanged.

In the present study, the Araucanian cultural system at Santa Sylvia was pulled between several basins of attraction: the traditional Araucanian basin this research argues was established around AD 1100 (see Chapters 8 and 12) and the new Spanish basin introduced around AD 1550 (Figure 85). A later Chilean basin was introduced

in AD 1820, replacing the Spanish (Figure 86). Prior to the arrival of the Spanish, no evidence has yet been found to indicate that the area around Santa Sylvania was affected by an outside basin, and remained stable<sup>1</sup> in its own developmental processes. The introduction of the Spanish basin of attraction brought the actors within the Araucanian cultural system to a crossroads: which direction would they, and the system, go? Could they overcome the strength of the Spanish basin, which was strengthened by military technology? Would power relationships remain the same or change from internal to external control? Would the effects of the Spanish basin and cultural system be too much for the Araucanian system to handle, or would the Araucanian agents be able to “absorb [the Spanish] disturbance” and “reorganize/rebound while undergoing change” to retain Araucanian control over the system and structures?

Systems, such as that of the Araucanians in the area of Santa Sylvania and the wider Araucania, can shift to a new stability domain without a specific event or impetus, and the difficulty in returning to the previous stability domain generally means the system will “cease to be” (Giddens 1984) by exiting the previous RC and entering a new one with different power relationships. This research argues that the changes to the base structures of a system (political, economic, religious, and social), move a system into a new stability domain, force and exit into a new adaptive cycle, and create a new system. To see this archaeologically is related to the broader aspects of incorporation and avoidance in RT. A new basin of attraction can be generally seen in the introduction of new material culture that suggests some form of outside influence. The “strength” of the basin is illustrated in its depth (see Figure 83). The new basin does not necessarily have the “attractive strength” to change the culture system, but nonetheless can exert some influence. Ethnohistorical accounts can be more explicit in defining the introduction of new basins of attraction, as they often provide specific information and dates regarding

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<sup>1</sup> The arrival of the Inka to the north may have introduced a new basin of attraction, but there is no direct evidence in the area surrounding Santa Sylvania that such a basin had much effect apart from possible economic interactions (Dillehay and Gordon 1986)

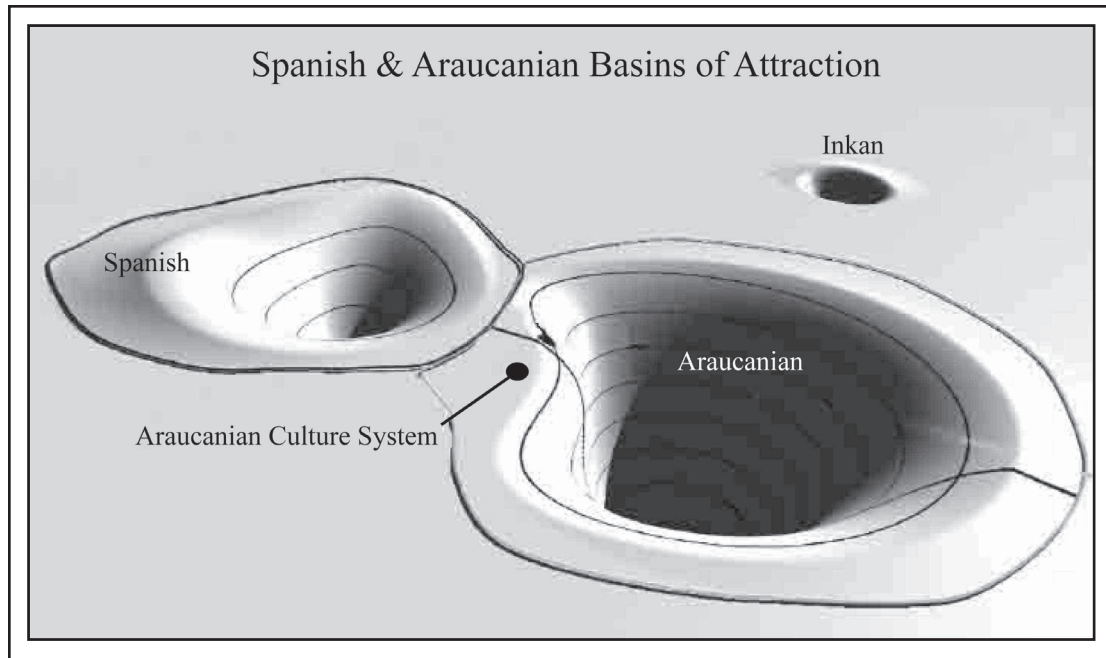


Figure 85: Stability landscape showing three basins of attraction exerting pull or influence on the Araucanian culture system (black dot). The Inka basin, to the right, no longer exerted control over the Araucanian system after about AD 1530, replaced by the Spanish basin. Though the Spanish basin exerted pull, the deeper Araucanian basin exerted enough pull on the cultural system that it was not pulled into the Spanish basin.

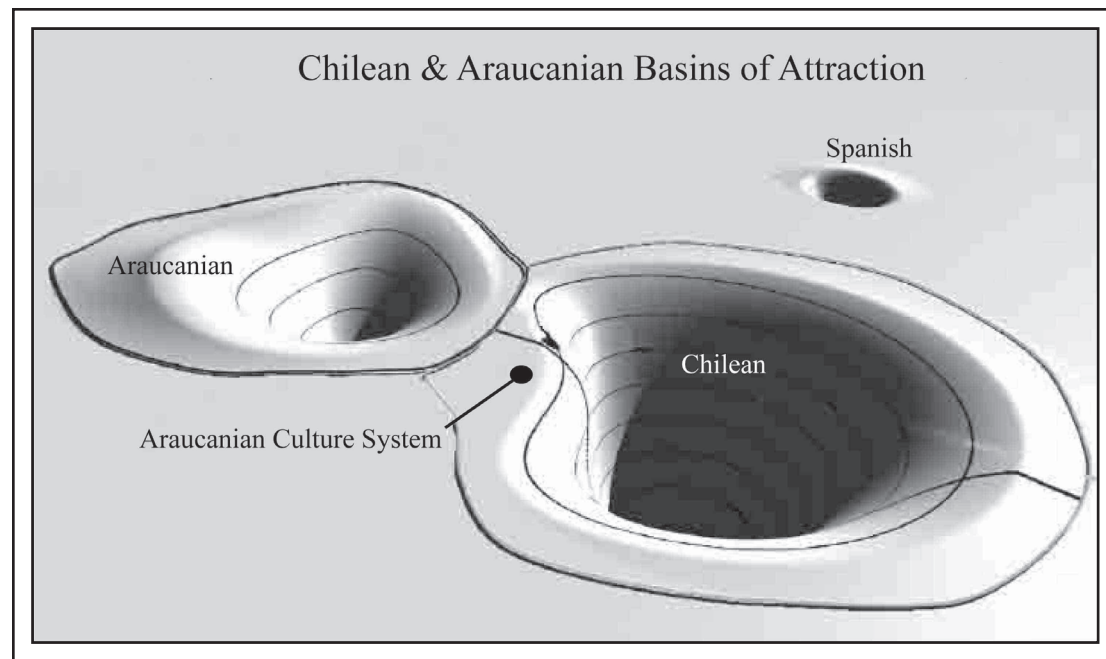


Figure 86: Diagram showing the Chilean stability domain with the Araucanian and Chilean basins of attraction. The Chilean basin exerted enough “pull” that the Araucanian cultural system (black dot) shifted away from the Araucanian basin in the early 1800’s.

contact between cultures and the effects one culture can have on another. Thus, multiple lines of inquiry, i.e. archaeology, ethnohistory, ethnography, and so on, should be used to delineate the timing and effects that basins of attraction have on cultural systems.

*Araucanian Resilience Cycle at Santa Sylvania: Growth and Conservation, AD 900 and AD 1100 Occupations*

The following is a summary of the results of research at Santa Sylvania based on the phases of the ARC and incorporating the long-term processes of RT. Later, these concepts are expanded to show how Santa Sylvania fits into the broader processes of resilience and development in the wider Araucania.

For the Araucanians of Santa Sylvania, the stability domain and concurrent adaptive cycle in which they were found at the arrival of the Spanish were established early, perhaps as early as AD 1100. The first occupation at Santa Sylvania, dated to around AD 900, is argued to be during a growth cycle in the ARC. This is argued to be a **growth phase** in the sense that the structures that would define the Araucanian cultural system do not yet appear fully developed and continued to evolve during this time. Pitren ceramics, recovered from this occupation, were first introduced into the Araucania around AD 300. These ceramics coincided with a gradual shift towards sedentary settlement, animal domestication, and intensive agriculture in the Araucania (Aldunate 1989). No evidence was recovered from this occupation to indicate exploitation of domesticated plants such as maize or peppers, but possible post holes seen in excavations in the area labeled T3 (Appendix D Figure 6 ) suggest the construction of more permanent *ruka* dwellings concurrent with a shift to sedentism (see Chapter 8). Obsidian recovered from this occupation appears to have come from the Nevados de Sollipulli north of the Santa Sylvania. This obsidian indicates that the Santa Sylvania Araucanians participated in long-distance trade networks that had been in place for millennia, extending from the Argentinian Pampa to the Pacific Coast (Navarro and Pino 1999; Stern et al. 2009).



Maintenance of these networks likely required negotiation and skill on the part of Araucanian actors, which may have led to the development of social roles such as *lonko* or *ülmen*, though this is speculative. At the very least, individuals and families likely viewed themselves as part of particular *lof* or *reguain* in the area based on kin relationships. Broader spatial organization *ayllarehue* and *butanmapu*, may have existed but evidence to support this is unclear. This particular occupation appears to have been of limited duration, based on the quantities of artifacts recovered. Further investigation at the site may reveal more profound activity during the AD 900 use of Santa Sylvia.

A second occupation around AD 1100 also corresponds to the **growth phase** in the Araucanian RC, which may have shifted to a **conservation phase** by the time the occupation ended. Conservation, argued here, is a phase in which the cultural system is established. The traditional structures are in place and continue to develop albeit in a limited fashion. Political, economic, social, and ideological practices are “mature” and maintained by particular leaders in their respective spheres of power and influence.

At Santa Sylvia, Pitrén ceramic styles continued to be used during the AD 1100 occupation and a new type defined as Liucura was also introduced. Liucura may be associated with El Vergel style, which developed elsewhere in the Araucania around the same time, AD 1100, with a concurrent increase in sedentism and agropastoralism (Aldunate 1989; Dillehay 1990). At Santa Sylvia, evidence indicates that the occupants grew maize and peppers, exploited wild resources such as strawberries and medicinal plants, and may have participated in the construction of *kuel* ritual mounds found nearby (Dillehay 2010). These constructions appear to have been initiated around Santa Sylvia by AD 1200, possibly introducing a change to the ideological structures of the still-developing cultural system. This is what Dillehay (2007) calls “proto-Araucanian.” If *lonko*, *ülmen*, and religious specialists such as *machi* and *boquiboye* did not exist before, they may have come into being at this time to manage the construction of mounds, participation in religious and social activities, and abovementioned trade and kin

networks.

This research argues that these leaders gradually became the main agents of stability and transformation within the system yet found their authority contingent on their abilities, strategies, and agency in a disbursed heterarchy rather than a hierarchical organization (Dillehay 1992). Increased settlements in the area (Dillehay 2010) suggest a population increase likely concurrent with amplification in *lof* and *regua*, and perhaps *ayllarehue* social organizations, though the latter is speculative. Individuals at Santa Sylvania may have seen themselves as “being Araucanian” at this time through their relationships with communities elsewhere in the Araucania. Thus, the base political, economic, social, and ideological structures forming the Araucanian cultural system were established at Santa Sylvania and the surrounding area likely by AD 1100 and “conserved” thereafter (see Chapter 10).

*Araucanian Resilience Cycle at Santa Sylvania: Conservation, Release, and Reorganization/ Rebound Phases, AD 1580 Occupation*

The third occupation at Santa Sylvania began around AD 1580 and was more intensive than the predecessors. If any Araucanians still lived at the site proper, they were likely in the **conservation phase** of the ARC argued for above and in Chapter 12. During this conservation phase, the Araucanians develop networks, power relationships, and ideology though the base structures of the cultural system remained largely unchanged. Araucanians living near Santa Sylvania may have been affected by the previous iterations of Spanish settlement at the fort/city of Villarrica (on the opposite side of Lake Villarrica) from AD 1552 to 1580, but may have remained relatively insulated until a possible Spanish *encomendero* arrived to build Santa Sylvania, which may have been called Antelepe at the time (see Chapter 12). Construction required considerable labor to transport and shape granite cobbles from the river bottom, as well as construct and maintain the *encomendero*'s house (Complex B), the chapel/mausoleum (Complex A), the

*indios amigos* house (Complex C), the work area (Complex D) and the soldier's quarters (Complex E; see Gordon 2011), as well as procure the agricultural and animal resources necessary for the site. Some "accommodation, cooperation, and collusion" (Liembann and Murphy 2011) may have transpired, as some Araucanians may have actively sided with the Spanish as *indios amigos*. Others may have used initial accommodation as a strategic mechanism to learn about the Spaniards and to incorporate useful items, such as horses, wheat, and barley, into Araucanian material culture.

The limited amount of materials recovered suggests an occupation of no more than ten years. The limited use of Santa Sylvia may attest to the inability of the Spanish basin of attraction to exert enough force on the Araucanian cultural system to bring it to a new stability domain. Some success may have happened—the three indigenous females buried in the chapel, along with the five Hispanic males and one mestizo male, indicate that at least a few, if not more, of the Araucanians converted to Catholicism or were converted by being placed in the chapel. The *encomendero* and his retinue may have tried to ingratiate themselves with the Araucanians by "eating like an Indian" (Rodriguez-Alegría 2005), consuming primarily Araucanian goods rather than seeking Spanish imports. Inhabitants of Santa Sylvia during this occupation ate maize, peppers, wheat, barley, fish, cows, sheep, as well as wild plants and animals. The Spanish may have used some European-made ceramics, tools, and other goods, while the Araucanians appear to have actively avoided European materials. Instead, the evidence suggests the Araucanians may have chosen to perpetuate pre-existing material culture without much, if any, Spanish influence, though still flexible towards incorporating anything deemed useful (see Chapter 8). Overall, the Araucanians appear to have actively perpetuated their traditional culture during what this research defines as a **conservation phase** in the ARC.

Documentary sources indicate that throughout the Araucania and presumably at Santa Sylvia, tensions between the Araucanians and Spanish remained high (Ruiz de Gamboa 1583 in Medina 1959). These tensions appear to have been exacerbated by

communication between Araucanians in the region surrounding Santa Sylvania and their kin living in Purén, who maintained a state of perpetual war with the Spanish (R. Quiroga 1577 in Medina 1959). Evidence suggests that the Araucanians at Santa Sylvania entered into what this research argues to be a **release phase**. A release phase, as defined in Chapter 5, is the period in which the system and the actors within come to a crossroads. Outside disturbance becomes great enough that the system can no longer be conserved without losing stability, or the basin of attraction is exerting enough pull to move the cultural system across the threshold (see Figure 84).

In a cultural system, a release phase is often associated with armed conflict. In the present study, tensions between the Araucanians and Spanish appear to have been high enough that a decision had to be made whether to be subject to the Spanish or retain autonomous control of the Araucanian cultural system. If the Araucanians fought and lost, they would likely **reorganize/exit** to a new RC under Spanish authority. Victory could lead to a **reorganization/rebound** phase back into the same ARC and continued autonomy. Perhaps in AD 1588, tensions erupted and Santa Sylvania was abandoned in the wake of an offensive led by the toqui Janequeo that passed through the region (see Chapter 12; Ovalle 2003[1677]; Rosales 1989[1674]). Gordon (2011) suggests that tensions influenced by other areas in the Araucania in AD 1598 led to the abandonment and destruction of Santa Sylvania. The Spaniards may have fled the site for Villarrica and the coast, leaving the Araucania entirely (Tribaldos de Toledo 2009[1630]). It is also possible that the site was attacked and all the inhabitants killed, though the recovered evidence does not suggest armed conflict at the site (see Chapter 9). In either case, the site was burned to the ground, seen in the abundance of burned materials recovered in both the present research and Gordon's excavations.

The site itself does not appear to have been reoccupied for several centuries, as far as has been determined. The Araucanians in the area around Santa Sylvania, after defeating the Spanish, may have entered into what this research argues to be a brief

**reorganization/ rebound phase.** It is speculated here that new *lonko* and *toqui* were selected to replace any killed in battle, settlements were likely rebuilt, trade and kin networks may have been re-established to the east and west, and the area could have been incorporated into broader *ayllarehue* and *butanmapu* spatial organizations (Olalverria 1593 in Medina 1960), all of this serving to strengthen Araucanian cultural system. The Spanish basin of attraction appears to have been relegated to the Bio Bio frontier, likely exerting little influence on the area around Santa Sylvania aside from forays by Catholic missionaries in the 17<sup>th</sup>, 18<sup>th</sup>, and 19<sup>th</sup> Centuries (Carvallo 1785; Rosales 1989[1674]). By about AD 1642, or the formal establishment of the Bio Bio frontier, the Araucanians at Santa Sylvania entered into a what is suggested to be another **conservation phase** that would last until the 19<sup>th</sup> Century.

*Araucanian Resilience Cycle at Santa Sylvania: Conservation and Release Phases, AD 1850 Occupation*

As noted above, evidence recovered at Santa Sylvania indicates that the site remained unoccupied for much of the 17<sup>th</sup>, 18<sup>th</sup>, and 19<sup>th</sup> Centuries, though investigations in the surrounding area suggest a substantive Araucanian population (Dillehay 2010). The avoidance of may be due to a feeling of “shame” or anger on the part of the surviving Araucanians for having been influenced by or cooperating with the Spanish, thereby avoiding new settlements, though this is speculative (Quiñenaó, personal communication, 2010). Whatever the reason, the site itself was not re-occupied until a brief episode dated to around AD 1850 south of area occupied by the Spanish in an area labeled T4 in the present research (see Chapter 8). The inhabitants appear to have used the same type of Liucura- or El Vergel-style ceramics, manufactured in the same way as in prior centuries and without any new elaboration or influence. Post holes identified in T4 suggest a possible *ruka* (Appendix D Figure 8), but the overall lack of materials indicates a very temporary occupation as part of the long conservation phase that began shortly after the

site abandoned by the Spanish (see Chapter 8).

By the time of this possible AD 1850 occupation, it is argued that the Spanish basin of attraction had disappeared entirely, replaced by a steadily encroaching Chilean basin of attraction that exerted more force or influence on the Araucanian culture system. This is due primarily to technological changes from the industrial revolution in the form of military hardware, railroads, and telegraph lines, as well as direct governmental efforts (Collier 2003). As railroad networks were extended south from Santiago, bringing settlers, soldiers, and goods, the Araucanians at Santa Sylvia appear to have abandoned the site once again in the late 19<sup>th</sup> Century. Other Araucanian communities in the area may have sent warriors and material goods to support the defensive efforts against the Chilean army in the central valley (see Chapter 13). Enough warriors appear to have been sent that when the Chilean army arrived in Pucón in AD 1883, they met little or no resistance. Chilean authority firmly established in the area, the Araucanians are argued to have entered a **reorganization/exit** phase and moved into a new resilience cycle.

### **Araucanian Resilience in the Broader Araucania**

#### *Araucanian Resilience Cycle: Growth Phase, AD 300-1300*

Santa Sylvia was and continues to be a part of the wider Araucania, part of a Panarchy within RT. Panarchy is “a cross-scale, nested set of adaptive cycles, indicating the dynamic nature of structures...” (Holling et al. 2002:74). Events in one part of the Araucania affected events in another via those networks of “concrete social relationships that provide that base units of social structure” (Smilde 2007). Thus, the ARC seen at Santa Sylvia is argued to have applicability generally to the Araucania through archaeological, ethnographic, and ethnohistoric evidence, explored below

As noted in Chapter 10, humans have lived in the Araucania for many millennia, perhaps as early as 12,500 BC (Dillehay 2000; Lavalee 2000). These were nomadic

hunter-gatherer's who exploited wild plant and animal resources, probably in kin group-based bands that might be considered the precursors to the Araucanian *lof*. Mobility was the general pattern of subsistence until approximately AD 300, with the introduction of ceramic technology and domestic agriculture (Aldunate 1989). Though mobility was still important, humans gradually shifted towards sedentary settlement patterns to maintain crops and fields (Bellwood 2005; Keeley 1995). Eventually, maize agriculture came to dominate an agricultural toolkit that included peppers, quinoa, beans, and domesticated llamas (Aldunate 1989).

With the beginnings of sedentism, incipient agriculture and animal husbandry, what may be called “proto-Araucanian” culture (Dillehay 2007) initiated a **growth phase** within a new RC. This would have included the development of ideology, cosmology, and religious practice, the establishment of social relationships (both between genders and households/kin) with related communities or families throughout the Araucania, and across the Andes into Argentina, laying the foundation of Araucanian political, economic, social, and religious structure starting this growth phase around AD 300 with the beginnings of the Pitrén ceramic complex (Adán et al. 2010), and appear to have arrived at Santa Sylvania around AD 900 (see above). Where exactly these structures first developed is unknown, though possibly came to pass in or near what the Spanish would call the Araucanian “Estado”, around Arauco, Tucapel, Purén and Angol (Medina 1975), or perhaps as part of a broader, networked “pan-Araucanian” development that included Santa Sylvania (Dillehay 2007).

#### *Araucanian Resilience in the Araucania: Conservation Phase, AD 1200-1475*

By about AD 1200, what may be considered the traditional Araucanian culture system was established, signaled by the construction of *kuel* ritual mounds, *nguillatun* ceremonial fields in Purén, near Santa Sylvania and in a few other river valleys (Dillehay 2007; Dillehay and Saavedra 2010). The introduction of El Vergel and Valdivia-style

pottery, *ruka* households, burial practices, and social authorities also signal a shift to sedentism and the development of the Araucanian cultural structures (Aldunate 1989; Dillehay 1990a, 2007). This was a continuation of networks of kin relationships previously established (Adán et al. 2004; Aldunate 1989; Dillehay 1990a, 2007; Dillehay and Saavedra 2010; Gordon 1975, 1978). These developments were likely an outgrowth of trade and communication with kin and neighbors throughout the Araucania and in Argentina, and possibly communities in northern central Chile and beyond (Gaete and Sanchez 1995). These networks primarily included *lof*, *rehue* and later *ayllarehue* kin organizations (Ray 2007), and were stabilized during this hypothetical conservation phase that lasted from AD 1300 to about 1475. This stabilization included a basin of attraction, centered in the Araucanian culture system and based on the political, economic, social, and ideological structures in place (see Figure 84).

This research argues that this period from about AD1100 to 1475 constitutes a **conservation phase** in the ARC. By this time, the political, economic, social, and ideological structures appear to be firmly in place, though still subject to development by Araucanian agents. No evidence has been found to indicate a substantive change or the introduction of revolutionary practices. Politically and socially, the cultural structure of the Araucanians at Santa Sylvia mirrored that of other areas of the Araucania. *Lonkos* were seen as kin-group heads (*lof* or *rehue*) who received their authority through personal capabilities and persuasion, who had power over elements related to activities carried out during the daytime. Ritual specialists, either *machi* shamans or *boquibuye* priests (or both), directed the affairs of religious practice, including the construction and maintenance of *kuel* mounds, many aspects of *nguillatun* and other ceremonies, and the activities of nighttime (Bacigalupo 1996, 2007, 2010). This “diffused but complementary corporate leadership” (Dillehay 2007:339) formed a heterarchical structure that could absorb or incorporate disturbance from outside groups, without major changes to the overall system. Economics, at least until the arrival of the Spanish, appear to have



remained dependent on the growing of maize, beans, and peppers, raising animals (llamas), trading ceramics, stone tools, obsidian, and other materials, gathering wild plants, and further developing kin networks from the coast to Patagonia (Aldunate 1989; Berón 2006; Dillehay 1990a; Mandrini 1984).

Perhaps most importantly, the people themselves may have recognized themselves as “Araucanian,” (or *Reche* the “true people”; see Boccara 2008) through their relationships, kin group organization, religious practices, and material culture (ceramics in particular; Janusek 2004). The cultural system informed individual and group identity and was in turn strengthened by the recognition of that identity. This does not mean that conflict and warfare did not occur amongst the Araucanians, but internecine fighting did not diminish the recognition of neighbors as “being Araucanian.” Without it, the ability to trade, intermarry, and otherwise create networks of interaction would have been nonexistent (Smilde 2003).

*Araucanian Resilience Cycle: Release and Reorganization/Rebound, AD 1475-1550*

By the beginning of the 16<sup>th</sup> Century, the Araucanians in general appear to have experienced little change to the overall cultural system apart from Valdivia-style ceramics that were introduced as early as AD 1200 (Aldunate 1989; Berón 2006). The Inka, who were limited in their expansion southward by northern Araucanians during what is argued to be a brief **release phase** in the ARC, limited to these northern Araucanians. This phase does not appear to have had a recognizable effect south of the Bio Bio, though the Inka do appear to have extended economic and social influence into the Araucania (Dillehay and Gordon 1998). To what degree is unclear at present and remains for further study (Sauer and Dillehay 2012). Inka influence was does not appear to have been direct, but rather trickled-down through networks and kin relationships. The introduction of an Inka basin of attraction exerted little influence south of the Bio Bio, and the Araucanians were able to **reorganize/rebound** back into their ARC by incorporating northern refugees and

some Inka stylistic markers (Dillehay 1990a), and strengthening pre-existing networks and relationships (Dillehay 2007).

*Araucanian Resilience Cycle: Conservation and Release Phases, AD 1550-1602*

Before AD 1550, the general Araucania was in what this research argues to be a **conservation phase**: traditional structures were maintained without much outside influence apart from some possible Inkan influences seen in ceramics, loan words, and perhaps ritual practices (Dillehay 2007; Sauer and Dillehay 2012). Oral traditions in the area around Purén suggest that some Araucanians knew about the coming of the Spanish by AD 1540, possibly transmitted from communication with northern neighbors, or from Peruvian *yanacona* refugees fleeing Peru (Dillehay 2007; Gonzalez 1986). How much they knew, or how much this influenced participation in the *cahuines* described by Ercilla (2003[1569]) is not clear from the archaeological and historical record. The expedition of Almagro and the subsequent settlement by Pedro de Valdivia brought a new basin of attraction that exerted pull on the Araucanian culture system (Figure 84) almost immediately. Some accommodation and cooperation did occur while the Spanish established settlements throughout the Araucania (Nuñez 2001[1674]). During this conservation phase, the Araucanians incorporated the horse, cows, sheep, pigs, wheat, and barley from the Spanish into their material culture, part of the “absorption of disturbance” outlined in RT (Gunderson and Holling 2004).

Depredations and cruelties (i.e. disturbances) on the part of the Spanish appear to have become too much to “absorb” for most Araucanians in this early period of contact (Ercilla 2003). Based on the events of the First General Offensive of 1553-1557, which included the first destruction of Villarrica in AD 1553, leaders at Santa Sylvia were likely coordinated with war leaders to the northwest (R. Quiroga 1577 in Medina 1959; see Figure 78). The Araucanians took the fight directly to the Spanish in December 1553, destroying several forts and expelling the Spanish, thus entering in what is defined here

as a **release phase** within the ARC. Receiving word of the offensive, the Araucanians around Villarrica, perhaps aided by others living near Santa Sylvia, attacked Villarrica and destroyed it in AD 1553. All Spaniards were forced to flee north of the Bio Bio River (Tribaldos de Toledo 2009[1630]). This First General Offensive and associated release phase, as defined by this research, lasted until about AD 1558, ending with the death of Caupolican and the arrival of a new Spanish governor (Bengoa 2003; Villalobos 1985). Not exactly a defeat, the end of the First Offensive was more of a cessation of direct hostilities between the Spanish and Araucanians, which allowed the Spanish to return south of the Bio Bio and reconstruct many of the fort/cities destroyed during the Offensive (Goicivich 2006).

This release phase was crucial within the ARC. Had the Araucanians been summarily defeated by the Spanish during this First Offensive, it is probable that the Araucanian cultural system would have crossed towards the Spanish basin of attraction and entered a new stability domain under Spanish authority (Figure 84). This may have caused a concurrent shrinking of the Araucanian basin from which recovery would have been extremely difficult. If a sufficient number of Araucanians became disaffected with the course of the war, or rejected the leadership of *toqui* (as happened with Lautaro; Rosales 1989[1674]; J. Quiroga 1979[1677]). The multiple possibilities of a release phase could shift the Araucanian system towards a different basin of attraction and eventual transition to a new adaptive cycle. Fortunately for the Araucanians, the Spanish were unable to fully colonize and the system remained under the influence of the Araucanian basin of attraction (Marmolejo 1990; Vivar 1978).

Fundamental this phase is the agency of the Araucanians in actively fighting against the Spanish and strategically modifying the traditional structures of the system. Some of these modifications included an emphasis on the importance toqui, inclusion of war refugees, and a shift to a war footing centered in the *ayllarehue* and later *butanmapu* (Olaverria 1594 in Medina 1960). By choosing direct confrontation, the

Araucanians bolstered their identity both within and without the society. The Spanish and other Europeans (Bolivar 2003[1815]) began to respect the fighting prowess of the Araucanians, which in no small measure affected the course of the war (Gonzalez de Najera 1889[1614]; Ovalle 2003[1646]; J. Quiroga 1979 [1677]; Vivar 1979[1558]), and the Araucanians themselves gained confidence that bolstered their “anti-colonial identity” (Coña 2002; Loomba 2005).

*Araucanian Resilience Cycle: Reorganization/Rebound and Conservation Phases, AD 1558-1598*

After the removal of the Spanish, the Araucanians entered a **reorganization/rebound** phase, following the same general pattern throughout the Araucania. This phase is marked by reorganization that incorporates a few changes that may help the system be more stable, such as changes in leadership or incorporation of new practices. The rebound aspect indicates that the base structures and power relationships remain generally intact, thereby transitioning the system back into the RC. Researchers have suggested that some Araucanian communities may have adopted refugees into their own local *lof* and *regua*, exchanged wives and fostered networks, all while continuing to develop their mastery of the horse and new military tactics (Dillehay 2007; Kicza 2003; Lewis 1994; Wachtel 1977). As before, warriors were called on by *toqui* still engaged in fighting to the north and west (the Araucanian *Estado*), probably through *ayllarehue* organizations that had increased in importance as part of a strategic restructuring of social organization (Olaverria 1594 in Medina 1960). The *butanmapu* organization may have increased in importance, though it was probably not a *new* form of social organization, (Goicovich 2006; Silva 2001). Trade across the Andes may have also increased as greater numbers of Araucanians from Chile migrated east, which furthered network ties and kin relationships (Lazzari and Lenton 2002; Mandrini and Orтели 2002). Populations appear to have rebounded from the decades of war, ritual practices continued and may have increased

with the construction of new *kuel* (Dillehay 2007; Dillehay and Saavedra 2010), and relationships with kin elsewhere in the Araucania and Patagonia were maintained (Berón 2006; Briones and Lanata 2002a).

The Spanish returned south of the Bio Bio River after AD 1558. Villarrica and numerous other cities were reconstructed, new *encomiendas* were granted, and the Spanish again tried to impose authority over the Araucanians and their cultural system. Again, many Araucanians became *indios amigos* and actively participated in the construction of new Spanish settlements, including Santa Sylvia (see Chapter 7). The majority, however, appear to have remained wary, if not defiantly hostile, and a general tension remained throughout the Araucania. This tension was punctuated by episodes of direct, violent conflict (Villalobos 1985). Overall, the period from AD 1558 to 1598 is argued to have been a **conservation phase** for the Araucanians many individuals and communities actively worked to maintain the traditional culture system and autonomy.

*The Araucanian Adaptive Cycle: Release Phase, AD 1598-1602*

This possible conservation phase continued until the beginning of the Second General Offensive initiated by Araucanians near Purén in AD 1598 (Mariño 1960[1595]). With this offensive, it is argued that the Araucanians entered a **release phase**. By AD 1602, all fort/cities south of the Bio Bio were destroyed and all surviving Spaniards and many *indios amigos* were expelled (Ovalle 2003[1674]; J. Quiroga 1979[1677]). The Quillin treaty, ratified by the Spanish crown in 1641, established the Bio Bio River as the southern frontier and the Araucanians as an independent people, and no more attempts at military conquest were attempted by the Spanish (Abreu y Bertodano 1740).

*Araucanian Resilience Cycle: Reorganization/Rebound, Growth, and Conservation, AD 1602-1860*

Having successfully “absorbed” Spanish disturbance with limited changes to the system, the Araucanians entered into new **reorganization/rebound, growth and conservation phases** that continued for the next 250 years. Again, these phases were not exactly the same as in the previous iteration of the ARC, but rather incorporated new aspects of material culture (horse, wheat, barley) and social organization (*ayllarehue* and *butanmapu*) as the Araucanian cultural system continued to develop. The growth in the growth phase included increased relations with groups in Patagonia (Bechís 2002; Berón 2006; Lazzari and Lenton 2002; Mandrini 1984), maintenance of ties with groups elsewhere in the Araucania (Luna 2007; Quiñanao, personal communication, 2010; A. Saavedra 2006) and maintenance of the overall heterarchical nature of the system itself (Crumley 1995; Dillehay 1992b; 2007). There may have been small disturbances within the phases (a.k.a. Panarchy) such as the missionization attempts by Catholic missionaries (Foerster 1996), and possible effects of the continued fighting along the frontier, but it appears that the majority of the Araucania remained relatively isolated from events along the Bio Bio frontier (Berger 2006), and the overall cultural system was conserved going into the 19<sup>th</sup> Century.

*Araucanian Resilience Cycle: Release and Reorganization/Exit, AD 1860-1885*

Chilean independence in AD 1820 introduced a new basin of attraction which exerted considerable influence on the Araucanian system. Perhaps around AD 1860, with the initial efforts of the Chilean army to “pacify” the Araucania, the Araucanian system shifted to a new stability domain, one dominated by the Chilean basin of attraction (Figure 85; see also Chapter 13). This shift, argued here, may be due in large part to the modernization of the Chilean military, especially the building of train and telegraph lines

and use of modern weapons such as the repeating rifle. The majority of Araucanians had limited recourse against these advances as they had never adopted gunpowder, metalwork, or other elements of modern weaponry<sup>2</sup> (Bengoa 2000). Though train and telegraph lines did not reach the whole Araucania immediately, the rapid movement of Chilean troops during the “pacification” precipitated Araucanian movement into a new, final **release phase**, wherein warriors from across the Araucania were called on to fight in the central valleys, suffering defeats and massive casualties in the 1860’s and 1870’s (Coña 2002; Lara 1888b; Navarro 2008[1890]; Vera 1905). By the time the Chilean army arrived in Villarrica, evidence indicates that no warriors were left to fight or leaders to maintain the system as it had been (Coña 2002; Navarro 2008[1890]; Subercaseaux 1883). Thus, this research argues that the Araucanian exited the ARC that began in AD 300, moving into a new cycle and stability basin, with political, economic, social, and ideological structures under the authority of the Chilean government beginning in about AD 1885 (Caniqueo 2006; Luna 2007; Ray 2007; A. Saavedra 2007).

Another important aspect that influenced this transition to a new RC is related to the shifts in attitudes of many Araucanians during the 18<sup>th</sup> and 19<sup>th</sup> Centuries, particularly along the Bio Bio frontier (Berger 2006; Keun 1986; Villalobos 1995). Gradual changes in attitude were seen most explicitly in *lonko* and other leaders who willingly sold lands, entered into treaties with the Spanish and Chileans without consultation with other leaders, and received monetary remuneration for services (Bengoa 2000). Because of this interaction, a breakdown occurred in communication and cooperation appears to have transpired between Araucanian communities along the coast that spread throughout the Araucania (Coña 2002). Thus, from within the political and economic structures of the Araucanian system were debilitated, decreasing flexibility and influencing the shift of the Araucanian system towards the Chilean basin of attraction and stability domain from

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2 Evidence suggests that *indios amigos*, particularly along the frontier, became more “Chilean” and adopted metal tools, Chilean clothes, and other materials. Notably, though, they did not adopt guns or gunpowder, as far as the record shows (Bengoa 2000).

which it could not recover.

*The Araucanian Adaptive Cycle: Reorganization/Exit, Growth, and Conservation Phases, AD 1885-Present*

Thus, the Araucanian entered into a new **reorganization/exit** and **growth phase** under a new RC going into the 20<sup>th</sup> Century. The base system structures and power relationships had shifted from Araucanian to Chilean control, and the Araucanian system became dominated by the Chilean stability domain and basin of attraction. Socially, the Araucanians were placed on *reducciones*, losing access to much of their traditional lands and forced into permanent sedentism (Ray 2007). Polygamy was outlawed, traditional *ruka* made of thatch were gradually replaced with tin, brick, and wood houses, and Mapudungun was replaced with Spanish (Bengoa 2000, 2004, 2010). Economically, capitalism replaced previous trade networks, including the introduction of Chilean peso coinage and a reliance on banks and lenders for the purchase of goods and services, leading to a concurrent increase in wealth disparity between Chileans and Mapuche (Haughney 2006; A. Saavedra 2006). Politically, control was vested in the Chilean state, *lonkos* and other leaders able to appeal for redress to government officials but without the authority once enjoyed (Quiñanao, personal communication, 2010). As of today, it appears that the Mapuche are in a **conservation phase**, trying to maintain or regain as many rights as possible to protect traditional lands and cultural activities under the structure dictated by the Chilean government (ibid). This research suggests that the original Araucanian basin of attraction still exists, but is increasingly shrinking and may no longer exist in the future.



## Broader Possibilities

As argued in the introduction, the Araucanians of Santa Sylvia and the wider Araucania are unique. They are not the only indigenous group to resist or fight against the Spanish (Liebmann and Murphy 2011) but they are the only group to do so successfully from the outset of contact. They are not the only ones to strategically restructure their society in the face of incursion (Parmenter 2010; Witgen 2012), but they are the only ones to do so without experiencing the hybridization and syncretism that affected so many other indigenous groups in the Americas. They are, however, the only indigenous group in North or South American to receive recognition as an independent, autonomous culture by a European nation-state (Abreu y Bastidias 1740). They are the only ones who managed to do all of this on their own terms for over 350 years.

One fear in emphasizing the unique nature of the Araucanians is that they then become incomparable to other indigenous groups in the Americas. This research suggests that the Araucanian example, however unique, can still provide important information for cross-cultural comparison on topics related to colonialism, anti-colonialism, culture contact, agency, identity, ethnicity, heterarchy, hierarchy, power, and cultural development. Though the timing and context of Araucanian resiliency to the Spanish is distinct, they still share many common attributes with other indigenous groups. Initial Spanish success elsewhere in the Americas was due in no small part to *indios amigos*, something that is no less true at Santa Sylvia. What are the factors that induced some individuals to side with the colonizers, while others fought against them? How are *indios amigos* treated in the archaeological, ethnohistoric, and ethnographic records? The Spanish had to adapt many aspects of their colonial efforts throughout the Americas. What are the differences and commonalities between these changes? Several indigenous societies successfully removed the Spanish from their ancestral lands. How do those successes compare to the Araucanians? Overall, how does the colonial enterprise of the

Spanish in south-central Chile compare to the rest of the Americas? These and many other topics are needed in cross-cultural comparisons and analyses, and the Araucanian example can provide important data for these investigations.

Additionally, the Araucanian example at Santa Sylvia can only be studied effectively through the combined lenses of archaeology, history, and ethnography. As this research has shown, the Araucanians have a deep cultural history (archaeological) that remained through Spanish efforts at control (history) and remains to the present day (ethnography). Failing to incorporate one of these research areas would leave major gaps in understanding the development of Araucanian culture through time and space. The vast majority of indigenous groups in the Americas are subject to the same sorts of analyses as each has, in one way or another, a culture history that extends from the past into the present. Holistic approaches to topics of agency, identity, contact, development, and power can assist modern-day indigenous groups and broader societies as they come to terms with how the past is perceived, interpreted, and employed.

This research has also shown that Resilience Theory has great potential for anthropologists and historians in studying the diachronic and synchronic processes that go into cultural development. RT can operate at many scales and provides an explanatory framework for getting to the heart of cultural systems and structures, their interplay, and the effects of outside “disturbance” on those systems. Of particular import are the actions of individuals and communities to either adapt to disturbance or transform the system (Walker et al. 2004). Issues of population growth, climate change, and others directly influence the ability of a system to be resilient, and RT studies have the potential to provide important information for researchers and public policy officials as they come to terms with these issues for their communities and nations.

For archaeologists, more can be done to understand the long-term developmental processes that contribute to the maintenance of cultural systems seen in the archaeological record, and how these past societies dealt with the same or similar

issues to those today (Redman 2005; Redman and Kinzig 2003; Redman et al. 2005). Importantly, these issues need not be confined to the interplay between humans and their environment, or Social-Ecological Systems (SES; see Hegmon et al. 2008; Walker et al. 2004). RT can be adapted to examine cultural systems by themselves, as this research has shown, which has greater potential and applicability for ethnographers, historians, sociologists, geographers, and other researchers interested in issues of cultural development and permanence, resilience, resistance, agency, identity, and other topics.

As this research has indicated, Araucanian actors at Santa Sylvia effectively used their pre-existing cultural structures (political, economic, social, and ideological) to fashion a culture composed of individuals dedicated to their ideal of independence and one that managed to remain independent for over 350 years. RT illustrates how, across scales and through time, the Araucanians both maintained and adapted their cultural system in order to maintain autonomy. Unlike many other theories of culture, RT recognizes the non-static and ever-evolving nature of culture as well as the importance of agency and identity in the perpetuation of a cultural system. Change is inevitable, but need not be a debilitating process that leads to the eventual destruction of a culture.

Rather, RT allows for the incorporation of external stimuli that, in many ways, can make the system even stronger, while at the same time avoiding other stimuli deemed unwanted or debilitating. In this way, actors are able to act strategically to incorporate or avoid particular aspects of a foreign culture. At different scales, researchers can examine why some cultural aspects, such as ideology, remain within a culture system when others are changed. These scales can also be applied to regions: how in one area a culture remains vibrant, while in another it undergoes drastic modification. The interplay of actors, identities, ideologies, and environments, all affect the creation and maintenance of cultural systems both today and in the past. RT can suggest the framework for analyzing those interactions.

In sum, the Araucanians at Santa Sylvia successfully maintained autochthonous

control of their cultural system for nearly 400 years through a combination of strategic action, pre-existing cultural norms and practices, and an inherent desire to remain autonomous, or an anti-colonial identity fashioned in the early years of Spanish incursion. This resilience is seen in perpetuation of material culture before, during, and after contact, limited incorporation of outside goods, historical accounts of interaction, and the oral traditions and activities of modern Mapuche. This research has shown that the Araucanians/Mapuche at Santa Sylvia, far from being an accident of history, actively worked to maintain their cultural system in the face of repeated and intense disturbance and did so successfully, the only indigenous group to do so from the outset of contact and for several centuries. By incorporating the example of the Araucanians into further studies of colonialism, culture contact, resistance, resilience, agency, identity, and power, researchers will be able to plumb more deeply the myriad effects that these topics (and others) have had and continue to have on our world today.

## APPENDIX A

### POLLEN, PHYTOLITH, AND STARCH ANALYSIS

POLLEN, PHYTOLITH, AND STARCH ANALYSIS  
OF TWO GROUNDSTONE RESIDUE WASHES  
FROM SANTA SYLVIA, CHILE

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## INTRODUCTION

Two groundstone tools from Santa Sylvia, Chile, were washed to recover pollen, phytoliths, and starch. The washes were conducted in Chile and the resulting residue was dried and sent to PaleoResearch Institute for analysis. The goal of the analysis was to identify pollen, plant opal phytoliths, and starch grains that may be derived from plant material processed with these tools.

## METHODS

The two grinding stone tools were washed in Chile for pollen, phytolith, and starch grains. Although the exact protocol employed is not known, a sonicating toothbrush and liquid were used to remove residue from the working surfaces of these tools. For each sample, the resulting liquid with residue and sediment was evaporated. The dried sediment was then placed in plastic bags and sent to PaleoResearch for analysis. At PaleoResearch, the plastic bags were opened, and their contents were divided for pollen and phytolith extraction. Both of these analyses have to potential to recover starch grains. It should be noted that these bags contained an extremely high amount of sediment. The key to conducting a useful groundstone wash is determining when to stop discarding the adhering soil and when to start saving the wash material. When material from the surrounding soil matrix is included in the wash, the pollen and phytolith records from the actual use of the tool can be overwhelmed by the post-use environmental signal. When silt- and clay-sized particles are visible in the micro-crevasses, it is actually common for us to wet-brush (without sonication) the use-surface before turning on the sonication. This should result in a very small amount of visible residue in the wash solution, usually less than 0.5 ml for a typical groundstone tool. Each sample submitted was several ml in volume, indicating that a significant amount of the surrounding soil matrix was included in the wash.

### Pollen and Starch Extraction

A chemical extraction technique based on flotation is the standard preparation technique used in this laboratory for removing pollen from sediments, even those removed from grinding stones. For these samples, the dried sample, representing the wash collected in the field, was removed from the sample bag, which was then rinsed with reverse osmosis deionized (RODI) water to ensure that we recovered the entire sample.

Hydrochloric acid (10%) was used to remove calcium carbonates present in the sediments, after which the samples were screened through 250-micron mesh. The samples were rinsed until neutral by adding water, letting the samples stand for 2 hours, then pouring off the supernatant. A small quantity of sodium hexametaphosphate was added to each sample once it reached neutrality, then the samples were allowed to settle according to Stoke's Law in settling columns. This process was repeated with ethylenediaminetetraacetic acid (EDTA). These steps remove clay prior to heavy liquid separation. The samples then were freeze dried. Sodium polytungstate (SPT), with a density of 1.8, was used for the flotation process. The samples were mixed with SPT and centrifuged at 1500 rpm for 10 minutes to separate organic from inorganic remains. The supernatant containing pollen and organic remains was decanted.

SPT again was added to the inorganic fraction to repeat the separation process. The supernatant was decanted into the same tube as the supernatant from the first separation. This supernatant was then centrifuged at 1500 rpm for 10 minutes to allow any remaining silica to be separated from the organics. Following this, the supernatant was decanted into a 50-ml conical tube and diluted with distilled water. These samples were centrifuged at 3000 rpm to concentrate the organic fraction in the bottom of the tube. This pollen-rich organic fraction was rinsed, then all samples received a short (20–30 minute) treatment in hot hydrofluoric acid to remove any remaining inorganic particles. The samples then were acetylated for 3–5 minutes to remove any extraneous organic matter.

A light microscope was used to count pollen at a magnification of 500x. The pollen preservation in these samples varied from good to poor. Comparative reference material collected at the Intermountain Herbarium at Utah State University and the University of Colorado Herbarium was used to identify the pollen to the family, genus, and species level, where possible.

Pollen aggregates were recorded during identification of the pollen. Aggregates are clumps of a single type of pollen and may be interpreted to represent either pollen dispersal over short distances or the introduction of portions of the plant represented into an archaeological setting. The aggregates were included in the pollen counts as single grains, as is customary. The presence of aggregates is noted by an "A" next to the pollen frequency on the pollen diagram. A plus (+) on the pollen diagram indicates that the pollen type was observed outside the regular count while scanning the remainder of the microscope slide. The pollen diagram was produced using Tilia 2.0 and TGView 2.0.2.

"Indeterminate" pollen includes pollen grains that are folded, mutilated, or otherwise distorted beyond recognition. These grains were included in the total pollen count since they are part of the pollen record. The microscopic charcoal frequency registers the relationship between pollen and charcoal. The total number of microscopic charcoal fragments was divided by the pollen sum, resulting in a charcoal frequency that reflects the quantity of microscopic charcoal fragments observed, normalized per 100 pollen grains.

Pollen analysis also included examination for starch granules and, if they were present, their assignment to general categories. Starch granules are a plant's mechanism for storing carbohydrates. Starches are found in numerous seeds, as well as in starchy roots and tubers. The primary categories of starches include the following: with or without visible hila, hilum centric or eccentric, hila patterns (dot, cracked, elongated), and shape of starch (angular, ellipse, circular, eccentric). Some of these starch categories are typical of specific plants, while others are more common and tend to occur in many different types of plants.

### **Phytolith and Starch Extraction**

Approximately 1 ml of sediment from each plastic bag was placed in a 15-ml centrifuge tube and dried under vacuum. The dried samples were mixed with potassium cadmium iodide heavy liquid (density 2.3 g/ml) and centrifuged to separate the phytolith and starch microfossils, which will float, from most of the inorganic silica fraction, which will not. The samples were rinsed with water to remove the heavy liquid. At this point, the samples were viewed with a light microscope to assess the recovery process. It was determined that an overwhelming amount of



organic matter was present in the samples, most likely derived from the surrounding soil matrix. This necessitated the use of nitric acid to remove a portion of the organic material. Approximately 5 ml of 70% nitric acid was added to each sample, and then they were allowed to sit at room temperature for 24 hours. Nitric acid was chosen because archaeological starch grains can survive some exposure to this oxidizing chemical. The samples were then rinsed to neutral with water. Next, for each sample, a subsample of the wash residue was mounted in optical immersion oil for counting with a light microscope at a magnification of 500x. A maximum of 300 phytoliths were counted, after which the remainder of the slide was scanned for rare types and those of economic significance. Diatoms and sponge spicules, organisms with silica shells, also were noted and documented. A percentage diagram (showing relative abundance) was produced using Tilia 2.0 and TGView 2.0.2.

## DISCUSSION

Santa Sylvia, located approximately 14 km east of Pucón, Chile, yielded two groundstone tools in a dark brown/black stratigraphic layer composed of medium- to fine-grained soil. These tools were washed in Chile, then the residue was evaporated and bagged prior to being submitted to PaleoResearch for microfossil extraction and pollen, starch, and phytolith analysis (Table 1). The site is at an elevation of 350 m above sea level on the south bank of the Liucura River. The region contained a mixture of deciduous/coniferous forest at an elevation of 350 m above sea level. It is reported that this site was relatively unencumbered with vegetation outside of local grasses and a few oak and laurel trees. Today, the site is covered with native notros (firebush—*Embothrium* sp.) trees and pine. Santa Sylvia contains pre- to post-Hispanic Native American (Araucanian/Mapuche) elements, as well as the remains of a Spanish “fortified house” from the early contact period (AD 1554–1602). The prehispanic occupations date to AD 836 and AD 1050 (Jacob Sauer, personal communication). Discussion of the results will begin with sample 1479, which is presumed to be the oldest of the two samples.

### Sample 1479

Sample 1479 represents a wash of a groundstone tool recovered from a depth of 40–50 cmbs. Dried sediment from the wash was submitted for pollen, starch, and phytolith analysis.

### **Pollen Analysis**

Pollen analysis of groundstone sample 1479 yielded a wide variety of pollen types. Poaceae pollen (Figure 1, Table 2), representing grasses, dominated the record. Poaceae pollen was divided into two size classes. The smaller grains were retained in the family group of Poaceae, while the larger grains that exhibit a texture and large pore were placed in a group labeled Cerealia, since they are of the same size and texture as cultivated cereal pollen. Pollen from *Bambusa*, for which there is abundant phytolith evidence, tends to be larger than other Poaceae pollen and to exhibit a granulate surface. Pollen of this type was broken out and listed as *Bambusa*-type on the diagram.

Small quantities of *Jubea*, Myrtaceae, *Nothofagus*, *Pitavia*, Apiaceae, Low-spine Asteraceae, High-spine Asteraceae, Brassicaceae, Calyceraceae, *Centrunculus*-type, Chenopodium, *Lathyrus*, *Lotus*-type, *Fagara*, *Phytolacca*, and Rhamnaceae represent local plants that include Chilean wine palm, a member of the myrtle family, southern beach, a small evergreen family in the citrus or rue family, a member of the umbel family, various members of the sunflower family, a member of the mustard family, a member of a family closely related to the sunflower family, chaffweed, Chenopodiums, sweet peas, lotus, wild lime, pokeweed, and a member of the buckthorn family. Pollen representing plants that may have been processed either as food or medicine on this groundstone include Cerealia, *Fragaria*-type, *Lomatia*, *Peumus*-type, and Solanaceae.

Recovery of pollen evidence for grinding cereals indicates that this piece of groundstone was used after contact with the Spanish, who introduced Old World cereals. The presence of even a small quantity of *Fragaria*-type pollen on a groundstone is unusual because generally strawberries are eaten fresh and raw.

*Lomatia hirsuta* (radal) is a wild tree that grows in Chile from Coquimbo to Chiloe from the sea to sub mountain zones (700–120 m). Leaves of this tree exhibit antifungal activity, particularly against *Candida albicans*, which was chosen as the test organism (Simonsen *et al.* 2006). Phenolic acids such as cinnamic acid (identified in this study of *Lomatia hirsuta*), coumarins and flavonoids are known to have antimicrobial activity using different mechanisms, making them effective against different target organisms. This study identified the presence of (1) 2-methoxyjuglone, (2) cinnamic acid, (3) ethyl cinnamate, (4) 4-hydroxybenzoic acid, (5) vanillic acid, (6) methyl vanillate, (7) isovanillic acid, and (8) 4-hydroxyacetophenone (piceol) in the methanol extract that was examined with GC-MS. These compounds, in addition to previously identified compounds scopoletin and umbelliferone, provide antifungal and/or antibacterial properties. A tea made from the leaves of *L. hirsuta* has been used locally for the treatment of coughs, bronchial troubles, and asthma (Simonsen *et al.* 2006).

*Peumus* (boldo) also has medicinal properties. According to the Tropical Plant Database, boldo leaves are used to stimulate digestion, to remedy liver problems, to support the gallbladder, to expel worms and kill parasites, as a stimulant and a laxative, to reduce inflammation and relieve pain, and to reduce gas. It is likely that boldo leaves were collected while the shrubby evergreen tree was in flower, which carried pollen onto the tools used to process the leaves, including this groundstone.

Solanaceae pollen probably represents *Capsicum*, as it was most consistent with pollen of this genus. Some *Capsicum* (chile peppers) were originally brought under domestication in Mexico, while others were domesticated in South America. *C. annum*, which originated in Mexico, is the most widely cultivated species of pepper, and its numerous varieties include bell peppers, jalapenos, pimentos, chile peppers, and cayenne pepper (Foster and Cordell 1992: 83); (Heiser 1990:148). *Capsicum pubescens* (rocoto peppers) originated in the Andes in Ecuador and Bolivia, where they are still cultivated. It has the reputation of being difficult to grow except at high elevations. *Capsicum baccatum*, which includes the very hot and small chiltepin, probably originated in northern Argentina and Bolivia, although it is cultivated throughout much of South America today. It was growing in Brazil when the Portuguese arrived. Finally, *Capsicum frutescens*, which includes cayenne and tabasco peppers, probably was brought under domestication in the Amazon basin (Foster and Cordell 1992:83-84).

Microscopic charcoal was particularly abundant in this sample, which may reflect the grinding of items that had been parched in a hearth. The abundance of pollen in this sample, as well as its preservation, argue against this piece of groundstone having been burned after its use.

A single parasite egg of *Diphyllobothrium* (fish tapeworm) was noted in this sample. The recovery of this parasite egg suggests that one or more occupants of this site, possibly the person using the grinding stone or a close relative, was infested with these tapeworms that come from eating fish. *Diphyllobothrium latum* parasite eggs represent a tapeworm found in freshwater fish, which are known to be common in temperate (high altitude) Chile and Argentina in South America, although the range is spreading to lower elevations, at least in North America. Usually the host, in this case a human, supports only a single tapeworm that is broad and rather long, often more than 30 feet (approximately 10 meters) in length. This tapeworm species is acquired by eating raw or undercooked fish.

Two intermediate hosts are required to complete the life cycle of this tapeworm variety. The eggs, in freshwater, hatch into an embryo surrounded by a ciliated membrane. The embryo swims until ingested by an appropriate crustacean. The embryo must be ingested within 24 hours of hatching or it will die. The larval form develops in the crustacean body cavity. Once an appropriate fish consumes the crustacean, the liberated larva burrows through the fish gut wall into the body cavity. The larva matures into a second larval stage in the flesh of the fish. At that time the mature larva averages 4 to 5 mm in length, although it may be longer. As humans consume raw or under cooked fish containing the larva, the body of the larva degenerates, leaving the scolex to attach to the mucosa and develop into a worm in about three weeks. Incubation in humans, after which eggs begin to appear in the feces, is typically 4 to 6 weeks but can take as long as two years. Most individuals remain asymptomatic, although intestinal obstruction is possible with larger tapeworms. This lack of symptoms is probably due to the site of tapeworm attachment in the ileum. Some individuals, however, experience various complaints of nausea, abdominal discomfort, nervousness, weakness, loss of appetite, or hunger pains. Megaloblastic anemia is noted in about 1% of infested persons. Anemia occurs only when the tapeworms attach higher in the jejunum, since the tapeworms then compete with the host for nutrients (Beck and Davies 1976:133-137).

A single *Sporormiella* dung fungal spore also was noted in this sample. *Sporormiella* is an ascomycete fungus found only on the dung of herbivores. The genus is widespread in subboreal and temperate regions of the world. *Sporormiella* spores are borne in ascospores on the surface of drying dung and are spread passively to nearby vegetation, where they are ingested (Davis and Shafer 2006). Many coprophilous fungi such as *Sporormiella* rely on a cyclic process involving herbivore ingestion of spores with foliage; germination of spores following passage through the gut; mycelial growth within, and eventual sporulation on dung (Wicklow et al. 1980). While grazing, herbivores can also inadvertently ingest ascospores, the fruiting bodies on dung that contain millions of individual spores, especially in areas where dense herbivore populations exist (Aptroot and Geel 2006). Depending on the context of the sample, recovery of *Sporormiella* in archaeological samples may be an indicator for the presence and utilization of herbivores. Interpretations can range from the presence of dung on the landscape to the burning of dung for fuel to the utilization of intestinal material for cooking and subsistence. Its presence here in this sample collected from a grinding stone suggests the possibility that intestines of a grazing animal were processed, perhaps for use as casing, with modern sausages being the analog.

## Starch Analysis

*Zea mays*-type angular starch was present in this sample, suggesting that maize was processed using this groundstone.

## Phytolith Analysis

Phytolith analysis of sample 1479 yielded an incredibly high concentration of phytoliths derived from the surrounding environment (Figure 2). This phytolith-based environmental signal was dominated by morphotypes derived from the bamboo subfamily (Bambusoideae). In fact, *Chusquea*-type buliform phytoliths were co-dominant with pyramidal rondels. These buliform phytoliths are found exclusively in leaf material (Montti et al. 2009). *Chusquea* is the only genus of bamboo native to Chile; it is a dominant forest understory plant in beech (*Nothofagus*) and mixed beech/evergreen forests, often inhibiting the growth of herbs, shrubs, and tree seedlings (Veblen et al. 1979; Veblen 1982). The absence of arboreal phytoliths in this sample may simply be due to the over-representation of bamboo phytoliths in the record, as bamboos are highly silicified and prolific producers of phytoliths. These bamboos are dependent on a forest canopy for survival. Bamboo phytoliths were present at approximately 30% relative abundance. Phytoliths derived from cool-season C3-metabolism grasses from the subfamily Pooideae constituted about 25% of the phytolith record. This suggests that pooid grasses were also a significant component of the surrounding vegetation. This is potentially important because many cereal grain grasses such as wheat (*Triticum*), barley (*Hordeum*), and rye (*Elymus*) are members of the Pooideae. Although some pooids are adapted to shady forest understory settings, cereal grain taxa, wild or cultivated, require full-sun habitats.

Phytoliths derived from the warm-season, C4-metabolism grass subfamily Panicoideae were present at about 10% relative abundance. Panicoid grasses, including maize (*Zea mays*), require full-sun habitats. This panicoid abundance is most likely under represented because the pyramidal-type rondel observed here at 20% relative abundance could not be ascribed to a particular grass subfamily. However, this rondel is most likely derived from Panicoideae taxa. This would place the panicoid relative abundance at about 30%. Thus, the phytolith record suggests that the surrounding environment was a mix of forest with a bamboo understory but also with significant openings to support the growth of panicoid and pooid grasses. This is important, as there is strong evidence that maize (panicoids) and possibly cereal grains (pooids) were processed with this tool.

Despite the strength of the environmental signal, phytoliths derived from the use of this tool were observed. A total of five wavy-top maize (*Zea mays*) rondels were recovered, three of which can be seen in Figure 3 A–C. Wavy-top rondels can be produced in large numbers in the glume material for many varieties of maize. A small amount of these phytoliths can accompany the processing, cooking, and consumption of maize and can be recovered from artifacts and features that represent these various activities. These particular phytoliths meet all of the requirements, as outlined by Pearsall et al. (2003), to be considered maize (*Zea mays*) cob wavy-top rondels. The main characteristics are that maize wavy-top rondels have a circular to oval base in outline (top view) that is flat, not concave in side view; the base must be longer than the body is high or tall; the top (the side opposite the rondel base) is a single, complete wave that is equal to or less than the length of the rondel base; and the peak or sides of the wave are not horns or spikes. The five wavy-top rondels observed here meet all of these parameters and are considered to be derived from maize. Two additional wavy-top rondels

were observed, but their base edge (as viewed from the side) was slightly concave, and not completely flat. Although these two phytoliths are most likely derived from maize, strict adherence to the rules devised by Pearsall et al. (Pearsall, et al. 2003) require us to be conservative and consider them “consistent with” the assemblage observed in *Zea mays*, but not diagnostic of only *Zea mays*. In addition, it should be stated that many of the pyramidal rondels not ascribed to any particular subfamily here may, in fact, also be derived from maize, although other grasses can produce similar phytoliths. Thus, the phytolith record indicates that this tool was used to process maize (*Zea mays*).

Several epidermal sheet elements that are most likely derived from a Pooideae grass were observed. These phytolith types can be indicators of grass seed processing, as the bract material that surrounds Pooideae grass seed has highly silicified epidermal sheets with distinctive wavy patterns along the margins of the long cells (Figure 3 E). In fact, the jagged pattering along the margin of the long cells for this phytolith is diagnostic of oat grass (Rosen 1992). Oat grass (*Avena* sp.) is a common agricultural weed and cultivated cereal grain in the Old World. It is unclear whether this *Avena* phytolith is derived from a weedy *Avena* species or from *Avena sativa* (common oats), a cultivated cereal grain. Regardless, the *Avena* grass was likely introduced to this area intentionally or unintentionally by the Spanish. Several dendriform phytoliths were observed during the scan of the slide after the 300-phytolith count was completed, one of which can be seen in Figure 3 D. Dendriforms also originate in the bract material (lemmas, paleas, and glumes) that surrounds the seeds of some wild and domesticated grasses. They are very common in the bract material of Pooideae grasses, some of which are domesticated cereals, and many of which are native to North America and the higher elevations of South America. Because these dendriforms were disarticulated from the epidermis, taxonomic identification was not possible. However, their presence here is a strong indication that C3 Pooideae grasses, as either weeds or cultivated crops, were present at this site. In addition, the recovery of dendriforms from this tool suggests that grass seeds were processed. With the recovery of the *Avena* epidermal sheet element, oat grains (*Avena sativa*) were likely to have been processed with this tool.

### **Sample 1129**

Sample 1129 represents a wash of a groundstone tool recovered from a depth of 10–20 cmbs. Dried sediment from the wash was submitted for pollen, starch, and phytolith analysis.

### **Pollen Analysis**

Pollen analysis of groundstone sample 1129 also yielded a wide variety of pollen. In addition to the dominant Poaceae pollen, representing grasses, small quantities were recovered of *Juniperus*, *Nothofagus*, Apiaceae, High-spine Asteraceae, Liguliflorae, Brassicaceae, Caryophyllaceae, Cheno-am, Cyperaceae, *Erodium*, Fabaceae, *Lathyrus*, *Lotus*-type, *Phrygilanthus*, *Phytolacca*, and *Plumbago* pollen, representing local trees, shrubs, and herbaceous plants that included at least juniper, southern beech, a member of the umbel family, various members of the sunflower family, members of the mustard and pink families, members of the Cheno-am group, sedges, filaree, members of the legume family that included at least a perennial pea and lotus, a parasitic plant (molina), pokeweed, and plumbago or leadwort. Pollen that might represent food and/or medicine includes Cerealia-type, *Fragaria*-type,

*Lomatia*, *Peumus*-type, and Solanaceae, representing cultivated cereals, strawberry, radal, boldo, and a member of the nightshade family that includes peppers.

*Phrygilanthus acutifolius* (molina), a hemiparasitic plant and member of the Loranthaceae, has been proven to have antimicrobial activity against both gram positive (*Staphylococcus*) and gram negative (*Serratia*, *Acinetobacter*, and *Pseudomonas*) bacteria. Both aqueous and ethanol extracts of the flowers were tested with results suggesting that the ethanol extract causes disintegration of the cell surface and cell death as a result of swelling of the bacterial body (Daud et al. 2005). Local use against respiratory infections is suggested on various websites but could not be documented in published literature.

Recovery of *Zea mays*-type angular starch and *Zea mays* pollen, the latter while scanning the microscope slide from this sample, document the grinding of maize with this groundstone.

A few fern spores were noted in this sample, indicating that ferns grew in the vicinity of the site. Little microscopic charcoal was recorded in this feature, suggesting that little ash was introduced onto its surface during its use life.

### Starch Analysis

Starch was observed only in the pollen fraction from this sample. Both a Poaceae-centric starch, which was not diagnostic for cereals, and a *Zea mays*-type angular starch were observed. The Poaceae starch was not diagnostic of any particular member of the grass family. Spherical starches with centric hila are observed in many grass seeds, including both native and cultivated grasses. Therefore, it is not considered to be diagnostic beyond the family level.

### Phytolith Analysis

Phytolith analysis of sample 1129 yielded both an environmental signal and a record of subsistence. In fact, the environmental record indicates that some change in the surrounding vegetation took place between the time period represented by sample 1479 and the time period of this sample. Bamboo phytolith relative abundance increased from 25% to 40% for this sample. Panicoideae phytoliths decreased in relative abundance from 10% to 5%. New to the record are a few phytoliths from sedges (Cyperaceae), conifers (Pinaceae), and indeterminate arboreal taxa. Given the fact that bamboo is a forest understory plant and that Panicoideae taxa require full sun habitats, the phytolith record indicates that forested areas increased and open areas decreased in the vicinity of this site.

Despite the strength of the environmental signal, phytoliths derived from the use of this tool were observed. Three wavy-top rondel phytoliths diagnostic of maize (*Zea mays*) were recovered (Figure 4 A–C). A possible maize rondel was also recovered (Figure 4 D), but we are hesitant to call it diagnostic of maize since the upper margin of the wave is a bit too jagged. Thus, the phytolith record indicates that this tool was used to process maize (*Zea mays*).

Several silicified epidermal sheet elements were observed, most of which appeared to be derived from the bamboo taxa present at the site. One epidermal sheet element (Figure 4 E) appears to be derived from either wheat (*Triticum*) or barley (*Hordeum*), indicating that cereal

grains were processed with this tool. The few dendriforms observed here are not great matches with cultivated cereals, but they do suggest that cereal grains were processed with this tool.

The background information provided with these samples suggested that the dark brown/black stratigraphic layer at this site might be the result of burning. Phytoliths that have been exposed to oxidative fire, particularly an open flame and airflow, can exhibit varying degrees of darkening, from dull opaque to completely black; whereas unburned phytoliths, or those exposed to high heat in a low-oxygen environment, are typically transparent or opalescent (Parr 2006). Many of the *Chusquea*-type bulliform phytoliths were darkened from fire, as is the cereal grain epidermal sheet element in Figure 4 E. Thus, the phytolith record verifies that vegetation was burned at this site. Since maize and cereal crops require full-sun exposure for growth and development of the cob, fire may have been used for creating openings in the forest.

## SUMMARY AND CONCLUSION

Pollen and starch evidence for the use of these tools indicate the grinding of maize (*Zea mays*) with both implements, which is also attested in the phytolith signature. Pollen representing food includes *Fragaria*-type, representing strawberries, and *Capsicum*, representing peppers. Pollen representing plants with medicinal properties includes at least *Lomatia*, which is antifungal; *Peumus* (boldo), which is noted as a digestive stimulant and an aid in killing parasites; and *Phrygilanthus*, which has antibacterial properties. The recovery of a *Diphylobothrium* parasite egg in one of the groundstone samples suggests that people living in this area had a need for a medicine that killed parasites. *Peumus* pollen was observed on both pieces of groundstone. The pollen record from these two groundstone tools suggests that their primary use was in processing medicines, rather than food, if the quantity of pollen representing the medicinal plants is considered. The presence of *Sporormiella* dung fungal spores in the same sample that contained the parasite egg suggests the possibility that herbivore intestines were processed.

Environmental information obtained from these samples indicates that the local forested area includes *Nothofagus* and small quantities of *Jubea* (a palm), *Juniperus* or a relative, *Myrtaceae*, and *Pitavia* (a member of the Rutaceae). Bamboos are probably represented by the larger Poaceae pollen, labeled *Bambusa*-type. Although they appear in the non-arboreal portion of the pollen diagram, they probably represent plants growing tall enough to be included as trees in the interpretation. The environmental signal from the pollen record suggests that this area was relatively open and not densely forested. Poaceae pollen was the most abundant, probably representing the local growth of grasses. A variety of shrubby and herbaceous plants are noted in the pollen record, suggesting the presence of a rich vegetation community upon which to draw. Sample 1479 yielded a record of a much larger local population of ferns, or possibly the processing of ferns. Microscopic charcoal also was particularly abundant in this sample.

Phytolith analysis indicates that both of these tools were used to process maize (*Zea mays*). Both of these groundstone tools were also used to process cereal grains, indicating that they are associated with historic deposits. Sample 1479 yielded an epidermal sheet element phytolith diagnostic of oat grass (*Avena* sp.), indicating that common oats (*Avena sativa*) may have been cultivated by the site occupants. Sample 1129 yielded an epidermal

sheet element phytolith derived from either wheat (*Triticum*) or barley (*Hordeum*). Unfortunately, the phytolith fraction derived from the surrounding environment overwhelmed (diluted) the food-processing phytolith record. There is undoubtedly more food processing information in the phytolith fraction, but this would require a significant amount of scanning time. For future groundstone washes, additional cleaning is suggested prior to collecting the wash sample to minimize the environmental signal. Even aggressive pre-treatment will rarely remove all of the environmental record; it only minimize its impact on the processing record. The environmental record from these tools also provided potentially valuable information. Since these two groundstone tools were recovered from different depths and, by supposition, difference periods of time, the environmental portion of the record suggests, in general terms, changing vegetation and perhaps environmental conditions at this site. The phytolith record indicates that forested areas increased and open areas decreased in the vicinity of this site from the period of time that groundstone sample 1479 was used to the time that groundstone sample 1129 was used.



TABLE 1  
 PROVENIENCE DATA FOR SAMPLES FROM THE SANTA SYLVIA SITE, CHILE

Sample No.	Depth (cmbs)	Provenience/ Description	Analysis
1129	10-20	Sediment remaining from a groundstone wash with distilled water after evaporation.	Pollen Phytolith/Starch
1479	40-50	Sediment remaining from a groundstone wash with distilled water after evaporation.	Pollen Phytolith/Starch

TABLE 2  
 POLLEN TYPES OBSERVED IN SAMPLES FROM THE SANTA SYLVIA SITE, CHILE

Scientific Name	Common Name
ARBOREAL POLLEN:	
<i>Jubea</i>	Chilean wine palm
<i>Juniperus</i>	Juniper
Myrtaceae	Myrtle family
<i>Nothofagus</i>	Southern beech
Rutaceae:	Rue or citrus family
<i>Pitavia</i>	Pitao, Canelillo
NON-ARBOREAL POLLEN:	
Apiaceae	Umbel family
Asteraceae:	Sunflower family
Low-spine	Includes ragweed, cocklebur, sumpweed
High-spine	Includes aster, rabbitbrush, snakeweed, sunflower, etc.
Liguliflorae	Chicory tribe, includes dandelion and chicory
Brassicaceae	Mustard or cabbage family
Calyceae	Calycera family
Caryophyllaceae	Pink family
<i>Centunculus</i> -type	False pimpernel
Cheno-am	Includes the goosefoot family and amaranth
Cyperaceae	Sedge family
<i>Erodium</i>	Storksbill, Heron-bill, Filaree
Fabaceae:	Bean or Legume family
<i>Lathyrus</i>	Perennial pea
<i>Lotus</i>	Trefoil
<i>Phytolacca</i>	Pokeweed
<i>Phytolacca</i> -type	Pokeweed
<i>Plumbago</i>	Leadwort
Poaceae:	Grass family

TABLE 2 (Continued)

Scientific Name	Common Name
<i>Bambusa</i> -type	Bamboo
Rhamnaceae	Buckthorn family
<i>Zanthoxylum</i>	Prickly ash
FOOD:	
<i>Capsicum</i> -type	Peppers
<i>Fragaria</i> -type	Strawberry
<i>Zea mays</i>	Maize, Corn
MEDICINE:	
<i>Lomatia</i>	Radal
<i>Peumus</i> -type	Boldo
<i>Phrygilanthus</i>	Molina
OTHER POLLEN:	
Indeterminate	Pollen too poorly preserved to identify
STARCH:	
Poaceae centric starch	Typical of starches produced by grass seeds
<i>Zea</i> -type angular starch	Typical of starches produced by maize
SPORES:	
Monolete bumpy	Fern
Monolete smooth	Fern
Trilete reticulate	Fern
Trilete scalloped	Fern
Trilete smooth	Fern
PARASITES:	
<i>Diphyllobothrium</i>	Fish tapeworm
OTHER:	
Charred Asteraceae fragment	Charred tissue fragment from a member of the sunflower family
Charcoal	Microscopic charcoal

TABLE 2 (Continued)

Scientific Name	Common Name
<i>Scolecodont</i>	Worm jaw
<i>Sporormiella</i>	Dung fungus
TOTAL POLLEN CONCENTRATION	Quantity of pollen per cubic centimeter (cc) of sediment

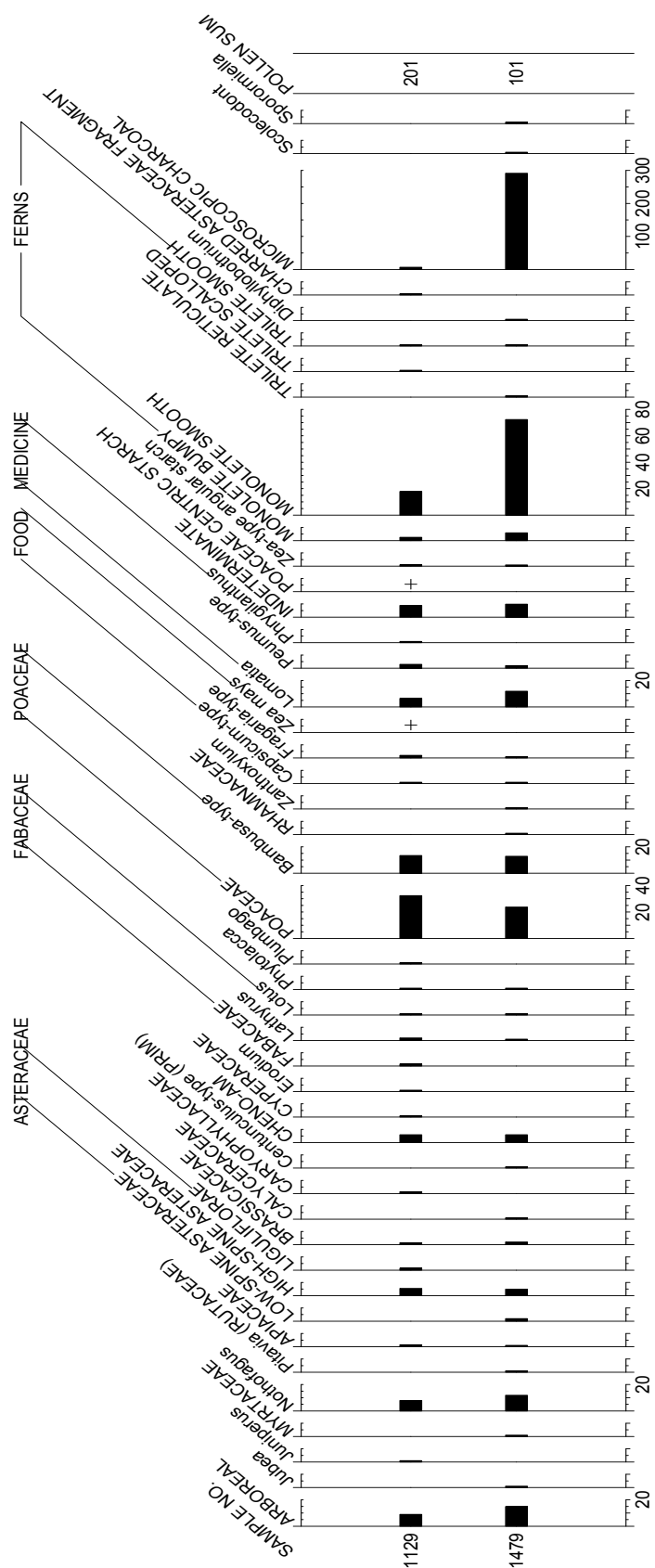


FIGURE 1. POLLEN DIAGRAM FOR GROUNDSTONE FROM SANTA SYLVIA, CHILE.

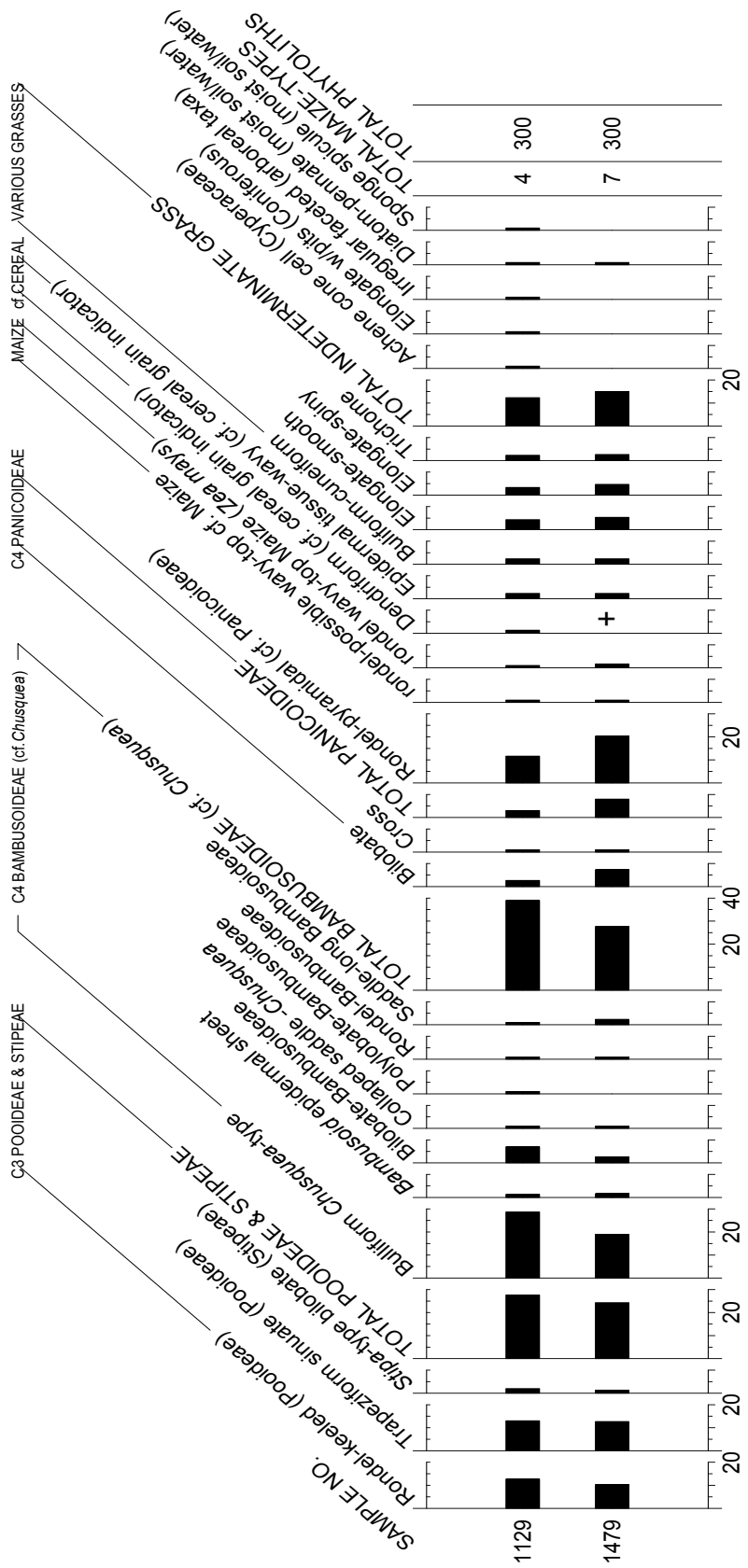


FIGURE 2. PERCENTAGE PHYTLITH DIAGRAM FOR GROUND STONE RESIDUE WASHES, SANTA SYLVIA, CHILE.

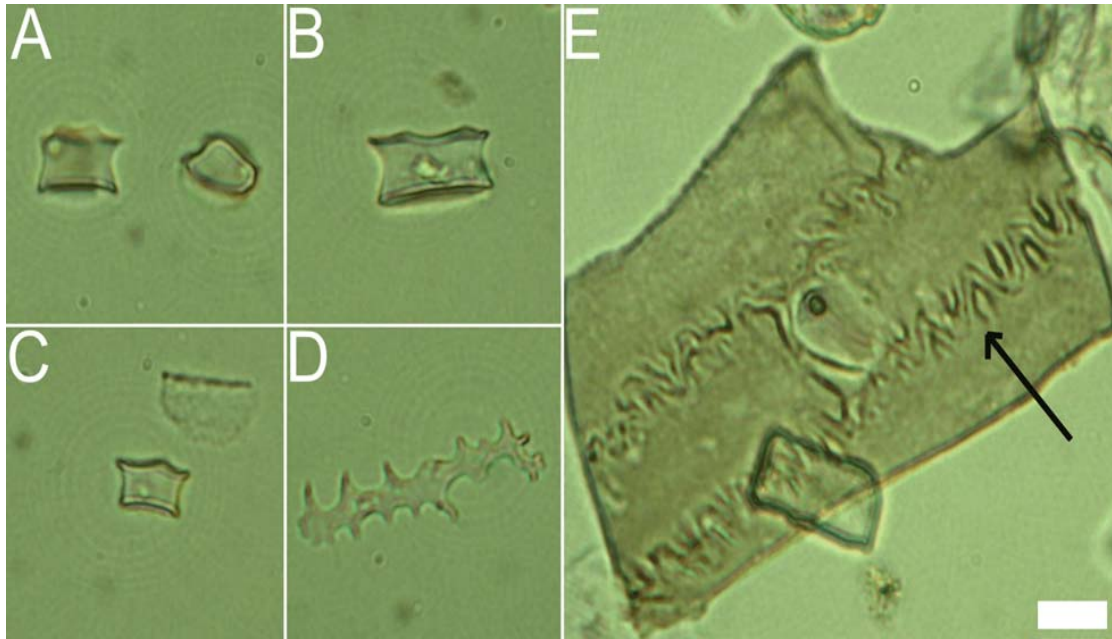


FIGURE 3. SELECTED PHYTOLITHS MICROGRAPHS FROM GROUNDSTONE SAMPLE 1129

All micrographs taken at 500x magnification. Scale bar equals 10 microns.

- A) Wavy-top rondel in side view (left) and top view (right).
- B) Wavy-top rondel in side view.
- C) Wavy-top rondel in side view. These wavy-top rondels are diagnostic of maize (*Zea mays*).
- D) Dendriform phytolith from the husk of a cereal grain.
- E) Epidermal sheet element fragment with a keeled rondel *in situ*. The jagged margins of the long cells for this sheet element are a diagnostic characteristic for oat grass (*Avena* sp.).

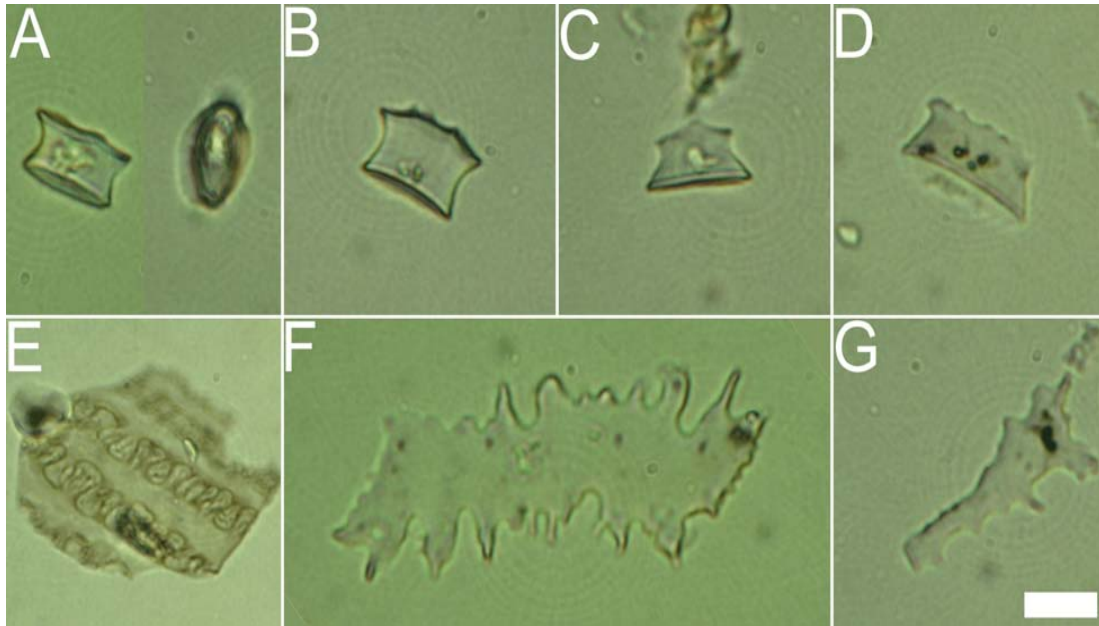


FIGURE 4. SELECTED PHYTOLITH MICROGRAPHS FROM GROUNDSTONE SAMPLE 1479

All micrographs taken at 500x magnification. Scale bar equals 10 microns.

- A) Wavy-top rondel in side view (left) and top view (right).
- B) Wavy-top rondel in side view.
- C) Wavy-top rondel in side view. These wavy-top rondels are diagnostic of maize (*Zea mays*).
- D) Possible maize wavy-top rondel, but not a diagnostic form.
- E) Epidermal sheet element derived from wheat (*Triticum*) or barley (*Hordeum*).
- F and G) Dendriform phytoliths derived from the husk of cereal grains.



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## APPENDIX B

### FLOAT REMAINS ANALYSIS

## Summary

Appendix B is the report in Spanish presented by Claudia Silva of the Museo de Historia Natural de Concepción, who analyzed 25 bags of floated material recovered from Santa Sylvia. These samples were taken from selected features and areas in T1, T2, and T3 and floated at the Instituto de Geociencias, Universidad Austral de Chile. Flotation separates cultural materials from the soil matrix, divided into a “heavy fraction” of materials that are caught in a thin screen, and a “light fraction” that float to the surface and are caught in nylon mesh. The remains are then dried and bagged for analysis.

Silva’s analysis indicates that during the occupations of Santa Sylvia, the inhabitants exploited primarily wild resources, rather than domesticates such as maize peppers, and potatoes. Appendix A presents information that suggests the inhabitants did consume domesticates, but the present analysis shows that wild plants received greater use. No specific pattern appears in the materials analyzed, though more is needed to be done in order to fully reconstruct the possible diet of the inhabitants of Santa Sylvia from pre- to post-Hispanic times.

# Informe de análisis carpológico para sitio Santa Sylvia, comuna de Pucón, IX región

Claudia Silva Díaz<sup>1</sup>

## 1. Introducción

Los análisis arqueobotánicos, y en particular los carpológicos, fueron aplicados por primera vez en el centro-sur de Chile, durante la pasada década de 1990 (por ejemplo, Rojas y Cardemil 1994), aunque su principal interés ha sido el estudio de los restos vegetales depositados en asentamientos del período prehispano. Así aunque con excepciones, como los recientes análisis en el fuerte Niebla, XIV región de los Ríos (Silva 2009), en los sitios arqueológicos del período de ocupación española, la preocupación por sus evidencias vegetales ha sido escaso.

Por ello el presente análisis resulta novedoso, al examinar materiales provenientes de un sitio de data histórica temprana. Se trata del asentamiento hispano Santa Sylvia, localizado en la comuna de Pucón, IX región de Chile, y que según datos bibliográficos habría sido abandonado alrededor del año 1598 d.C., teniendo una corta ocupación –entre dos a tres años-, a juzgar por la cantidad y tipo de materiales culturales reunidos durante las pasadas excavaciones del sitio, ocurridas entre los meses de Noviembre de 2009 y Marzo de 2010 (ver Sauer 2010).

En dichos trabajos de campo, se recolectaron los sedimentos de 24 rasgos, los cuales fueron sometidos a tratamiento mediante técnica de flotación, para luego analizar macrocópicamente las semillas recuperadas.

Siendo este un asentamiento histórico (no descartándose ocupaciones previas), una de las hipótesis manejadas para este análisis, era el hallazgo de especies vegetales de origen europeo, tanto domésticas como silvestres. A partir de esto, también debía evaluarse el probable reemplazo de frutos locales por los adventicios, o una convivencia de ambas fuentes de recursos vegetales. Otra posibilidad era la predominancia de especies nativas y/o endémicas dentro del repertorio vegetal del sitio, ante la dificultad de abastecimiento de este tipo de establecimientos y la realización de tareas agrícolas, debido al asedio mapuche.

## 2. Material y Método

Para obtener y procesar las muestras carpológicas de Santa Sylvia, se siguieron los siguientes pasos:

### 1) Obtención de muestras de sedimento

Se recuperaron los sedimentos contenidos en 24 rasgos, distribuidos en las cuatro

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trincheras de excavación. Los rasgos son los siguientes: 13, 32, 33, 38, 42, 63, 80, 84, 87, 90, 95, 121, 124, 127, 141, 150, 159, 164, 165 y, 20-30cm. En tanto hay cuatro muestras sin adscripción espacial clara, estas estaban contenidas en las bolsas 9, 17, 21 y 25. Cada muestra fue de 4 litros.

## 2) Flotación de los sedimentos

Se procesaron las muestras de sedimentos mediante la técnica de *flotación por máquina asistida*, con el fin de recuperar carporrestos, es decir, frutos, semilla, además de fragmentos de carbón. La flotación consiste en someter una muestra de sedimento a un flujo constante de agua dentro de un recipiente, lo que permite segregar una *fracción liviana* (material que flota como los restos vegetales) y una *fracción pesada* (cerámica, lítico, óseo, malacológico, vegetales, etc.). El sedimento restante decanta en el fondo del recipiente (Watson 1976, Greig 1989).

## 3) Análisis de carporrestos.

Para el análisis de los carporrestos, la fracción pesada se observó bajo lupa simple de aumento 5x, mientras que la fracción liviana fue observada mediante una lupa binocular de aumento 10x y 20x. Posteriormente, se identificó y especificó el estado de conservación de los restos vegetales, utilizando los criterios de carbonización (carbonizado/no carbonizado) e integridad (completo/fragmentado). El estado de carbonización de las semillas es importante de considerar pues las condiciones ambientales del centro-sur de Chile, no permiten la preservación de restos vegetales crudos. En consecuencia, los granos carbonizados tienen mayores probabilidades de perdurar y conservarse en el sitio, y según su asociación contextual, son calificados como parte del registro arqueológico del lugar. De todas formas, los carporrestos no carbonizados se cuantifican ya que indican una probable contaminación de las muestras con restos vegetales actuales.

La identificación de los carpos fue apoyada con la revisión de colecciones de referencia (semillas y frutos actuales y arqueológicos), y consulta de bibliografía especializada (Martin y Barkley 1973, Hoffman 1997, Matthei 1995, Mösbach 1999). Además se clasificó a los taxa determinados según su origen, esto es, endémico (propio de la zona en estudio), nativo no endémico (introducido antes de la conquista hispánica) y adventicio (alóctonos, introducidos en tiempos históricos) (Belmar y Quiroz 2000a).

## 3. Resultados

### *Fracción Liviana*

En total fueron recuperados 171 restos carpológicos, distribuidos en 19 de los 24 rasgos analizados. En tanto cinco muestras no presentaron semillas, correspondiendo a los rasgos 32, 42, 95 y 164, junto a la bolsa 17. De los carpos analizados, se logró la identificación taxonómica en 109 casos (63,74%), distinguiendo diez especies, dos géneros y cinco familias de plantas (Tabla 1).

Taxón	Rasgo / Nivel																		Total general	
	32	33	38	63	80	84	87	90	121	124	127	141	150	159	165	20-30cm	bolsa 21	bolsa 25		bolsa 9
<i>Aristotelia chilensis</i>														2		1			1	4
Asteraceae	4		2			1	1		1						2	2	2			15
<i>Bromus</i> sp.				1							1	1				1		3	2	9
<i>Chenopodium album</i>						1								2			5	2		10
<i>Chenopodium</i> sp.		1				1		2								1				5
Fabaceae															1					1
<i>Fragaria chiloensis</i>									1						2					3
<i>Gevuina avellana</i>							1									1				2
<i>Muehlenbeckia hastulata</i>			2			1				1					1				1	6
<i>Plantago lanceolata</i>															3					3
Poaceae															1			1		2
<i>Portulaca oleracea</i>	4		1			1	2	1	1				1		2		2	1	12	28
<i>Relbunium hypocarpium</i>					1	1									3				1	6
<i>Rubus ulmifolius</i>															5				1	6
<i>Typha angustifolia</i>							1	2	1	1				1		2			1	9
no identificable				3	2	4			7	1			3	1			1	1	3	26
no identificada	5	1	1		2	1	1	4	2		2	1	1	1	5	6	1		2	36
<b>Total general</b>	<b>13</b>	<b>2</b>	<b>6</b>	<b>4</b>	<b>5</b>	<b>11</b>	<b>6</b>	<b>10</b>	<b>12</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>6</b>	<b>5</b>	<b>27</b>	<b>14</b>	<b>11</b>	<b>8</b>	<b>24</b>	<b>171</b>

**Tabla 1.** Frecuencias absolutas de semillas según Taxa y Rasgo/Nivel, en el sitio Santa Sylvia.

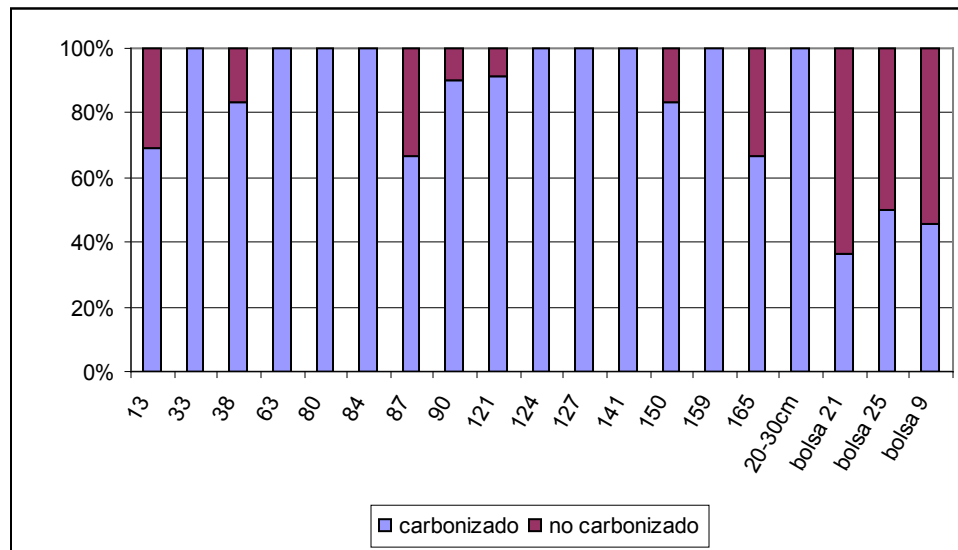
Dentro de los géneros reconocidos, es importante centrar nuestra atención en las semillas clasificadas como *Bromus* sp., pues a este género de Poáceas o gramíneas, pertenecen tres especies de cereales que fueron mencionados por los cronistas españoles entre los cultivos presentes en las huertas mapuches del período histórico temprano (Valdivia 1929 (1550-1554)). Los cereales en cuestión son el magu o mango (*Bromus mango*), el lanco (*Bromus stamoneus*), y la teca o tuca (*Bromus bertherianus*). Sin embargo en la actualidad, los dos últimos no siguen cultivándose pudiendo encontrarlos en estado silvestre, y el mango es una especie extinta. Ambas situaciones estarían determinadas por el reemplazo de estos cereales por el cultivo del trigo (*Triticum aestivum*), cuyas principales ventajas habrían sido su alta productividad y rápida maduración respecto a las especies endémicas (Torrejón y Cisternas 2002). Asimismo la extinción del mango puede explicarse por el carácter doméstico de esta especie, puesto que su reproducción dependía de la manipulación humana, cual es uno de los rasgos principales de los vegetales domesticados (Matthei 1986), con lo que el abandono de su cultivo ocasionó su desaparición.

En tanto todas las especies identificadas corresponden a vegetales silvestres, y la mayor parte de ellos son de carácter endémico o nativo. Entre estas últimas encontramos al maqui (*Aristotelia chilensis*), frutilla blanca o miñe-miñe (*Fragaria chiloensis*), avellana (*Gevuina avellana*), quilo (*Muehlenbeckia hastulata*), relbún (*Relbunium hypocarpium*) y bato (*Typha angustifolia*). Estos vegetales tienen conocidos usos tanto en medicina, alimentación, tintes o como fibra vegetal. Así por ejemplo, las avellanas se consumen crudas o tostadas, los pequeños frutos

del maqui se comen en forma fresca o hechos conserva, ocurriendo algo parecido con la frutilla blanca, aunque en este caso se suma la elaboración de chicha. En tanto el quilo es utilizado para la confección de sogas, siendo también medicinal (diurético); el tallo del batro es comestible, y la raíz del relbún es usado como tintura roja (Mösbach 1999, Hoffman 1997).

Por otra parte, la quinguilla (*Chenopodium album*), el llantén menor (*Plantago lanceolata*), la verdolaga (*Portulaca oleracea*) y la mora (*Rubus ulmifolius*), arribaron a estas latitudes junto con los europeos, por lo que su adscripción al período de ocupación del sitio, depende de su estado de carbonización. Como se aclaró anteriormente, en nuestra área de estudio solo los restos vegetales carbonizados resisten la descomposición, con lo cual las semillas crudas encontradas son de data reciente y las que se presentaron quemadas tendrían una mayor antigüedad.

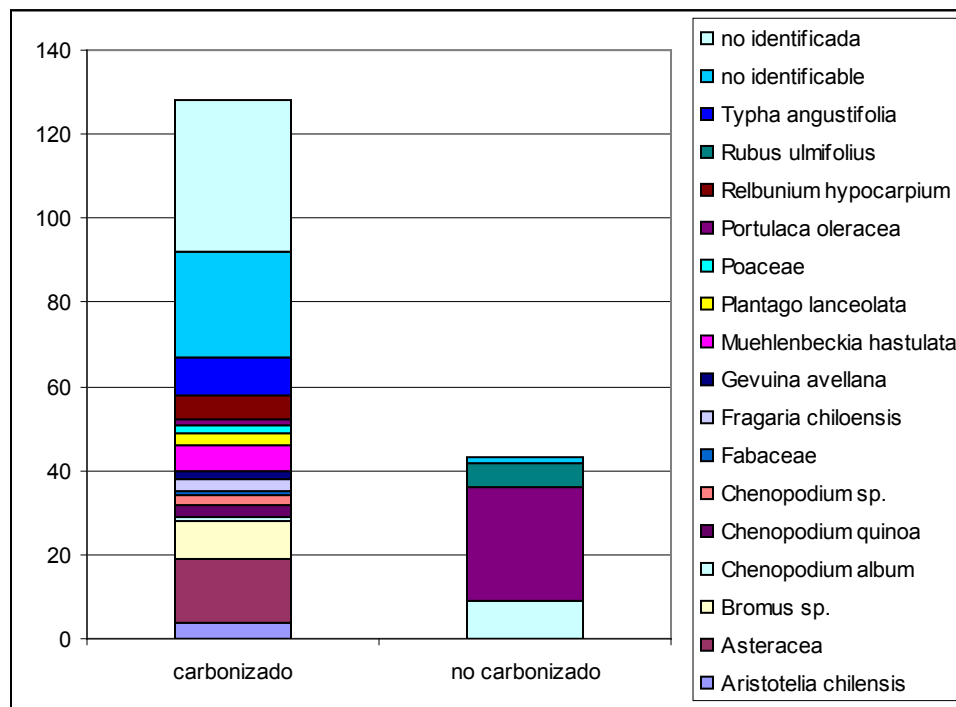
Respecto a la carbonización de los carpos, y observando esta situación en cada uno de los rasgos con evidencias arqueobotánicas, podemos mencionar que todos presentaron semillas quemadas, siendo predominantes en la mayoría de ellos con excepción de las muestras contenidas en las bolsas 9, 21 y 25 (Gráfico 1). La presencia de semillas no carbonizadas puede deberse a la contaminación de las muestras durante la extracción de los sedimentos, o bien, por la cercanía de los rasgos a la superficie del sitio, determinando la depositación de semillas de plantas recientes en su sustrato. Con esto, los rasgos 33, 63, 80, 84, 124, 127, 141, 159 y 20-30cm, están libres de restos vegetales modernos, aunque esta cuestión no resta importancia a las evidencias provenientes de los demás rasgos, debido a que los procesos post-depositacionales no son una temática medular en nuestro estudio, y las semillas no carbonizadas son excluidas al momento de interpretar el sitio. Esto



**Gráfico 1.** Frecuencias relativas de semillas carbonizadas y no carbonizadas, según rasgo/nivel, en sitio Santa Sylvia.



último porque, como vemos en el Gráfico 2, todas las semillas crudas pertenecen a especies adventicias o no tienen identificación taxonómica, por lo que no habrían sido parte del repertorio vegetal de los habitantes de Santa Sylvia.



**Gráfico 2.** Frecuencias absolutas de semillas carbonizadas y no carbonizadas según taxa vegetal, en sitio Santa Sylvia.

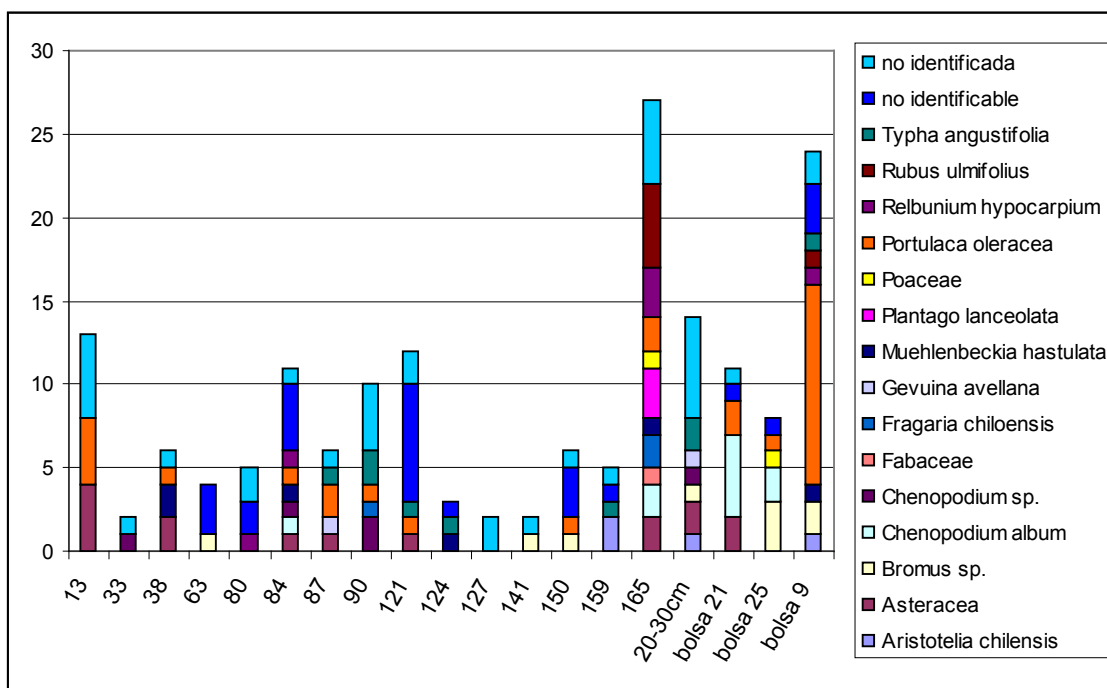
Si siguiendo con nuestro análisis según rasgo, los más notorios por el mayor número de ejemplares contenidos son el rasgo 165 con 27 semillas, y las 24 semillas contadas en la bolsa 9 (Tabla 1 y Gráfico 3). De todos modos, estas cantidades son reducidas, por lo que se hace difícil asegurar que los lugares en donde se ubicaron estos rasgos hayan sido áreas en donde la manipulación de vegetales era una actividad principal.

No obstante estas mismas muestras junto a los rasgos 84 y 20-30cm, destacan por su buena variedad de taxa. Así sin contar las semillas no identificadas y no identificables, el de mayor diversidad fue el rasgo 165 con 10 taxa, le siguen las muestras de la bolsa 9 con 7 taxa, y los rasgos 84 y 20-30cm, con 6 taxa cada uno (Gráfico 3).

De modo más particular, hay que señalar que los rasgos que presentaron semillas carbonizadas de vegetales endémicos y nativos (silvestres y posiblemente domesticados, como es el caso del *Bromus sp.*), fueron (Tabla 1 y Gráfico 3):

- Rasgo 38: *Muehlenbeckia hastulata* (quilo) (1)
- Rasgo 63: *Bromus sp.* (1)

- Rasgo 84: *M.hastulata* (quilo) (1); *Relbunium hypocarpium* (relbún) (1)
- Rasgo 87: *Gevuina avellana* (avellana) (1); *Typha angustifolia* (batro)(1)
- Rasgo 90: *Fragaria chiloensis* (frutilla blanca) (1); *T. angustifolia* (batro) (1)
- Rasgo 121: *T. angustifolia* (batro) (1)
- Rasgo 124: *M. hastulata* (quilo) (1); *T. angustifolia* (batro) (1)
- Rasgo 141: *Bromus* sp. (1)
- Rasgo 150: *Bromus* sp. (1)
- Rasgo 159: *Aristotelia chilensis* (maqui)(2)
- Rasgo 165: *F. chiloensis* (frutilla blanca) (2); *M. hastulata* (quilo) (1); *R. hypocarpium* (relbún) (3)
- Rasgo 20-30cm: *A. chilensis* (maqui) (1); *Bromus* sp.(1); *G. avellana* (avellana) (1); *T. angustifolia* (batro) (1).
- Bolsa 25: *Bromus* sp.(1)
- Bolsa 9: *A. chilensis* (1); *Bromus* sp. (1); *M. hastulata* (quilo) (1); *R. hypocarpium* (relbún) (1); *T. angustifolia* (batro) (1)



**Gráfico 3.** Frecuencias absolutas según rasgo/nivel y taxa vegetales en sitio Santa Sylvia.

### Fracción Pesada

Por su parte, la revisión de las fracciones pesadas no arrojó resultados concluyentes respecto a las evidencias arqueobotánicas. Solo en el rasgo 150 se recuperó una semilla carbonizada, pero que sin embargo no pudo ser identificada taxonómicamente; también se encontraron restos vegetales en el rasgo 33, con 5 pequeños tallos de un vegetal no identificado, y en los rasgos 63, 90, 124 y 164,

con fragmentos de carbón (Tabla 2).

De todas formas, destacan los abundantes restos de escoria hallados en el rasgo 15, que podría indicar la presencia de un área de combustión asociada al trabajo con metales u otro material que requiera de fuertes temperaturas.

Rasgo/ Nivel	Material							Total general
	carbón	cerámica	escoria	lítico	semilla no identificada	tallo	sin material	
13							x	0
15			30					30
32							x	0
33		1				5		6
38				1				1
42		1						1
54		1						1
63	8							8
80							x	0
84			4					4
87		2	1					3
90	5							5
121			4					4
124	2							2
127							x	0
141							x	0
150					1			1
159		2	5					7
164	5							5
165				1				1
20-30cm							x	0
bolsa 10			1					1
bolsa 18							x	0
bolsa 22							x	0
bolsa 26		1						1
<b>Total general</b>	20	8	45	2	1	5	x	81

**Tabla 2.** Frecuencias absolutas de materiales en fracciones pesadas, según rasgos en sitio Santa Sylvia.

#### 4. Conclusiones

Cuantitativamente las muestras analizadas no fueron significativas, pues los rasgos que presentaron el mayor número de semillas (rasgo 165 y bolsa 9) no superaban la treintena de ejemplares. Con esto, es difícil afirmar que tanto estos rasgos como los demás que contenían granos carbonizados (19 de las 24 muestras estudiadas), hayan correspondido a áreas de manejo de recursos vegetales. De todos modos, no hay que descartar que los ocupantes de este sitio tuvieran la costumbre de asear los espacios de uso más cotidiano, por lo que los restos de vegetales y otros materiales desechados luego de su uso, estarían depositados

en basurales fuera de los recintos de Santa Sylvania. Así las semillas recuperadas pudieron haber caído accidentalmente, quedando depositadas en lugares difíciles de limpiar.

No obstante, desde el punto de vista taxonómico los resultados se vuelven más interesantes. Así es notable la ausencia de especies domésticas, tanto locales como adventicias, lo cual podría ser resultado de la imposibilidad de realizar trabajos agrícolas en el lugar, probablemente ocasionado por el asedio mapuche. Este ambiente bélico y la carencia de plantas cultivadas, como por ejemplo el trigo, base de la dieta europea, habrían provocado el pronto abandono del asentamiento, hipótesis también manejada a partir de la cantidad de materiales arqueológicos encontrados durante la excavación del sitio.

Así las cosas, los habitantes de Santa Sylvania debieron recurrir a los vegetales silvestres endémicos y nativos para suplir esta falta de recursos alimenticios. Con esto se explica la presencia de semillas carbonizadas de maqui (*Aristotelia chilensis*), frutilla blanca o miñe-miñe (*Fragaria chiloensis*), avellana (*Gevuina avellana*) y batro (*Typha angustifolia*), todas plantas comestibles. Es muy posible que la recolección de dichos frutos haya estado orientado por algunos habitantes originales del sector, puesto que como se afirma en la bibliografía (Gordon 1991), dentro de este asentamiento español existían recintos ocupados por mapuches.

En este contexto, la aparición de granos de *Bromus* sp., género de gramíneas entre las que se encuentran el mango (*B. mango*), la teca (*B. bertherianus*) y el lanco (*B. stamoneus*), cereales propios de las huertas mapuche en tiempos históricos tempranos (Valdivia 1551, Matthei 1985), se explique también por el aprovechamiento de conocimientos botánicos y hortícolas locales, por parte de los europeos asentados en Santa Sylvania. A pesar de ello, la ausencia de otros cultígenos nativos, como el maíz (*Zea mays*) y la quínoa (*Chenopodium quinoa*), que han sido identificados en varios sitios arqueológicos del período prehispano tardío en el centro-sur de Chile (Dillehay et al. 2007, Massone et al. 2007, Silva 2010) reafirma la idea de la dificultad que tenían los ocupantes de este lugar para realizar actividades agrícolas.

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## APPENDIX C

### OBSIDIAN CHEMICAL ANALYSIS

## Summary

The following appendix presents a table of the raw obsidian chemical analysis performed by Dr. Charles R. Stern of the University of Colorado-Boulder. Briefly, obsidian carries particular chemical signatures unique to the volcano from which it came, and can thus be sourced to a particular volcano or volcanic region (Stern et al. 2009). In this case, 25 samples of obsidian from Santa Sylvania were analyzed. Results indicate that black obsidian largely comes from the Nevados de Sollipulli source, located about 45km north of Santa Sylvania. Red and banded obsidian comes from the Portada Covunco, an area in Argentina approximately 100km northeast of Santa Sylvania. These same obsidian types have been found at sites along the Pacific coast, suggesting some degree of long-distance trade (see Chapter 9).



	samp #	typ e	Ti*	Mn	Rb	Sr	Y	Zr	Nb	Cs	Ba	La	Ce	Pr	Nd	S	Eu	Gd	Tb	Dy	Ho	Er	T	Yb	Lu	Hf	Pb	Th	U	
Sauer samples																														
es120	1277	????	673.7	9.92	4.51	9.11	1.04	21.16	3.58	DL	24.56	0.60	1.12	0.1	0.46	0.0	DL	0.1	DL	0.1	0.0	DL	0.1	DL	0.3			0.2		
es120	1834	L1	1481.00	388.49	107.35	127.82	140.7	210.98	6.36	4.4	688.65	20.39	39.76	4.32	14.02	2.88	0.74	3.11	0.37	2.23	0.47	1.49	1.83	0.27	0.28	4.66	23.46	10.44		
es120	862	L1	1572.67	391.64	111.56	131.23	149.7	221.50	7.03	4.4	694.51	21.49	40.21	4.23	15.30	2.80	0.70	2.98	0.32	2.32	0.44	1.62	1.60	0.27	0.25	21.25	10.92	2.55		
es120	862	L1	1499.36	383.77	113.96	132.11	148.7	221.10	14.93	4.6	706.50	21.65	40.90	4.31	15.21	2.94	0.87	3.30	0.53	2.44	0.58	1.70	2.00	0.35	0.29	21.12	17.46	2.88		
es120	2606	L1	1460.58	391.64	109.52	127.26	146.4	218.52	6.02	4.5	688.30	21.09	40.95	4.18	14.60	2.80	0.77	3.02	0.06	2.20	0.45	1.57	1.63	0.28	0.25	18.95	10.67	2.62		
es120	776	PC1	1083.69	401.27	161.56	46.56	172.0	156.18	29.11	6.8	231.20	30.67	56.53	5.49	17.43	3.07	0.41	3.49	0.42	2.62	0.54	1.77	1.90	0.30	0.48	14.824.5	6.08	6.6		
es120	523	L1	1515.73	374.46	105.00	123.83	148.5	209.12	6.00	4.2	677.98	20.90	39.00	4.20	14.71	2.85	0.78	3.04	0.39	2.24	0.48	1.58	1.69	0.22	0.25	18.410.5	10.59	2.62		
es120	1881	L1	1430.52	382.03	105.84	124.34	145.3	209.66	11.27	4.5	695.43	20.54	39.44	4.30	14.31	2.75	0.78	3.02	0.22	2.22	0.49	1.54	1.74	0.27	0.27	17.913.7	13.77	2.62		
es120	2010	PC1	1041.59	379.77	151.98	43.27	153.4	149.05	27.56	6.4	216.97	26.39	49.05	4.80	15.83	2.71	0.31	3.17	0.36	2.42	0.51	1.59	1.82	0.21	0.43	19.523.7	23.72	5.87		
es120	1623a	L1	1381.97	372.59	106.64	123.46	138.6	207.62	7.16	4.4	666.76	20.04	39.44	4.99	14.03	2.85	0.68	3.04	0.36	2.16	0.45	1.48	1.70	0.25	0.27	15.58	10.81	2.63		
es121	1623b	PC1	948.41	389.85	190.36	45.43	162.8	151.18	26.62	6.6	229.75	30.94	55.96	5.30	16.59	2.90	0.41	3.52	0.42	2.64	0.53	1.73	1.97	0.28	0.44	12.324.3	24.30	5.81		
es121	1567a	L1	1418.88	398.50	111.07	125.90	146.6	219.52	7.24	4.9	689.46	21.11	40.16	4.25	15.67	3.00	0.78	3.02	0.42	2.26	0.48	1.67	1.82	0.25	0.28	12.533	11.58	2.98		
es121	1567b	L1	1435.33	386.32	108.69	125.69	140.1	213.04	6.90	4.6	688.30	19.12	38.50	3.90	13.36	2.79	0.73	3.06	0.37	2.23	0.45	1.52	1.74	0.24	0.27	19.248	10.63	2.64		
es121	1743a	L1	1462.38	389.97	105.37	122.56	140.7	213.06	6.72	4.5	678.89	20.32	38.65	4.09	15.03	2.84	0.71	3.14	0.37	2.17	0.54	1.59	1.61	0.24	0.25	15.411.0	11.00	2.73		
es121	1743b	PC1	1086.55	398.09	157.57	45.17	170.5	150.43	26.89	6.5	237.69	31.03	54.53	5.50	18.03	2.98	0.41	3.51	0.43	2.56	0.51	1.74	2.20	0.22	0.34	24.2DL	24.29	5.92		
es121	1743c	L1	1399.78	387.84	110.60	123.35	142.5	210.18	7.20	4.9	677.55	19.49	38.93	4.03	13.91	2.74	0.72	2.92	0.27	2.17	0.45	1.53	1.77	0.25	0.28	19.148	10.57	2.65		

PC1 = Portada Covunco, Argentina  
MEL1 = Nevados de Sollipulli, Chile

## APPENDIX D

### EXCAVATION UNIT PLAN AND PROFILE MAPS

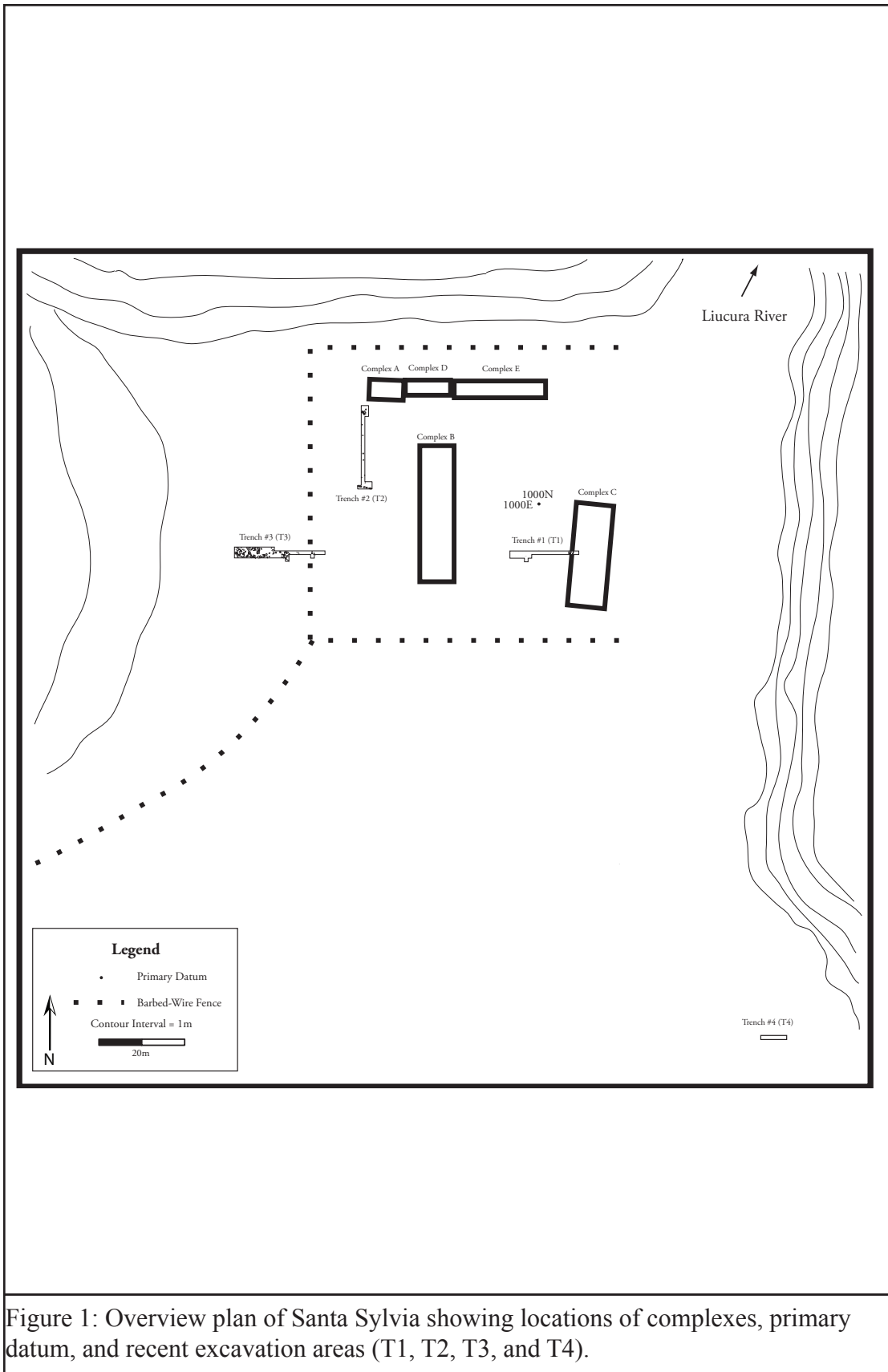


Figure 1: Overview plan of Santa Sylvia showing locations of complexes, primary datum, and recent excavation areas (T1, T2, T3, and T4).



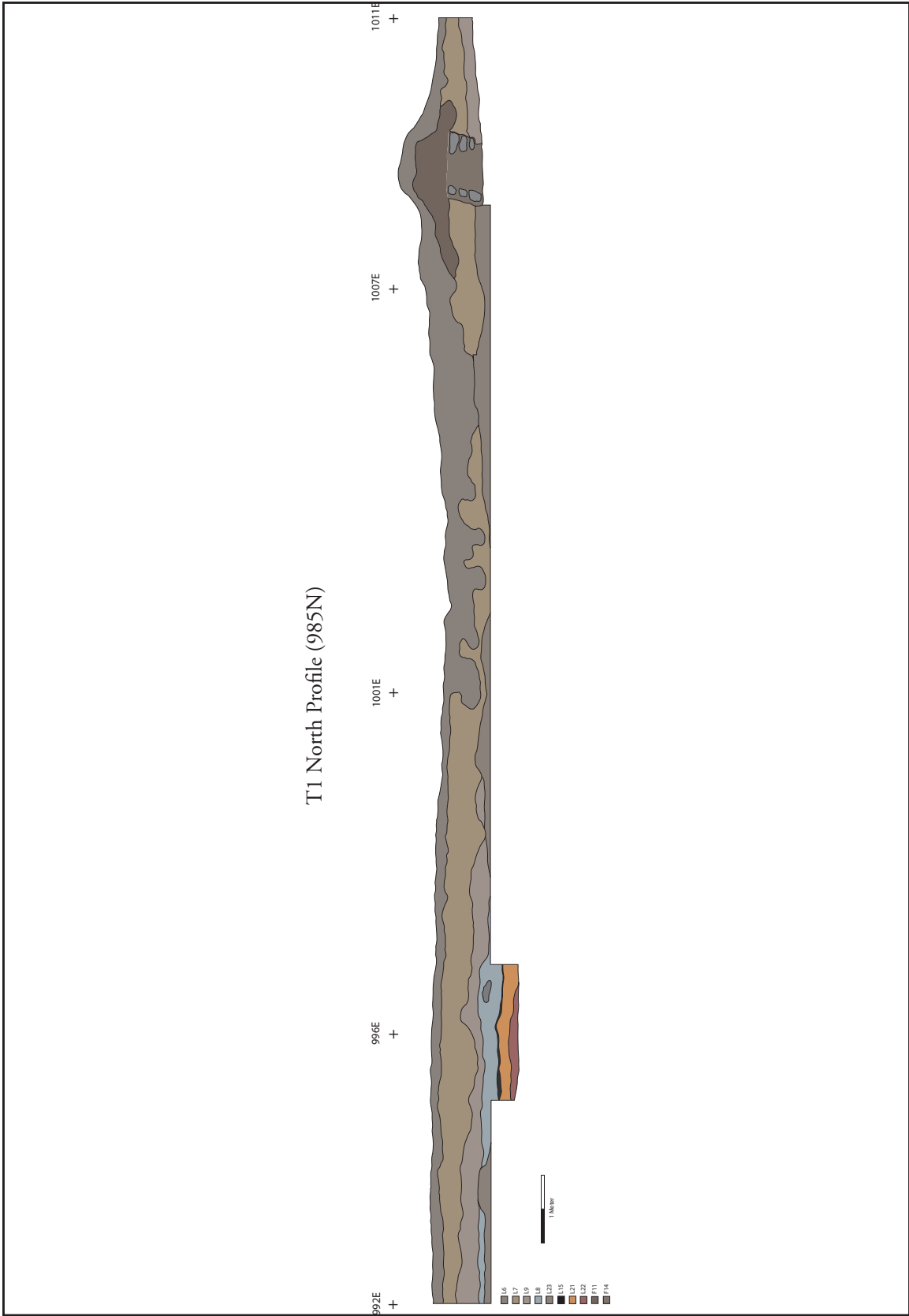


Figure 3: Profile view of T1 showing stratigraphic layers and features.

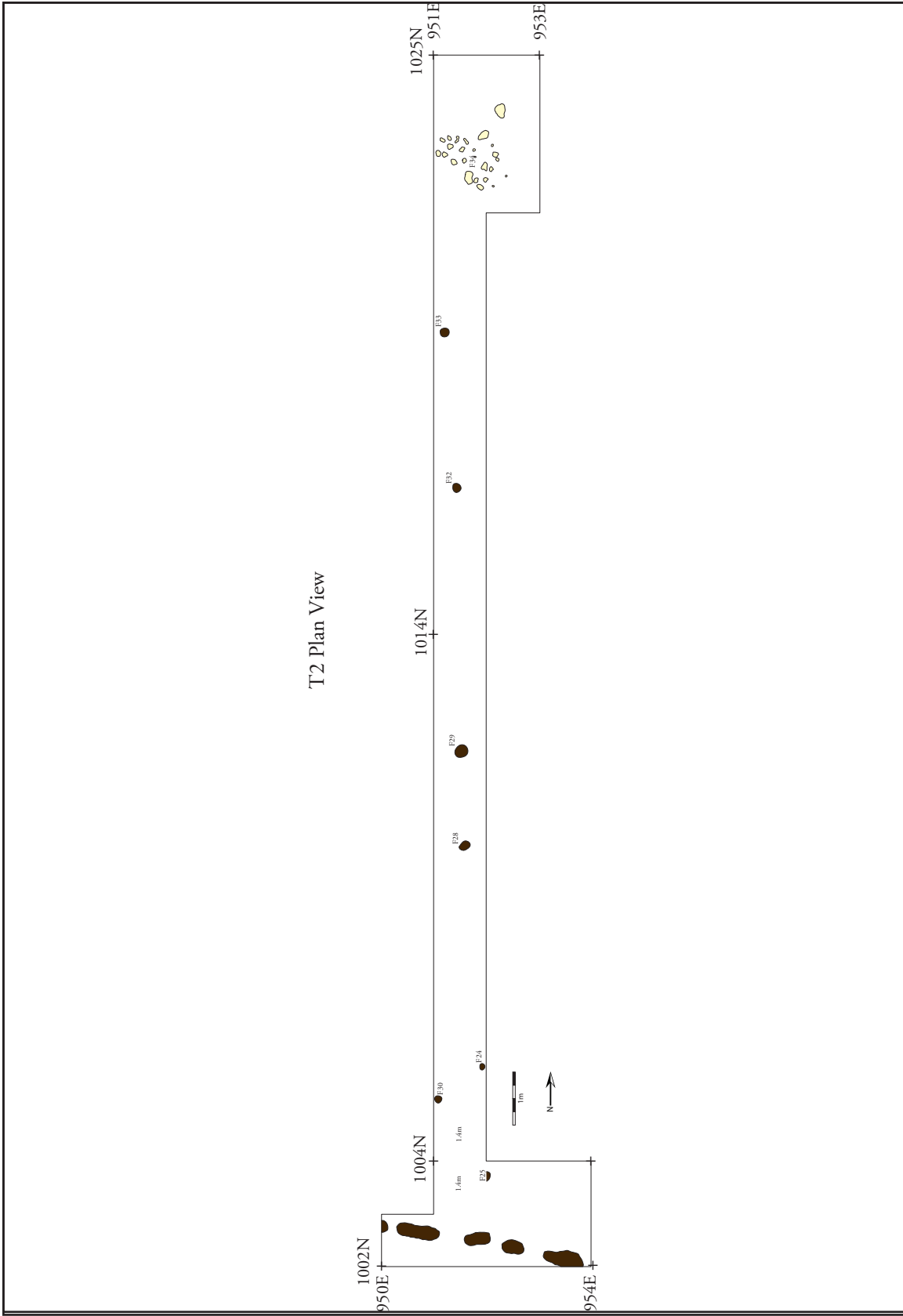


Figure 4: Plan view of T2 showing excavation units and identified features.





Figure 6: Plan view of T3





Figure 7: Profile view of T3.

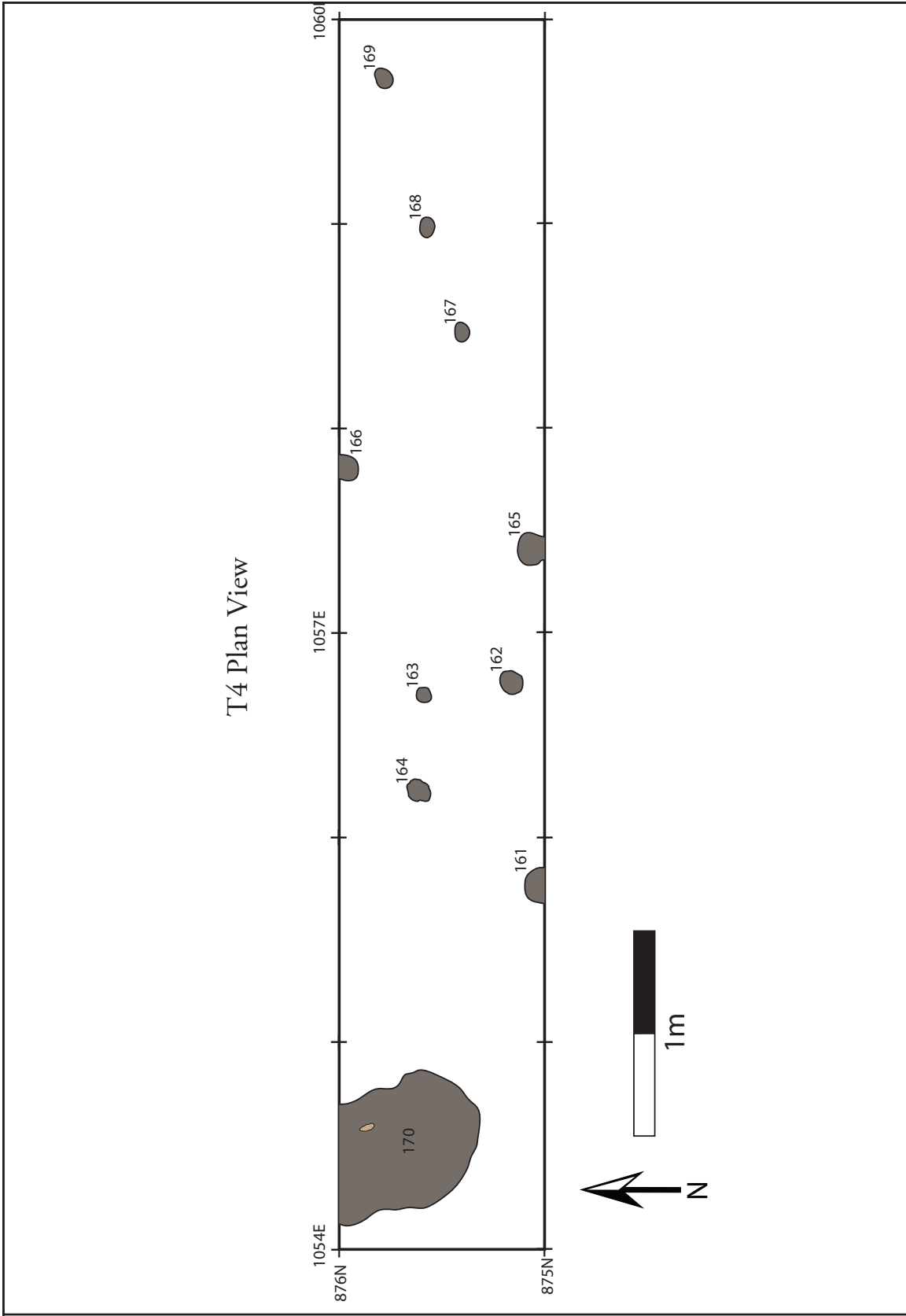


Figure 8: Plan view of T4 showing identified features and excavation units.

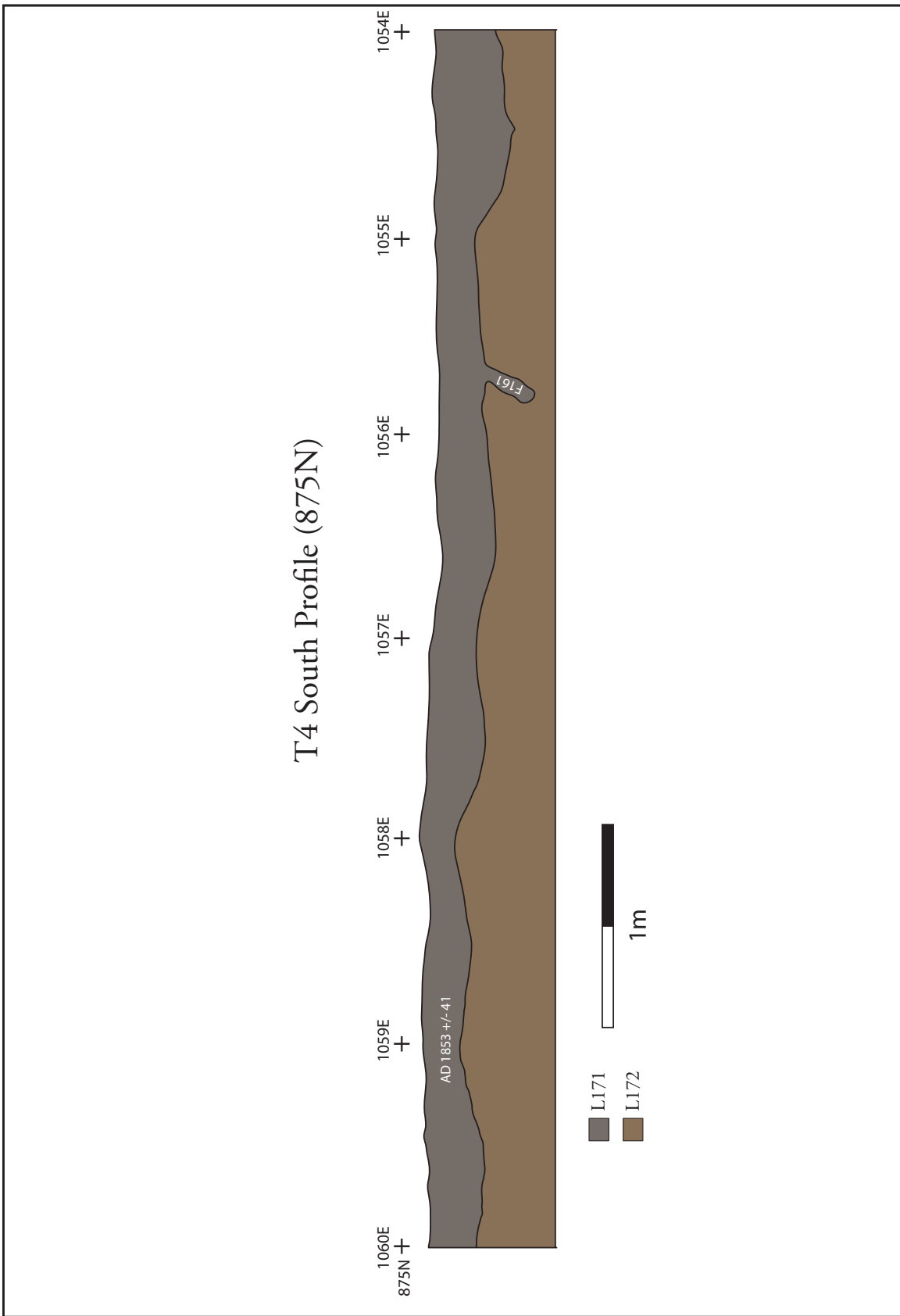


Figure 9: Profile view of T4 showing stratigraphic sequence.

## Appendix E

### FEATURE DESCRIPTIONS

## **Summary**

The following section contains descriptions of the excavations, layers, and features identified during the current research at Santa Sylvania. Excavations units are identified with a “T” prefix, stratigraphic layers with “L,” features such as post holes and soil stains with “F,” surface areas with “S,” and datum points with “D.” For locational references, the reader is referred to Appendix D, which contains profile and plan view maps of the information given below.

## Surface Materials

**Surface #:** 2

**Address:** N/A

**Depth:** N/A

**Associations:** T1, T2, T3, T4

**Description:**

Encompassing the whole of the site currently known as Santa Sylvia, F2 includes the open area east of a line of oak trees to a small forest of oak located on a slope above the south bank of the Liucura River, 150 ms east-west. This area includes a modern barbed-wire fence, which measures approximately 70m north-south by 70m east-west in a square, though the eastern side of the square is open, i.e. no barbed-wire fence. The northern fence line marks the far northern edge of the site, which extends south for approximately 200m. Subsequent investigations suggest that site materials may extend even farther to the south, but this remains to be investigated. The total site area measures 150m east-west by 200m north south and may be amplified in later research.

F2 is located on a flat area on top of a small rise, about 160m above and south of the Liucura River. The area inside the modern fence includes several features previously investigated by Americo Gordon in the late 1980's. Several mounded areas were identified and excavated, revealing 5 constructions identified as a chapel/mausoleum (Complex A), the house of the landowner (Complex B), house of friendly Indians (Complex C), a work area (Complex D) and soldier's quarters (Complex E), which date to approximately AD 1580. Subsequent testing indicated the presence of subsurface materials to the east and south of the modern fence which had not been investigated.

**Surface #:** 4

**Address:** N/A

**Depth:** Surface

**Associations:** F2

**Description:**

S4 was defined as the present ground surface of F2. It is composed of humid earth, dark brown in color (5Y 4/1) and medium to fine grained. The feature is covered by blackberry bushes, grasses, Notros (*Embothrium coccinum*) and oak trees and the remains of human occupation at Santa Sylvania, including the walls of 5 complexes, a defensive trench, and open pits from previous archaeological investigations. Several artifacts were recovered from this feature, including ceramics, roof tile, and fragments of basalt groundstone. No evidence was seen to suggest that S4 had been plowed or otherwise affected by machinery or agricultural activities, though evidence for cow pasturage was visible.

### **Datums**

**Datum #:** 3

**Address:** 1000N 1000E

**Depth:** Surface

**Associations:** F2

**Description:**

D3 is the primary datum, placed in a flat open area in between two mounded areas previously identified as Complexes B and C. Composed initially of a wooden stake later replaced by a 1.5m length of rebar, D3 was given the address of 1000N 1000E and serves as the baseline for placement subsequent excavations. The datum sits at an elevation of 350m above sea level at coordinates 5650135S, 258315E UTM, 39°15'52"S, 71°

49°05'W.

**Datum #:** 18

**Address:** 1015N 952E

**Depth:** S4

**Associations:** F2

**Description:**

D18 was defined as a stake placed at 1015N 952E based off of the primary datum D3 at 1000N 1000E to facilitate placement of excavation units in the western area of the site, south of Complex A. It was first a wooden stake later replaced by a 2m length of iron rebar. UTM location is: 258263W 5650136S.

**Datum #:** 157

**Address:** 969N 951E

**Depth:** Surface

**Associations:** N/A

**Description:**

D157 was a stake placed at 969N 921E for measurement and placement of the T4 excavation trench.

## **Trenches**

**Trench #:** 1

**Address:** 985N 922-1010E

**Depth:** 0-1.3m below S4

**Associations:** L6 -F17

**Description:**



Also referred to as Trench #1, T1 was located in a flat, open area in between Complexes B and C (F17), beginning at 985N 992E and running east in 1m intervals to 1011E. Excavations were initiated on 4 November 2009. The location of T1 was selected randomly, based on the topography of the site and no apparent evidence of previous excavations. Excavations were carried out in 10cm intervals, and the fill was screened using 6mm mesh. Materials recovered included ceramics, lithics, a stone pipe stem, roof tiles, a few fragments of black obsidian, and groundstone.

During excavations, 10 distinct layers were identified: L6, L7, L8, L9, L15, L21, and L22 were defined through most of T1. L6, L7, and L9 were the only layers to contain cultural materials, generally to a depth of about 40cm, or to the identification of a compact clay layer labeled L8. Only two units, 985N 995-996E were excavated past the L8 layer, to a depth of about 130cm below S4. An ash lens, labeled L15, appears to have been deposited by a volcanic eruption. Beneath L15, L21 and L22 were defined, though they contained no cultural materials. Two other layers, L11 and L14, were identified as part of the F17 (Complex C) probable wall.

Based on the materials recovered and the stratigraphic layers, excavations were expanded south to include 984N 992-997E, excavated to a depth of 50cm below S4, or when the L8 layer was recognized. The discovery of ceramic fragments (Liucura Red) constituting the majority of a vessel in 984N 996E led to the expansion of one unit, 983N 996E to see if any more ceramics would be recovered. None were forthcoming and the unit was not excavated past 50cm. From 985N 998-1008E, the units were excavated to about 60cm below S4 depending on the topography. From 985N 1004-1008E the ground sloped northward, apparently due to erosion though the recovery of modern trash in 985N 1007E may indicate looter activity.

In 985N 1008E the western wall, labeled F12, of F17 (Complex C) was discovered, which contained three rows of worked granite cobbles on the outside and a similar set on the inside of the feature, separated by 50cm of hard, compact L14 soil.

Above F12 a hard layer of soil, labeled L11, was identified, which may be the result of erosion of the *tapia* walls of the complex erected by the Spanish. The discovery of a possible post hole, F13, in 985N 1008E supports the conjecture that the walls were constructed by creating a wooden framework above the granite cobble base, which was then filled with mud and clay and allowed to harden. F13 may be the remains of a post hole for that framework.

Excavations within F17, 985N 1009-1010E, revealed the same stratigraphic sequence as the exterior but with a very limited number of artifacts. On the north profile of 985N 1009E, plastic sheeting, likely from Gordon's excavations, was discovered at about 30cm below S4. This indicates that the interior of F17 may have been excavated more fully than it appeared, at least along the F12 wall.

Artifacts recovered in T1 included ceramics (types Liucura Red, Brown, Gray, and Black), a stone pipe stem, roof tiles (likely eroded from Complex B), and groundstone fragments. The limited number of artifacts recovered during excavations in T1 may indicate that this area may have been a patio area that was kept clean of debris, the materials recovered found as a result of later erosion. The stratigraphy suggests that L7 served as the main occupation layer, which may date to around AD 1580 by radiocarbon dating of charcoal recovered in this layer and thermoluminescence from Gordon's excavations. L23, because of its loose, ashy nature, may indicate a burning episode at the site at some point, though this is unclear. A total of 26m<sup>2</sup> were excavated in T1.

**Trench #:** 2

**Address:** 1003N 951E

**Depth:** 0-1.5m below S4

**Associations:** S2, L6, L7, L8, F20-F35

**Description:**

Initiated at 1003-1004N 951E, Trench #2 was designated T2. It was located west of Complex B on a flat area, similar to the possible “patio” between Complex B and F17. T2 was oriented north-south parallel to Complex B. Excavations were eventually extended to 1024N 951E just south of Complex A. Excavations were also extended south to 1002 N 951-953E, west 1m to 1001N 950E, and east 2m to 1002-1003N 952-953E. In the northern half of T2, excavations were extended east to 1022-1024N 952E for a total of 31m<sup>2</sup> in excavation units during the course of work in T2. Excavations were done in 10cm intervals to an average depth of 50-60cm throughout T2, and fill was screened using 6mm mesh.

Stratigraphy followed the same general pattern as in T1, with a slightly deeper L6 layer about 15cm thick. The L6 layer was followed by L7, which averaged about 40-50cm thick with some variation in thickness throughout T2. The hard clay L8 layer appeared below L7 at about 50cm from 1002-1014N 951E. From 1015-1022E, L8 appeared between 30-45cm. Excavations were generally halted upon reaching L8, or at 50cm. Most cultural materials were recovered between 0-40cm.

In 1003-1004 951E, excavations were extended to about 150cm to see if any cultural deposits might be identified below the L8 layer. The L8 layer was about 70cm thick and extremely hard, requiring a pickaxe for removal. Below this layer, L23 was defined at about 115cm and continued to 160cm. F23 is very similar to L9, though slightly sandier with several pockets of coarse-grained sand throughout. At about 160cm, the L15 ash lens was identified, and excavations ended.

Several possible post holes, F24, F25, F29, F30, F32, and F33 were identified, running roughly north-northwest through T2. In general, each feature was 15-20cm in diameter with a range of depths from 10-40cm. These features are likely the remains of a modern fence, though it is possible that they constitute a western picket line from the Spanish occupation. Further excavation and testing may reveal the nature of these features.

A series of ash stains were identified in the southernmost portion of T2. The first, identified as F31, composed 5 oblong stains running west-northwest in 1002N 950-953E. Each stain was about 10cm wide and 15-25cm long and very shallow, no more than 5cm deep. These stains may be from a burning episode at the site, though whether it is more recent than the one during just after the Spanish occupation described by Gordon is difficult to determine as insufficient charcoal material was identified in these stains. Another stain, F26, was defined in 1003N 952-953E. Originally seen as two stains (F26 and F27 respectively) further excavation revealed it to be one stain, designated F26, which measured about 35cm north-south by 75cm east west straddling over the line between 1003N 952 and 953E. F26 was only about 10cm deep without any sizeable cultural deposits. It may also be related to a historic burning episode, though this is speculative.

In 1022N 951E, what appears to have been backfill from the Gordon excavations was identified, marked by the appearance of black plastic sheeting and a change in soil color from the L6 layer to disturbed-looking brown/gray soil (5YR 5/3) that extended from the surface to 25-30cm from 1022-1023E 951E or about 80cm along the west profile. These units are adjacent to an area marked with a “?” on one of Gordon’s maps, which meaning is unknown. A quantity of yellow/brown (2.5YR 8/4) sandstone rocks, labeled as F34, appeared in 1022-1023N 951-952E, extending eastward. No artifacts were recovered within the feature, and its purpose is unclear. It may also be the result of previous excavation by Gordon, part of the backfill debitage also identified.

A new layer, L35, was identified in 1023-1024N 951-952E, composed of red/brown fine to medium-grained soil with numerous inclusions of basalt rocks. The reason for this color shift is unclear, though it may be related to Complex A, the chapel/mausoleum identified by Gordon. According to Gordon, a burial was found in front of the complex, and although no remains were unearthed in T2, it is possible that the change in soil to the L35 layer is related to some form of burial practice.

Artifacts recovered in the course of excavations in T2 were ceramics, including the first Valdivia-style fragments in 1015N 951E between 20-30cm; lithics, primarily flakes of granite, basalt, obsidian, and andesite. Two arrowheads, a broken one of black obsidian was recovered in 1016N 951E between 10-20cm, and another of black obsidian with a concave base in 1024N 952E between 30-40cm were recovered in T2. Other tools included several fragments of groundstone, and numerous roof tiles were also recovered.

In sum, T2 is very similar to T1 in terms of artifact quantity and variability, suggesting that the main cultural occupation is related to the Spanish era around AD 1580. No features or artifacts recovered indicate a pre-Hispanic, and shallow stains such as F26 and F31 may confirm a continued, historic use of the site, though in what time period is unclear at present.

**Trench #:** 3

**Address:** 986N 932E

**Depth:** N/A

**Associations:** F2, L37-F159, F173-F179

**Description:**

Also referred to as Trench #3, T3 was initiated at 986N 932E in an area of Santa Sylvia west of the modern barbed wire fence. This portion of the site had not been excavated by Gordon and had remained open to ranching activities at Fundo El Coihue. Despite this, a magnetic resistivity survey in 2006 indicated the presence of subsurface features possibly related to the complexes excavated by Gordon dating to the Spanish colonial era, ca. AD 1580. Excavations were expanded to the east to 986N 941E, west to 986N 918E, north to 987N 919-928E, and south to 985N 919-933E and 938E. Two units were also opened in 984N 932-933E, following the indications of features and other materials. A total of 51m<sup>2</sup> were excavated, revealing 130 distinct features through three (3) stratigraphic layers that may indicate three (3) separate occupations dating to

about AD 900, AD 1100, and AD 1580. All material was screened using 6mm mesh and all sizeable (more than 2cm in diameter) materials were bagged for analysis. More than 10,000 artifacts were recovered, all fragmentary, including ceramics, lithics, groundstone, arrowheads, charcoal, obsidian, and roof tile.

The stratigraphy of T3 was markedly different from T1, T2, and T4. The initial layer beneath S4 labeled L37, was composed of dark gray/black soil (5YR 2/1), loosely compacted with numerous charcoal inclusions. This suggests that materials from L37 were heavily burned at some point in the past, perhaps at the abandonment of Santa Sylvia in the late 16<sup>th</sup> Century. Initially, it was surmised that the darkness of the soil may be due to animal activity from Fundo El Coihue, but subsequent excavations at T4 does not contain the same stratigraphic profile despite being as affected by animals and other ranch activities as T3. The L37 layer also appears to have been heavily intrusive upon lower layers (L65 and L39), suggesting an intensive occupation dating to around AD 1580. This is also born out in the quantity of features identified and artifacts recovered, which were most numerous in from about 0-40cm below S4 or the average depth of L37. Because of the variable nature of L37, most features associated with this layer were not identified until 45cm or 60cm below S4.

Below L37, a second layer labeled L65 was identified. It was composed of gray/brown soil (10YR 5/3), heavily affected by L37. Generally, L65 was seen from about 40cm to 55cm below S4 though as noted above this was extremely variable due to intrusions from L37. The soil was lightly compacted, medium to fine-grained with numerous inclusions of charcoal. This charcoal appears to date to about AD 1100 which was not as intensive as L37. Several features were identified related to this layer (L99, F100, F112, F114, F115, F133, F 140, F159, F176, F177, F180) many of which appear to be post holes which may indicate a previous *ruka* construction centuries before the construction of the Spanish complexes at Santa Sylvia. All of the other features appear to be related to the L37 occupation.

A third layer, L39, was identified around 60cm below S4 though this was also highly variable due to L37 intrusions. L39 was composed of light brown/red soil (2.5YR 5/8) that extended to a depth of about 80cm below S4. Artifacts such as ceramics, lithics, and charcoal were recovered from this layer, and one charcoal sample provided a date of about AD 900. This date, plus the artifacts recovered (particularly Pitren Red ceramics) suggest an early occupation for Santa Sylvia, though the charcoal may be “old wood” and thus not dating to that actual time period. No features were identified to this specific layer which may be due to the effects of the L37 and L65 layers, though it may be more likely that the L39 occupation was less intensive than subsequent occupations. Below L39 a hard compact clay layer labeled L59 was identified. It was similar in composition to L8, though more of a light gray (Gley2 7/5PB). It extended to at least 100cm below S4 which also corresponded to the deepest extent of excavations in T3 carried out in 986N 926-941E.

As noted above, most identified features appear related to L37 as they contain soil from that layer. Several features, such as F42, F43, F45, F47, and F104 were very deep, extending to nearly 140cm below S4 which suggests probable post holes from a possible *ruka* construction dating to the Spanish occupation. Surrounding features which were not as deep may indicate supporting posts to these larger posts, though this is speculation. Four possible firepits, F38, F66, F107, and F120 all contained orange/brown (2.5YR 4/6) soil, which appears to be oxidized. Each of these features were very shallow, no more than 10cm in depth, which may suggest either short use of these features (corresponding to a short occupation of the site) or evidence for heavy burning at the site.

In the western portion of T3, a series of small, circular post holes were identified about 30cm below S4. Labeled F110 and F129, these features may indicate the presence of small animal pens or similar structure associated with the possible *ruka* a few meters to the east. The darker soil stains (F173 and F174; 5YR 4/6) that lie inside these features may indicate animal activity, though no coprolites or other materials were recovered. To

the east in T3, generally near the 939E line in 985-986N, three possible post holes were identified and labeled as F68, F69, and F158. About 50cm apart, these features may be the remains of an outer fence or palisade related to the Spanish occupation. Notably, the number and concentration of features diminishes considerably in the units west and east of this line, which may suggest that this possible fenceline acted as a “border” between the outer Araucanian occupation zone and the interior Spanish occupation. F70 and F72 may also be related to this possible fenceline, though these holes are not as deep as F68, F69, and L158.

The largest quantities of cultural materials were recovered in the L37 layer, again suggesting that this was the most intensively used area at the site. Artifacts recovered include Liucura Red, Brown, Gray, and Black ceramics, which were generally seen from 0-50cm. Pitrén Red ceramics were seen from 0-70cm, and Valdivia red-on-white, black-on-white, and red-on-gray were seen only above 30cm. These latter ceramics suggest that Valdivia style was introduced to Santa Sylvia with the AD 1580 occupation (L37), while Liucura styles were used in both the AD 1580 and AD 1100 occupations, and Pitrén style was used through all three possible occupations. Numerous lithics were recovered, primarily granite and andesite flakes, though some basalt was also seen throughout the excavations. Black, red, and red/black obsidian was also recovered through all layers. Five (5) arrowheads were also recovered as well as numerous roof tiles, all above 40cm.

Overall, T3 indicates an intensive occupation of Santa Sylvia dating to about AD 1580. A previous occupation dating to AD 1100 was not as intensive though still may indicate farming activities and a long-term occupation. The earliest occupation, dating to AD 900, was apparently less intensive, perhaps no more than a seasonal round.

**Trench #:** 4

**Address:** 875N 1054-1059E

**Depth:** 0-60cm below S4



**Associations:** F161-170, L171-L172

**Description:**

Also referred to as Trench #4, T4 was a small excavation trench initiated at 875N 1054E. In consultation with the project advisor, this trench was placed in an area south and east of the main portion of Santa Sylvia, at the top of a rise above the Liucura River. Time constraints limited excavations to only 6m<sup>2</sup>, encompassing 875N 1054E to 1059E, and to a depth of 60cm below S4. Photographs from the time of Gordon's excavations indicates that this area had been cleared of brush or other plant material by burning, though not to the same effect as in T3. Charcoal, ceramic sherds, lithic flakes, groundstone were recovered in the fill, which was screened through 6mm mesh.

The stratigraphic sequence in T4 was distinct from T1, T2, and T3. An upper layer, labeled L171, was composed of gray/brown soil (5YR 2.5/1) fine to medium-grained with inclusions of basalt and small clay nodules. L171 was seen from the surface to about 30cm, though this varied throughout the trench. A second layer, labeled L172, was seen from 30cm to 60cm, and was composed of compacted brown/yellow soil (10YR 3/6), fine to medium-grained, also with basalt inclusions and clay nodules. Most artifacts were recovered in L171, though some were seen as deep as 60cm in L172. A charcoal sample recovered from L171 dated to AD 1850, indicating a possible occupation towards the end of the 19<sup>th</sup> Century, perhaps just before the Chilean army arrived in the AD 1880's.

A total of 10 features were identified. Two of these, F161 and F165, appear to be post holes with a depth of about 30cm each, both delving at an angle similar to F47 and F104 though narrower in size. The other features, F162, F163, F164, F167, F168, and F169 may also be small post holes, which may indicate a small, short-term *ruka* or similar construction. Artifacts recovered include Liucura Brown and Gray ceramics, granite and andesite flakes, black obsidian, one fragment of groundstone, and a roof tile from Complex B. The scarcity of artifacts indicates that this occupation was likely short,

or these artifacts may be related to the earlier occupations of Santa Sylvia, and the C14 date is from wood burned within the last century.

### **Stratigraphic Layers**

**Layer #:** 6

**Address:** N/A

**Depth:** 0-10cm below S4

**Associations:** S4T1, L7, T2

**Description:**

L6 was defined as a stratigraphic layer first identified in T1 (in 985N 992E) and later T2 (in 1003N 956E), which extends to an average depth of 10cm in T1 and 15cm in T2, below S4. It is composed of loose, dark brown (5Y 4/1, similar to S4) and humid soil, with roots, branches, decomposing leaves and other vegetal remains. The soil is fine to very fine grained without inclusions of clay or rock, though numerous small nodules of basalt, about the size of marbles, were recovered in T1. Recovered artifacts in T1 include ceramics (Liucura Red, Brown, Gray, and Black), roof tile, and lithics. No features were identified in this layer. A portion of L6 extended to L8 in 985N 1007E, where a bag of modern trash was recovered. This suggests a possible looter pit or some other form of erosion in this area. This layer appears to correspond to the “*suelo*” layer identified by Gordon during his excavations (2011:57).

In T2, the L6 layer was slightly deeper, going to about 15 cm. Composition and color remained the same, as did artifact styles except for the removal of a few fragments of Valdivia-style ceramics. Some features (F24, F25, F26, F28, F29, F30, F31, F32, and F33) may have started in L6 as they contain the same dark brown soil (5Y 4/1).

**Layer #:** 7

**Address:** N/A

**Depth:** 10-40cm below S4

**Associations:** T1, L6, L8, T2

**Description:**

L7 was identified as a stratigraphic layer below L6, composed of brown/yellow soil (2.5Y 5/3) that extended generally between 10-40cm. It was first defined in T1 at 985N 992E and again in T2 at 1003N 956E). This layer was irregular throughout both T1 and T2, perhaps due to root action or some other disturbance. Initially, L7 appeared to extend to 55-60cm, but subsequent excavations revealed a slightly different layer, L9, composed of soil that was darker and contained more ash and sand. The soil in L7 appeared fine to medium-fine grained with inclusions of clay and gravel, which increased from 35-40cm towards the sandy L9 layer. Some of the lower layers contained what appeared to be burned clay nodules, which may indicate a burning episode at the site sometime in the past and related to the ashy soil of L9. The compact nature of a lower layer (L8) may indicate that L7 and L9 compose the majority of the Spanish-era occupation first identified by Gordon. Ceramics (types Liucura Red, Brown, Gray, and Black), lithics, roof tile, charcoal, and a few fragments of groundstone were recovered in the fill, steadily decreasing until no artifacts were recovered below 40cm in T1 and 50cm in T2. A broken pipe stem made from granite was recovered in 985N 1001E at 40cm in T1. Within this layer was identified F13 in T1, a possible post hole next to Complex C. L11 intruded into L7 at 985N 1008E, though L7 reappeared beneath the former layer. L7 also appeared in the interior of F17, 985N 1009-1010E.

In T2 several features were identified, including F24, F25, F28, F29, D30, D32, and D33. Several thin ash stains composing F26 and F31, appeared in L7, localized primarily in the southern units of T2. These stains may be the remains the burning episode, identified by Gordon and in the burned clay seen in T1, which may have

transpired at the abandonment of the site in the late 16<sup>th</sup> century. Some fragments of Valdivia-style ceramics were recovered in L7 in T2, as well as two obsidian arrowheads and roof tiles. No other features or materials were recovered in L7 in both T1 and T2. L7 appears to be a part of the layer “*Lapilli Poco Metiorizado*” from Gordon’s excavations (2011:57).

**Layer #:** 8

**Address:** 985N 992E

**Depth:** 70-90cm below S4 (in T1); 50-110cm below S4 (in T2)

**Associations:** T1, L9, T2, F23

**Description:**

L8 was first identified at about 70cm in 985N 992E in T1, composed of a hard, compact clay layer of soil, light gray in color (Gley2 7/10b). Initial investigation suggested that L7 led directly into L8, but further excavation revealed a sandy, loosely compact layer, labeled L9, between L7 and L8. In T1, the L8 layer was generally 10-20cm thick and irregular, particularly in units 985N 997-1000E. No artifacts were found in L8, and excavations in units 985N 996-1011E ended when this layer was identified.

In T2, the L8 layer was much thicker and more compacted and did not have the L9 layer above, just L7. It was identified in T2 in 1003-1004N 951E at about 50cm, and was much thicker than in T1. A pickaxe was used to remove L8 in 1003-1004N 951E to about 110cm, making this layer about 60cm thick. A new layer, L23, appeared below and no artifacts were recovered. Excavations terminated in the rest of T2 upon reaching the L8 layer.

Initially, it was hypothesized that L8 may be the remains of the deteriorated walls from Complexes B and C. It is also possible, and more likely, that L8 may be the “floor” or ground surface from the Spanish-era occupation, compacted and hardened from human activity. This latter possibility may be supported by the L9 layer in T1, which layer may

indicate a burning episode based on the burned material recovered as well as the ashy, sandy nature of this layer. L8 appears to be part of the “*Lapilli Poco Metiorizado*” layer defined by Gordon (2011:57).

**Layer #: 9**

**Address:** 985N 992E

**Depth:** 40-70cm below S4

**Associations:** T1, L7, L8

**Description:**

Initially seen as part of L7, L9 was defined during continuing excavations in T1 as a loosely compacted, brown/gray (7.5YR 5/1) layer of medium to fine-grained soil distinct from L7 before the L8 layer. L9 contained ash and sand, which may be from the effects of a burning episode in the site history. This layer was identified in T1 and not T2. The only materials recovered were charcoal and a limited number of ceramic fragments (Liucura Red, Gray, Brown, and Black) which may be the result of erosion or root action. L9, like L7 and L8, appear to compose the “*Lapilli Poco Metiorizado*” layer from Gordon’s excavations.

**Layer #: 10**

**Address:** 985N 1007E

**Depth:** 70cm below S4

**Associations:** T1, L8

**Description:**

L10 was initially identified as a compact layer of clay, possibly wall deterioration from F17. Further excavation linked L10 to L8, and the latter label was applied.

**Layer #: 11****Address:** 985N 1008E**Depth:** 15-40cm below S4**Associations:** T1, L6, L7, F12, L14, F17**Description:**

First identified in 985N 1008E, L11 was defined as a hard, compacted layer of soil, brown/black in color (5YR 3/2) below L6 and only seen in T1. This layer appears to be related to F17 (Complex C) and may be due to the erosion of the possible hardened clay (*tapia*) walls of that complex. L11 was first identified at about 20cm in 985N 1008E, directly below the L6 layer and at 30cm in 985N 1007E, due to the slope created by wall (F12) of F17. The layer is about 30cm thick in 985N 1007 E, increasing to a maximum thickness of about 70cm in 985N 1008-1009E, directly above the hardened clay (L14) in between the stone foundations of F12. This layer is very similar to L14 (10YR 3/2), though not as dark. No materials were recovered in L11.

**Layer #: 14****Address:** 985N 1008E**Depth:** 40cm below S4**Associations:** T1, L11, F12, F17**Description:**

L14 was defined as the hardened *tapia* material in between the stone cobble rows in F12. Similar in color though slightly lighter (10YR 3/2) as L11 (5YR 3/2), L14 separated the stones by 50cm of clay and appears to be the “mortar” in between. No cultural materials were recovered from L14.

**Layer #:** 15

**Address:** 985N 995E

**Depth:** 90-105cm below S4 (inT1); 150cm (in T2) below S4

**Associations:** T1, L8, T2, L21

**Description:**

L15 was defined as a thin (15cm thick in some places) layer of soil beneath L8, likely deposited by a volcanic eruption. It is composed of black (Gley2 2.5/5B), very sandy soil that extends in a thin lens into 985N 992-993E and 984N 992-996E. The last known major eruption of the Villarrica Volcano may have occurred around AD 330 (Pucón 2009), possibly depositing the L15 layer. It was first identified in T1 at 985N 995E at about 90cm. In T2, the L15 layer was seen only in 1003-1004N 951E at about 150cm. The soil appears similar to the sand on the beach of Lake Villarrica. No cultural materials were recovered. Gordon also identified this layer, which he called “Arena Volcanica” at about 70cm in his “Pozo J-28” which lies north of F17 (Gordon 2011:57).

**Layer #:** 16

**Address:** 985N 1009E

**Depth:** 100cm below S4

**Associations:** T1, L7, F17

**Description:**

Below the L7 layer in F17 appeared L16, which was defined as a compacted layer of medium to fine-grained soil, gray/brown in color (7.5YR 5/1) that may have served as the interior floor of F17. It is very similar to the L9 layer, though slightly lighter in color and with less sand. The layer appeared to be heavily impacted by root action and other natural material. No cultural features or artifacts were identified or recovered.

**Layer #:** 20

**Address:** 1003N 951E

**Depth:** 0-15cm below S4

**Associations:** L6, T2

**Description:**

F20 was initially defined as a stratigraphic layer extending from 0-15cm. Further investigation determined that F20 was the same layer as L6, with the same soil composition and color. The identification of the L7 layer beneath reconfirmed that F20 was instead L6, and redefined accordingly.

**Layer #:** 21

**Address:** 985N 995E

**Depth:** 105-120 below S4

**Associations:** T1, L8, L22

**Description:**

Below the L15 ash lens in T1 at 985N 995E, L21 was defined as a stratigraphic layer composed of light brown soil (7.5YR 6/8) medium to fine-grained with numerous clay inclusions and small fragments of basalt. It appears to have no cultural occupation, as no materials were recovered. This layer may correspond to the layer "*paleosuelo amarillento*" identified by Gordon (Gordon 2011:57).

**Layer #:** 22

**Address:** 985N 995E

**Depth:** 120-130cm below S4

**Associations:** T1, L21

**Description:**

L22 was defined as a layer of red/brown soil (2.5YR 4/6), coarse to medium-



grained and very sandy with several pockets of gray/brown (2.5YR 5/2) sand within. No cultural materials were recovered in this layer, which does not preclude the possibility of deeper deposits. Time restrictions limited further exploration. It is likely that this layer is deeper (>130cm), which remains to be explored. L22 may be either the “*paleosuelo rojizo*” or “*paleosuelo rojo oscuro*” identified by Gordon in Pozo J-28 (Gordon 2011:57).

**Layer #:** 23

**Address:** 1003N 951E

**Depth:** 110-150cm below S4

**Associations:** L8, T2, L15

**Description:**

Below the L8 compact clay layer in T2 at about 110cm was identified L23. Initially believed to be the same as L9 in T1, further excavations revealed L23 to be distinct from L9 in both color and content. It is composed of medium to fine-grained sandy soil, brown/gray in color (10YR 4/1) with numerous pockets of light gray sand throughout (Gley2 7/10B), including a large, irregular pocket about 10cm wide by 7cm high in the north profile. The layer was very thick, about 40cm, ending at the appearance of the L15 ash lens at about 150cm. No cultural materials were recovered, and this layer was not identified in any other excavation unit. This may be the same type of layer as the “*lapilli meteorizado*” identified by Gordon (2011:57), but unlikely due to its depth, consistency and location in the site.

**Layer #:** 35

**Address:** 1024N 951-952E

**Depth:** 30cm below S4

**Associations:** L6, T2

**Description:**

A new stratigraphic layer, labeled L35, appeared in 1024N 951-952E in the northernmost units of T2. L35 was first identified at 30cm below S4 composed of red/brown soil (2.5YR 4/6), similar in composition and texture to L22 (seen the lower strata of T1). The soil is loosely compacted, medium to fine-grained, with inclusions of basalt and sand. T3 appeared about 55cm thick, terminating at the L8 layer 90cm below S4. Ceramics, lithics, obsidian, and roof tile were recovered in the fill to 50cm. Why the soil color changed is unknown, though it may be related to Complex A, the chapel/mausoleum identified by Gordon, which lies 5m northeast. Gordon indicated that at least one burial was recovered in the “patio” or entrance to Complex A, and this L35 soil may be related to burial practices or other activity related to the complex. No other features were identified in L35.

**Layer #:** 37

**Address:** 986N 932E

**Depth:** Variable

**Associations:** S4T3, F 39, L65

**Description:**

L37 was defined as the upper stratigraphic layer in T3. The depth of this layer was variable, extending from the S4 surface to between 40 and 70cm. It was composed of very dark gray/black soil (5YR 2/1) medium to medium-fine grained with numerous inclusions of clay and charcoal, the latter suggesting a severe burning episode at some point in the past. A C<sup>14</sup> date from charcoal recovered in this layer at about 20cm placed the occupation at about AD 1580, during the probable Spanish occupation identified by Gordon. This layer contained the largest quantity of artifacts of any portion of the site, including ceramics (types Liucura Red, Gray, Brown, and Black; Valdivia Red-on-White, Red-on-Gray, and Black-on-White; and Pitren Red), lithics (granite, andesite, black obsidian, red obsidian, and basalt), basalt mano grinding stones, projectile points of

quartz and obsidian, and roof tiles. Portions of L37 have likely been affected by historic agricultural activities and animal pasturage, but does not account for the darkness of the soil. Most of the features identified in T3 appear associated with or contain the same fill as L37. This layer appears to have heavily impacted lower layers, particularly L65, suggesting again that this occupation was the most intensive at Santa Sylvia.

**Layer #:** 39

**Address:** 986N 932E

**Depth:** Variable

**Associations:** T3, L37, L65, F59

**Description:**

First identified 40cm below S4 in 986N 932E, L39 was defined as a stratigraphic soil layer subsequent to L37. Later excavations revealed that another layer, L65, was in between L37 and L39. The depth of L39 varied, generally 55-80cm below S4 though some in some areas L39 appeared at 40cm. It is composed of fine to medium-fine grained loosely compacted soil, light brown/red in color (2.5YR 5/8), impacted by both L37 and L65. The fill contained ceramics (Liucura Red, Brown, Gray, Black and Pitrén Red) lithics (obsidian, granite, andesite) and several features, including F100 from which was recovered a date of about AD 900 from charcoal in the fill. This date indicates an early occupation episode for Santa Sylvia by Araucanian peoples, evidenced also by the ceramic types recovered.

**Layer #:** 59

**Address:** 986N 931E

**Depth:** 80-100cm

**Associations:** T3, L39

**Description:**

L59 is defined as a stratigraphic layer below L39, first identified in 986N 931E at about 80cm below S4. It is composed of very compact fine-grained clay soil, similar to L8 but of a different color (Gley2 7/5PB). No features or cultural material were recovered in this fill. Portions of this layer were excavated to 20cm (100cm below S4) and may be deeper, but excavations did not extend deeper than 100cm.

**Layer #:** 65

**Address:** 986N 935E

**Depth:** 45-60cm below S4 (variable)

**Associations:** T3, L37, L39

**Description:**

L65 is defined as a stratigraphic layer situated between L37 and L39 composed of gray/brown soil (10YR 5/3). Difficult to discern, L65 appears to be an intermediate occupation layer between the early L39 layer (ca. AD 900) and the later L37 layer (ca. AD 1580). Charcoal recovered from this layer dated to around AD 1100. The soil is lightly compacted but heavily disturbed by L37, apparently completely obliterated in some portions of the site. Generally, L65 is about 20-30cm thick, identified between 40-60cm below S4. Artifacts recovered from this layer include ceramics (types Liucura Red, Brown, Gray, and Black and Pitrén Red), lithics, ground stone, and obsidian. A groundstone recovered from this layer was washed and the resulting material sent for analysis. This revealed that the occupants during this time were exploiting maize, peppers, and medicinal herbs, though no such materials were otherwise recovered in the fill.

**Layer #:** 171

**Address:** 875N 1054-1059E

**Depth:** 0~30cm below S4

**Associations:** T4-F170, L172

**Description:**

L171 was defined as the upper layer, between 0 to about 30cm below S4 in T4. It was composed of compacted gray/brown soil (5YR 2.5/1) with inclusions of clay and basalt nodules. A C14 date from charcoal recovered in this layer indicates that it may have contained an occupation dating to around AD 1850, further supported by the number of possible post holes and other features associated with this layer. Most cultural materials associated with T4 were recovered in the L171 layer.

**Layer #:** 172

**Address:** 875N 1054-1059E

**Depth:** ~30-60cm below S4

**Associations:** T4, L171

**Description:**

Defined from about 30cm to 60cm below S4, L172 is a stratigraphic layer composed of brown/yellow soil (10YR 3/6), loosely compacted and medium to fine-grained with inclusions of basalt and clay. No features were identified with this layer, and artifacts recovered included ceramics (Liucura Brown and Gray), flakes of granite and andesite, and charcoal.

## Features

**Feature #:** 12

**Address:** 985N 1008E

**Depth:** 45cm below S4

**Associations:** T1, L11, L14, F17

**Description:**

F12 was defined as the western wall of F17 (Complex C). First identified at about 45cm in 985N 1008E, further excavation revealed portions of F12 to be revealed at about 70cm in between 985N 1008 and 1009E. The wall is composed of three rows of worked granite cobbles, separated by about 50cm of *tapia* (L14). Seventeen cobbles were identified, 8 on the exterior (west) side, and 9 on the interior (west) side. All cobbles appear to have been shaped somewhat and held in place by the hard *tapia*. Research suggests that walls like F12 were made by erecting a woven structure around the cobble foundation, into which clay was poured and allowed to harden. The resulting wall could then be defensive in nature and possibly withstand earthquakes (Guarda 1971). The discovery of possible post hole F13 in 985N 1008, immediately adjacent to F12 and F17, supports this hypothesis. No cultural materials were recovered in this layer.

**Feature #:** 13

**Address:** 985N 1008E

**Depth:** 100-109cm below S4

**Associations:** T1, L7, F12, L14

**Description:**

The only feature to appear in T1, F13 was defined as a possible post hole in 985N 1008E, first identified at about 100cm. It is semi-circular in shape, 20cm north-south and 10cm east-west, apparently cut in half by F12. F13 was composed of dark gray/black soil (5YR 3/1) slightly darker than L11. The fill was about 9cm deep with a slightly flat base. No cultural materials were recovered. It may be the remains of a posthole, part of the structure used to build the F12 wall.

**Feature #:** 17

**Address:** 985N 1008-1010E

**Depth:** N/A

**Associations:** F2, T1, L6, L7, L11, F12, L14, L16

**Description:**

To facilitate use of the Feature System, Complex C was identified as F17 in this project. Gordon identified F17 as the “*indios amigos*’ house” which according to his notes received little excavation. However, subsequent survey identified numerous open 2.5x2.5m pits in the southern half of F17, indicating that excavations had indeed occurred. Further, plastic sheeting was discovered in the profile at 985N 1009-1010E at about 30cm, again suggesting that at least a portion of the wall of F17 was previously investigated though the plastic did not extend farther into the interior of the complex or the excavation units.

F17 measures approximately 30m north-south by 12m east-west, enclosed by the F12 wall. What appears to be a small doorway, about 1.5m wide, appears in the north wall. Gordon’s maps indicate that F17 may have had two rooms, one measuring about 12m east-west by 5m north-south in the northern portion of the complex, separated by a wall that enclosed the remainder (Gordon 2011:58). No evidence was seen to suggest that this was the case, though such a wall separating two rooms may have been excavated entirely or eroded away. Few artifacts were recovered, mostly in the L7 fill and none below about 30cm. The lack of artifacts may be from the previous excavations, though no evidence suggests that Gordon’s excavations went further into the complex. It is unknown at present for what this complex was used.

**Feature #:** 24

**Address:** 1005N 951E

**Depth:** 15cm below S4; ~27cm

**Associations:** L6, L7, L8, T2, F25, F29, D32, D33

**Description:**

F24 was defined as a possible post hole, identified in 1005N 951E at about 30cm

in the L7 layer. Subsequent investigation revealed that F24 extended up into the L6 layer which was visible in the eastern profile of T2. It was filled with loosely compacted L6 soil (dark brown/gray; 5Y 4/1) that extended to a depth of about 37cm, ending at the compacted L8 layer. The visible portions of F24 in 1005N 951E measured 17cm north-south by 16cm east-west, though the feature may extend to the east into unexcavated 1005N. Excavation of F24 began at 30cm, revealing a depth of about 7 cm; however, the profile indicates that the feature is about 27cm deep, measured from the L6 layer. F24 may be related to F25, F29, D32, and D33 forming the remains of a possible fenceline, though this is speculative. No cultural materials were recovered in the fill.

**Feature #:** 25

**Address:** 1003N 952E

**Depth:** 10cm below S4; ~57cm

**Associations:** L6, L7, L8, T2, F24, F28, F29, D32, D33

**Description:**

Located in 1003N 925E, F25 was defined as a possible post hole, which was noted in the profile after excavations were extended to 100cm in 1003N 951E, which bisected the feature. F25 excavated beginning at about 10cm below S4 (present-day surface) and was revealed to be filled with L6 soil (5Y 4/1) which extended to a depth of about 44cm before ending at the compact L8 layer, making the feature around 57cm deep. The visible section of F25, seen in 1003N 952 east, measured about 7cm east west and 18cm north-south. No cultural materials were recovered from this feature. It may be associated with a fenceline composed of F24, F25, F29, F32, and F33.

**Feature #:** 26

**Address:** 1002-1003N 952-953E

**Depth:** 15cm below S4; 3-7cm



**Associations:** T2, 31

**Description:**

Located about 15cm below S4 in 1002-1003N 952-953, F26 was defined as a soil stain measuring approximately 50cm north-south by 200cm east-west, though it may extend further to the east into portions as yet unexcavated. F26 is composed of dark brown/gray soil, slightly darker than L6 (5Y 3/1) and contains inclusions of charcoal, roof tile, and some ceramic fragments (Liucura Red and Brown). The stain is only 3-7cm deep and may be related to the D31 stain to the south and west.

**Feature #:** 27

**Address:** 1003N 953E

**Depth:** 15cm below S4; 3-7cm

**Associations:** T2, D31

**Description:**

F27 was initially identified as a soil stain similar to F26. Further excavation revealed them to be the same feature, and F27 was subsumed under F26.

**Feature #:** 28

**Address:** 1010N 951E

**Depth:** 25cm below S4

**Associations:** T2

**Description:**

F28 appeared initially at about 24cm below S4. Initially composed of light brown soil (7.5YR 7/3), further investigation revealed no depth and F28 was reclassified as possible root action or a rodent burrow with no associated cultural features. It is also possible that it is, in fact, related to the possible fence line of F24, F29, F32, and F33, but the irregular shape (15cm east-west by 8cm north south) and lack of profundity suggests

that this feature is not a part of that series.

**Feature #:** 29

**Address:** 1011N 951E

**Depth:** 30cm below S4; ~37cm deep

**Associations:** T2, F24, D32, D33

**Description:**

F29 is defined as a possible post hole, first identified at about 30cm below S4 in 1011N 951E. The feature measures 17cm east-west by 16cm north-south, and was excavated to a depth of 22cm, or approximately 37cm deep (below L6). The base was revealed to be flat and unrounded, suggesting that this F29 may date to the Spanish period, Spanish post holes often having flat bases, or to the later Chilean historical period. No materials were recovered in the fill. F29 may be associated with F24, F32, and F33 as a possible historic fenceline.

**Feature #:** 30

**Address:** 1005N 951E

**Depth:** 70cm below S4; ~60cm deep?

**Associations:** T2

**Description:**

Due to a digging issue, F30 was not identified until 70cm below S4. It was defined as a possible posthole, evidenced by a circular stain filled with L6 soil (5Y 4/1). Because of the misrecognition, the feature appeared to be only 5cm deep, though presumably extended up into L7 and L6, perhaps actually 60cm deep from the bottom of L6. No artifacts were recovered from the fill and this particular feature, if a posthole, does not appear to be associated directly with F24, F25, F32, or F33, though it is still possible they are all a part of the same structure.

**Feature #:** 31

**Address:** 1002N 950-953E

**Depth:** 20cm below S4; 5cm deep

**Associations:** T2, F26

**Description:**

F31 is defined as a series of soil stains, 5 in total, west-northwest through 1002N 950-953E. They appear to be composed of the same color soil as L6 (5Y 4/1) and may be derived from that layer. D31 first appeared at about 20cm below S4 and each stain was less than 5cm deep, indicating that these may be from a burning episode and not a specific feature such as a firepit. Several fragments of roof tile were visible in this feature, apparently eroded from Complex B, and small chunks of charcoal were also visible in the fill. This feature may be associated with F26, perhaps deposited from the same burning episode, though this remains unclear. Why the stains are disbursed as they are is also unclear, though they may be a result of wooden beams or similar construction falling and burning.

**Feature #:** 32

**Address:** 1016N 951E

**Depth:** 20cm below S4; 32cm deep

**Associations:** T2, F24, F25, F29, F33

**Description:**

Identified at 20cm below S4 in 1016N 951E, F32 was a possible post hole, perhaps associated with F24, F25, F29, and D33. D32 measured 16cm north-south and 17cm east-west, with a depth of 27 cm. It was composed of the same L6 layer soil primarily in the L7 layer, and extended 2.5cm into the L8 compact clay layer. The base appeared flat, like F29, which may indicate a Spanish-style fencepost, though this is speculation. A float sample was taken, which revealed wild plant material recovered in

floatation (see Appendix B).

**Feature #:** 33

**Address:** 1019N 951E

**Depth:** 47cm below S4; 15cm deep

**Associations:** T2, F24, F25, F29, F32, F33

**Description:**

The final possible post hole in T2 was defined as D33, located at 47cm below S4 in 1019N 951E. It was a circular feature, 20cm east-west and 24cm north-south, slightly oval in shape, filled with the same soil appearing in L6 (5Y 4/1). It may be a part of or related to the F24, F25, F29, and D32 possible fence line. The fill was very loose and about 15cm deep. The base was irregular, with indications of a rodent burrow from the east. Charcoal fragments were abundant in this feature, of which samples were taken. A float sample was also taken, which, like F32, revealed fragments of wild plant material.

**Feature #:** 34

**Address:** 1022-1023N 951-952E

**Depth:** 10cm below S4; ~30cm deep

**Associations:** T2

**Description:**

D34 was first identified in 1022N 951E and defined as a series of yellow/brown (2.5YR 8/4) sandstone fragments, possibly deposited during the excavations by Gordon along with backfill soil referred to above. Twenty-six (26) pieces were visible, ranging in size from 2cm to 25cm. None appeared worked, and no other cultural material was evident.

**Feature #:** 38

**Address:** 986N 931E

**Depth:** 20cm below S4; 7cm deep

**Associations:** T3, L37, F40, F41

**Description:**

A sizeable stain of orange/brown soil (2.5YR 4/6) labeled as L38, appeared at 20cm below S4. First identified in 986N 931E, further investigation revealed that D38 measured 120cm north south and 128cm east-west, within units 985-986N 931-933E. It is composed of medium-fine grained soil, lightly compacted, with small clay inclusions and ceramic recovered in the fill which was approximately 7cm deep. The oxidized appearance of the soil suggests that D38 was a firepit during the occupation of Santa Sylvia, perhaps related to a possible *ruka* located to the west. Two circular possible posthole features, F40 and F41, were identified within D38 in the center and northwest portions. Two other features in the western portion of the site, F 107 and F123 had the same oxidized appearance as D38, though smaller in size.

**Feature #:** 40

**Address:** 986N 932E

**Depth:** 20cm below S4

**Associations:** T3, L37, F38

**Description:**

Noted near the center of F38, F40 was defined as a circular soil stain, possibly a post hole, identified at 20cm below S4. It measured 25cm north-south and 27cm east west, containing the L37 dark gray/black soil (5YR 2.5/1) for a depth of about 15cm. Excavation of F40 revealed an irregular shape, extending to the east for about 7 cm with no apparent pattern. Several pieces of charcoal and ceramic were recovered in the fill of F40, including a small Liucura Brown vessel nearly complete. The use of this feature

is not known, though it may be the remains of a post hole for constructing a spit over the possible F38 fire pit, or may be a small midden, the latter more likely due to the irregular shape of the feature upon excavation. No lithics or other cultural materials were recovered in the fill.

**Feature #:** 41

**Address:** 986N 932 E

**Depth:** 20cm below S4

**Associations:** T3, L37, F38, F40

**Description:**

Located 5cm northwest of F40, F41 was identified as another semi-circular feature within F38. It measured 17cm north-south and 15cm east-west, and contained L37 soil (5YR 2.5/1) to a depth of 12cm. Only charcoal was identified in the fill. The precise use for this feature is unknown, though it may be related to erecting a spit over the possible D38 firepit, like F40.

**Feature #:** 42

**Address:** 986N 930E

**Depth:** ~70cm below S4

**Associations:** T3, L37.

**Description:**

Identified in the center-east of 986N 930E, F42 was first noted at about 70cm below S4 due to a deep extension of L37 obscuring identification of this feature in shallower depths. F42 was a possible post hole, measuring 40cm north-south and 39cm east west, composed of dark gray/black L37 soil (5YR 2.5/1). Numerous charcoal fragments were recovered in the fill, and it is likely that other artifacts were recovered in shallower depths, which may have been associated with this feature but indeterminate due

to the difficulty in recognizing this feature until 70cm. Excavations revealed a depth of 52cm (starting at 70cm below S4), for a total depth of 123cm below S4. The base of the F42 appeared flat. This feature may be a posthole, part of a possible *ruka* structure dating to the Spanish-era occupation (ca. AD 1580). The size of the hole may indicate a center support post, though this is speculative. A float sample taken from this feature revealed wild plant material (see Appendix B).

**Feature #:** 43

**Address:** 986-987N 928E

**Depth:** 45cm below S4

**Associations:** T3, L37, F44, F45

**Description:**

F45 was defined as a circular stain, possibly a post hole, first identified at about 70cm below S4 in 986N 928E in the 987N profile line. Subsequent excavation in 987N 928E revealed that the feature extended to the north approximately 47cm and measured 60cm east-west. The full dimensions of the F43 could not be determined as it was bisected on the 987N line. It was composed of dark gray/black L37 soil (5YR 2.5/1) to a depth of 115cm below S4. At 55cm, F43 narrowed to 30cm wide, which was maintained to the bottom which was rounded instead of square. The feature cut through both the L39 and L65 layers, suggesting that this feature was constructed during the AD 1580 occupation and may be related to the construction of a *ruka* indicated by F42 and other features. Charcoal, ceramics, and lithics were recovered in the fill, though not in great quantities.

**Feature #:** 44

**Address:** 986N 928E

**Depth:** ~70cm below S4

**Associations:** T3, L37, F43, F45

**Description:**

F44, first identified at 70cm below S4 was defined as a circular soil stain, possibly a post hole, located in 986N 928E. The feature measured 36cm north-south and 36cm east-west, extending to a depth of only 5cm, or 75cm below S4 filled with the same dark gray/black L37 soil (5YR 2.5/1). No artifacts or other materials were recovered in this feature. If it was a post hole, the depth was much less profound than other similar features, such as F43 and F45 which extended to nearly 150cm below S4.

**Feature #:** 45

**Address:** 985-986N 928E

**Depth:** ~70cm below S4

**Associations:** T3, L37, F44

**Description:**

F45 was defined as a circular soil stain, possibly a post hole, first identified at 70cm below S4 in 986N 928E. The south profile (along the 985N line) revealed that F45 extended down from the L37 layer, beginning at about 45cm, at an angle slightly to the west. Composed of the dark gray/black L37 soil (5YR 2.5/1), further excavation noted that F45 extended to a depth of 140cm below S4 with a rounded base similar to F43. Removal of the fill in 985N 928E revealed that F45 measured 12cm north-south and 35cm east-west. The feature was likely larger north-south, perhaps around 30cm, but was bisected before a full measure could be established. Artifacts recovered in the fill included ceramics, charcoal, and lithics. It is possible that F45 is a post hole related to F42 and F43, though the patterning of features in T3 makes identification of specific constructions difficult.



**Feature #:** 46

**Address:** 986N 926E

**Depth:** 60cm below S4

**Associations:** T3, L37, F47

**Description:**

A small circular feature, labeled F46, was identified at 60cm below S4 in 986N 926E. Composed of dark gray/black L37 soil (5YR 2.5/1), the feature is small, measuring 15cm north-south and 11cm east-west with a depth of 13cm. No materials were recovered in the fill. F46 may be a post hole, perhaps once containing a thin support post, though this is uncertain. It was very close to F47, separated by only 3cm of soil.

**Feature #:** 47

**Address:** 985-986N 926E

**Depth:** 40cm below S4

**Associations:** T3, L37, F46

**Description:**

Three centimeters southwest of F46, F47 was initially identified as a possible post hole at 70cm below S4. Subsequent excavations in 985N 926E revealed that F47 appears to begin at about 40cm at the end of the L37 layer. It is composed of dark gray/black soil from L37 (5YR 2.5/1) and measures 55cm north-south and 50cm east-west, though in an oval shape extending diagonally southwest. In the south profile of 986N (the 985N line), F47 was about 35cm wide with a depth of 90cm and a flat base. No materials were recovered in the fill.

**Feature #:** 48

**Address:** 986N 925E

**Depth:** ~70cm below S4

**Associations:** T3, L37, F49, F50, F51, F52, F56

**Description:**

The first of a series of six soil stains noted in 986N 925E, F48 was defined initially as a soil stain first identified at 70cm below S4. It was composed of dark gray/black L37 soil (5YR 2.5/1), measuring 20cm north-south and 40cm east-west in an oval shape. Several pieces of charcoal were recovered in the fill without any other artifacts. Excavation of the feature revealed a depth of 55cm, 120cm below S4 diagonally sloping to the south. F48 was likely a post hole, though direct association with a constructed feature cannot be determined at this time.

**Feature #:** 49

**Address:** 986N 925E

**Depth:** ~70cm below S4

**Associations:** T3, L37, F48, F50, F51, F52, F56

**Description:**

F49 was defined as the second soil stain in 986N 925E, located in the center-west of the unit north of F52 and west of F48. It is a feature composed of dark gray/black soil from L37 (5YR 2.5/1) measuring 20cm north-south and 25cm east-west, oriented slightly to the northwest. First identified at about 70cm below S4 further excavation revealed a possible post hole 46cm deep (116cm below S4) with a base slightly rounded with a point at the base 7cm wide and 6cm deep. The fill contained charcoal and a few lithic fragments. The reason behind the point at the base is unclear, though it may be associated with the placement of a post for a construction of some type.

**Feature #:** 50

**Address:** 986N 925E

**Depth:** ~70cm below S4

**Associations:** T3, L37, F48, F49, F51, F52

**Description:**

F50 was identified 10cm north of F49 in 986N 925E as a soil stain, possibly a post hole, at 70cm below S4. The feature measures 22cm north-south and 17cm east-west in a circular pattern, containing dark gray/black L37 soil (5YR 2.5/1). Further excavation found that F50 was about 39cm deep with a small point measuring 7cm wide and 5cm deep at the base, similar to the pattern of F49. No materials were recovered in the fill and, like F49, the reason behind the point at the base is unclear.

**Feature #:** 51

**Address:** 986N 925E

**Depth:** ~70cm below S4

**Associations:** T3, L37, F48, F49, F50

**Description:**

F51 was located on the north profile of 986N 926E, likely extending into 987N 926E which was not fully excavated due to time constraints. The feature measures 8cm north-south and 15cm east-west and was composed of dark gray/black L37 soil (5YR 2.5/1). Excavations revealed a depth of about 10cm with a rounded base. Within the north profile of 986N 926E (on the 987N line) F51 appears to extend up about 30cm, with a slightly irregular shape, for a total depth of about 40cm. No artifacts or other materials were recovered in the fill.

**Feature #:** 52

**Address:** 986N 925E

**Depth:** ~70cm below S4

**Associations:** T3, L37, F48, F49, F50

**Description:**

F52 was defined as a soil stain located in the southwest corner of 986N 926E, composed of dark gray/black (5YR 2.5/1) L37 soil. It appeared to extend into 986N 294E as well as 985N 925-926E, but due to time constraints was not excavated in its entirety.

**Feature #:** 53

**Address:** 986N 929E

**Depth:** 70cm

**Associations:** T3, L37

**Description:**

F53 was defined as a soil stain located in the center of 986N 929E, first identified at ~80cm below S4. Similar to F42 and F44 nearby, F53 is composed of dark gray/black soil from L37 (5YR 2.5/1), which became less dark (2.5YR 3/1) during excavation. The feature measures 25cm north-south and 39cm east-west and extends to a depth of 37cm (117cm below S4). Excavation of F53 revealed a slight bell shape extending to the west. This feature may be a posthole similar to F45 and F48 which also extend diagonally, though F53 is not as apparent as the former features. No cultural materials were recovered in the fill.

**Feature #:** 54

**Address:** 986N 927E

**Depth:** ~70cm

**Associations:** T3, L37

**Description:**

Located in the center of 986N 927E, F54 was defined as stained soil, slightly oval but irregular in shape first identified at 70cm below S4. It was composed of the dark gray/black L37 soil (5YR 2.5/1), measuring 21cm north-south and 38cm east-west. Excavations revealed that F54 was 22 cm deep inclined to the south. Within the fill of 54

were discovered several intrusive spots of L39 soil which appear to have been from insect activity or root action. Several large pieces of charcoal were recovered as well as four fragments of ceramic (types Liucura Brown and Gray). It is unclear at the moment what F54 might have been, though the possibility exists that it was a posthole.

**Feature #:** 55

**Address:** 986N 925E

**Depth:** 45cm below S4

**Associations:** T3, L39, F100

**Description:**

First identified in the southern profile of 986N 925E, F55 was later re-defined as F100.

**Feature #:** 56

**Address:** 986N 925E

**Depth:** ~70cm

**Associations:** T3, L37, F48, F49, F50, F51

**Description:**

F56, defined as a semi-circular soil stain was first identified at 70cm in 986N 925E, likely associated with F48, F49, F50, and F51. It was composed of the same dark gray/black soil as L37 (5YR 2.5/1), measuring 12cm north-south and 14cm east-west. The feature was not fully excavated due to time constraints.

**Feature #:** 57

**Address:** 986N 925E

**Depth:** 45cm below S4

**Associations:** T3, L37

**Description:**

F57 was first identified in the north profile of 986N 925E (along the 987N line). Heavy rains collapsed the feature before it could be investigated.

**Feature #:** 58**Address:** 987N 927-928E**Depth:** 50cm below S4**Associations:** T3, L37, F45**Description:**

First identified in the northwest corner of 986N 928E, 50cm from F45, F58 was defined as a soil stain that, upon further excavation, extended west into 987N 927E. The feature measured 41cm north-south (though it may extend north into 988N 927-928E, which was not excavated) and 40cm east-west in a circular shape. It is likely that F58, like F43 and F45 was the remains of a posthole, but time constraints inhibited full excavation of this feature. Notably, a white quartz projectile point, ceramics (types Liucura Red, Brown, and Gray) and charcoal were recovered in the fill.

**Feature #:** 60**Address:** 986N 933E**Depth:** 60cm below S4**Associations:** T3, L37**Description:**

Located at the southwest corner of 986N 933E, F60 was defined as a soil stain, possible post hole, situated in the south profile of 986N 932-933E (985N line). It was identified at 60cm below S4 composed of dark gray/black (5YR 2.5/1) L37 layer soil in a circular form which likely extends into 985N 933E which remained unexcavated. Excavations in F60 revealed the feature to have a depth of 50cm (110cm below S4),

ending with a square base at the compacted F59 layer. The feature generally measures 10cm north-south (bisected by the 985N line) and 36cm east-west, tapering to 20cm east-west at the base. Ceramics (types Liucura Red, Brown, and Gray) were recovered in the fill.

**Feature #:** 61

**Address:** 986N 934E

**Depth:** 60cm below S4

**Associations:** T3, L37, F61

**Description:**

F61 was defined as a soil stain identified at 60cm below S4 in 986N 934E. The feature was semi-circular, containing the L37 dark gray/black soil with spots of gray/white soil (Gley2 8/5PB) and very loose. Further excavations revealed the feature to be 2cm deep with no cultural materials. It is likely that F61 was the result of animal or insect activity or some other natural action.

**Feature #:** 62

**Address:** 986N 934E

**Depth:** 60cm below S4

**Associations:** T3, L37

**Description:**

F62 was located in the south profile of 986N 934E (on the 985N line) and defined as a possible post hole. First identified at 60cm below S4, F62 extends up in the profile, beginning at about 50cm, or the interface between L37 and L65 and L39. The feature measures 18cm north south (likely extending south into 985N 934E, which was not excavated) and 28cm east-west. Further excavation revealed a depth of 55cm (105cm below S4) composed of dark gray/black L37 soil (5YR 2.5/1) and a rounded base.

Several large pieces of charcoal were recovered in the fill, suggesting that this feature (or materials inside) had been burned at some point, perhaps when Santa Sylvia was abandoned. A red clay pipe stem (10R 4/8) was recovered in the fill, the bowl still intact.

**Feature #:** 63

**Address:** 986N 935E

**Depth:** 60cm

**Associations:** T3, L37, F64, F137?

**Description:**

F63 was defined as a possible post hole located in the south profile of 986N 935E, first identified at 60cm below S4. Composed of dark gray/black L37 soil (5YR 2.5/1), F63 extended down from L37 through the L65 and into the L39 layer to a depth of 25cm (85cm below S4). The base of F63 is rounded and runs diagonally to the west. At 60cm, the feature measures 10cm north-south and 21cm east-west. F63 likely extends south into 985N 935E, but remains unexcavated. No cultural materials were recovered in the fill.

**Feature #:** 64

**Address:** 986N 935E

**Depth:** 60cm

**Associations:** T3, L37, F63, F137?

**Description:**

Located in the center of 986N 935E at 60cm below S4, F64 was defined as a circular soil stain composed of dark gray/black L37 soil (5YR 2.5/1). The feature measures 14cm north-south by 12cm east-west with a depth of 7cm (67cm below S4) and a square base. It may be the remains of a posthole, but the shallowness of the feature makes identification difficult.



**Feature #:** 66

**Address:** 986-987N 924E

**Depth:** 50cm below S4

**Associations:** F67

**Description:**

F66 is a large soil stain, first identified in the north profile of 986N 924E. Further excavations in 987N 924E revealed that the feature extended north 85cm, measuring 90cm in total north-south and 57cm east-west, and was composed of L37 dark gray/black soil (5YR 2.5/1). Notably, three orange stains (2.5YR 4/6) similar to the composition of F38, were identified within F66. These may indicate the remains of small fires, or some other form of oxidation as yet undetermined. Time constraints on the project precluded fully excavating F66. Charcoal was the only cultural material visible in the fill.

**Feature #:** 67

**Address:** 987N 924E

**Depth:** 50cm below S4

**Associations:** T3, L37

**Description:**

Located 10cm northwest of F66, F67 was identified as a soil stain, possibly a post hole, composed of dark gray/black L37 soil (5YR 2.5/1) and measuring 10cm north-south by 13cm east-west. No cultural materials were identified with this feature, which only had a depth of about 2cm. It may have been the result of root activity or some other natural phenomena.

**Feature #:** 68

**Address:** 986N 939E

**Depth:** 50cm below S4

**Associations:** T3, L37 F69, F70

**Description:**

F68 was defined as a circular soil stain, possibly a posthole, located in the northeast portion of 986N 938E at 50cm below S4. It measures 16cm north-south and 19cm east-west, composed of light brown/gray soil (2.5 5/1) that appears to be a mix of L65 and L39 soils. Excavations revealed a depth of 23cm (73cm below S4) with no cultural features recovered in the fill. It is possible that F68, along with F69 and F158, compose a fenceline that ran north-south through this portion of the site.

**Feature #:** 69

**Address:** 986N 939E

**Depth:** 50cm below S4; 31cm deep

**Associations:** T3, L37, F68, F158?

**Description:**

Located 30cm south of F68 in 986N 939E, F69 was defined as a circular soil stain, possibly a post hole, identified at 50cm below S4. The feature measures 17cm north-south and 20cm east-west and is composed primarily of dark gray/black soil (5YR 2.5/1) from L37. Another soil stain was noted immediately east. This stain was composed of brown/gray soil (2.5Y 3/3) in a semi-circular pattern, measuring 20cm north-south and 13cm east-west. Both sections were excavated, with the dark gray/black section extending to a depth of 32cm (83cm below S4) with a square base; the brown/gray section was only 8cm deep with a square base. It appears likely that the dark gray/black portion was the remains of a post hole, perhaps associated with F68 and F158 as part of a fence line running north-south. The brown/gray portion of the feature may be the result of animal activity, or a feature from a previous occupation. No cultural materials were recovered in either portion.

**Feature #:** 70

**Address:** 986N 939E

**Depth:** 50cm below S4

**Associations:** T3, L37

**Description:**

F70 is a small soil stain, measuring 12cm north-south and 10cm east-west, located in the far east of 986N 938E. It was first identified at 50cm below S4 and is composed of the same dark gray/black soil (5YR 2.5/1) as L37, suggesting that this feature is associated with that layer and possible occupation. F70 was only 5cm deep, changing to the L39 soil (2.5YR 5/8). This may indicate that F70 was the remains of an animal or insect burrow or was caused by root action. It is possible that it could be cultural, perhaps a post hole associated with F68 and F69. No cultural materials were recovered, including charcoal, to indicate that this was the case.

**Feature #:** 71

**Address:** 986N 939E

**Depth:** 40cm below S4

**Associations:** T3, L37

**Description:**

Identified as a soil stain in 986N 939E at 40cm below S4 F71 was later determined to be non-cultural, likely the result of root action or an insect burrow. This was based on the looseness of the sandy soil fill and the hole apparently tunneling in several directions. No cultural materials were recovered.

**Feature #:** 72

**Address:** 986N 939-940E

**Depth:** 30cm below S4

**Associations:** T3, L37

**Description:**

F72 was identified at 30cm below S4 at 986N 939-940E. Composed of orange/brown soil (2.5YR 4/6) very similar in color and composition to F38, it is possible that F72 was the remains of a firepit or other burning action. A small depression, 7cm in diameter, was visible within F72, in 986N 939E, composed of gray/yellow soil (2.5Y 7/4) which may be from a burrowing animal or root action. F72 measured 18cm north-south and 37cm east-west, and was about 6cm deep. No material culture was recovered in the fill.

**Feature #:** 73

**Address:** 986N 932E

**Depth:** ~60cm below S4

**Associations:** T3, L37

**Description:**

Identified first in the north profile of 986N 932E, F73 was defined as a soil stain and possible post hole. It measured 27cm east-west and 18cm south from the profile. It contained the dark gray/brown (5YR 2.5/1) L37 soil, surrounded by several small granite stones. The feature measured 25cm deep upon excavation, inclined diagonally towards the east, very similar to, but not as deep as, F45. Charcoal, ceramics, and small flakes of granite were recovered in the fill.

**Feature #:** 74

**Address:** 986N 924E

**Depth:** 60cm below S4

**Associations:** T3, L37

**Description:**

F74 is a small soil stain, circular in shape, located in the center-west portion of 986N 924E. Identified at 60cm below S4F74 measures 10cm north-south and 12cm east-west. It is composed of dark gray/black soil (5YR 2.5/1) from L37 with small pieces of charcoal in the fill. It was about 9cm deep with a slightly rounded, though irregular, base, indicating a possible post hole. No other artifacts were recovered in the fill.

**Feature #:** 75

**Address:** 986N 923E

**Depth:** 60cm below S4

**Associations:** T3, L37, F76?

**Description:**

Located in the center-south of 986N 923E, F75 was defined as a small soil stain, 15cm north-south and 18cm east-west, circular in form though slightly irregular. The fill was composed of dark gray/black (5YR 2.5/1) L37 soil with small charcoal inclusions to a depth of only 5cm. The base was squared though irregular. This feature may have been the base for a post or some other structure, perhaps related to F76 or F74, though this is speculative. No artifacts or other materials were recovered in the fill.

**Feature #:** 76

**Address:** 986N 922-923E

**Depth:** 60cm below S4

**Associations:** T3, L37, F75?

**Description:**

First identified in the east profile of 986N 923E (923E line), further excavation revealed F76 to be a large soil stain, 105cm north-south and 15cm east-west, though most of the feature is likely located in 986N 922E, which was excavated only to 30cm. It was composed of dark gray/black (5YR 2.5/1) L37 soil, likely associated with that

occupation, with charcoal inclusions and some ceramic fragments (Liucura Red and Brown). The purpose of this feature remains unclear, as it was not excavated in its entirety due to time constraints. It appeared to extend up into the L37 layer, and its size may suggest a borrow pit or midden burial. It may be associated with F123, which is another large stain to the northeast.

**Feature #: 77**

**Address:** 987N 923-924E

**Depth:** 40cm below S4

**Associations:** T3, L37, F81

**Description:**

F77 was a large soil stain composed of dark gray/black soil, similar to L37 but slightly lighter (5YR 6/1). It was identified in 987N 984E at 40 cm; further excavation revealed F77 extending into 987N 923E. The feature measured 50cm north-south and 38cm east-west in an irregular crescent shape. Depth was only 4 cm with no inclusions of charcoal or any other cultural materials. It is unknown what F77 was, though it may have been related to the F81 which was revealed to be a possible post hole.

**Feature #: 78**

**Address:** 986-987N 923E

**Depth:** 40cm below S4

**Associations:** T3, L37, F81, F122

**Description:**

First identified in the north profile of 986N 923E, F78 was defined as a soil stain composed of dark gray/black L37 soil (5YR 2.5/1). In 986N 923E the feature extended south from the profile about 10cm in a circular shape, 17cm wide east-west. To the north, F78 expanded in size, measuring 20cm north-south and 24cm east west in 987N 923E.

Excavations along the profile in 986N 923 east revealed that F78 had a depth of about 8cm with a rounded base, with a total possible depth of 28 cm from the bottom of the L37 layer seen in the profile. It may have been a shallow post hole, though this is unknown. Small pieces of charcoal were recovered in the fill, though no other artifacts were present.

**Feature #:** 79

**Address:** 987N 923E

**Depth:** 40cm below S4

**Associations:** T3, L37, F80

**Description:**

F79 was located in the north-central portion of 987N 923E at 40cm below S4. It was composed of dark gray/black soil (5YR 2.5/1), the same as L37, circular in shape measuring 32cm north-south and 28cm east-west. It had a depth of 7cm with a flat base rounded in the corners. The purpose of this feature is unknown and no artifacts or other materials were recovered in the fill.

**Feature #:** 80

**Address:** 987N 923E

**Depth:** 40cm below S4

**Associations:** T3, L37, F79

**Description:**

F80 was defined as a circular soil stain composed of dark gray/black soil, lighter than L37 (10YR 6/1) and very loose, located 5cm northeast of F79 in 987N 923E. The feature measured 6cm north-south and 7cm east-west with a depth of only 2cm. This suggests that this feature was the result of animal or insect activity, or perhaps root action. No cultural materials were recovered in the fill.

**Feature #:** 81

**Address:** 987N 923E

**Depth:** 40cm below S4

**Associations:** T3, L37, F77, F78

**Description:**

F81, located in the southern half of 987N 923E between F77 and F78, was defined as a soil stain, possibly a post hole, first noted at 40cm below S4. It is composed of loos dark gray/black soil (5YR 2.5/1) from L37, measuring 22cm north-south and 13cm east-west in an irregular shape. Excavations revealed a depth of 23cm (43cm below S4), which narrowed to 5cm wide at a rounded base. This indicates that F81 was likely a post hole, perhaps constructed during the L37 occupation (~AD 1580). Charcoal and ceramics (Liucura Red and Brown) were recovered in the fill.

**Feature #:** 82

**Address:** 985N 931E

**Depth:** 60cm below S4

**Associations:** T3, L37, F82, F88

**Description:**

First seen in the south profile of 985N 931E, F82 was defined as a soil stain 60cm below S4. It was composed of L37 dark gray/black soil with pieces of charcoal. The feature measured 10cm from the profile to the north and 35cm east-west. F82 may be related to F83 and F88, which were identified nearby, but this is unclear. The feature was not excavated due to time constraints.

**Feature #:** 83

**Address:** 985N 931E

**Depth:** 60cm below S4



**Associations:** T3, L37, F82

**Description:**

F83 was defined as a semi-oval soil stain, possibly a post hole, located along the western edge of 985N 931E and extending 2cm into 985N 930E, 8cm northwest of F82. The feature was found at 60cm below S4 composed of dark gray/black L37 soil (5YR 2.5/1), and likely associated with that layer. F83 extended to a depth of 9cm to a rounded base that tapered to 2cm. A few small fragments of charcoal were visible in the fill, but insufficient in size for collection. No other cultural materials were recovered.

**Feature #:** 84

**Address:** 985N 931E

**Depth:** 60cm

**Associations:** T3, L37, F124

**Description:**

F84, located in the center-south of 985N 931E, was defined as a soil stain, possibly a post hole, composed of L37 dark gray/black soil (5YR 2.5/1) at 60cm below S4. The feature measures 24cm north-south and 25cm east-west in an irregular circle shape, with small pieces of charcoal on the surface. Excavations revealed a depth of 23cm (83cm below S4) tapering to a 4cm wide rounded point. A few fragments of Liucura Red, Liucura Gray, and charcoal were recovered in the fill.

**Feature #:** 85

**Address:** 985N 931E

**Depth:** 60cm below S4

**Associations:** T3, L37, F126

**Description:**

F85 was identified as a soil stain composed of L37 dark gray/black soil (5YR

2.5/1) 60cm below S4 in 985N 931E. It measured 23cm north-south and 20cm east-west, but further investigation revealed no depth and the likelihood of root action or an animal burrow. The soil was very loose and contained no artifacts or other cultural materials.

**Feature #:** 86

**Address:** 985N 931E

**Depth:** 60cm below S4

**Associations:** T3, L37, F87

**Description:**

F86 was located in the center-north of 985N 931E at 60cm below S4 and defined as a soil stain located next to another stain later defined as F87. Initially the two stains appear to be one single feature, but later investigation revealed them to be separate. F86 measures 29cm north-south and 22cm east-west, composed of dark gray/black L37 soil (5YR 2.5/1) with charcoal inclusions. It extended to a depth of 12cm, but only on the east side, which tapered to a 2cm point, the rest of the interior of the feature being rounded. Several pieces of charcoal were recovered, and no other materials were seen. It is unclear the purpose behind this feature.

**Feature #:** 87

**Address:** 985N 931E

**Depth:** 60cm below S4

**Associations:** T3, L37, F86

**Description:**

F87, located 2cm northeast of F86, was defined as a soil stain at 60cm below S4 in 985N 931E. It measured 20cm north-south and 24cm east-west with pieces of charcoal in a dark gray/black (5YR 2.5/1) L37 soil matrix. Excavation revealed it to be very shallow, only 5cm with a base sloping up to the east. The purpose of this feature is unclear and

may be related to F86 in some fashion.

**Feature #:** 88

**Address:** 985N 931-932E

**Depth:** 60cm below S4

**Associations:** T3, L37, F88

**Description:**

F88 was defined as a soil stain located in the south profile of 985N between 931 and 932E. Possibly a post hole, the feature was identified at 60cm below S4 at the change between the L37 and L39 (no L65 was visible) layers, composed of dark gray/black (5YR 2.5/1) L37 soil with spots of yellow/gray (2.5YR 7/3). From the southern profile of 985N 931E the feature extended to the north 18cm and 48cm east-west. Further excavations in 984N 932E indicated a further extension to the south of 42cm and east for 26cm towards F89. Excavations revealed a depth of 52cm (112cm below S4) tapering to a rounded point 20cm wide with several compact clay nodules from the L39 layer along the base. Charcoal, ceramics (types Liucura Red and Brown), and granite flakes were recovered in the fill. The feature appears to have been a post hole.

**Feature #:** 89

**Address:** 984-985N 932E

**Depth:** 60cm below S4

**Associations:** T3, L37, F88

**Description:**

First identified as a soil stain along the southern profile of 985N 932E, F89 was composed of dark gray/black L37 soil (5YR 2.5/1) with numerous charcoal inclusions and flakes of granite and andesite. Excavations in 984N 932E revealed that F89 extended to the south, measuring in full approximately 102cm north-south and 68cm east west. It

likely extended into 984N 933E, though this area, like F89, remained unexcavated. Time constraints prohibited full excavation of the feature, which also appeared to extend up into the L37 layer. The purpose of this feature is unclear due to its size.

**Feature #:** 90

**Address:** 985N 929E

**Depth:** 60cm below S4

**Associations:** T3, L37, F125, F126

**Description:**

F90 was defined as an oval-shaped soil stain located in the center-west of 985N 929E at 60cm. It is composed of dark gray/black soil (5YR 2.5/1) from the L37 layer in an oval oriented east-west. Surface measures were 38cm north-south and 59cm east-west. Excavations of the feature revealed a depth of 61cm tapering to a 14cm wide rounded point at the base, suggesting that F90 was a post hole associated with the L37 occupation ca. AD 1580. Charcoal, ceramics (types Liucura Brown and Gray), and granite flakes were recovered in the fill.

**Feature #:** 91

**Address:** 985N 929E

**Depth:** 60cm below S4

**Associations:** T3, L37

**Description:**

F91 was defined as a circular soil stain, possibly a post hole, located in the south profile of 985 N 929E at 60cm below S4. It was composed of dark gray/black soil from L37 (5YR 2.5/1) with pieces of charcoal on the surface. The feature measured 9cm north-south (from the profile) and 15cm east-west. Subsequent excavations revealed that the feature had little depth, about 5cm, making it difficult to identify the purpose of this

feature.

**Feature #:** 92

**Address:** 985N 928E

**Depth:** 45cm below S4

**Associations:** T3, L37, F45

**Description:**

Located 10cm east of F45 along the 929E line, F92 was defined as a circular soil stain, possibly a post hole, identified at 45cm below S4. The feature had been slightly bisected by excavations in 985N 929E, revealing a feature 25cm deep tapering to a point 5cm in width and composed of dark gray/black L37 soil (5YR 2.5/1). On the surface (at 45cm) F92 measured 10cm north-south and 12cm east-west. No materials were recovered in the fill. It may have been a shallow post hole, perhaps as a support to the larger F45 post.

**Feature #:** 93

**Address:** 985N 928E

**Depth:** 45cm below S4

**Associations:** T3, L37

**Description:**

F93 was identified near the east profile of 985N 928E at 45cm below S4. The feature was defined as a circular soil stain, possibly a post hole, composed of dark gray/black soil (5YR 2.5/1) from the L37 layer. F93 measured 11cm north-south and 10cm east-west. The feature was not excavated.

**Feature #:** 94

**Address:** 985N 928E

**Depth:** 45cm below S4

**Associations:** T3, L37

**Description:**

Between F45 and F95 was identified a feature labeled F94, a small soil stain. Further investigation revealed that F94 was the result of natural phenomena, possibly from roots or an animal burrow, as the feature was filled with very loose, sandy soil, light gray/brown in color (5YR 7/1) mixed with L37 soil (5YR 2.5/1). The feature had no depth.

**Feature #:** 95

**Address:** 985N 928E

**Depth:** 45cm

**Associations:** T3, L37

**Description:**

F95 was defined as a large, semi-oval soil stain located in the southwest portion of 985N 928E, first identified at 45cm below S4. It was composed of dark gray/black soil from L37 (5YR 2.5/1), measuring 27cm north-south and 50cm east-west, running 7cm into 985N 927E. Excavation revealed a possible post hole, 60cm in depth (105cm below S4) that tapered to a 5cm-wide rounded base. Charcoal, ceramics (types Liucura Red and Black) and a few flakes of granite and andesite were recovered in the fill.

**Feature #:** 96

**Address:** 985N 927E

**Depth:** 45cm below S4

**Associations:** T3, L37, F95?

**Description:**

Located in 985N 927E in the eastern half, F96 was defined as a soil stain, possibly a post hole, discovered at about 45cm below S4. It contained dark gray/black (5YR 2.5/1) L37 soil with pieces of charcoal on the surface. It measured 19cm north-south and 26cm east-west in an oval shape. F96 was excavated to a depth of 30cm (75cm below S4) to a semi-square base 20cm wide. Only charcoal was recovered from the fill.

**Feature #:** 97**Address:** 985N 926-927E**Depth:** 45cm below S4**Associations:** T3, L37**Description:**

F97 was identified in the south profile of 987N on the line between 926 and 927E at 45cm below S4. It was defined as a soil stain, possibly a post hole, circular in shape measuring 8cm north from the south profile and 13cm east-west. The feature was composed of dark gray/black L37 soil without any cultural materials on the surface. F97 was not excavated.

**Feature #:** 98**Address:** 985N 926-927E**Depth:** 45cm below S4**Associations:** T3, L37, F47**Description:**

Between 926 and 927E at 985N at 45cm below S4 F98 was defined as an oval soil stain about 20cm southeast of F47. It was composed of dark gray/black L37 soil (5YR 2.5/1) with charcoal and sand in the fill. F98 measured 11cm north-south and 16cm east west. Excavation revealed a slightly irregular base, about 11cm deep with a 2cm deep

inclusion on the eastern edge, similar to F86 but not as deep. The rounded base measured 15cm wide. The purpose of this feature is unclear.

**Feature #:** 99

**Address:** 985N 926E

**Depth:** 45cm below S4

**Associations:** T3, L37

**Description:**

F99 was defined as a circular soil stain located in-between F47 and F100, first identified at 45cm below S4 in 985N 926E. It was separated from F47 by 5cm and F100 by 3cm, though obviously a separate feature. F99 measured 21cm north-south and 19cm east-west, with a depth of 15cm to a rounded base 6cm wide. It was composed of gray/brown L65 soil (10YR 5/3), loosely compacted with charcoal, ceramics (Liucura Red, Gray, and Black) and fragments of granite recovered in the fill. It appears to be a possible post hole associated with the possible L65 occupation (ca. AD 1100) along with F100, though heavily impacted by the subsequent L37 occupation.

**Feature #:** 100

**Address:** 985N 926E

**Depth:** 45cm below S4

**Associations:** T3, L65, F99?

**Description:**

F100 was first labeled as F55, defined as a circular soil stain seen in 985N 926E at 45cm below S4. It was first seen in the south profile of 986N 926E, and was seen in greater detail during the excavations to the south of that unit. It was composed of brown/gray soil (7.5YR 5/3) slightly lighter than the L65 layer (10YR 5/3) though associated with that possible occupation. F101 was seen in going through F100 in the northeast



portion, the former feature containing L37 dark gray/black soil. F100 measured 38cm north-south (from the 986N line south) and 50cm east-west, with a depth of 25cm to a rounded base 20cm wide. This feature may have been a post hole associated with the possible second occupation of Santa Sylvania dating to around AD 1100.

**Feature #:** 101

**Address:** 985N 926E

**Depth:** 45cm below S4

**Associations:** T3, L37, F100

**Description:**

Located within F100, F101 was defined as a small circular soil stain composed of dark gray/black L37 soil (5YR 2.5/1), identified at 45cm below S4. It may be the remains of a hole for a thin support post, though it appears more likely to be the result of root action or animal activity. The feature measures 5cm north-south and 6cm east west with a maximum depth of about 3cm. No cultural materials were recovered in the fill.

**Feature #:** 102

**Address:** 985N 925E

**Depth:** 45cm below S4

**Associations:** T3, L37

**Description:**

F102 was defined as a circular soil stain located in the center-south of 985N 925E at 45cm below S4. It was composed of dark gray/black L37 soil (5YR 2.5/1), measuring 22cm north-south and 20cm east-west, with small pieces of charcoal on the surface and through the fill. Excavations revealed a depth of about 25cm, tapering to a point 8cm wide and slightly rounded. It may have been part of a post hole related to the L37 occupation layer, though not as deep as many of the other features such as F43 and F47.

**Feature #:** 103

**Address:** 985N 925E

**Depth:** 45cm below S4

**Associations:** T3, L37

**Description:**

An irregularly-shaped soil stain, F103 was identified in the south profile of 985N 925E at 45cm below S4. Further investigations revealed that F103 was very shallow, less than 3cm, loosely compacted with L37 dark gray/black soil (5YR 2.5/1) with inclusions of sand. The composition and size of the feature suggests root action or an animal burrow, as no cultural materials were found in the fill.

**Feature #:** 104

**Address:** 985-986N 923-924E

**Depth:** 45cm

**Associations:** T3, L37, F45, F57

**Description:**

F104 was identified at the four corners of 985-986N 923-924N at about 45cm below S4. It was defined as an irregular soil stain composed of dark gray/black L37 soil (5YR 2.5/1) with charcoal fragments on the surface. On the surface, F104 measured 19cm north-south and 20cm east-west, and excavations revealed a depth of 75cm (115cm below S4) in what appears to be a post hole similar to F45 and F47, running slightly diagonally to the west. The base was rounded, approximately 10cm in width, extending into the L39 layer and nearly the hard compact clay F59 layer. It is likely that this feature is related to the L37 occupation layer and may be a post hole for a *ruka* or similar structure, though this is speculative. Charcoal and fragments of granite and andesite were recovered in the fill.

**Feature #:** 105

**Address:** 985N 923E

**Depth:** 45cm below S4

**Associations:** T3, L37, F104, F107

**Description:**

Located in-between F104 and F107, F105 was defined as a semi-circular soil stain identified at 45cm below S4 in 985N 923E. It is composed of dark gray/black soil from L37 (5YR 2.5/1), 10cm north-south and 13cm east-west in size with numerous inclusions of charcoal. Excavation revealed a depth of about 7cm with an irregular rounded base. The purpose of this feature is not readily apparent.

**Feature #:** 106

**Address:** 985N 924E

**Depth:** 45cm below S4

**Associations:** T3, L37, F118, F119

**Description:**

F106 was located in the south profile of 985N 924E, defined as a large, irregular soil stain identified at 45cm below S4. It measured 68cm north-south (north from the southern profile, along the 985N line) and 70cm east-west, running diagonally to the northeast in the unit. It was composed of dark gray/black soil (5YR 2.5/1) from L37 with many fragments of charcoal and ceramics (type Liucura Red) on the surface. The feature was not excavated due to time constraints, though the feature may be the remains of a post hole, like F43, F45, and F47; or perhaps a larger soil stain such as F89.

**Feature #:** 107

**Address:** 985N 923E

**Depth:** 30cm below S4

**Associations:** T3, L37, F105, F108

**Description:**

F107 was defined as a large, multi-colored soil stain, possibly the remains of a firepit (similar to F38) located in 985N 923E, first identified at about 30cm below S4. It is composed of oxidized orange soil (2.5YR 4/8), dark gray/black soil (5YR 5/2) similar to L37 though slightly lighter, and brown/gray soil (5YR 5/2) in the northern half of the feature. In total, F107 measures 81cm north-south (from the south profile of 985N 923E; the feature may extend into 984N 923E) and 68cm east-west. Like D38, the feature was very shallow, only about 3cm deep, further indicating a superficial burn area. Fragments of charcoal along with andesite and granite flakes were recovered in the fill, which may suggest tool stone tempering in a fire. F107 is located adjacent to, though slightly below (5cm) F108, a rectilinear feature running to the northwest. It is unclear if these two features are related.

**Feature #:** 108**Address:** 985-987N, 921-923E**Depth:** 30cm below S4**Associations:** T3, L37, F107**Description:**

Running from the southeast of 985N 922E to the northwest of 987N 921E, approximately 300cm total, F108 was defined as a gray (10YR 3/2) rectilinear soil stain composed of very fine-grained, sandy soil. The feature averaged about 25cm wide through its length, with fragments of charcoal throughout. From 30cm below S4 the feature only had a depth of about 3cm, but noted in the north profile of 987N 921E it may have a depth of at least 20cm for a total of 23cm below S4. The purpose of this feature is unclear. It may be related to the L37 occupation (AD 1580), but as it bisects F107 and F123, it may be a modern intrusion from a plow or similar instrument.

**Feature #:** 109

**Address:** 985N 927E

**Depth:** 45cm below S4

**Associations:** T3, L65, F54?, F99, F100

**Description:**

On the north edge of 985N 927E, F109 was defined as a semi-circular soil stain bisected by deeper excavations in 986N 927E. It was composed of brown/gray soil (7.5YR 4/3) very similar in color and composition to L65, likely associated with that layer along with F99 and F100. It measured 7cm north-south (south from the 986N line) and 13cm east-west, with a depth of only 5cm. The base was rounded, and tapered to a width of about 3cm. The purpose of this feature is unclear, though it may have been a shallow post hole.

**Feature #:** 110

**Address:** 985N

**Depth:** 30cm below S4

**Associations:** T3, L37, F129

**Description:**

First identified in 985N 921E, further excavation revealed F110 to be a series of 20 small circular soil stains, possibly post holes, in a semicircular pattern extending to the north and west into 987N 918E. Seventeen (17) of these stains are small, about 5-7cm in diameter and varying in depth 5-15cm. Three (3) larger stains are 15-17cm in diameter and 25-30cm deep. Each is composed of lightly compacted dark gray/black L37 soil (5YR 2.5/1), likely associated with that occupation layer (AD 1580). Another, similar series of stains, F129, was identified to the west of F110. The exact purpose of this feature is unclear, though it may be the remains of a small animal pen or similar feature, though no coprolites or other materials were recovered in the interior units. If it was an

animal pen, it may be associated with the suggested *ruka*, evidenced by the possible post holes F43, F45, F47, and F104.

**Feature #:** 111

**Address:** 985N 921E

**Depth:** 30cm below S4

**Associations:** T3, L37, F112

**Description:**

Initial excavations indicated that F111 was a separate feature, but further investigations revealed it to be a part of F112, a rounded circular northern extension measuring about 24cm north-south and 27cm east-west.

**Feature #:** 112

**Address:** 985N 921-922E

**Depth:** 30cm below S4

**Associations:** T3, L65, F114

**Description:**

Located in 985N 921-922E at 30cm below S4, F112 was defined as a soil stain occupying the southern half of the south profile of 985N. It was composed of brown/gray (10YR 5/3) L65 soil with an intrusion or inclusion of dark gray/black L37 soil in the far eastern portion, next to F108. The feature is semi-circular, measuring 50cm north-south and 70cm east west. Charcoal was recovered from the surface, though no other artifacts were apparent. This feature may be associated with the L65 layer occupation, AD 1100, and may be associated with F114 to the north. F112 was not excavated.

**Feature #:** 113

**Address:** 986N 920-921E

**Depth:** 30cm

**Associations:** T3, L37, F110?

**Description:**

F113 was defined as a soil stain located on the line between 920-921E at 986N, first identified in 986N 921E at 30cm below S4. It is composed of dark gray/black soil (5YR 2.5/1) likely from the L37 layer in an irregular oval shape with fragments of charcoal on the surface. F113 measures 27cm north-south and 20cm east-west, slightly diagonally to the southwest. It appears to be part of the L37 occupation, though this is speculative, and may be associated with F110. F113 was not excavated.

**Feature #:** 114

**Address:** 986N 921E

**Depth:** 30cm below S4

**Associations:** T3, L65, F112, F115

**Description:**

F114 was defined as a small circular soil stain, composed of brown/gray soil (10YR 5/3, similar to L65) along the eastern edge of 986N 921E at 30cm below S4. It measured 19cm north-south and 17cm east-west, similar in soil composition to F112, F115, F173 and F174. It may be associated with the L65 layer occupation, though the feature was not excavated in its entirety due to time constraints.

**Feature #:** 115

**Address:** 986N 920E

**Depth:** 30cm below S4

**Associations:** T3, L65, F112, F114

**Description:**

Identified at 30cm below S4 in the center of 986N 920E, F115 was defined as a semi-circular soil stain composed of brown/gray L65 soil (10YR 5/3), similar in composition to F112 and F114. It measured 20cm north-south and 24cm east-west. The feature was not excavated, and it may be associated with the L65 occupation (AD 1100). No cultural materials were seen on the surface.

**Feature #:** 116**Address:** 985N 926E**Depth:** 45cm below S4**Associations:** T3, L37**Description:** T3

F116 was first identified as an irregularly shaped oval soil stain immediately south of F100. Further investigation revealed no depth to the feature and no recoverable cultural artifacts. It was probably caused by natural activity, perhaps root or animal, and unrelated to any other cultural feature.

**Feature #:** 117**Address:** 985N 926E**Depth:** 45cm below S4**Associations:** T3, L37, F102**Description:**

Seventeen (17) cm southeast of F102, F117 was identified as a circular soil stain, irregularly shaped, at 45cm below S4 in 985N 926E. It was composed of dark gray/black L37 soil (5YR 2.5/1), possibly associated with that layer, measuring 11cm north-south and 12cm east west. Small fragments of charcoal were identified on the surface of the feature, which was not excavated.



**Feature #:** 118

**Address:** 985N 924E

**Depth:** 70cm below S4

**Associations:** T3, L37, F103, F106

**Description:**

F118 was identified as an oval soil stain located in between F103 and F106 at 70cm below S4 in 985N 924E. It was composed of brown/gray L65 soil (5YR 2.5/1), perhaps associated with that occupation and related to F100 and F99 100cm to the northeast. It measured 13cm north-south and 11cm east-west, oriented diagonally northeast. The feature was shallow, only about 5cm (a total of 75cm below S4) with a rounded base. Only charcoal was recovered in F118.

**Feature #:** 119

**Address:** 985N 924E

**Depth:** 45cm below S4

**Associations:** T3, L37, F106

**Description:**

Located 10cm northwest of F106, F119 was initially identified as a soil stain, possibly a post hole, identified at 45cm below S4 in 986N 924E. The feature disappeared at 50cm with no cultural materials besides a few fragments of charcoal recovered in the fill. It may have been a small extension from F106 or the result of natural activity. It is not believed to be cultural.

**Feature #:** 120

**Address:** 987N 920-921E

**Depth:** 20cm below S4

**Associations:** T3, L37

**Description:**

F120 was defined as an irregular soil stain composed of apparently oxidized orange-brown soil (2.5YR 5/8) similar in composition to D38 and F107, located in the north half of 987N 920-920E. The feature measured 40cm north-south and 45cm east west with a small section 35cm to the south of the main portion measuring about 10cm north-south by 11cm east-west. F120 was shallow, about 5cm deep (like F38 and F107) with charcoal in the fill. It may be the remains of a firepit related to the L37 occupation or the result of a subsequent burning episode.

**Feature #:** 121**Address:** 987N 922E**Depth:** 30cm below S4**Associations:** T3, L37**Description:**

F121 was defined as a circular soil stain located on the line between 922 and 923E at 987N, first identified at 30cm below S4. It was composed of dark gray/black L37 soil (5YR 2.5/1), likely associated with that occupation, with fragments of charcoal that were also recovered in the fill. It measured 21cm north-south and 24cm east-west, with a depth of 16cm to a rounded base 10cm wide. No other cultural materials, such as ceramics or lithics, were recovered in the fill. The purpose of this feature is unclear.

**Feature #:** 122**Address:** 987N 922E**Depth:** 30cm below S4**Associations:** T3, L37, F78?**Description:**

In the south profile of 987N 922E (mostly noted in the north profile of 986N

922E) at 30cm below S4 F122 was defined as a shallow soil stain, possibly a post hole. It measured 11cm north-south and 15cm east-west, with a depth of 11cm (noted in the profile) that tapered to a point approximately 6cm wide. Numerous small fragments of charcoal were identified in the fill but were too small to recover. This feature may be related to F78 in some way, which also appeared to be a shallow posthole, but how is not clear.

**Feature #:** 123

**Address:** 987N 921-922E

**Depth:** 30cm below S4

**Associations:** T3, L37, F152, F108?

**Description:**

Identified at 30cm below S4F123 was defined as a large soil stain encompassing most of the western quarter of 987N 922E, which extended westward into 987N 921E as well. It was composed of dark gray/black L37 soil (5YR 2.5/1) with fragments of charcoal on the surface. F123 measured about 100cm north-south (from the 987N line) and 35cm east-west, and was bisected on the west by F108. It does not appear that F123 and F108 are related, and F123 was not excavated in its entirety.

**Feature #:** 124

**Address:** 985N 931E

**Depth:** 60cm below S4

**Associations:** T3, L37, F84, F86, F87

**Description:**

First identified as part of F84, further investigation revealed a separate feature, labeled F124, separated from F84 by 4cm. It was composed of dark gray/black L37 soil (5YR 2.5/1), 14cm north-south and 17cm east-west to a depth of 10cm with a rounded

base 6cm wide. The walls of the feature were very smooth, apparently very well made. F124 may be related to the other features in the unit (F84, F86, and F87 in particular) though how is not entirely clear. It may be a shallow hole for a post. A few fragments of charcoal were recovered from the interior fill.

**Feature #:** 125

**Address:** 985N 929E

**Depth:** 60cm below S4

**Associations:** T3, L37, F90?, F126, F140

**Description:**

F125 was identified as a small soil stain identified 60cm below S4 in 985N 929E, about 35cm northwest of F90. It was composed of dark gray/black soil (5YR 2.5/1) from the L37 layer, and measured 10cm north-south and 9cm east-west. Excavations revealed F125 to be shallow, only 4cm deep (64cm below S4) with a rounded base about 6cm wide. F125 may have been larger, extending up into the L37 layer, but this is unclear. No artifacts were recovered in the fill.

**Feature #:** F126

**Address:** 985N 929E

**Depth:** 60m below S4

**Associations:** T3, L37, F90, F125

**Description:**

F126, located in the northeast corner of 986N 929E at 60cm below S4 was defined as a small, semi-oval soil stain, measuring 9cm north-south and 7cm east-west. It was composed of dark gray/black soil from L37 (5YR 2.5/1), but was less than 2cm deep. F126, like F125, may have been larger and extended into the upper layers, but this is unclear. No artifacts were recovered in the fill. It may be the result of natural activity,

similar to F85.

**Feature #:** 127

**Address:** 986N 933E

**Depth:** 60cm below S4

**Associations:** T3, L37, F60

**Description:**

F127 was defined as a circular soil stain, possibly a post hole, located in the northeast quadrant of 986N 933E, first identified at 60cm below S4. It was composed of dark gray/black L37 soil (5YR 2.5/1), measuring 20cm north-south and 18cm east-west, with a depth of 12cm (72cm below S4). The feature tapered to a base approximately 4cm in width. No cultural materials were recovered in the fill. It is likely that the feature extended into the upper layers, but the irregular nature of L37 made identification before 60cm difficult.

**Feature #:** 128

**Address:** 986N 918E

**Depth:** 30cm below S4

**Associations:** T3, L37, F180

**Description:**

Located in the westernmost unit of T3 in 986N 918E, F128 was defined as a semi-circular soil stain first identified at 30cm below S4. It measured 38cm north-south and 42cm east-west in a slightly irregular shape with fragments of charcoal on the surface. Excavations revealed a shallow feature, 7cm deep with a rounded base about 25cm wide. One flake of granite was recovered in the fill. F128 is closely associated with a brown/gray (10YR 5/3) L65-like soil stain that appears attached to the southeast, though the soil composition indicates that these are two separate features, with F128 intruding into F180.

**Feature #:** 129

**Address:** 985-987N 918E

**Depth:** 30cm below S4

**Associations:** T3, L37, F110?

**Description:**

Like F110, F120 was a series of small circular soil stain, possible a fence, extending from 985N 918E north into 987N 918E. There were 11 possible post holes identified, roughly 5-7cm in diameter and 5-15cm deep. Unlike F110, there were no larger “support” holes identified. Its purpose remains unclear, though it may be, like 110, a small fence or animal paddock associated with the L37 occupation (AD 1580).

**Feature #:** 130

**Address:** 1005N 922E

**Depth:** Surface to 60cm below S4

**Associations:** T3, L37, L39, L65, F131, F132

**Description:**

F130 was a 1x1m test pit placed at 1005N 922E, north of T3, to see if the stratigraphic profile seen in T3 continued to the north and south (F131, F132). F130 was excavated to a depth of about 120cm below S4 with ceramics (Liucura Red, Brown, Gray, and Black); flakes of obsidian, granite, and andesite; a fragment of basalt groundstone; and charcoal recovered in the fill. The stratigraphic profile follows that of T3, with the L37 layer from 0-35cm, L65 from 35 to 75cm, and L39 from 75 to 120cm. No specific features were recovered in F130, though evidence suggests that the occupation on the “exterior” of Santa Sylvania continues at least 20m north of T3.

**Feature #:** 131

**Address:** 974N 920E

**Depth:** 0-60cm below S4

**Associations:** T3, L37, L39, L65, F130, F132

**Description:**

F131 was a second test pit, placed at 974N 920E (10m south of T3), to test the extension of the occupations revealed during the excavations in T3. The unit was excavated to a depth of 60cm and indicated a similar stratigraphic profile to T3: L37 extended from the surface to about 16cm (shallower than in T3); L65 extended from 16cm to 40cm; and L39 extended from 40cm to 60cm. No specific features were identified in F131, though ceramics (Liucura Red, Brown, Gray, and Black) were recovered to a depth of 50cm, lithic flakes (obsidian, andesite, and granite) were recovered to a depth of 40cm, roof tiles were seen in the first 20cm, and charcoal was found throughout the excavations.

**Feature #:** 132

**Address:** 964N 920E

**Depth:** 0-60cm below S4

**Associations:** T3, L37, L39, L65, F130, F131

**Description:**

A third test pit, F132, was placed 10m south of F131 at 964N 920E to continue to examine the distribution of cultural materials in the “exterior” of Santa Sylvania. The unit was excavated to a depth of 60cm and followed the same general stratigraphic sequence of T3. The L37 layer was identified from the surface to about 11cm, which is considerably shallower than what is seen in T3 and F130. The L65 layer was identified from 11cm to about 40cm, and the L39 layer was identified from 40cm to 60cm. No features, such as post holes or soil stains, were identified in F132. Ceramics (Liucura

Red, Brown, and Gray) and charcoal were recovered in the fill to a depth of 60cm. Lithics (granite, andesite, and obsidian) were recovered to 50cm. Notably, no roof tile fragments were recovered. F132 and F131 together seem to indicate a decrease in the intensity of occupation in the southern reaches of Santa Sylvania, as the L37 layer appears less thick, though this may simply be due to the placement of these two units.

**Feature #:** 133

**Address:** 986N 934E

**Depth:** 60cm

**Associations:** T3, L65

**Description:**

F133 was defined as a soil stain, possibly a post hole, composed of brown/gray soil (apparently from L65) noted in the north profile of 986N 934E at about 60cm below S4. It was a circular feature, measuring 10cm north-south (from the north profile) and 13cm east-west. Excavations revealed a depth of about 7cm with a rounded base about 11cm in width. No artifacts or cultural materials were identified in the fill. F133 may have been the result of natural action, such as from roots or animal burrowing.

**Feature #:** 134

**Address:** 986N 936E

**Depth:** 60cm below S4

**Associations:** T3, L37, F135

**Description:**

Located in 986N 936E, F134 was identified at 60cm below S4 along the north profile of the unit. It was composed of dark gray/black soil (5YR 2.5/1) from the L37 layer in a semi-circular shape extending north into the profile. The feature measured 25cm north-south (from the north profile) and 22cm east-west. Excavations revealed



a depth of 19cm (79cm below S4) tapering to a rounded point about 7cm wide. F134 may have been a post hole related to the L37 occupation (AD 1580), though this is speculative. Charcoal was recovered in the fill.

**Feature #:** 135

**Address:** 986N 936E

**Depth:** 60cm below S4

**Associations:** T3, L37, F134

**Description:**

F135 was a small circular soil stain, located about 10cm southwest of F134 at 60cm below S4. It was composed of dark gray/black L37 soil (5YR 2.5/1), measuring 12cm north-south and 10cm east-west. The feature was not excavated.

**Feature #:** 136

**Address:** 986N 937E

**Depth:** 60cm below S4

**Associations:** T3, L37

**Description:**

Noted in the north profile of 986N 937E at 60cm below S4 F136 was defined as a circular soil stain, possibly a post hole, composed of gray soil (Gley2 6/10B), distinct in color from most other features in T3. The feature measured 20cm north-south (from the north profile) and 25cm east-west. It was excavated to a depth of 47cm (117cm below S4) with a rounded base 20cm wide, suggesting a posthole. The color of the fill makes assignment to a particular layer or occupation difficult, though it is likely associated with the L37 layer based on its location in the profile. Charcoal was recovered in the fill, along with ceramics (types Liucura Gray and Brown) and lithic flakes (granite and andesite).

**Feature #:** 137

**Address:** 986N 935E

**Depth:** 60cm below S4

**Associations:** T3, L37, F63?

**Description:**

F137 was initially identified as a series of small holes, similar to F110 on the opposite side of T3. They were composed of L37 soil (5YR 2.5/1), though further investigation revealed irregular, shallow holes that were likely the result of an animal burrow or similar non-human action. No other holes of a similar nature were found in the vicinity to suggest a cultural feature.

**Feature #:** 138

**Address:** 985N 930E

**Depth:** 60cm below S4

**Associations:** T3, L37, F83, F139

**Description:**

F138 was defined as a small circular soil stain, located at 60cm below S4 in 985N 930E. It was composed of dark gray/black L37 soil (5YR 2.5/1), and measured 9cm north-south and 10cm east-west. It may be related to F139 located 25cm to the west and F83 20cm to the east. Excavations revealed that F138 was very shallow, only about 4cm deep, with a rounded base 2cm wide. It may have been a small post hole, though natural action such as root or animal burrowing could also explain this feature. No cultural materials were recovered in the fill.

**Feature #:** 139

**Address:** 985N 930E

**Depth:** 60cm below S4

**Associations:** T3, L37, F83, F138

**Description:**

To the west of F138, F139 was defined as a small circular soil stain, measuring 9cm north-south and 11cm east west, very similar in size and composition to F138. It was discovered at 60cm below S4 in 985N 930E. Excavations revealed a shallow depth, about 5cm deep with a rounded base 3cm wide. It is possibly the same sort of feature as F138, a small post hole or the result of animal burrowing or root action.

**Feature #:** 140

**Address:** 985N 929E

**Depth:** 60cm below S4

**Associations:** T3, L65, F100?

**Description:**

F140 was defined as a small soil stain composed of brown/gray soil (10YR 5/3), apparently from the L65 layer, located on the north edge of 985N 929E and in the south profile of 986N 929E. The soil was loose, medium to fine-grained with small fragments of charcoal and pockets of sand. It measured 18cm north-south (from the 986N line) and 32cm east-west. It showed a depth of about 9cm (69cm below S4) with a rounded base about 12cm wide. It may be associated with F100 and F109 to the west, which also contain L65 soil, likely associated with that layer. No artifacts were recovered in the fill.

**Feature #:** 141

**Address:** 987N 926-927E

**Depth:** 50cm below S4

**Associations:** T3, L37, F58

**Description:**

F141 was first identified in 987N 927E, eventually extending into 926E, defined

as a large soil stain composed of L37 soil (5YR 2.5/1), 60cm below S4. It was irregularly shaped, running roughly to the southeast from the north profile (the 988N line), with fragments of charcoal evident on the surface. It measured about 80cm north-south and 80cm east-west. It was excavated to a depth of 80cm (140cm below S4) with an extension that tapers to a rounded base 12cm wide. F141 was likely the remains of a posthole, similar to F43, F45, F47, F58, and others. The disbursed amount of stained soil may be indicative of the collapse of a burned pole, though this is speculative.

**Feature #:** 142

**Address:** 987N 926E

**Depth:** 50cm below S4

**Associations:** T3, L37, F141

**Description:**

Located in the northeast corner of 987N 926E at 50cm below S4 F142 was defined as an irregular soil stain, oval shaped, composed of dark gray/black L37 soil (5YR 2.5/1). It measured 12cm north-south and 20cm east-west. It had a depth of 36cm (86cm below S4) in a relatively straight-walled hole which tapered to a rounded base 7cm wide. Charcoal, lithics (granite and andesite flakes), and ceramics (Liucura Red and Brown) were recovered in the fill. This appears to have been a post hole, similar to F141 and others though not as deep.

**Feature #:** 143

**Address:** 987N 926E

**Depth:** 50cm below S4

**Associations:** T3, L37, F144

**Description:**

F143 was identified as a small soil stain located at 50cm below S4 in 987N 926E,

about 15cm southwest of F141. The feature disappeared upon further excavation, by 52cm below S4 with no apparent depth or cultural material. It may have been the result of natural activity from the L37 layer.

**Feature #:** 144

**Address:** 987N 926E

**Depth:** 50cm below

**Associations:** T3, L37, F143

**Description:**

Like F143, F144 was defined as a small soil stain at 50cm below S4 in 987N 926E. It was composed of dark gray/black soil from L37 (5YR 2.5/1), measuring 10cm north-south and 11cm east-west. Excavation revealed a depth of only 5cm without any cultural materials recovered. It may also be a naturally-occurring feature from root action or similar activity.

**Feature #:** 145

**Address:** 987N 925-926E

**Depth:** 50cm below S4

**Associations:** T3, L37, F144, F147

**Description:**

F145 was first identified in the north profile of 986N 926E (along the 987N line) at about 50cm below S4. Further excavation revealed the feature to extend to the north and west, measuring 17cm north-south (from the 987N line) and 30cm east-west, straddling the 986E line. It was composed of dark gray/black (5YR 2.5/1) L37 soil with charcoal inclusions on the surface. It was only 8cm deep with a rounded base about 5cm wide. No other cultural materials were recovered in the fill.

**Feature #:** 146

**Address:** 987N 925E

**Depth:** 50cm below S4

**Associations:** T3, L37, F142

**Description:**

In the northeast corner of 987N 925E was identified F146, defined as a circular soil stain composed of dark gray/black F37 soil (5YR 2.5/1). The feature measured 11cm north-south and 13cm east-west with fragments of charcoal on the surface. F146 was not excavated due to time constraints.

**Feature #:** 147

**Address:** 987N 925E

**Depth:** 50cm below S4

**Associations:** T3, L37, F145?

**Description:**

F147 was first identified in the north profile of 986N 925E (along the 987N line) at about 50cm below S4. It measured 8cm north-south (from the southern profile) and 15cm east-west, but disappeared at about 55cm with no obvious base or form. It may have been the result of root action or some other natural phenomena. No cultural materials were recovered in the fill.

**Feature #:** 148

**Address:** 987N 925E

**Depth:** 50cm below S4

**Associations:** T3, L37, F149

**Description:**

F148 was defined as a circular soil stain, possibly a post hole, located in the

center-west of 987N 925E at 50cm below S4. It measured 13cm north-south and 12 cm east-west with a slightly irregular shape, with a composition of loose dark gray/black L37 soil (5YR 2.5/1), apparently associated with that layer. F148 had a depth of 11cm (61cm below S4) with a rounded base 5cm wide. It may have been a support post for a structure, but this is not precisely known. No materials were recovered in the fill.

**Feature #:** 149

**Address:** 987N 925E

**Depth:** 987N 925E

**Associations:** 50cm below S4

**Description:**

Noted in the northeast of 987N 925E, F149 was defined as a circular soil stain composed of dark gray/black L37 soil (5YR 2.5/1), though very loose with patches of gray sandy soil (Gley2 7/5PB) that may be the result of root action or animal intrusion. The feature measured 19cm north-south and 18cm east-west. F149 was not excavated.

**Feature #:** 150

**Address:** 986N 940E

**Depth:** 60cm below S4

**Associations:** T3, L37?

**Description:**

F150 was a circular feature, possibly a post hole, located in 986N 940E at 60cm below S4. It was composed of gray/brown soil (2.5YR 5/1) similar to L37 but slightly lighter. F150 measured 15cm north-south and 17cm east west, with a depth of 10cm (70cm below S4). The interior was straight walled, descending to a square base 15cm wide. It is possible that this was a post hole for a fence or similar structure, but from which epoch is not clear. No cultural materials were recovered in the fill.

**Feature #:** 151

**Address:** 984N 933E

**Depth:** 60cm

**Associations:** T3, L37, F89

**Description:**

Initially defined as a separate feature, F151 was later determined to be a part of F89.

**Feature #:** 152

**Address:** 987N 922E

**Depth:** 30cm below S4

**Associations:** T3, L37

**Description:**

F152 was defined as an irregular, semi-circular soil stain, located along the eastern edge of 987N 922E at 30cm below S4. It was composed of dark gray/black L37 soil (5YR 2.5/1), measuring 12cm north-south and 17cm east-west. Excavations revealed a depth of about 11cm to a rounded base about 6cm wide. No material remains were recovered in the fill, and its purpose is unclear.

**Feature #:** 153

**Address:** 987N 922E

**Depth:** 30cm below S4

**Associations:** T3, L37, F152,

**Description:**

F153 appeared as a small soil stain in 987N 922E at 30cm below S4. Further investigation revealed no depth, suggesting this feature was made by root action or a burrowing animal.



**Feature #:** 154

**Address:** 987N 922E

**Depth:** 30cm below S4

**Associations:** T3, L37

**Description:**

Like F153, F154 appeared to be a soil stain feature. It was revealed to be likely the result of root action, as it had no depth and no cultural materials.

**Feature #:** 155

**Address:** 987N 922E

**Depth:** 30cm below S4

**Associations:** T3, L37, F153, F154

**Description:**

F155, like F153 and F154 in the same unit, appeared as a semi-circular soil stain that was later revealed to be likely caused by root action or other natural phenomena. No cultural materials were recovered in the feature, and it had no discernible depth.

**Feature #:** 156

**Address:** 984N 933E

**Depth:** 30cm below S4

**Associations:** T3, L37, F89

**Description:**

F156 was defined as a large soil stain located in 984N 933E, first identified at 30cm below S4. It was composed of dark gray/black L37 soil (5YR 2.5/1), apparently related to that occupation layer. F156 measured 60cm north-south and 30cm east-west, likely extending to the east into 984N 934E, which was not excavated. The feature was

not excavated as well, due to time constraints. It may be related to the large stain F89, and may contain a post hole or similar feature that was collapsed and burned at some point in the past.

**Feature #:** 158

**Address:** 985N 938E

**Depth:** 60cm below S4

**Associations:** T3, L37, F68, F69

**Description:**

F158 was a circular soil stain, possibly a post hole, located in 985N 938E at 60cm below S4. It was composed of dark gray/black L37 soil (5YR 2.5/1), likely associated with that layer, and measured 13cm north-south and 15cm east-west. It had a depth of 20cm (80cm below S4) with straight walls tapering to a rounded base about 8cm in width. F158 appears to be associated with F68 and F69, suggesting a possible fence line, perhaps a picket line from the L37 occupation era (AD 1580). These features may also be the remains of a modern fenceline. No cultural materials were recovered in the fill.

**Feature #:** 159

**Address:** 985N 938E

**Depth:** 60cm

**Associations:** T3, L37, F158

**Description:**

F159 was defined as a soil stain, brown/gray in color (10YR 5/3, similar to L65), located at 60cm below S4 in 985N 938E. The feature was first seen in the west profile along the 938E line, and likely extends westward into 985N 937E. It measured 38cm north-south and 20cm east-west (from the 938E line). It had a depth of about 50cm (110cm below S4), extending diagonally to the south with a rounded base approximately

30cm in width. Charcoal, ceramics (one fragment of Liucura Red) and lithics (yellow andesite) were recovered in the fill. This feature appears to be associated with the L65 occupation, perhaps dating to about AD 1100.

**Feature #:** 161

**Address:** 875N 1055E

**Depth:** 30cm below S4

**Associations:** T4, L171

**Description:**

F161 was defined as a circular soil stain, possibly a post hole, noted in the south profile of 875N 1055E at 30cm below S4. It is composed of gray/brown soil (5YR 2.5/1) from the L171 layer, measuring 11cm north-south (from the south profile) and 15cm east west, with a depth of 30cm (60cm below S4), inclined diagonally towards the west, and tapering to a rounded base 6cm wide. No artifacts, charcoal, nor other cultural materials were recovered in the fill. F161 may be related to F162 and F165, but this is speculation. It does appear to be related to the L171 occupation layer that dates to about AD 1850.

**Feature #:** 162

**Address:** 875N 1056E

**Depth:** 30cm below S4

**Associations:** T4, L171, F161?

**Description:**

Identified at 30cm below S4 in 875N 1056E, F162 was defined as a small circular soil stain, possibly a post hole. It measured 11cm north-south and 10cm east-west, with a depth of 18cm (48cm below S4). The feature tapered to a point 4cm wide at the base. It may be related to F161 and the L171 occupation layer. No artifacts were recovered in the fill.

**Feature #:** 163

**Address:** 875N 1056E

**Depth:** 30cm below S4

**Associations:** T4, L171, F162, F164

**Description:**

Similar to F162, F163 was composed of gray/brown soil from the L171 layer (5YR 2.5/1), defined as a circular soil stain at 30cm below S4 in 875N 1056E. Possibly a post hole, F163 measured 9cm north-south and 8cm east west, with a depth of 26cm (56cm below S4) and tapering to a rounded base 3cm wide. A few fragments of charcoal were recovered in the fill. This feature may be a post hole related to F161 and F162 and date to the L171 occupation of ca. AD 1850.

**Feature #:** 164

**Address:** 875N 1056E

**Depth:** 30cm below S4

**Associations:** T4, L171, F163?

**Description:**

F164 was defined as a circular soil stain, possibly a post hole, located in 875N 1056E at 30cm below S4. It is composed of gray/brown L171 soil (5YR 2.5/1) with small pieces of charcoal on the surface. F164 measured 12cm north-south and 20cm east-west, slightly larger than the other features in the unit. It had a depth of 17cm (47cm below S4) to a squared base 15cm wide with straight walls. The feature was much wider and squared off than the other features in T4. It may be related to F161, F162, and F165, though how is not clear. The fill from L171 suggests a relationship to the possible occupation dating to AD 1850.

**Feature #:** 165

**Address:** 875N 1057E

**Depth:** 30cm below S4

**Associations:** T4, L171, F161?

**Description:**

First identified in the south profile of 875N 1057E, F165 was defined as a soil stain, possibly a post hole, 30cm below S4. It was composed of gray/brown L171 soil (5YR 2.5/1), likely associated with that occupation, measuring 19cm north-south (from the south profile) and 25cm east-west. F165 was about 35cm deep (65cm below S4), inclined diagonally towards the west to a rounded base 17cm wide. Charcoal and ceramics (Liucura Brown) were recovered in the fill. Notably, F165 and F161 both extend diagonally, though in opposite directions. Why this is so is not clear.

**Feature #:** 166

**Address:** 875N 1056E

**Depth:** 30cm below S4

**Associations:** T4, L171

**Description:**

F166 was a small circular soil stain located on the north profile of 875N 1056E at 30cm below S4. It was composed of black/red soil (2.5YR 2.5/1), measuring 10cm north-south and 10cm east-west. Further excavation revealed no depth to the feature, which extended to the north into the profile. This suggested root action or an animal burrow, not cultural activity. No artifacts or other materials were recovered in the fill.

**Feature #:** 167

**Address:** 875N 1058E

**Depth:** 30cm below S4

**Associations:** T4, L171, F168

**Description:**

F167 was defined as a small circular soil stain, possibly a post hole, located in the center-south of 875N 1058E at 30cm below S4. It measured 7cm north-south and 9cm east-west, with a depth of 8cm (38cm below S4) that tapered to a point 2cm wide. No artifacts or cultural materials were recovered in the fill. Though shallow, F167 may be related to F168 and F169, and may be a part of the L171 occupation layer.

**Feature #:** 168

**Address:** 875N 1058E

**Depth:** 30cm below S4

**Associations:** T4, L171, F167, F169?

**Description:**

Located in the center-east of 875N 1058E at 30cm below S4 F168 was defined as a circular soil stain, possibly a shallow post hole related to F167 and F169. It measured 10cm north-south and 9cm east-west, with a depth of 10cm (40cm below S4) tapering to a rounded point 3cm wide. No artifacts or other cultural materials were recovered in the fill.

**Feature #:** 169

**Address:** 875N 1059E

**Depth:** 30cm

**Associations:** T4, L171, F168?

**Description:**

F169 was a small circular soil stain, possibly a post hole, located in 875N 1059E at 30cm below S4. It measured 9cm north-south and 9cm east-west, composed of gray/brown soil from the L171 layer (5YR 2.5/1). F169 had a depth of 13cm (43cm below S4),

with irregular walls tapering to a point 5cm wide. No cultural materials were recovered in the fill. This feature may be related to F168 and other features in T4, though in what capacity is unclear. It does appear to be related to the L171 occupation layer.

**Feature #:** 170

**Address:** 875N 1054E

**Depth:** 30cm below S4

**Associations:** T4, L171

**Description:**

F170 was defined as a large soil stain located in 875N 1054E at 30cm below S4. The feature is large, occupying most of the unit, and measured 70cm north-south and 65cm east-west. Many pieces of charcoal were seen in the surface, as well as fragments of ceramic (Liucura Brown). The amount of charcoal suggests the possibility of a fire pit or related activity area. On the north side, the soil had a hollow sound, suggesting that something may have been buried there previously, though excavations revealed no buried deposits. The feature itself was only about 10cm deep, ending near the L172 layer.

**Feature #:** 173

**Address:** 985-987N 918-919E

**Depth:** 30cm below S4

**Associations:** T3, F174, F175

**Description:**

F173 was defined as a large, irregularly-shaped soil stain, brown in color (5YR 4/6) that first appeared at about 30cm below S4 in 986N 919E. It was later revealed to extend north into 987N 919E, south into 985N 919E, and east into 986N 918E. The soil is lightly compacted, fine-grained, and different from the other features in T3. Initially it was believed to be a stain associated with L65, but the color is different (darker brown)

than the other L65-related features. Notably, both F173 and F174 fall within the line of possible post holes that make up F110, which may indicate that these stains (F173, and F174) are associated with the F110 feature in some capacity, perhaps formed from animal activity, though nothing specific was indicated in these stains. F173 measured 155cm north-south and 40cm east-west at its widest point. A large, dark stain, F175, was noted in the northern portion of F173, apparently separate from the larger feature. Charcoal was seen on the surface, though no other cultural materials were apparent. The feature was not excavated.

**Feature #:** 174

**Address:** 985-986N 919-920E

**Depth:** 30cm below S4

**Associations:** T3, F173, F178

**Description:**

Like F173, F174 was defined as a large, irregular soil stain composed of brown soil (5YR 4/6) first identified at 30cm below S4 in 985N 920E. The feature later expanded into 986N 920E and 985-986N 919E. It measured about 100cm north-south and 150cm east-west. A large stain composed of L37 soil, labeled F178, was defined in the northeast portion of F173. F174 was contained entirely within F110, like F173, and may be associated with that feature. Charcoal was visible on the surface, and no other cultural materials were apparent. The feature was not excavated.

**Feature #:** 175

**Address:** 987N 919E

**Depth:** 30cm below S4

**Associations:** T3, L37, F173

**Description:**



F175 was defined as a semi-circular soil stain in the northernmost portion of F173 in 987N 919E at 30cm below S4. It was composed of dark gray/black L37 soil (5YR 2.5/1), measuring 30cm north-south and 29cm east-west, with small fragments of charcoal visible on the surface. It is unclear if this feature is associated with F173 or is the result of a separate intrusion. F175 was not excavated.

**Feature #:** 176

**Address:** 987N 918-919E

**Depth:** 30cm below S4

**Associations:** T3, L65, F177

**Description:**

Located along the north profile of T3 in 987N 918-919E, F176 was defined as a soil stain composed of gray/brown L65 soil (10YR 5/3), identified at 30cm below S4. It measured 22cm north-south (from the north profile) and 87cm east-west. One of the F110 holes intruded into the southern portion of F176. Small, unrecoverable fragments of charcoal were identified on the surface, though the feature was not excavated due to time constraints. It appears to be associated with the L65 occupation, along with F177 located 51cm to the east. It is likely that the feature extends north into 988N 918-919E and may represent the remains of a post hole or similar feature.

**Feature #:** 177

**Address:** 987N 919E

**Depth:** 30cm below S4

**Associations:** T3, L65, F176

**Description:**

F177 is a small, semi-circular soil stain located in 987N 919E at 30cm below S4. Similar to F176, F177 is composed of fine-grained brown/gray L65 soil (10YR 5/3),

apparently associated with that occupation layer, and may represent the remains of a post hole. It measured 20cm north-south (from the north profile) and 24cm east-west. The feature was not excavated.

**Feature #:** 178

**Address:** 985-986N 920E

**Depth:** 30cm below S4

**Associations:** T3, L37, F174

**Description:**

F178 was defined as an irregular circular soil stain located in the northeast portion of F174 in 985-986N 920E at 30cm below S4. It was composed of dark gray/black L37 soil (5YR 2.5/1), similar to F175, and measured 34cm north-south and 30cm east-west. Charcoal was visible on the surface, though time constraints precluded excavation of the feature in its entirety. It may be related to the L37 occupation, perhaps associated with the F110 possible animal pen.

**Feature #:** 179

**Address:** 987N 919E

**Depth:** 30cm below S4

**Associations:** T3, L37, F173, F174?

**Description:**

F179, located in the southern half of 987N 919N along the 987N line, was defined as a small, irregular soil stain identified at 30cm below S4 20cm east of F173. F179 was composed of dark gray/black L37 soil (5YR 2.5/1), apparently associated with that layer, and measured 19cm north-south and 16cm east-west. Though unexcavated, it may represent the remains of a post hole, associated with the F110 possible animal pen, though this is speculative.

## APPENDIX F

### CERAMIC ANALYSIS RAW DATA

## Summary

The following appendix presents a table of the raw ceramic data analyzed in this project. Ceramic sherds were recovered throughout the site and in most stratigraphic layers, being the most diagnostic of the materials recovered at the site. An arbitrary sample of over 2,500 sherds were analysed of nearly 8,000 recovered, the majority from T3 (Trench #3). Materials were analyzed for exterior and interior color (based on the Munsell 2000 color charts), section, slip, decoration, temper, thickness, grain, and clay. Chapter 9 presents a summary of the classifications and analysis of these ceramics.

Location	Depth	Section	Style	Color (exterior)	Munsell	Thickness (mm)	Temper	Slip	Clay	Decoration	Grain
Surface	Surface	Body	Smoothed	Red/Brown	2.5YR 4/8	9 Sand		None	Brown	None	Medium-Fine
Surface	Surface	Body	Smoothed	Red/Brown	2.5YR 4/8	9.5 Sand		None	Brown	None	Medium-Fine
Surface	Surface	Body	Smoothed	Gray	Gley2 6/10B	11 Sand		None	Gray/Brown	None	Fine-Very Fine
985N 992E	10-20cm	Body	Smoothed	Gray/Black	Gley2 5/10B	5 Sand		None	Brown	None	Fine-Very Fine
985N 992E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand		None	Brown	None	Fine-Very Fine
985N 992E	10-20cm	Body	Smoothed	Dark Gray/Brown	7.5YR 4/1	9 Sand		None	Brown	None	Fine-Very Fine
985N 995E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	6 Sand		Red	Brown	None	Fine-Very Fine
985N 995E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	5.5 Sand		None	Gray/Brown	None	Fine-Very Fine
985N 999E	0-10cm	Rim	Smoothed	Dark Gray/Red	2.5YR 4/2	6 Sand		None	Gray	None	Fine-Very Fine
985N 999E	0-10cm	Body	Smoothed	Dark Gray/Red	2.5YR 4/2	6 Sand		None	Gray	None	Fine-Very Fine
985N 999E	0-10cm	Body	Smoothed	Dark Gray/Red	2.5YR 4/2	8 Sand		None	Gray	None	Fine-Very Fine
985N 999E	0-10cm	Body	Smoothed	Dark Gray/Red	2.5YR 4/2	6.5 Sand		None	Gray	None	Fine-Very Fine
985N 999E	0-10cm	Body	Smoothed	Dark Gray/Red	2.5YR 4/2	8 Sand		None	Gray	None	Fine-Very Fine
985N 999E	10-20cm	Body	Smoothed	Red/Dark Gray	2.5YR 4/8	6.5 Sand		Red/Brown	Brown	None	Fine-Very Fine
985N 999E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/3	5.5 Sand		None	Brown	None	Fine-Very Fine
985N 999E	10-20cm	Body	Smoothed	Gray/Red	10R 4/1	6 Sand		None	Brown	None	Fine-Very Fine
985N 996E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6.5 Sand		None	Brown	None	Fine-Very Fine
985N 998E	0-10cm	Rim	Smoothed	Red/Brown	2.5YR 4/8	4 Sand		None	Brown	None	Very Fine
985N 998E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	7.5 Sand		None	Brown	None	Medium-Fine
985N 998E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	6 Sand		None	Brown	None	Fine-Very Fine
985N 995E	30-40cm	Rim	Smoothed	Gray/Tan	10YR 6/2	6 Sand		Gray	Brown	None	Very Fine
985N 995E	20-30cm	Rim	Smoothed	Dark Gray/Brown	7.5YR 4/1	6.5 Sand		Gray	Brown	None	Very Fine
985N 998E	10-20cm	Body	Smoothed	Tan/Brown	7.5YR 6/4	7 Sand		None	Brown	Painted	Fine-Very Fine
985N 996E	20-30cm	Body	Smoothed	Gray/Brown	10YR 5/2	6.5 Sand		None	Brown	None	Very Fine
985N 998E	30-40cm	Body	Smoothed	Gray/Black	Gley2 5/10B	5 Sand		Black	Brown	Painted	Fine-Very Fine
985N 998E	30-40cm	Body	Smoothed	Gray	Gley2 6/10B	7 Sand		None	Brown	None	Fine-Very Fine
985N 1000E	0-10cm	Body	Smoothed	Gray/Red	10R 4/1	6 Sand		None	Gray	None	Fine-Very Fine
985N 1000E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	8 Sand		None	Brown	None	Fine-Very Fine
985N 1003E	30-40cm	Body	Smoothed	Red/Tan	2.5YR 5/4	6 Sand		Red	Brown	Painted?	Fine-Very Fine
985N 1003E	30-40cm	Body	Smoothed	Gray	Gley2 6/10B	6.5 Sand		None	Gray/Brown	None	Fine-Very Fine
985N 1003E	10-20cm	Handle	Smoothed	Brown/Red	7.5YR 4/6	17.5 Sand		None	Brown	None	Very Fine
985N 1003E	10-20cm	Rim	Smoothed	White/Gray	10R 7/1	7.5 Sand/Grog		White	Brown	Painted	Fine-Very Fine
985N 1003E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	6 Sand		Red	Brown	None	Fine-Very Fine
985N 1003E	10-20cm	Body	Smoothed	Red/Gray	10R 5/2	7 Sand		None	Brown	None	Medium-Fine
985N 1003E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	7 Sand		None	Brown	None	Fine-Very Fine
985N 1003E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	5.5 Sand		Red	Brown	None	Fine-Very Fine
985N 1003E	10-20cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	6 Sand		Black	Brown	None	Fine-Very Fine
985N 1003E	10-20cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	6 Sand		Black?	Brown	None	Fine-Very Fine
985N 1003E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	7 Sand		None	Brown	None	Fine-Very Fine
985N 1003E	20-30cm	Body	Smoothed	White/Red	2.5YR 7/2	5 Sand		White	Brown	Painted	Fine-Very Fine
985N 1003E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand		None	Brown	None	Fine-Very Fine
985N 1003E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand		None	Brown	Painted?	Fine-Very Fine
985N 1000E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	4.5 Sand		Red	Brown	Slip	Fine-Very Fine
985N 1000E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	6 Sand		None	Brown	None	Fine-Very Fine
985N 1000E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	7 Sand		None	Brown	None	Fine-Very Fine
985N 1003E	0-10cm	Body	Smoothed	Light Gray	10YR 6/1	6 Sand		None	Gray	None	Very Fine
985N 1001E	10-20cm	Body	Smoothed	Black	Gley1 2.5/N	5 Sand		None	Brown/Red	None	Very Fine
985N 1002E	20-30cm	Body	Smoothed	Gray	Gley2 6/10B	8.5 Sand		None	Gray/Brown	None	Fine-Very Fine
985N 1002E	20-30cm	Body	Smoothed	Red/Gray	10R 5/2	7 Sand		None	Brown	None	Fine-Very Fine
985N 1002E	20-30cm	Body	Smoothed	Brown/Gray	10YR 5/4	6.5 Sand		None	Brown	None	Fine-Very Fine
985N 1002E	20-30cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5 Sand		None	Brown	None	Fine-Very Fine
985N 1002E	30-40cm	Body	Smoothed	Gray	Gley2 6/10B	7 Sand		None	Brown	None	Fine-Very Fine
985N 1002E	30-40cm	Body	Smoothed	Brown/Black	10YR 3/2	6.5 Sand		None	Brown	None	Very Fine
985N 1002E	0-10cm	Body	Smoothed	Red/Gray	10R 5/2	6 Sand		None	Brown	Painted?	Very Fine
985N 1002E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	6 Sand		None	Brown	None	Fine-Very Fine

985N 1001E	20-30cm	Body	Smoothed	Red	2.5YR 4/6	9 Sand	Red	Brown	Painted?	Medium-Fine
985N 1001E	30-40cm	Body	Smoothed	Brown/Black	10YR 3/2	3 Sand	Brown	Brown	None	Very Fine
985N 1004E	30-40cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	7 Sand	None	Brown	None	Fine
985N 1005E	10-20cm	Body	Smoothed	Gray/Red	10R 4/1	7 Sand	None	Red/Brown	None	Fine-Very Fine
985N 1005E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	7 Sand	None	Brown/Red	None	Fine-Very Fine
985N 1004E	10-20cm	Body	Smoothed	Gray/Red	10R 4/1	6.5 Sand	White?	Brown/Red	None	Fine-Very Fine
985N 1004E	10-20cm	Body	Smoothed	Red/Tan	2.5YR 5/4	5 Sand	None	Brown	None	Fine-Very Fine
985N 1004E	10-20cm	Body	Smoothed	Red/Gray	10R 5/2	5 Sand	None	Brown/Gray	None	Fine
985N 1004E	0-10cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	7.5 Sand	None	Gray/Brown	None	Fine
985N 1004E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/6	6 Sand	None	Brown	None	Fine-Very Fine
985N 1004E	20-30cm	Neck	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Brown	Slip	Very Fine
985N 1004E	20-30cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6.5 Sand	None	Brown	Incised?	Fine-Very Fine
985N 1004E	20-30cm	Body	Smoothed	Red/Gray	10R 5/2	5 Sand	None	Gray/Brown	None	Fine-Very Fine
985N 1004E	20-30cm	Body	Smoothed	Red/Gray	10R 5/2	4.5 Sand	None	Brown/Gray	None	Fine-Very Fine
985N 1005E	20-30cm	Body	Smoothed	Red/Gray	10R 5/2	7.5 Sand	None	Gray/Brown	None	Fine-Very Fine
985N 1005E	30-40cm	Rim	Smoothed	Black/Brown	7.5YR 3.2	4 Sand	None	Brown/Gray	Painted?	Fine-Very Fine
985N 1005E	30-40cm	Body	Smoothed	Brown/Gray	10YR 5/4	4.5 Sand	None	Brown	None	Fine-Very Fine
985N 1005E	30-40cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	None	Brown	None	Fine-Very Fine
985N 1007E	40-50cm	Body	Smoothed	Gray/Brown	10YR 4/6	6 Sand	None	Brown/Gray	None	Fine-Very Fine
985N 1008E	0-10cm	Body	Smoothed	Gray/Red	10R 4/1	4 Sand	None	Gray/Brown	None	Fine-Very Fine
985N 1007E	20-30cm	Body	Smoothed	Gray/Red	10R 4/1	6.5 Sand	None	Brown/Gray	None	Fine
985N 1007E	30-40cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	7 Sand	None	Gray/Brown	None	Very Fine
985N 1007E	30-40cm	Body	Smoothed	Brown/Gray	10YR 5/4	4 Sand	None	Gray/Brown	None	Very Fine
985N 1007E	10-20cm	Body	Smoothed	Brown/Tan	7.5YR 6/2	4 Sand	None	Brown	None	Very Fine
985N 1007E	20-30cm	Body	Smoothed	Gray/Brown	10YR 5/2	5 Sand	None	Brown/Gray	None	Fine-Very Fine
985N 1007E	0-10cm	Body	Smoothed	Gray/Black	Gley2 5/10B	5 Sand	None	Brown/Gray	None	Fine-Very Fine
985N 1005E	40-50cm	Body	Smoothed	Red/Brown	2.5YR 4/8	4 Sand	None	Brown	None	Fine-Very Fine
985N 1005E	40-50cm	Body	Smoothed	Gray/Black	Gley2 5/10B	4 Sand	Black?	Brown/Gray	Slip?	Fine-Very Fine
985N 1008E	20-30cm	Base	Smoothed	Gray/Black	Gley2 5/10B	8.5 Sand	None	Red/Brown	None	Fine
985N 1006E	60-70cm	Body	Smoothed	Gray/Red	10R 4/1	4.5 Sand	None	Brown	None	Fine-Very Fine
985N 1006E	60-70cm	Body	Smoothed	Brown/Red	7.5YR 4/6	7 Sand	None	Brown	None	Fine
985N 1006E	60-70cm	Body	Smoothed	Red	2.5YR 4/6	6 Sand	None	Red/Brown	None	Fine-Very Fine
985N 1007E	50-60cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	Red	Brown	Slip	Fine-Very Fine
985N 1007E	50-60cm	Body	Smoothed	Black/Brown	7.5YR 3.2	6 Sand	None	Brown	None	Fine
985N 1008E	40-50cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Brown	None	Fine-Very Fine
985N 1008E	40-50cm	Body	Smoothed	Brown/Gray	10YR 5/4	6.5 Sand	None	Brown	None	Fine
985N 1008E	60-70cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	7.5 Sand	Black	Brown	Slip	Very Fine
985N 1008E	70-80cm	Neck	Smoothed	Gray/Black	Gley2 5/10B	7 Sand	None	Brown/Gray	None	Fine-Very Fine
985N 1008E	70-80cm	Body	Smoothed	Brown/Red	7.5YR 4/6	7.5 Sand	None	Brown	None	Fine
985N 1008E	40-50cm	Body	Smoothed	Brown/Tan	7.5YR 6/2	8 Sand	None	Brown	None	Fine-Very Fine
985N 1008E	40-50cm	Body	Smoothed	Gray/Brown	10YR 5/2	7.5 Sand	None	Brown/Red	None	Fine-Very Fine
985N 1008E	40-50cm	Body	Smoothed	Red/Dark Gray	2.5YR 4/3	5 Sand	None	Gray	None	Fine-Very Fine
985N 1009E	50-60cm	Body	Smoothed	Brown/Gray	10YR 5/4	6 Sand	None	Brown	None	Fine-Very Fine
985N 1009E	50-60cm	Body	Smoothed	Gray/Brown	10YR 5/2	3.5 Sand	None	Brown	None	Very Fine
984N 994E	0-10cm	Body	Smoothed	Red/Gray	10R 5/2	5.5 Sand	None	Gray/Brown	None	Fine
984N 994E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	4.5 Sand	Red	Brown	Slip	Fine
984N 994E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	8.5 Sand	None	Brown/Gray	None	Fine
984N 994E	0-10cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	7 Sand	None	Brown	None	Fine-Very Fine
984N 994E	0-10cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	6.5 Sand	None	Brown/Gray	None	Fine-Very Fine
984N 995E	0-10cm	Handle	Smoothed	Gray/Brown	10YR 5/2	7.5 Sand	None	Gray/Brown	None	Fine-Very Fine
984N 995E	0-10cm	Body	Smoothed	Brown/Black	10YR 3/2	14 Sand	None	Brown	None	Medium-Fine
984N 995E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	Red?	Brown	Slip	Fine-Very Fine
984N 995E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	None	Brown	None	Fine-Very Fine
984N 996E	0-10cm	Body	Smoothed	Brown/Tan	7.5YR 6/2	6 Sand	None	Brown	None	Fine-Very Fine
984N 996E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	5.5 Sand	Red	Brown	Slip	Fine-Very Fine
984N 996E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	6 Sand	None	Gray/Red	None	Fine-Very Fine
984N 996E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	6 Sand	None	Brown/Gray	None	Fine-Very Fine



983N 996E	0-10cm	Rim	Smoothed	Gray/Black	Gley2 5/10B	5.5 Sand	None	Brown/Gray	None	Fine-Very Fine
983N 996E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	10 Sand	None	Gray/Red	None	Medium-fine
1006N 951E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	none	Brown	None	Fine
1006N 951E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	6.5 Sand	None	Gray	None	Fine-Very Fine
1003N 952E	10-20cm	Rim	Smoothed	Tan/Brown	7.5YR 6/4	7 Sand	None	Brown	None	Very Fine
1003N 952E	10-20cm	Body	Corrugated?	Brown/Gray	10YR 5/4	4.5 Sand	None	Brown	None	Very Fine
1003N 952E	10-20cm	Body	Smoothed	Red/Gray	10R 5/2	6 Sand	Red	Gray	Incised?	Fine-Very Fine
1006N 951E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	8 Sand	None	Brown	None	Fine
1014N 951E	Surface	Body	Smoothed	Brown/Gray	10YR 5/4	7 Sand	None	Brown	None	Fine-Very Fine
1006N 951E	10-20cm	Body	Smoothed	Gray/Red	10R 4/1	5.5 Sand	None	Brown/Gray	None	Fine-Very Fine
1007N 951E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	Red	Brown	Slip	Fine-Very Fine
1007N 951E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	5.5 Sand	None	Brown	None	Fine
1007N 951E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	6 Sand	None	Brown	None	Fine
1003N 952E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	Red?	Brown	Slip	Fine-Very Fine
1003N 952E	0-10cm	Body	Smoothed	Red/Gray	10R 5/2	6 Sand	None	Brown/Gray	None	Fine-Very Fine
1003N 952E	0-10cm	Body	Smoothed	Gray/Tan	10YR 6/2	5 Sand	None	Gray/Brown	None	Fine-Very Fine
1007N 951E	0-10cm	Body	Smoothed	Gray/Tan	10YR 6/2	4 Sand	None	Gray/Brown	None	Fine-Very Fine
1005N 951E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	6 Sand	None	Brown	None	Very Fine
1005N 951E	10-20cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	6 Sand	None	Brown	Incised?	Fine-Very Fine
1005N 951E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	6.5 Sand	None	Gray	None	Fine-Very Fine
1009N 951E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	6.5 Sand	None	Gray/Brown	None	Fine-Very Fine
1009N 951E	10-20cm	Body	Smoothed	Gray/Black	Gley2 5/10B	6 Sand	None	Gray/Brown	None	Very Fine
1002N 952E	0-10cm	Rim	Smoothed	Dark Gray	5YR 3/1	4 Sand	None	Gray/Brown	None	Very Fine
1002N 952E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	4.5 Sand	None	Brown	None	Fine-Very Fine
1002N 952E	0-10cm	Body	Smoothed	Tan/Brown	7.5YR 6/4	5.5 Sand	Tan	Brown	Slip	Very Fine
1002N 952E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	5 Sand	Gray?	Gray/Brown	Slip	Very Fine
1002N 952E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	6.5 Sand	None	Brown/Gray	None	Very Fine
1009N 951E	20-30cm	Body	Smoothed	Brown/Gray	10YR 5/4	7 Sand	None	Brown	None	Fine-Very Fine
1010N 951E	0-10cm	Body	Corrugated	Gray/Brown	10YR 5/2	5 Sand	None	Brown	None	Fine
1010N 951E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	9 Sand	None	Brown	None	Fine-Very Fine
1009N 951E	0-10cm	Body	Smoothed	Dark Gray/Brown	7.5YR 4/1	6 Sand	Black?	Brown/Gray	Slip?	Fine-Very Fine
1003N 952E	20-30cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	8 Sand	None	Gray	None	Very Fine
1003N 952E	20-30cm	Body	Smoothed	Black	Gley1 2.5/N	5 Sand	None	Gray?	None	Fine-Very Fine
1003N 952E	20-30cm	Body	Smoothed	Tan/Brown	7.5YR 6/4	4 Sand	Tan?	Brown	Slip?	Medium-Fine
1002N 952E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	9 Sand	None	Brown/Gray	None	Fine-Very Fine
1002N 952E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	7 Sand	None	Brown	None	Fine-Very Fine
1002N 952E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	6.5 Sand	None	Brown/Red	None	Fine-Very Fine
1002N 952E	10-20cm	Neck?	Smoothed	Brown/Gray	10YR 5/4	11 Sand	None	Brown/Red	None	Fine
1008N 951E	30-40cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	7 Sand	Red	Gray	Slip	Fine-Very Fine
1002N 952E	10-20cm	Body	Smoothed	Black	Gley1 2.5/N	6 Sand	Black	Brown	Slip	Fine-Very Fine
1002N 952E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	None	Brown	None	Fine-Very Fine
1002N 952E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	Red	Brown	Slip	Fine-Very Fine
1011N 951E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	10.5 Sand	None	Brown	None	Fine
1011N 951E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	7.5 Sand	None	Brown	None	Fine-Very Fine
1010N 951E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	8 Sand	None	Brown	None	Medium-Fine
1010N 951E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	none	Brown	None	Medium-fine
1010N 951E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7.5 Sand	None	Brown	None	Fine
1010N 951E	10-20cm	Handle	Smoothed	Brown/Gray	10YR 5/4	12.5 Sand	None	Brown	None	Fine-Very Fine
1010N 951E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	Red	Brown	Slip	Fine-Very Fine
1010N 951E	10-20cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	6 Sand	Black?	Gray/Brown	Slip?	Fine-Very Fine
1010N 951E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7.5 Sand	Light Red?	Brown/Gray	Slip	Medium-Fine
1010N 951E	10-20cm	Body	Smoothed	Gray/Black	Gley2 5/10B	11 Sand	None	Gray	None	Medium-Fine
1010N 951E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	7 Sand	None	Gray/Brown	None	Fine-Very Fine
1003N 953E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	5.5 Sand	None	Brown	None	Fine-Very Fine
1003N 953E	10-20cm	Body	Corrugated	Gray	Gley2 6/10B	3.5 Sand	None	Brown/Gray	None	Fine-Very Fine



1012N 951E	0-10cm	Body	Smoothed	Black	10YR 3/2	5.5 Sand	Black?	None	Brown	None	Fine-Very Fine
1012N 951E	0-10cm	Body	Smoothed	Black	Gley1 2.5/N	9 Sand	Black?	Slip	Brown/Gray	Slip	Fine
1012N 951E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	10 Sand	None	None	Brown	None	Fine-Very Fine
1012N 951E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	5.5 Sand	None	None	Brown	None	Fine-Very Fine
1012N 951E	0-10cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	9 Sand	none	None	Brown/Gray	None	Fine-Very Fine
1002N 951E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	5 Sand	None	None	Brown	None	Fine-Very Fine
1002N 951E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	4.5 Sand	None	None	Brown	None	Fine-Very Fine
1002N 951E	10-20cm	Neck	Smoothed	Brown/Gray	10YR 5/4	3.5 Sand	None	None	Brown	None	Fine-Very Fine
1013N 951E	10-20cm	Body	Corrugated	Gray/Black	Gley2 5/10B	4 Sand	None	None	Brown	None	Fine-Very Fine
1013N 951E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	8 Sand	None	None	Brown	None	Medium-fine
1013N 951E	10-20cm	Body	Smoothed	Black	Gley1 2.5/N	11.5 Sand	None	None	Brown	None	Medium-fine
1013N 951E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	None	Brown	None	Medium-fine
1013N 951E	10-20cm	Body	Smoothed	Black	Gley1 2.5/N	9 Sand	None	None	Brown/Gray	None	Fine-Very Fine
1013N 951E	10-20cm	Body	Smoothed	Black	Gley1 2.5/N	6 Sand	None	None	Brown	None	Fine-Very Fine
1013N 951E	10-20cm	Body	Smoothed	Dark Gray/Red	2.5YR 4/2	5.5 Sand	Red?	Slip?	Brown	Slip?	Fine-Very Fine
1013N 951E	10-20cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	5 Sand	None	None	Brown	none	Fine-Very Fine
1013N 951E	10-20cm	Body	Smoothed	Black	Gley1 2.5/N	8.5 Sand	None	None	Brown/Gray	None	Fine
1013N 951E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	9 Sand	None	None	Brown	None	Fine-Very Fine
1013N 951E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	7 Sand	none	None	Brown	None	Medium-Fine
1013N 951E	10-20cm	Body	Smoothed	Black	Gley1 2.5/N	8.5 Sand	None	None	Gray	None	Fine-Very Fine
1013N 951E	10-20cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	7 Sand	None	None	Brown	None	Fine-Very Fine
1013N 951E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	8 Sand	None	None	Brown	None	Fine-Very Fine
1013N 951E	10-20cm	Body	Smoothed	Black	Gley1 2.5/N	7.5 Sand	None	None	Gray	Slip	Fine-Very Fine
1003N 953E	20-30cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	6.5 Sand	Black?	Slip	Brown/Red	Slip	Fine-Very Fine
1003N 953E	20-30cm	Body	Smoothed	Gray	Gley2 6/10B	5.5 Sand	Gray?	Slip	Brown/Gray	Slip	Fine-Very Fine
1012N 951E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	None	None	Red/Brown	None	Very Fine
1012N 951E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	5.5 Sand	None	None	Brown	None	Fine-Very Fine
1012N 951E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	5 Sand	None	None	Gray/Brown	None	Fine-Very Fine
1010N 951E	20-30cm	Body	Smoothed	Brown/Gray	10YR 5/4	10 Sand	None	None	Brown	None	Fine-Very Fine
1010N 951E	20-30cm	Body	Smoothed	Brown/Red	7.5YR 4/6	7 Sand	None	None	Brown	None	Medium-fine
1002N 951E	0-10cm	Body	Corrugated	Gray/Brown	10YR 5/2	4.5 Sand	None	None	Gray/Brown	None	Fine-Very Fine
1002N 951E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	10 Sand	None	None	Brown	None	Fine-Very Fine
1002N 951E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	7.5 Sand	None	None	Brown	none	Fine-Very Fine
1011N 951E	10-20cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	4.5 Sand	None	None	Gray/Brown	None	Fine-Very Fine
1013N 951E	0-10cm	Handle	Smoothed	Brown/Tan	7.5YR 6/2	19 Sand	None	None	Brown	None	Fine-Very Fine
1013N 951E	0-10cm	Body	Smoothed	Brown/Tan	7.5YR 6/2	11 Sand	None	None	Brown	None	Fine-Very Fine
1013N 951E	0-10cm	Body	Corrugated	Black/Gray	Gley2 4/5PB	5 Sand	None	None	Brown/Gray	None	Fine-Very Fine
1013N 951E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	None	Brown	None	Fine
1003N 953E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	4.5 Sand	None	None	Brown	None	Fine
1002N 953E	0-10cm	Body	Smoothed	White/Red	2.5YR 7/2	8.5 Sand	None	None	Brown	None	Fine-Very Fine
1002N 953E	0-10cm	Body	Smoothed	Red/Gray	10YR 5/2	3.5 Sand	White	Painted	Red/Brown	Painted	Fine-Very Fine
1002N 953E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	9 Sand	None	None	Brown	None	Fine-Very Fine
1002N 953E	0-10cm	Body	Smoothed	Gray/Red	10R 4/1	7 Sand	None	None	Red/Gray	None	Fine
1002N 953E	20-30cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	6 Sand	None	None	Gray	None	Fine-Very Fine
1002N 953E	20-30cm	Body	Smoothed	Gray	Gley2 6/10B	6 Sand	None	None	Brown	None	Fine-Very Fine
1002N 953E	20-30cm	Body	Smoothed	Gray/Brown	10YR 5/2	6 Sand	None	None	Brown/Gray	None	Fine-Very Fine
1002N 953E	20-30cm	Body	Smoothed	Red/Gray	10R 5/2	7 Sand	None	None	Brown/Gray	None	Fine-Very Fine
1002N 953E	20-30cm	Body	Smoothed	Gray/Brown	10YR 5/2	5.5 Sand	Noen	None	Brown	None	Fine-Very Fine
1014N 951E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	6 Sand	None	None	Gray/Brown	None	Fine
1014N 951E	0-10cm	Body	Corrugated	Gray	Gley2 6/10B	6 Sand	None	None	Gray/Brown	None	Fine-Very Fine
1014N 951E	0-10cm	Body	Incised	Gray	Gley2 6/10B	6 Sand	None	None	Gray/Brown	None	Fine-Very Fine
1014N 951E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	5 Sand	None	None	Brown/Gray	None	Fine-Very Fine
1014N 951E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	6 Sand	None	None	Brown	None	Medium-Fine
1014N 951E	0-10cm	Body	Corrugated	Gray/Brown	10YR 5/2	4 Sand	None	None	Brown/Gray	None	Fine-Very Fine
1014N 951E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	5 Sand	None	None	Gray/Brown	None	Fine-Very Fine
1014N 951E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	6 Sand	None	None	Brown/Red	None	Fine-Very Fine

1014N 951E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	None	Brown	None	Fine-Very Fine
1014N 951E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	5 Sand	None	Brown	None	Fine-Very Fine
1014N 951E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	4.5 Sand	None	Brown	None	Fine
1014N 951E	0-10cm	Body	Smoothed	Gray/Black	Gley2 5/10B	6 Sand	None	Brown/Gray	None	Fine-Very Fine
1014N 951E	10-20cm	Rim	Smoothed	Gray/Black	Gley2 5/10B	6 Sand	None	Brown	None	Fine-Very Fine
1014N 951E	10-20cm	Neck	Smoothed	Brown/Gray	10YR 5/4	7 Sand	None	Brown	None	Fine-Very Fine
1014N 951E	10-20cm	Body	Corrugated	Black	Gley1 2.5/N	5 Sand	Black?	Brown/Gray	Slip	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7.5 Sand	Red?	Brown	Slip	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	6 Sand	None	Brown	None	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	6 Sand	Red?	Brown/Red	Slip	Fine
1014N 951E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	5.5 Sand	None	Brown	None	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	None	Brown	None	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	5.5 Sand	None	Gray/Brown	None	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Gray/Black	Gley2 5/10B	6 Sand	None	Brown	None	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	8.5 Sand	None	Brown/Red	None	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	7.5 Sand	None	Brown	None	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Brown/Tan	7.5YR 6/2	4.5 Sand	None	Brown	None	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Gray/Black	Gley2 5/10B	4.5 Sand	None	Gray/Brown	None	Fine
1014N 951E	10-20cm	Body	Smoothed	Gray/Red	10R 4/1	10 Sand	None	Red/Brown	None	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Gray/Black	Gley2 5/10B	4.5 Sand	None	Brown/Gray	None	Fine-Very Fine
1014N 951E	10-20cm	Body	Corrugated	Gray/Brown	10YR 5/2	4 Sand	None	Brown/Gray	None	Fine-Very Fine
1014N 951E	10-20cm	Body	Corrugated	Gray/Brown	10YR 5/2	4 Sand	None	Brown/Gray	None	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	None	Brown/Red	None	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	6 Sand	Red	Brown/Red	Slip	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	7.5 Sand	Red	Brown	Slip	Fine-Very Fine
1014N 951E	10-20cm	Base	Smoothed	Brown/Red	7.5YR 4/6	4 Sand	None	Brown	None	Fine
1014N 951E	10-20cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	5 Sand	Black	Brown/Gray	Slip	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	10 Sand	None	Red/Brown	None	Fine
1014N 951E	10-20cm	Body	Corrugated	Light Gray	10YR 6/1	3.5 Sand	None	Brown/Gray	None	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	12 Sand	None	Brown	None	Fine
1014N 951E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Brown	None	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	None	Brown	None	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Gray/Tan	10YR 6/2	4 Sand	None	Gray/Brown	None	Fine-Very Fine
1014N 951E	10-20cm	Body	Corrugated	Brown/Tan	7.5YR 6/2	7 Sand	None	Brown	None	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Brown	None	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	4.5 Sand	None	Gray	None	Fine-Very Fine
1014N 951E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	11 Sand	None	Red	None	Medium-Fine
1014N 951E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	11.5 Sand	None	Red	None	Medium-Fine
1014N 951E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	9 Sand	Noen	Red	None	Medium-Fine
1014N 951E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	11 Sand	None	Red	None	Medium-Fine
1014N 951E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	11.6 Sand	None	Red	Noen	Medium-Fine
1014N 951E	20-30cm	Body	Smoothed	Gray/Black	Gley2 5/10B	4.5 Sand	None	Gray/Brown	None	Fine
1014N 951E	20-30cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	None	Brown	None	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Gray/Red	10R 4/1	9 Sand	Gray	Red/Brown	Painted	Fine-Very Fine
1014N 951E	10-20cm	Body	Corrugated	Tan/Brown	7.5YR 6/4	4.5 Sand	None	Brown	None	Fine-Very Fine
1014N 951E	10-20cm	Body	Corrugated	Brown/Gray	10YR 5/4	5 Sand	None	Brown	None	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	9 Sand	None	Brown	None	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Brown	None	Medium-Fine
1014N 951E	10-20cm	Body	Smoothed	Red/Gray	10R 5/2	7 Sand	Red?	Brown	Slip?	Fine-Very Fine
1014N 951E	10-20cm	Rim	Smoothed	Red/Gray	10R 5/2	7 Sand	None	Brown	Slip	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Black	Gley2 6/10B	4.5 Sand	None	Brown/Red	None	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Red	Gley1 2.5/N	7 Sand	Red	Brown	Slip	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	7 Sand	None	Brown/Gray	Slip	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5.5 Sand	None	Brown	None	Fine
1014N 951E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	None	Red/Brown	None	Fine-Very Fine
1014N 951E	10-20cm	Body	Corrugated	Black	Gley1 2.5/N	4 Sand	Gray	Gray/Brown	Slip	Fine
1014N 951E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	5 Sand	None	Brown	None	Fine-Very Fine

1014N 951E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	7 Sand	Red	Brown/Gray	Slip	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Red/Gray	None	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Light Gray	10YR 6/1	4.5 Sand	None	Brown/Gray	None	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	Red	Brown	Slip	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	9 Sand	None	Brown	None	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	4.5 Sand	None	Brown/Gray	None	Fine
1014N 951E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	5 Sand	None	Brown	None	Fine-Very Fine
1014N 951E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	5 Sand	None	Brown/Gray	None	Fine
1010N 951E	30-40cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Red/Brown	None	Fine-Very Fine
1010N 951E	30-40cm	Body	Smoothed	Gray/Brown	10YR 5/2	7 Sand	None	Gray/Red	None	Medium-Fine
1010N 951E	30-40cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	6 Sand	Black?	Brown	Slip	Fine-Very Fine
1010N 951E	30-40cm	Body	smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Brown	None	Fine-Very Fine
1010N 951E	30-40cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	6.5 Sand	None	Brown	None	Fine-Very Fine
1010N 951E	30-40cm	Body	Smoothed	Brown/Gray	10YR 5/4	6 Sand	None	Brown	None	Medium-Fine
1015N 951E	0-10cm	Body	Smoothed	Gray/Black	Gley2 5/10B	4.5 Sand	None	Brown/Gray	None	Fine-Very Fine
1015N 951E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	None	Brown	None	Fine
1015N 951E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	8.5 Sand	None	Brown/Gray	None	Fine-Very Fine
1015N 951E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	5 Sand	None	Brown	none	Fine-Very Fine
1015N 951E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	7 Sand	None	Brown/Gray	None	Fine-Very Fine
1015N 951E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	4.5 Sand	None	Gray/Brown	None	Fine-Very Fine
1015N 951E	0-10cm	Body	Smoothed	Red/Brown	10YR 5/2	5 Sand	None	Brown/Red	None	Fine-Very Fine
1015N 951E	0-10cm	Body	Smoothed	Black	Gley1 2.5/N	5 Sand	None	Brown/Red	None	Fine-Very Fine
1020N 951E	20-30cm	Body	Smoothed	Black	Gley1 2.5/N	5 Sand	Black	Brown/Red	None	Fine
1020N 951E	20-30cm	Neck	Smoothed	Gray/Brown	10YR 5/2	3 Sand	None	Brown/Red	None	Fine-Very Fine
1020N 951E	20-30cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	6 Sand	Black	Brown	Slip	Fine-Very Fine
1020N 951E	20-30cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	5.5 Sand	Black?	Brown/Gray	Slip	Fine-Very Fine
1020N 951E	20-30cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	4 Sand	Black?	Brown/Gray	Slip	Fine-Very Fine
1020N 951E	20-30cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	4 Sand	Black?	Gray/Brown	Slip?	Fine-Very Fine
1020N 951E	20-30cm	Body	Smoothed	Brown/Red	7.5YR 4/6	7 Sand	Black	Brown	Slip	Fine-Very Fine
1020N 951E	20-30cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	4 Sand	Black	Gray/Brown	Slip	Fine-Very Fine
1017N 951E	10-20cm	Body	Smoothed	White/Red	2.5YR 7/2	6.5 Sand	White	Red/Brown	Painted	Fine-Very Fine
1017N 951E	10-20cm	Neck	Smoothed	Red/Brown	2.5YR 4/8	4 Sand	None	Brown/Red	None	Fine-Very Fine
1017N 951E	10-20cm	Neck	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Brown/Red	None	Fine-Very Fine
1017N 951E	10-20cm	Rim	Smoothed	Black/Gray	Gley2 4/5PB	6.5 Sand	Black?	Gray	Slip	Fine-Very Fine
1017N 951E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	6.5 Sand	None	Gray/Brown	None	Fine-Very Fine
1017N 951E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	None	Brown/Gray	None	Fine
1017N 951E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	Red?	Brown/Red	Slip	Medium-Fine
1017N 951E	10-20cm	Body	Smoothed	Red/Gray	10R 5/2	8 Sand	None	Red/Brown	None	Fine-Very Fine
1017N 951E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	8 Sand	None	Red/Brown	None	Fine
1017N 951E	10-20cm	Base	Smoothed	Gray/Black	Gley2 5/10B	7 Sand	Black?	Brown	Slip	Fine-Very Fine
1017N 951E	10-20cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	6.5 Sand	Black	Brown/Gray	Slip	Fine-Very Fine
1017N 951E	10-20cm	Body	Smoothed	Black	Gley1 2.5/N	5.5 Sand	Black	Red/Brown	Slip	Medium-Fine
1017N 951E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	5.5 Sand	Red	Brown/Red	Slip	Fine-Very Fine
1017N 951E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	6 Sand	Red	Brown/Red	Slip	Fine-Very Fine
1018N 951E	20-30cm	Body	Corrugated	Gray/Brown	10YR 5/2	5 Sand	None	Brown/Gray	None	Fine-Very Fine
1018N 951E	20-30cm	Body	Smoothed	Gray/Brown	10YR 5/2	7 Sand	None	Red/Brown	None	Fine-Very Fine
1018N 951E	20-30cm	Body	Smoothed	Brown/Gray	10YR 5/4	7 Sand	None	Brown/Gray	None	Fine-Very Fine
1018N 951E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	None	Brown/Red	None	Fine
1018N 951E	20-30cm	Body	Smoothed	Brown/Gray	10YR 5/4	8.5 Sand	None	Brown/Red	None	Fine-Very Fine
1018N 951E	20-30cm	Body	Smoothed	Brown/Gray	10YR 5/4	7.5 Sand	None	Brown/Red	None	Fine-Very Fine
1018N 951E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Red/Brown	None	Fine-Very Fine
1018N 951E	20-30cm	Body	smoothed	Brown/Gray	10YR 5/4	7 Sand	None	Brown	None	Fine-Very Fine
1018N 951E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	None	Red/Brown	None	Fine
1018N 951E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Brown	None	Fine-Very Fine
1020N 951E	10-20cm	Body	Corrugated	Black	Gley1 2.5/N	5 Sand	None	Gray	None	Fine-Very Fine
1020N 951E	10-20cm	Body	Smoothed	Black/Brown	7.5YR 3.2	5.5 Sand	None	Brown	None	Fine

1020N 951E	10-20cm	Body	Corrugated	Brown/Red	7.5YR 4/6	4 Sand	None	Brown/Red	None	Fine-Very Fine
1020N 951E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	4.5 Sand	None	Brown/Red	None	Fine-Very Fine
1020N 951E	10-20cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	7 Sand	None	Brown/Gray	None	Fine-Very Fine
1020N 951E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	5 Sand	None	Brown	None	Fine-Very Fine
1020N 951E	10-20cm	Body	Smoothed	Black	Gley1 2.5/N	5 Sand	None	Brown	None	Fine
1019N 951E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	9 Sand	None	Brown/Gray	None	Very Fine
1019N 951E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	9 Sand	Red	Brown/Red	Slip	Fine-Very Fine
1019N 951E	0-10cm	Body	Smoothed	Light Gray	10YR 6/1	4.5 Sand	Light Gray?	Brown/Gray	Incised	Very Fine
1019N 951E	0-10cm	Body	Smoothed	Gray/Red	10R 4/1	6 Sand	None	Brown/Red	None	Medium-Fine
1019N 951E	0-10cm	Body	Corrugated	Gray	Gley2 6/10B	4 Sand	None	Brown	None	Very Fine
1019N 951E	0-10cm	Rim	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	None	Red/Brown	None	Fine-Very Fine
1019N 951E	0-10cm	Body	Smoothed	Gray/Black	Gley2 5/10B	5 Sand	None	Brown	None	Fine-Very Fine
1019N 951E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	5.5 Sand	None	Brown/Gray	None	Fine
1019N 951E	0-10cm	Body	Smoothed	Gray/Black	Gley2 5/10B	6 Sand	Black?	Brown	Slip	Fine-Very Fine
1019N 951E	0-10cm	Rim	Smoothed	Brown/Red	7.5YR 4/6	6.5 Sand	None	Red/Brown	None	Fine-Very Fine
1019N 951E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	5 Sand	None	Brown	None	Very Fine
1019N 951E	0-10cm	Body	Smoothed	Light Gray	10YR 6/1	5.5 Sand	None	Brown	None	Fine-Very Fine
1019N 951E	0-10cm	Body	Smoothed	Gray/Black	10YR 5/2	6 Sand	None	Brown/Gray	Slip	Fine-Very Fine
1019N 951E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/4	4.5 Sand	None	Gray/Brown	None	Fine
1019N 951E	0-10cm	Body	Smoothed	Gray/Black	Gley2 5/10B	3.5 Sand	None	Brown	None	Fine-Very Fine
1019N 951E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	5 Sand	None	Brown	None	Fine-Very Fine
1016N 951E	10-20cm	Rim	Corrugated	Gray/Black	Gley2 6/10B	6.5 Sand	None	Brown	None	Fine-Very Fine
1016N 951E	10-20cm	Body	Smoothed	Black	Gley1 2.5/N	20 Sand	None	Red/Brown	None	Medium
1016N 951E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	9.5 Sand	Red	Brown/Red	Slip	Fine-Very Fine
1016N 951E	10-20cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	5.5 Sand	None	Red/Brown	None	Medium-Fine
1016N 951E	10-20cm	Body	Smoothed	Gray/Red	10R 4/1	10 Sand	Gray	Red/Brown	Painted	Medium-Fine
1016N 951E	10-20cm	Body	Smoothed	Gray/Black	Gley2 5/10B	4 Sand	None	Brown/Red	None	Fine
1016N 951E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	7 Sand	None	Brown/Gray	None	Fine
1016N 951E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	4.5 Sand	None	Brown/Gray	None	Fine-Very Fine
1017N 951E	0-10cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	7 Sand	None	Brown/Gray	None	Fine
1017N 951E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	5 Sand	None	Brown/Gray	None	Fine-Very Fine
1017N 951E	0-10cm	Body	Smoothed	Black/Brown	7.5YR 3.2	4.5 Sand	None	Brown	None	Fine-Very Fine
1017N 951E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	4.5 Sand	None	Brown/Gray	None	Fine
1017N 951E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	8 Sand	None	Brown/Red	None	Medium-Fine
1017N 951E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	6.5 Sand	None	Gray	None	Fine-Very Fine
1017N 951E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Brown/Red	None	Fine
1017N 951E	0-10cm	Body	Smoothed	Dark Gray/Brown	7.5YR 4/1	5 Sand	None	Brown/Red	None	Fine
1010N 951E	0-10cm	Body	Corrugated	Brown/Gray	10YR 5/4	5 Sand	None	Gray/Brown	None	Fine-Very Fine
1010N 951E	0-10cm	Body	Corrugated	Light Gray	10YR 6/1	4.5 Sand	None	Gray/Brown	None	Fine
1010N 951E	0-10cm	Body	Smoothed	Light Gray	10YR 6/1	4 Sand	None	Brown/Gray	None	Fine
1010N 951E	0-10cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	5 Sand	None	Brown/Gray	None	Fine-Very Fine
1010N 951E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	Red	Brown/Red	Slip	Fine-Very Fine
1010N 951E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7.5 Sand	None	Red/Brown	None	Fine
1010N 951E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5 Sand	None	Red/Brown	None	Fine-Very Fine
1010N 951E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5 Sand	None	Red/Brown	None	Fine
1010N 951E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	4.5 Sand	None	Brown/Red	Slip	Fine-Very Fine
1010N 951E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Brown/Red	None	Fine-Very Fine
1010N 951E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	7 Sand	None	Brown/Red	None	Fine-Very Fine
1010N 951E	0-10cm	Body	Smoothed	Brown/Tan	7.5YR 6/2	8.5 Sand	None	Brown/Red	None	Fine-Very Fine
1019N 951E	10-20cm	Neck	Smoothed	Light gray	10YR 6/1	3.5 Sand	None	Gray/Brown	None	Fine-Very Fine
1019N 951E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	5 Sand	None	Brown	None	Fine
1019N 951E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Red/Brown	None	Fine-Very Fine
1019N 951E	10-20cm	Neck	Smoothed	Gray/Black	Gley2 5/10B	6 Sand	None	Gray/Brown	None	Fine-Very Fine
1019N 951E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	5 Sand	None	Brown	None	Fine-Very Fine
1019N 951E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	6.5 Sand	None	Brown/Gray	None	Fine-Very Fine



1018N 951E	10-20cm	Body	Corrugated	Gray	Gley2 6/10B	5.5 Sand	None	Gray	None	Fine-Very Fine
1018N 951E	10-20cm	Body	Corrugated	Red/Brown	10R 4/8	5 Sand	None	Red/Brown	None	Fine-Very Fine
1018N 951E	10-20cm	Body	Corrugated	Red/Gray	10R 5/2	5 Sand	None	Red/Brown	None	Fine-Very Fine
1018N 951E	10-20cm	Rim	Smoothed	Brown/Gray	10YR 5/4	4.5 Sand	None	Brown	None	Fine-Very Fine
1018N 951E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	None	Brown/Red	None	Fine-Very Fine
1018N 951E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Brown/Red	None	Fine-Very Fine
1018N 951E	10-20cm	Body	Smoothed	Brown/Black	10YR 3/2	5 Sand	None	Brown/Gray	None	Fine-Very Fine
1018N 951E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	8 Sand	None	Brown	None	Medium-Fine
1018N 951E	10-20cm	Body	Smoothed	Brown/Black	10YR 3/2	9.5 Sand	None	Brown/Red	None	Fine-Very Fine
1018N 951E	10-20cm	Body	Smoothed	Gray/Black	Gley2 5/10B	6 Sand	None	Gray/Brown	None	Fine-Very Fine
1018N 951E	10-20cm	Body	Corrugated	Brown/Red	7.5YR 4/6	4.5 Sand	None	Brown/Red	None	Fine-Very Fine
1018N 951E	10-20cm	Body	Smoothed	Brown/Tan	7.5YR 6/2	5 sand	None	Brown/Red	None	Fine
1018N 951E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6.5 Sand	None	Brown/Red	None	Fine-Very Fine
1018N 951E	10-20cm	Body	Smoothed	Black/Brown	7.5YR 3.2	5 Sand	None	Brown	None	Fine-Very Fine
1018N 951E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Red/Brown	None	Fine-Very Fine
1018N 951E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Brown/Red	None	Fine-Very Fine
1018N 951E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	4 Sand	None	Brown/Red	None	Fine
1018N 951E	10-20cm	Body	Corrugated	Brown/Red	7.5YR 4/6	4.5 Sand	None	Brown	None	Fine
1018N 951E	10-20cm	Rim	Smoothed	Black/Gray	Gley2 4/5PB	4 Sand	None	Gray/Brown	none	Fine-Very Fine
1018N 951E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	7.5 Sand	None	Brown	None	Fine-Very Fine
1018N 951E	10-20cm	Body	Smoothed	Brown/Red	10YR 5/4	6 Sand	None	Red/Brown	none	Fine
1018N 951E	10-20cm	Body	Smoothed	Brown/Gray	7.5YR 4/6	4.5 Sand	None	Gray	None	Fine-Very Fine
1018N 951E	10-20cm	Body	Corrugated	Brown/Gray	10YR 5/4	5 Sand	None	Brown/Red	None	Fine-Very Fine
1018N 951E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	5 Sand	None	Brown/Red	None	Fine-Very Fine
1018N 951E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	None	Brown/Red	None	Fine-Very Fine
1020N 951E	0-10cm	Body	Corrugated	Black/Brown	7.5YR 3.2	5 Sand	None	Brown/Gray	None	Fine-Very Fine
1020N 951E	0-10cm	Body	Smoothed	Red/Gray	10R 5/2	9 Sand	Red?	Brown/Red	Slip	Fine
1020N 951E	0-10cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	3.5 Sand	none	Brown/Gray	Incised	Fine-Very Fine
1020N 951E	0-10cm	Body	Corrugated	Gray/Brown	10YR 5/2	4 Sand	None	Red/Brown	None	Fine-Very Fine
1020N 951E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	6.5 Sand	None	Red/Brown	None	Fine-Very Fine
1020N 951E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	5 Sand	None	Brown/Gray	None	Fine-Very Fine
1020N 951E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	4.5 Sand	None	Brown/Gray	None	Fine-Very Fine
1020N 951E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	6.5 Sand	Red	Brown/Gray	Slip	Fine-Very Fine
1020N 951E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	5.5 Sand	None	Brown	None	Fine-Very Fine
1014N 951E	30-40cm	Body	Smoothed	Red/Brown	2.5YR 4/8	8 Sand	None	Brown/Red	None	Fine
1023N 951E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	4.5 Sand	None	Red/Brown	None	Fine-Very Fine
1023N 951E	10-20cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	4 Sand	None	Brown/Gray	None	Fine
1023N 951E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	6.5 Sand	None	Brown/Red	None	Fine-Very Fine
1023N 951E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	4 Sand	None	Brown/Red	None	Fine-Very Fine
1023N 951E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	5 Sand	None	Brown	None	Fine-Very Fine
1023N 951E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	7 Sand	None	Brown/Red	None	Fine-Very Fine
1022N 951E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5 Sand	None	Brown/Red	None	Fine-Very Fine
1022N 951E	10-20cm	Body	Smoothed	Brown/Tan	7.5YR 6/2	5 Sand	None	Brown/Red	None	Fine-Very Fine
1021N 951E	20-30cm	Body	Smoothed	Gray/Brown	10YR 5/2	7 Sand	None	Brown/Gray	None	Fine-Very Fine
1017N 951E	30-40cm	Handle	Smoothed	Brown/Red	7.5YR 4/6	10 Sand	None	Brown	None	Fine-Very Fine
1022N 951E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6.5 Sand	Red	Brown	Slip	Fine-Very Fine
1022N 950E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Brown/Red	None	Fine-Very Fine
1022N 951E	0-10cm	Handle	Smoothed	Brown/gray	10YR 5/4	13 Sand	None	Brown	None	Fine-Very Fine
1022N 951E	0-10cm	Rim	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	None	Brown	None	Fine-Very Fine
1022N 951E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	6 Sand	Red	Brown/Red	Slip	Fine-Very Fine
1022N 951E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	Red	Brown/Red	Slip	Medium-Fine
1022N 951E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	8 Sand	None	Brown/Red	None	Fine-Very Fine
1022N 951E	0-10cm	Body	Smoothed	Red/Gray	10R 5/2	5 Sand	None	Red/Gray	None	Fine-Very Fine
1022N 951E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	None	Red/Brown	None	Fine-Very Fine
1002N 950E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	8 Sand	None	Brown/Gray	None	Fine
1002N 950E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	8 Sand	None	Brown/Gray	None	Fine-Very Fine
1021N 951E	0-10cm	Body	Smoothed	Red/Gray	10R 5/2	5 Sand	None	Brown/Red	None	Fine

1015N 951E	50-60cm	Rim	Smoothed	Gray/Brown	10YR 5/2	7 Sand	None	Brown	None	Fine-Very Fine
1015N 951E	40-50cm	Body	Smoothed	Gray/Red	10R 4/1	8.5 Sand	None	Red/Brown	None	Medium-Fine
1015N 951E	40-50cm	Body	Smoothed	Red	2.5YR 4/6	6 Sand	Red	Brown/Gray	Slip	Fine-Very Fine
1023N 952E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6.5 Sand	None	Red/Brown	None	Fine
1023N 952E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	5 Sand	None	Gray/Brown	None	Fine-Very Fine
1023N 952E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Brown/Red	None	Fine-Very Fine
1023N 952E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	7 Sand	None	Brown/Red	None	Fine-Very Fine
1023N 952E	0-10cm	Body	Smoothed	Red/Gray	10R 5/2	10 Sand	None	Brown	None	Fine
1023N 952E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	6.5 Sand	None	Brown/Red	None	Fine-Very Fine
1023N 952E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	none	Brown/Red	none	Fine
1023N 952N	20-30cm	Rim	Smoothed	White/Red	2.5YR 7/2	7 Sand	White	Red/Brown	Painted	Medium
1023N 952N	20-30cm	Body	Smoothed	Black	Gley1 2.5/N	7 Sand	Black	Brown/Gray	Slip	Fine-Very Fine
1023N 952N	20-30cm	Handle	Smoothed	Brown/Red	7.5YR 4/6	9 Sand	None	Red/Brown	None	Fine-Very Fine
1023N 952N	20-30cm	Body	Smoothed	Black	Gley1 2.5/N	4 Sand	Black	Red/Brown	Slip	Fine-Very Fine
1023N 952N	20-30cm	Body	Smoothed	Black	Gley1 2.5/N	6.5 Sand	Black	Brown/Gray	Slip	Fine-Very Fine
1023N 952N	20-30cm	Body	Smoothed	Gray/Black	Gley2 5/10B	5 Sand	None	Brown/Gray	None	Fine-Very Fine
1023N 952N	20-30cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Light Gray	Slip	Medium-Fine
1023N 952N	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Brown/Red	None	Fine-Very Fine
1023N 952N	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	None	Brown/Red	None	Fine-Very Fine
1023N 952N	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	Noen	Brown/Gray	Noen	Fine-Very Fine
1023N 952E	10-20cm	Body	Smoothed	Black	Gley1 2.5/N	7.5 Sand	Black	Brown/Gray	Slip	Fine-Very Fine
1023N 952E	10-20cm	Body	Smoothed	Gray/Black	Gley1 2.5/N	4 Sand	Black	Gray/Brown	Slip	Fine-Very Fine
1023N 952E	10-20cm	Body	Corrugated	Gray/Black	Gley2 5/10B	4 Sand	None	Brown/Gray	None	Fine-Very Fine
1023N 952E	10-20cm	Body	Smoothed	Gray/Black	Gley2 5/10B	6.5 Sand	Noen	Brown/Red	None	Fine-Very Fine
1023N 952E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	None	Red/Brown	None	Fine-Very Fine
1023N 952E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	4.5 Sand	None	Brown/Gray	None	Fine-Very Fine
1023N 952E	10-20cm	Body	Smoothed	Black	Gley1 2.5/N	3 Sand	Black	Gray	None	Fine-Very Fine
1023N 952E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	7 Sand	None	Brown/Red	None	Fine-Very Fine
1023N 952E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7.5 Sand	None	Brown/Red	None	Fine
1023N 952E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Red/Brown	None	Fine-Very Fine
1023N 952E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	6.5 Sand	None	Red/Brown	None	Fine-Very Fine
1024N 951E	40-50cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	6 Sand	None	Gray/Brown	None	Fine
1022N 952E	0-10cm	Handle	Smoothed	Brown/Gray	10YR 5/4	10 Sand	None	Brown/Gray	None	Fine-Very Fine
1022N 952E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	9.5 Sand	None	Brown/Gray	None	Medium-Fine
1022N 952E	0-10cm	Body	Smoothed	Black	Gley1 2.5/N	4 Sand	Black	Red/Brown	None	Fine-Very Fine
1022N 952E	0-10cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	6 Sand	None	Red/Brown	None	Medium-Fine
985N 993E	30-40cm	Body	Smoothed	Brown/Gray	10YR 5/4	5.5 Sand	None	Red/Brown	None	Fine-Very Fine
1024N 951E	30-40cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	None	Brown	None	Very Fine
1024N 951E	30-40cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Brown/Red	Slip	Very Fine
1024N 952E	0-10cm	Body	Smoothed	Gray/Red	10R 4/1	5 Sand	None	Gray/Brown	Slip	Fine-Very Fine
1024N 952E	40-50cm	Handle	Smoothed	Red/Brown	2.5YR 4/8	9 Sand	None	Red/Brown	None	Fine-Very Fine
1022N 952E	10-20cm	Handle	Smoothed	Gray/Brown	10YR 5/2	11.5 Sand	None	Brown/Red	None	Fine-Very Fine
1022N 952E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	7 Sand	None	Brown/Red	None	Fine-Very Fine
1022N 952E	10-20cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	5.5 Sand	Black	Red/Brown	Slip	Medium-Fine
1022N 952E	10-20cm	Body	Corrugated	Black/Gray	Gley2 4/5PB	4.5 Sand	None	Gray/Brown	None	Fine-Very Fine
1022N 952E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	9.5 Sand	None	Brown	Noen	Fine-Very Fine
1022N 952E	10-20cm	Body	Smoothed	Black/Brown	7.5YR 3.2	6 Sand	None	Brown	None	Fine-Very Fine
1022N 952E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	5.5 Sand	None	Gray/Brown	None	Fine-Very Fine
1022N 952E	10-20cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	6.5 Sand	Noen	Brown/Gray	None	Fine-Very Fine
1022N 952E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	Noen	Brown/Red	None	Fine-Very Fine
1022N 952E	10-20cm	Body	Smoothed	Black	Gley1 2.5/N	6 Sand	Black	Brown/Red	Slip	Fine-Very Fine
1016N 951E	40-50cm	Body	Corrugated	Brown/Red	7.5YR 4/6	4.5 Sand	None	Brown	Noen	Fine-Very Fine
1024N 952E	30-40cm	Body	Smoothed	Red/Gray	10R 5/2	5 Sand	Noen	Red/Brown	None	Medium-Fine
1024N 952E	30-40cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Red/Brown	None	Fine-Very Fine
1024N 952E	30-40cm	Body	Smoothed	Red/Gray	10R 5/2	6 Sand	None	Red/Brown	None	Fine-Very Fine

1024N 952E	30-40cm	Body	smoothed	Gray/Black	Gley2 5/10B	5 Sand	None	Gray	None	Fine-Very Fine
1024N 952E	30-40cm	Body	Smoothed	Gray/Red	10R 4/1	5 Sand	None	Brown/Red	None	Fine-Very Fine
1016N 951E	20-30cm	Body	Smoothed	Red/Gray	10R 5/2	6.5 Sand	None	Brown/Red	None	Fine-Very Fine
1024N 951E	40-50cm	Body	Smoothed	Brown/Gray	10YR 5/4	7 Sand	None	Brown	None	Medium-Fine
1016N 951E	30-40cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6.5 Sand	None	Brown/Red	None	Medium-Fine
1016N 951E	30-40cm	Body	Smoothed	Gray	Gley2 6/10B	4.5 Sand	Gray	Brown	Slip	Fine-Very Fine
1024N 951E	40-50cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Brown/Red	Slip	Fine-Very Fine
1024N 952E	20-30cm	Rim	Smoothed	Black	Gley1 2.5/N	3.5 Sand	Black	Gray	Slip	Fine-Very Fine
1024N 952E	20-30cm	Body	Smoothed	Gray/Brown	10YR 5/2	4.5 Sand	Black	Red/Brown	Slip	Fine-Very Fine
1024N 952E	20-30cm	Body	Smoothed	Gray/Brown	10YR 5/2	5 Sand	None	Brown/Red	None	Fine-Very Fine
1024N 952E	20-30cm	Body	Smoothed	Gray/Brown	10YR 5/2	7 Sand	Gray	Red/Brown	Slip	Medium-Fine
1024N 952E	20-30cm	Body	Smoothed	Gray/Brown	10YR 5/2	7 Sand	Gray	Red/Brown	Slip	Medium-Fine
1024N 952E	20-30cm	Body	Smoothed	Black	Gley1 2.5/N	3 Sand	Black	Brown	Slip	Medium-Fine
1024N 952E	20-30cm	Body	Smoothed	Gray/Black	Gley2 5/10B	6 Sand	None	Brown/Red	None	Fine-Very Fine
1024N 952E	20-30cm	Body	Smoothed	Brown/Gray	10YR 5/4	4 Sand	None	Brown	None	Fine-Very Fine
1024N 952E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	4 Sand	None	Brown/Red	None	Fine-Very Fine
1024N 952E	20-30cm	Body	Smoothed	Brown/Gray	10YR 5/4	5 Sand	None	Brown/Red	None	Fine-Very Fine
1024N 951E	10-20cm	Body	Smoothed	Gray	10YR 5/4	4.5 Sand	Gray	Brown/Gray	Slip	Fine-Very Fine
1024N 951E	10-20cm	Body	Smoothed	Brown/Gray	Gley2 6/10B	7 Sand	None	Brown	None	Fine
1024N 951E	10-20cm	Body	Smoothed	Red/Brown	10YR 5/4	7 Sand	None	Brown/Red	None	Fine
1024N 951E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Brown/Red	None	Fine-Very Fine
1024N 951E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Red/Brown	None	Fine-Very Fine
1024N 951E	10-20cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	5.5 Sand	None	Red/Brown	None	Fine
1024N 951E	10-20cm	Body	Smoothed	Light Gray	10YR 6/1	6 Sand	Gray	Brown/Red	Slip	Fine-Very Fine
1024N 951E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Brown	None	Medium-Fine
1024N 951E	10-20cm	Body	Smoothed	Gray/Black	Gley2 5/10B	4.5 Sand	Gray	Brown	Slip	Fine-Very Fine
1019N 951E	40-50cm	Body	Smoothed	Gray/Black	Gley2 5/10B	10.5 Sand	None	Brown	None	Fine
1019N 951E	40-50cm	Body	Smoothed	Red	2.5YR 4/6	6 Sand	Red	Brown/Red	Slip	Medium-Fine
1019N 951E	40-50cm	Body	Smoothed	Gray	Gley2 6/10B	6 Sand	None	Gray/Brown	None	Fine-Very Fine
1019N 951E	40-50cm	Body	Smoothed	Red/Brown	2.5YR 4/8	8 Sand	Red	Brown/Red	Slip	Medium-Fine
1019N 951E	40-50cm	Body	Smoothed	Red/Brown	2.5YR 4/8	8 Sand	Red	Brown/Red	Slip	Medium-Fine
866N 931E	10-20cm	Rim	Smoothed	Brown/Gray	10YR 5/4	6 Sand	None	Brown	None	Fine-Very Fine
866N 931E	10-20cm	Handle	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Brown/Red	None	Fine-Very Fine
866N 931E	10-20cm	Handle	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Brown/Red	None	Fine-Very Fine
866N 931E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	8 Sand	None	Brown/Red	None	Fine-Very Fine
866N 931E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	7 Sand	None	Brown/Gray	None	Fine-Very Fine
866N 931E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	7 Sand	None	Brown	None	Medium-Fine
866N 931E	10-20cm	Body	Smoothed	Brown/Tan	7.5YR 6/2	6.5 Sand	None	Brown/Gray	None	Medium-Fine
866N 931E	10-20cm	Body	Smoothed	Red/Gray	10R 5/2	8 Sand	Red?	Gray/Red	Slip	Fine
866N 931E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	8.5 Sand	None	Red/Brown	None	Medium-Fine
866N 931E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	7 Sand	None	Brown/Gray	None	Fine
866N 931E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	6 Sand	None	Brown/Gray	None	Fine-Very Fine
866N 931E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	6 Sand	Gray	Brown/Gray	None	Fine-Very Fine
866N 931E	10-20cm	Body	Smoothed	Gray/Black	Gley2 5/10B	7.5 Sand	None	Gray/Brown	None	Fine-Very Fine
866N 931E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Gray/Red	Slip	Fine
866N 931E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5 Sand	None	Gray	None	Fine-Very Fine
866N 931E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Brown/Gray	None	Fine-Very Fine



986N 931E	10-20cm	Body	Smoothed	Gray/Red	10R 4/1		4.5 Sand	None	Brown/Red	None	Medium-Fine
986N 931E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2		6 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 931E	10-20cm	Body	Smoothed	Gray/Black	Gley2 5/10B		5 Sand	None	Gray	None	Fine
986N 931E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8		5.5 Sand	Red/Brown	Brown	Slip	Fine-Very Fine
986N 931E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8		5.5 Sand	Red/Brown	Brown	Slip	Fine-Very Fine
986N 931E	10-20cm	Body	Smoothed	Red/Gray	10R 5/2		5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 931E	10-20cm	Neck	Smoothed	Red/Tan	2.5YR 5/4		4.5 Sand	Red	Brown/Gray	Slip	Fine-Very Fine
986N 931E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6		5 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 931E	10-20cm	Body	Smoothed	Gray/Black	Gley2 5/10B		5 Sand	None	Gray	None	Fine
986N 931E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4		6 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 931E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4		6 Sand	None	Brown/Gray	None	Fine
986N 931E	10-20cm	Body	Smoothed	Gray/Tan	10YR 6/2		4.5 Sand	None	Brown	None	Fine-Very Fine
986N 931E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4		6 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 931E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8		7.5 Sand	None	Brown/Red	None	Fine
986N 931E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8		6 Sand	Red	Gray/Brown	Slip	Fine
986N 931E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B		5 Sand	Red	Gray/Brown	Slip	Fine-Very Fine
986N 931E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4		8 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 931E	10-20cm	Body	Smoothed	Red	2.5YR 4/6		4.5 Sand	Red	Brown/Red	None	Fine-Very Fine
986N 931E	10-20cm	Body	Smoothed	Brown/Tan	7.5YR 6/2		4.5 Sand	Red	Gray/Brown	Slip	Fine-Very Fine
986N 931E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B		5.5 Sand	None	Brown/Gray	Slip	Fine-Very Fine
986N 931E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4		4.5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 931E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2		6 Sand	Gray	Gray/Brown	Slip	Fine-Very Fine
986N 931E	10-20cm	Body	Smoothed	Red	2.5YR 4/6		4 Sand	Red	Brown/Red	Slip	Fine
986N 931E	10-20cm	Body	Smoothed	Gray/Red	10YR 5/2		6.5 Sand	none	Gray/Brown	None	Fine-Very Fine
986N 931E	10-20cm	Body	Smoothed	Gray/Red	10R 4/1		5 Sand	None	Brown/Gray	None	Medium-Fine
986N 931E	10-20cm	Body	Smoothed	Gray/Black	Gley2 5/10B		5.5 Sand	None	Gray/Brown	None	Fine
986N 931E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2		7 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 931E	10-20cm	Rim	Smoothed	Gray/Red	10R 4/1		6 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 930E	20-30cm	Rim	Smoothed	Gray/Brown	10YR 5/2		7.5 Sand	None	Red/Brown	None	Fine-Very Fine
986N 930E	20-30cm	Handle	Smoothed	Brown/Gray	10YR 5/4		16.5 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 930E	20-30cm	Handle	Smoothed	Red/Gray	10R 5/2		9 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 930E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8		5 Sand	Red	Brown/Gray	Slip	Fine-Very Fine
986N 930E	20-30cm	Body	Smoothed	Brown/Gray	10YR 5/4		6 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 930E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8		5.5 Sand	Red/Brown	Brown/Gray	Slip	Fine-Very Fine
986N 930E	20-30cm	Rim	Smoothed	Brown/Gray	10YR 5/4		8 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 930E	20-30cm	Rim	Smoothed	Brown/Gray	10YR 5/4		6 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 930E	20-30cm	Body	Smoothed	Brown/Gray	10YR 5/4		6 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 930E	20-30cm	Body	Smoothed	Black/Brown	7.5YR 3.2		6.5 Sand	Black	Brown/Gray	Slip	Fine-Very Fine
986N 930E	20-30cm	Body	Smoothed	Gray/Red	10R 4/1		8 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 930E	20-30cm	Body	Smoothed	Black	Gley1 2.5/N		9 Sand	Red	Brown/Gray	Slip	Fine-Very Fine
986N 930E	20-30cm	Body	Smoothed	Red	2.5YR 4/6		6.5 Sand	Red	Brown	Slip	Fine
986N 930E	20-30cm	Body	Smoothed	Gray/Red	10R 4/1		7 Sand	None	red/Brown	None	Fine
986N 930E	20-30cm	Body	Smoothed	Black/Gray	Gley2 4/5PB		5 Sand	None	Gray	None	Fine-Very Fine
986N 930E	20-30cm	Body	Smoothed	Red	2.5YR 4/6		5 Sand	Red	Brown	Slip	Fine-Very Fine
986N 930E	20-30cm	Body	Smoothed	Brown/Gray	10YR 5/4		9 Sand	Red/Brown	Brown/Gray	Slip	Fine
986N 930E	20-30cm	Body	Smoothed	Gray/Red	10R 4/1		6 Sand	None	Brown	None	Fine-Very Fine
986N 930E	20-30cm	Body	Smoothed	Brown/Red	7.5YR 4/6		5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 930E	20-30cm	Rim	Smoothed	Gray/Red	10R 4/1		10 Sand	None	Brown	None	Medium-Fine
986N 930E	20-30cm	Body	Smoothed	Red/Gray	10R 5/2		6.5 Sand	None	Gray/Brown	None	Fine
986N 930E	20-30cm	Body	Smoothed	Brown/Gray	10YR 5/4		9 Sand	None	Brown	None	Fine-Very Fine
986N 930E	20-30cm	Body	Smoothed	Gray/Red	10R 4/1		6 Sand	none	Brown/Red	None	Fine
986N 930E	20-30cm	Body	Smoothed	Gray/Black	Gley2 5/10B		6.5 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 930E	20-30cm	Body	Smoothed	Red/Gray	10R 5/2		5 Sand	None	Red/Brown	None	Fine-Very Fine
986N 930E	20-30cm	Body	Smoothed	Gray/Brown	10YR 5/2		8.5 Sand	None	Brown	None	Fine-Very Fine
986N 930E	20-30cm	Body	Smoothed	Gray/Brown	10YR 5/2		6 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 930E	20-30cm	Body	Smoothed	Red/Gray	10R 5/2		6 Sand	Red	Brown/Gray	Slip	Fine
986N 930E	20-30cm	Body	Smoothed	Red/Gray	10R 5/2		6 Sand	Red	Brown/Gray	Slip	Fine-Very Fine

986N 930E	20-30cm	Body	Smoothed	Red	2.5YR 4/6	5.5 Sand	Red	None	Gray/Brown	Slip	Fine-Very Fine
986N 930E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	4 Sand	None	None	Brown/Gray	None	Fine-Very Fine
986N 930E	20-30cm	Body	Smoothed	Red/Gray	I0R 5/2	5 Sand	None	None	Brown/Gray	None	Fine-Very Fine
986N 930E	20-30cm	Body	Smoothed	Gray/Black	Gley2 5/10B	8 Sand	None	None	Gray/Brown	None	Medium-Fine
986N 930E	20-30cm	Body	Smoothed	Brown/Gray	I0YR 5/4	7 Sand	None	None	Brown/Gray	None	Fine-Very Fine
986N 930E	20-30cm	Rim	Smoothed	Gray/Brown	I0YR 5/2	7.5 Sand	None	None	Gray	None	Fine
986N 930E	20-30cm	Neck	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	None	None	Brown	None	Fine-Very Fine
986N 930E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	None	None	Brown/Gray	None	Fine
986N 930E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	None	Red/Brown	None	Fine-Very Fine
986N 930E	20-30cm	Body	Smoothed	Gray/Brown	I0YR 5/2	6 Sand	None	None	Gray/Brown	Slip	Fine-Very Fine
986N 930E	20-30cm	Body	Smoothed	Red/Gray	I0R 5/2	4.5 Sand	None	None	Gray	None	Fine
986N 930E	20-30cm	Body	Smoothed	Gray/Brown	I0YR 5/2	5 Sand	None	None	Gray/Brown	None	Fine-Very Fine
986N 930E	20-30cm	Body	Smoothed	Gray/Brown	I0YR 5/2	5 Sand	None	None	Brown/Gray	None	Fine
986N 930E	10-20cm	Handle	Smoothed	Gray	Gley2 6/10B	10.5 Sand	None	None	Red/Brown	None	Fine
986N 930E	10-20cm	Handle	Smoothed	Red/Gray	I0R 5/2	20.5 Sand	None	None	Red/Gray	None	Fine
986N 930E	10-20cm	Rim	Smoothed	Brown/Gray	I0YR 5/4	3.5 Sand	Brown?	None	Gray/Brown	Slip	Very Fine
986N 930E	10-20cm	Rim	Smoothed	Red/Brown	2.5YR 4/8	7.5 Sand	Brown	None	Brown/Gray	Slip	Fine-Very Fine
986N 930E	10-20cm	Rim	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	None	None	Red/Brown	None	Fine-Very Fine
986N 930E	10-20cm	Rim	Smoothed	Gray	Gley2 6/10B	4.5 Sand	None	None	Gray	None	Fine-Very Fine
986N 930E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	5.5 Sand	None	Incised	Gray/Brown	None	Fine-Very Fine
986N 930E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	None	Brown/Gray	None	Fine-Very Fine
986N 930E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	None	None	Brown/Red	None	Fine
986N 930E	10-20cm	Body	Smoothed	Brown/Gray	I0YR 5/4	11.5 Sand	None	None	Brown/Gray	None	Fine
986N 930E	10-20cm	Body	Smoothed	Red/Gray	I0R 5/2	6 Sand	None	None	Gray/Brown	None	Fine-Very Fine
986N 930E	10-20cm	Body	Smoothed	Gray/Red	I0R 4/1	7 Sand	None	None	Red/Brown	None	Fine
986N 930E	10-20cm	Body	Smoothed	Red/Tan	2.5YR 5/4	7 Sand	None	None	Brown	None	Fine-Very Fine
986N 930E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red	None	Brown/Red	Slip	Fine
986N 930E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	7.5 Sand	Red	None	Brown/Gray	Slip	Fine
986N 930E	10-20cm	Body	Smoothed	Brown/Gray	I0YR 5/4	6 Sand	None	None	Brown	None	Fine-Very Fine
986N 930E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	None	None	Brown	None	Fine-Very Fine
986N 930E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	4.5 Sand	None	None	Brown/Gray	None	Fine-Very Fine
986N 930E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	6 Sand	Red	None	Brown/Red	None	Fine
986N 930E	10-20cm	Body	Smoothed	Brown/Gray	I0YR 5/4	5 Sand	None	None	Brown	None	Fine-Very Fine
986N 930E	10-20cm	Body	Smoothed	Gray/Brown	I0YR 5/2	5 Sand	None	None	Brown	None	Fine-Very Fine
986N 930E	10-20cm	Body	Smoothed	Brown/Gray	I0YR 5/4	6 Sand	None	None	Brown	None	Fine-Very Fine
986N 930E	10-20cm	Body	Smoothed	Red/Brown	I0YR 5/4	6 Sand	None	None	Brown/Gray	None	Fine
986N 930E	10-20cm	Body	Smoothed	Brown/Red	2.5YR 4/8	6 Sand	None	None	Brown	None	Fine-Very Fine
986N 930E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/6	5 Sand/Grog?	None	None	Brown/Red	None	Medium-Fine
986N 930E	10-20cm	Body	Smoothed	Brown/Black	I0YR 3/2	6.5 Sand	Red/Brown	None	Brown/Gray	Slip	Fine
986N 930E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	7.5 Sand	None	None	Brown/Gray	None	Fine-Very Fine
986N 930E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5.5 Sand	None	None	Brown/Gray	None	Fine-Very Fine
986N 930E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	8.5 Sand	None	None	Brown/Gray	None	Fine
986N 930E	10-20cm	Body	Smoothed	Gray	2.5YR 4/6	7 Sand	Red	None	Brown/Gray	Slip	Fine
986N 930E	10-20cm	Body	Smoothed	Gray/Brown	Gley2 6/10B	6 Sand	None	None	Gray	None	Medium-Fine
986N 930E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7.5 Sand	None	None	Brown/Gray	None	Fine-Very Fine
986N 930E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	None	None	Brown/Gray	None	Fine-Very Fine
986N 930E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	4.5 Sand	Red/Brown	None	Brown/Red	None	Fine-Very Fine
986N 930E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	Red	None	Brown/Gray	Slip	Fine
986N 930E	10-20cm	Body	Smoothed	Gray/Brown	I0YR 5/2	6 Sand	None	None	Red/Brown	None	Fine
986N 930E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	None	None	Red/Brown	None	Fine-Very Fine
986N 930E	10-20cm	Body	Smoothed	Gray/Brown	I0YR 5/4	6 Sand	None	None	Gray/Brown	None	Fine
986N 930E	10-20cm	Body	Smoothed	Brown/Gray	I0YR 5/4	5.5 Sand	Gray	None	Brown/Gray	Slip	Fine
986N 930E	10-20cm	Body	Smoothed	Gray/Brown	I0YR 5/2	6.5 Sand	Red?	None	Brown/Gray	Slip?	Fine-Very Fine
986N 932E	0-10cm	Rim	Smoothed	Brown/Red	7.5YR 4/6	5.5 Sand	None	None	Red/Brown	None	Fine-Very Fine
986N 932E	0-10cm	Rim	Smoothed	Brown/Red	I0YR 5/4	5 Sand	None	None	Brown/Red	None	Fine-Very Fine
986N 932E	0-10cm	Rim	Smoothed	Red/Brown	2.5YR 4/6	6 Sand	None	None	Brown/Red	None	Fine-Very Fine
986N 932E	0-10cm	Rim	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	None	Brown/Gray	None	Fine-Very Fine

986N 932E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	7 Sand	Red	Brown/Red	None	Fine
986N 932E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	None	Brown/Red	None	Medium-Fine
986N 932E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	9 Sand	None	Brown/Red	None	Medium-Fine
986N 932E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	5.5 Sand	Red	Brown/Red	Slip	Medium-Fine
986N 932E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6.5 Sand	None	Red/Brown	None	Fine-Very Fine
986N 932E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	4 Sand	None	Red/Brown	None	Fine-Very Fine
986N 932E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Red/Brown	None	Fine-Very Fine
986N 932E	0-10cm	Body	Smoothed	Light Gray	10YR 6/1	4.5 Sand	Light Gray	Brown/Gray	Slip	Fine-Very Fine
986N 932E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	5 Sand	None	Gray	None	Fine-Very Fine
986N 932E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Brown/Gray	None	Fine
986N 932E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	9 Sand	None	Red/Brown	None	Medium-Fine
986N 932E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	5.5 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 932E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	None	Gray/Brown	None	Fine
986N 932E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	7.5 Sand	None	Brown/Gray	None	Medium-Fine
986N 932E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	6 Sand	None	Brown	None	Fine-Very Fine
986N 932E	0-10cm	Rim	Smoothed	Brown/Gray	10YR 5/4	4 Sand	None	Brown	None	Very Fine
986N 932E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Red/Brown	None	Fine-Very Fine
986N 932E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Red/Brown	None	Fine
986N 932E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Red/Brown	None	Fine
986N 932E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	None	Brown/Red	None	Fine-Very Fine
986N 932E	0-10cm	Body	Smoothed	Light Gray	10YR 6/1	6 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 932E	0-10cm	Body	Smoothed	Red/Gray	10YR 5/2	6.5 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 932E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	3 Sand	None	Brown/Red	None	Fine
986N 932E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Brown/Red	None	Fine
986N 932E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	6.5 Sand	None	Brown/Gray	None	Very Fine
986N 932E	0-10cm	Body	Smoothed	Gray/Black	Gley2 5/10B	6.5 Sand	None	Gray	None	Fine-Very Fine
986N 932E	0-10cm	Body	Smoothed	Red/Gray	10R 5/2	6 Sand	None	Brown/Red	None	Fine
986N 932E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	5.5 Sand	Gray?	Brown	Slip	Fine
986N 932E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 932E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	4.5 Sand	Red	Brown/Gray	Slip	Fine-Very Fine
986N 932E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	6.5 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 932E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	7 Sand	Red	Red/Brown	None	Medium-Fine
986N 932E	0-10cm	Body	Smoothed	Tan/Brown	7.5YR 6/4	5 Sand	None	Brown	None	Fine-Very Fine
986N 932E	0-10cm	Base	Smoothed	Tan/Brown	7.5YR 6/4	7.5 Sand	Red/Brown	Brown/Gray	Slip	Fine
986N 932E	0-10cm	Body	Smoothed	Red/Gray	10R 5/2	5 Sand	None	Brown/Red	None	Medium-Fine
986N 932E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	6.5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 932E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	7 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 932E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	none	Red/Brown	None	Medium-Fine
986N 932E	0-10cm	Rim	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 932E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	7 Sand	Red	Red/Brown	None	Fine-Very Fine
986N 932E	0-10cm	Body	Smoothed	Tan/Brown	7.5YR 6/4	5 Sand	None	Brown	None	Fine-Very Fine
986N 932E	0-10cm	Body	Smoothed	Tan/Brown	7.5YR 6/4	7.5 Sand	Red/Brown	Brown/Gray	Slip	Fine
986N 932E	0-10cm	Body	Smoothed	Red/Gray	10R 5/2	5 Sand	None	Brown/Red	None	Medium-Fine
986N 932E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	6.5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 932E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	7 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 932E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	none	Red/Brown	None	Medium-Fine
986N 932E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 932E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 932E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 932E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	Red	Brown/Gray	Slip	Fine
986N 930E	0-10cm	Body	Smoothed	Light Gray	10YR 6/1	4.5 Sand	Light Gray	Gray/Brown	Slip	Fine-Very Fine
986N 930E	0-10cm	Body	Smoothed	Red/Gray	10R 5/2	4.5 Sand	Red	Gray/Brown	Slip	Fine-Very Fine
986N 930E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	6.5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 930E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	none	Red/Brown	None	Fine
986N 930E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	Red	Gray/Brown	Slip	Fine-Very Fine
986N 930E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	Red	Brown/Gray	Slip	Fine-Very Fine
986N 930E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	Red	Gray/Brown	Slip	Fine-Very Fine
986N 930E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	8 Sand	None	Gray	None	Medium-Fine
986N 930E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/4	6.5 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 930E	0-10cm	Body	Smoothed	Gray/Black	Gley2 5/10B	7 Sand	None	Gray	None	Fine-Very Fine
986N 930E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	6.5 Sand	None	Brown/Red	None	Fine-Very Fine
986N 930E	0-10cm	Body	Smoothed	Gray/Red	10R 4/1	7 Sand	None	Brown/Gray	None	Fine
986N 930E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	5.5 Sand	Light Gray?	Brown/Gray	Slip?	Fine-Very Fine
986N 930E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 930E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	4 Sand	Red	Red/Brown	Slip	Fine-Very Fine
986N 930E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	4.5 Sand	None	Brown/Gray	None	Fine-Very Fine



986N 930E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	7 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 930E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	None	Red/Brown	None	Fine-Very Fine
986N 930E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6.5 Sand	None	Brown/Red	None	Fine-Very Fine
986N 930E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	Red	Brown/Red	None	Fine-Very Fine
986N 930E	0-10cm	Body	Smoothed	Gray/Black	Gley2.5/10B	5.5 Sand	None	Gray	None	Medium-Fine
986N 930E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Brown/Gray	None	Fine-Very Fine
986N 930E	0-10cm	Body	Smoothed	Brown/Tan	7.5YR 6/2	5 Sand	None	Brown/Gray	Slip	Fine-Very Fine
986N 930E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Red/Brown	None	Medium-Fine
986N 930E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Red/Brown	None	Medium-Fine
986N 930E	0-10cm	Body	Smoothed	Gray/Red	10R 4/1	7.5 Sand	None	Red/Brown	None	Fine
986N 931E	20-30cm	Rim	Smoothed	Gray/Black	Gley2.5/10B	5 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 931E	20-30cm	Body	Smoothed	Gray/Brown	10YR 5/2	5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 931E	20-30cm	Rim	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Red/Brown	None	Fine-Very Fine
986N 931E	20-30cm	Body	Smoothed	Gray/Red	10R 4/1	8 Sand	None	Brown/Gray	None	Fine
986N 932E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Brown/Red	None	Fine
986N 932E	10-20cm	Rim	Smoothed	Brown/Red	7.5YR 4/6	5 Sand	Brown/Red	Brown/Gray	Slip	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5 Sand	None	Red/Brown	None	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	7.5 Sand	Brown?	Gray/Brown	Slip	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5 Sand	None	Brown/Gray	None	Fine
986N 932E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	Red/Brown	Brown	None	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	7 Sand	None	Red/Brown	None	Fine
986N 932E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Red/Brown	Slip	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Red/Brown	Slip	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Gray	Gley2.6/10B	6 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	4.5 Sand	Red/Brown	Gray	Slip	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Tan/Brown	7.5YR 6/4	6 Sand	Tan?	Brown	Slip?	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	9.5 Sand	None	Red/Brown	None	Fine
986N 932E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red/Brown	Brown/Gray	Slip	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	6 Sand	Brown	Brown/Gray	None	Medium-Fine
986N 932E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	3.5 Sand	None	Brown	None	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Brown/Tan	7.5YR 6/2	5 Sand	None	Brown/Gray	None	Medium-Fine
986N 932E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	4 Sand	None	Brown	None	Fine
986N 932E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	5.5 Sand	Red	Brown/Gray	Slip	Fine-Very Fine
986N 932E	10-20cm	Rim	Smoothed	Red	2.5YR 4/6	3.5 Sand	Red	Red/Brown	Slip	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	6 Sand	None	Brown/Red	None	Fine-Very Fine
986N 932E	10-20cm	Body	Corrugated	Gray	Gley2.6/10B	4.5 Sand	None	Gray/Brown	None	Very Fine
986N 932E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	8.5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	8.5 Sand	None	Red/Brown	None	Fine
986N 932E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	8 Sand	None	Red/Brown	None	Medium-Fine
986N 932E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	6 Sand	None	Red/Gray	None	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Black/Brown	7.5YR 3.2	4.5 Sand	None	Red/Brown	None	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	7 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Gray/Red	10R 4/1	6.5 Sand	None	Red/Gray	None	Fine
986N 932E	10-20cm	Rim	Smoothed	Gray	Gley2.6/10B	6 Sand	None	Gray/Brown	None	Fine
986N 932E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Brown/Red	Slip	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6.5 Sand	None	Brown/Red	None	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Gray	Gley2.6/10B	4 Sand	None	Gray	None	Very Fine
986N 932E	10-20cm	Rim	Smoothed	Red/Gray	10R 5/2	5 Sand	None	Red/Brown	None	Fine
986N 932E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	6.5 Sand	None	Brown/Red	None	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Red/Brown	None	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	4 Sand	Red	Red/Brown	None	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	4.5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Red/Brown	None	Fine-Very Fine

986N 932E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	6.5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	5.5 Sand	Red	Red/Brown	Slip	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Gray/Black	Gley2 5/10B	6 Sand	None	Gray/Brown	None	Fine
986N 932E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	7 Sand	None	Red/Brown	None	Fine
986N 932E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Red/Brown	None	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	4 Sand	Red	Brown/Red	None	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Gray/Red	10R 4/1	5 Sand	None	Red/Brown	None	Fine
986N 932E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5.5 Sand	None	Brown/Red	None	Fine
986N 932E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	6 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	8 Sand	Gray?	Brown/Gray	None	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	5 Sand	None	Brown	None	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	6.5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	5 Sand	None	Brown/Red	None	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	5 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 932E	10-20cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	5 Sand	None	Red/Gray	None	Fine-Very Fine
986N 930E	40-50cm	Handle	Smoothed	Gray/Red	10R 4/1	9.5 Sand	None	Red/Brown	None	Coarse-Medium
986N 930E	40-50cm	Body	Smoothed	Black	Gley1 2.5/N	7 Sand	Red	Red/Brown	Slip	Fine
986N 930E	40-50cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5.5 Sand	Brown/Red	Gray/Red	Slip	Fine-Very Fine
986N 930E	40-50cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	7 Sand	None	Gray/Brown	None	Fine
986N 930E	40-50cm	Neck	Smoothed	Red	2.5YR 4/6	6 Sand	Red	Brown/Gray	Slip	Fine-Very Fine
986N 930E	40-50cm	Body	Smoothed	Red	2.5YR 4/6	4 Sand	Red	Brown/Gray	Slip	Fine-Very Fine
986N 930E	40-50cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	Brown/Red	Red/Brown	Slip	Fine-Very Fine
986N 930E	40-50cm	Body	Smoothed	Gray	Gley2 6/10B	5.5 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 930E	40-50cm	Body	Corrugated	Gray/Black	Gley2 5/10B	4.5 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 930E	40-50cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5.5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 930E	40-50cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 930E	40-50cm	Body	Smoothed	Gray/Brown	10YR 5/2	8 Sand	None	Red/Brown	None	Fine
986N 930E	40-50cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	6.5 Sand	Black/Gray	Gray/Brown	Slip	Fine-Very Fine
986N 930E	40-50cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	None	Red/Brown	None	Medium-Fine
986N 930E	40-50cm	Body	Smoothed	Brown/Gray	10YR 5/4	7 Sand	None	Brown/Red	None	Fine
986N 930E	40-50cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Brown/Red	None	Fine
986N 930E	40-50cm	Body	Smoothed	Gray/Red	10R 4/1	7 Sand	Gray	Red/Brown	Slip	Fine
986N 930E	40-50cm	Body	Smoothed	Gray/Brown	10YR 5/2	7 Sand	None	Red/Brown	None	Fine-Very Fine
986N 930E	40-50cm	Body	Smoothed	Gray	Gley2 6/10B	5.5 Sand	Gray	Brown/Gray	Slip	Fine-Very Fine
986N 930E	40-50cm	Rim	Smoothed	Gray/Brown	10YR 5/2	6.5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 930E	40-50cm	Body	Smoothed	Tan/Brown	7.5YR 6/4	8.5 Sand	Tan?	Brown/Gray	Slip	Fine-Very Fine
986N 930E	40-50cm	Body	Smoothed	Red/Brown	Gley2 6/10B	5.5 Sand	None	Brown/Gray	None	Medium-Fine
986N 930E	30-40cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	None	Brown/Red	None	Fine-Very Fine
986N 930E	30-40cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	Red/Brown	Brown/Red	Slip	Fine-Very Fine
986N 930E	30-40cm	Neck	Smoothed	Gray	Gley2 6/10B	7.5 Sand	None	Brown/Gray	None	Medium-Fine
986N 930E	30-40cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Brown/Red	None	Fine-Very Fine
986N 930E	30-40cm	Body	Smoothed	Gray/Red	10R 4/1	6 Sand	None	Brown/Gray	None	Fine
986N 930E	30-40cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5 Sand	Brown	Brown	Slip	Fine-Very Fine
986N 930E	30-40cm	Body	Smoothed	Gray/Brown	10YR 5/2	7 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 930E	30-40cm	Rim	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	None	Gray/Brown	None	Fine
986N 930E	30-40cm	Body	Smoothed	Red	2.5YR 4/6	5.5 Sand	Red	Tan/Brown	None	Fine-Very Fine
986N 930E	30-40cm	Body	Smoothed	Gray	Gley2 6/10B	8 Sand	None	Brown/Red	None	Fine
986N 930E	30-40cm	Body	Smoothed	Red/Brown	2.5YR 4/8	10 Sand	None	Red/Brown	None	Medium-Fine
986N 930E	30-40cm	Body	Smoothed	Brown/Gray	10YR 5/4	6.5 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 930E	30-40cm	Body	Smoothed	Red/Gray	10R 5/2	6.5 Sand	None	Red/Gray	None	Medium-Fine
986N 930E	30-40cm	Body	Smoothed	Brown/Red	7.5YR 4/6	4.5 Sand	Brown	Brown/Gray	Slip	Fine-Very Fine
986N 930E	30-40cm	Body	Smoothed	Gray	Gley2 6/10B	7 Sand	Gray	Brown	Slip	Fine-Very Fine
986N 930E	30-40cm	Body	Smoothed	Red	10YR 5/2	8 Sand	None	Red/Brown	None	Fine
986N 930E	30-40cm	Body	Smoothed	Gray	2.5YR 4/6	7 Sand	Gray	Red/Gray	Slip	Fine-Very Fine
986N 930E	30-40cm	Body	Smoothed	Red	Gley2 6/10B	5 Sand	Gray	Brown/Gray	Slip	Fine-Very Fine



986N 930E	50-60cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Red/Brown	Slip	Fine-Very Fine
986N 930E	50-60cm	Body	Smoothed	Gray/Red	10R 4/1	6.5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 929E	20-30cm	Handle	Smoothed	Red/Brown	2.5YR 4/8	10 Sand	Red/Brown	Brown/Red	Slip	Fine
986N 929E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	None	Brown/Red	None	Fine
986N 929E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Brown/red	7.5YR 4/6	5.5 Sand	Brown/Red	Brown/Gray	Slip	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	Brown/Red	Brown	Slip	Fine
986N 929E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	Red/Brown	Brown/Red	Slip	Fine-Very Fine
986N 929E	20-30cm	Rim	Smoothed	Gray/Brown	10YR 5/2	5.5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 929E	20-30cm	Rim	Smoothed	Brown/Red	7.5YR 4/6	6.5 Sand	None	Red/Brown	None	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Red/Gray	10R 5/2	6 Sand	none	Brown/Gray	None	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Red	2.5YR 4/6	5.5 Sand	Red	Brown/Gray	None	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Red/Gray	10R 5/2	5.5 Sand	None	Red/Brown	None	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	Red/Brown	Brown/Red	Slip	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Red/Gray	None	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	Red	Brown/Red	None	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Red/Brown	None	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Red/Brown	None	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	8 Sand	Red	Brown/Red	Slip	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	9 Sand	None	Red/Brown	None	Medium-Fine
986N 929E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/6	4 Sand	Red	Brown/Gray	Slip	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	None	Red/Brown	None	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Red/Gray	10YR 5/2	6.5 Sand	Red/Brown	Brown/Gray	Slip	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Gray/Brown	10YR 5/2	8.5 Sand	None	Gray/Brown	None	Medium-Fine
986N 929E	20-30cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5.5 Sand	None	Brown/Red	None	Fine
986N 929E	20-30cm	Body	Smoothed	Gray/Brown	10YR 5/2	6 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Red/Brown	None	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Brown/Gray	10YR 5/4	9 Sand	None	Red/Brown	None	Medium-Fine
986N 929E	20-30cm	Body	Smoothed	Brown/Gray	10YR 5/4	9 Sand	None	Red/Brown	None	Medium-Fine
986N 929E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	Red/Brown	Brown/Red	None	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Red/Brown	Slip	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Gray	Gley2 6/10B	4.5 Sand	None	Gray	none	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Red/Gray	10R 5/2	5.5 Sand	None	Brown/Red	None	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Gray/Black	Gley2 5/10B	6.5 Sand	None	Gray/Brown	None	Fine
986N 929E	20-30cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6.5 Sand	None	Red/Brown	None	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	4.5 Sand	Brown/Red	Brown/Gray	Slip	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	None	Brown/Gray	None	Fine
986N 929E	20-30cm	Rim	Smoothed	Red/Brown	2.5YR 4/8	8 Sand	None	Brown/Red	None	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	None	Brown/Red	None	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Red/Gray	10R 5/2	7 Sand	none	Brown/Red	None	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Red/Gray	10R 5/2	7.5 Sand	None	Brown/Red	None	Fine
986N 929E	30-40cm	Body	Smoothed	Red/Gray	10R 5/2	8 Sand	None	Red/Brown	None	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Brown/Red	7.5YR 4/6	7 Sand	None	Brown/Red	None	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Gray/Black	Gley2 5/10B	7 Sand	None	Brown/REd	None	Fine
986N 929E	30-40cm	Body	Smoothed	Red/Gray	10R 5/2	5 Sand	None	Brown	None	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Gray/Red	10R 4/1	7.5 Sand	None	Red/Brown	None	Fine
986N 929E	30-40cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	Brown/Red	Red/Gray	Painted	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	Brown/Red	Red/gray	Slip	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5 Sand	Brown/Red	Brown/Gray	Slip	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	6 Sand	Black/Gray	Gray/Brown	Slip	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	None	Red/Gray	None	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	5.5 Sand	Black/Gray	Brown/Gray	Slip	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	6 Sand	Black/Gray	Brown/Gray	Slip	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	7 Sand	Black/Gray	Red/Gray	None	Medium-Fine
986N 929E	30-40cm	Body	Smoothed	Brown/Gray	10YR 5/4	6 Sand	None	Brown/Red	None	Fine
986N 929E	30-40cm	Rim	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	Red	Brown/Red	Slip	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Red	2.5YR 4/6	4 Sand	Red	Brown/Gray	Slip	Fine-Very Fine



986N 929E	30-40cm	Body	Smoothed	Red	2.5YR 4/6	7 Sand	Red	Brown/Red	Slip	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Brown/Red	None	Very Fine
986N 929E	30-40cm	Body	Smoothed	Gray/Red	10R 4/1	6 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Red/Gray	10R 5/2	7.5 Sand	None	Brown/Red	None	Fine
986N 929E	30-40cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	None	Brown/Red	None	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Gray/Black	Gley2 5/10B	5.5 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	6 Sand	None	Brown/gray	None	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Red	2.5YR 4/6	4 Sand	Red	Brown/Gray	Slip	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Gray/Red	10R 4/1	5 Sand	None	Tan/Gray	None	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Brown/Gray	10YR 5/4	6 Sand	None	Brown/Red	None	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Red/Brown	None	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Red/Gray	10R 5/2	5.5 Sand	None	Red/Brown	None	Very Fine
986N 929E	30-40cm	Body	Smoothed	Red/Gray	10R 5/2	5 Sand	Red	Brown/Gray	Slip	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Brown/Gray	10YR 5/4	5.5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Red/Brown	2.5YR 4/8	4 Sand	None	Brown/Red	None	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Gray/Red	10R 4/1	5.5 Sand	Black/Gray	Brown/Gray	Slip	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Red/Brown	2.5YR 4/8	4 Sand	None	Brown/Red	None	Fine-Very Fine
986N 928E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	6.5 Sand	Red	Red/Gray	Slip	Fine-Very Fine
986N 928E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Brown/Gray	None	Very Fine
986N 928E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	9 Sand	None	Red/Brown	None	Fine-Very Fine
986N 928E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Red/Brown	None	Fine-Very Fine
986N 928E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	7 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 928E	0-10cm	Body	Smoothed	Red/Gray	10R 5/2	5.5 Sand	None	Brown/Red	None	Fine-Very Fine
986N 928E	0-10cm	Body	Smoothed	Red/Gray	10R 5/2	6 Sand	None	Brown/Red	None	Fine-Very Fine
986N 928E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	5.5 Sand	None	Brown	None	Very Fine
986N 928E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 928E	0-10cm	Body	Smoothed	light Gray	10YR 6/1	4 Sand	Light Gray	Brown/Gray	Slip	Fine-Very Fine
986N 928E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5.5 Sand	Brown/Red	Gray/Brown	Slip	Fine-Very Fine
986N 928E	0-10cm	Body	Smoothed	Gray/Red	10R 4/1	14 Sand	None	Red/Brown	None	Fine-Very Fine
986N 928E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 928E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Brown/Red	slip	Fine
986N 928E	0-10cm	Body	Smoothed	Red/Gray	10R 5/2	6 Sand	Red/Brown	Brown/Gray	Slip	Fine-Very Fine
986N 928E	0-10cm	Body	Smoothed	Red/Gray	10R 5/2	6.5 Sand	None	Red/Brown	None	Fine-Very Fine
986N 928E	0-10cm	Body	Smoothed	Red/Gray	10R 5/2	7.5 Sand	None	Red/Brown	None	Fine
986N 928E	0-10cm	Body	Smoothed	Red/Gray	10R 5/2	6 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 928E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	5 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 928E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	4 Sand	None	Gray/Brown	None	Very Fine
986N 928E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Red/Brown	None	Fine-Very Fine
986N 928E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	5.5 Sand	None	Brown/Red	Slip	Fine-Very Fine
986N 928E	0-10cm	Body	Smoothed	Red/Gray	10YR 4/1	7.5 Sand	Black/Gray	Brown/Gray	Slip	Fine
986N 930E	60-70cm	Body	Smoothed	Dark Gray/Brown	7.5YR 4/1	7 Sand	Black/Gray	Brown/Red	Slip	Fine-Very Fine
986N 930E	60-70cm	Body	Smoothed	Red/Gray	10R 5/2	7.5 Sand	None	Gray/Red	None	Fine-Very Fine
986N 930E	60-70cm	Body	Smoothed	Red	2.5YR 4/6	7.5 Sand	Red	Gray/Brown	slip	Fine-Very Fine
986N 930E	60-70cm	Body	Smoothed	Black/Brown	7.5YR 3.2	8 Sand	None	Gray/Brown	None	Very Fine
986N 930E	60-70cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	7.5 Sand	Black	Brown/Gray	Slip	Fine-Very Fine
986N 930E	60-70cm	Body	Corrugated	Black/Gray	Gley2 4/5PB	4 Sand	Black	Brown/Gray	Slip	Fine-Very Fine
986N 930E	60-70cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Red/Brown	None	Fine-Very Fine
986N 930E	60-70cm	Body	Smoothed	Red	2.5YR 4/6	8 Sand	Dark Red	Red/Brown	Slip	Fine
986N 929E	40-50cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	Brown/Red	Brown/Gray	Slip	Fine-Very Fine
986N 929E	40-50cm	Rim	Smoothed	Black	Gley1 2.5/N	6 Sand	Black	Brown/Gray	Slip	Fine-Very Fine
986N 929E	40-50cm	Body	Smoothed	Brown/red	7.5YR 4/6	7 Sand	None	Brown/Red	None	Fine
986N 929E	40-50cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Red/Brown	None	Fine-Very Fine
986N 929E	40-50cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	None	Red/Brown	None	Fine-Very Fine



986N 929E	10-20cm	Handle	Smoothed	Brown/REd	7.5YR 4/6	7.5 Sand	None	Brown/Red	None	Fine
986N 929E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	6 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 929E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	None	Red/Brown	None	Fine-Very Fine
986N 929E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Brown/Red	None	Fine-Very Fine
986N 929E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	5.5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 929E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	8.5 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 929E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	5.5 Sand	Red	Gray/Brown	Slip	Fine-Very Fine
986N 929E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	5.5 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 929E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6.5 Sand	None	Brown/Red	None	Fine-Very Fine
986N 929E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	7 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 929E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	8 Sand	None	Red/Brown	None	Fine
986N 929E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	5.5 Sand	Red/Brown	Brown/Gray	Slip	Fine-Very Fine
986N 929E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Brown/Gray	None	Fine
986N 929E	10-20cm	Body	Smoothed	Red/Gray	10R 5/2	6 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 929E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 929E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	7 Sand	None	Brown/Gray	None	Fine
986N 929E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	5 Sand	Black/Gray	Brown	Slip	Fine
986N 929E	10-20cm	Rim	Smoothed	Gray/Red	10R 4/1	6.5 Sand	None	Brown/Red	None	Fine-Very Fine
986N 929E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	Red/Brown	Red/Brown	Slip	Fine-Very Fine
986N 929E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	7 Sand	None	Brown/Red	None	Fine
986N 929E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	5.5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 928E	10-20cm	Body	Smoothed	Black	Gley1 2.5/N	7.5 Sand	Black	Red/Brown	Slip	Fine
986N 928E	10-20cm	Body	Smoothed	Black	Gley1 2.5/N	7 Sand	black	Brown/Black	Slip	Fine-Very Fine
986N 928E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Brown/Red	None	Fine
986N 928E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5 Sand	None	Brown/Red	None	Fine-Very Fine
986N 928E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	4.5 Sand	None	Brown/Red	None	Fine-Very Fine
986N 928E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	12 Sand	Red	Brown/Red	Slip	Fine-Very Fine
986N 928E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	12 Sand	None	Brown/Gray	None	Fine
986N 928E	10-20cm	Handle	Smoothed	Red/Brown	2.5YR 4/8	9 Sand	None	Brown/Red	None	Medium-Fine
986N 928E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	4 Sand	None	Red/Brown	None	Fine-Very Fine
986N 928E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5 Sand	Red	Brown/red	Slip	Fine-Very Fine
986N 928E	10-20cm	Body	Smoothed	Red/Gray	10R 5/2	6 Sand	None	Brown/Red	None	Fine-Very Fine
986N 928E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	Red	Brown/Red	Slip	Fine-Very Fine
986N 928E	10-20cm	Body	Smoothed	Red/Gray	10R 5/2	6 Sand	Red/Brown	Brown/Red	Slip	Fine-Very Fine
986N 928E	10-20cm	Body	Smoothed	Black/Gray	10R 5/2	6 Sand	Black	Red/Brown	Slip	Fine
986N 928E	10-20cm	Rim	Smoothed	Gray/Brown	10YR 5/2	5.5 Sand	None	Brown/Gray	Slip	Fine
986N 928E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	6 Sand	Red	Brown/Red	Slip	Fine-Very Fine
986N 928E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	Black	Red/Brown	Slip	Medium-Fine
986N 928E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	4.5 Sand	None	Red/Brown	Slip	Medium-Fine
986N 928E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	6 Sand	Red	Brown/Red	Slip	Fine-Very Fine
986N 928E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	6 Sand	Red	Brown/Red	Slip	Fine-Very Fine

N 928E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	4 Sand	None	Brown	None	Fine-Very Fine
N 928E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Brown/Red	None	Fine-Very Fine
N 928E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	5 Sand	None	Brown/Gray	None	Fine
N 928E	10-20cm	Body	Smoothed	Red/Gray	10K 5/2	6 Sand	Red	Brown/Red	Slip	Fine-Very Fine
N 928E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	5.5 Sand	None	Brown	None	Fine
N 929E	0-10cm	Handle	Smoothed	Red/Brown	2.5YR 4/8	9 Sand	None	Brown/Red	None	Fine
N 929E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	8 Sand	None	Brown/Gray	None	Fine
N 929E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	7 Sand	Red	Brown/Gray	Slip	Fine-Very Fine
N 929E	0-10cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	7.5 Sand	None	Gray/Brown	None	Fine
N 929E	0-10cm	Body	Smoothed	Black/Brown	7.5YR 3.2	7 Sand	None	Brown	None	Fine-Very Fine
N 929E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	Red/Brown	Brown/Gray	Slip	Fine-Very Fine
N 929E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	4 Sand	Red	Brown/Gray	Slip	Fine-Very Fine
N 929E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	6 Sand	None	Brown/Gray	Slip	Fine-Very Fine
N 929E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	4.5 Sand	Red/Brown	Brown	Slip	Fine-Very Fine
N 929E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	8.5 Sand	None	Brown/Gray	None	Fine-Very Fine
N 929E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6.5 Sand	None	Brown/Gray	None	Fine
N 929E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	Red	Gray/Brown	Slip	Fine-Very Fine
N 929E	0-10cm	Body	Smoothed	Red/Brown	7.5YR 4/6	6 Sand	None	Red/Brown	None	Medium-Fine
N 929E	0-10cm	Body	Smoothed	Brown/red	7.5YR 4/6	6 Sand	Brown/Red	Red/Brown	Slip	Fine-Very Fine
N 929E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	None	Red/Brown	None	Fine
N 929E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	5.5 Sand	None	Brown/Gray	None	Fine-Very Fine
N 929E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	7 Sand	Red	Brown/Gray	Slip	Fine
N 929E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	4.5 Sand	None	Brown	None	Fine-Very Fine
N 929E	0-10cm	Body	Smoothed	Light Gray	10YR 6/1	5.5 Sand	Light Gray	Brown/Gray	Slip	Fine-Very Fine
N 929E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	5.5 Sand	Red	Gray/Brown	Slip	Fine-Very Fine
N 929E	0-10cm	Body	Smoothed	Red/Gray	10K 5/2	8 Sand	Red	Brown/Gray	Slip	Medium-Fine
N 929E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	Red/Brown	Brown/Red	Slip	Fine
N 929E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	Red/Brown	Brown/Gray	Slip	Fine-Very Fine
N 929E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	6 Sand	None	Gray/Brown	None	Fine-Very Fine
N 929E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	6 Sand	None	Gray/Brown	None	Fine-Very Fine
N 929E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Gray/Brown	None	Medium-Fine
N 929E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Brown/Red	None	Fine-Very Fine
N 929E	0-10cm	Body	Smoothed	Red/Gray	10K 5/2	6 Sand	None	Brown/Gray	None	Fine-Very Fine
N 929E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Brown/Gray	None	Fine-Very Fine
N 929E	0-10cm	Body	Smoothed	Red/Gray	10K 5/2	7.5 Sand	None	Red	None	Fine
N 929E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	Gray/Black	Brown/Gray	Slip	Fine-Very Fine
N 929E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	3.5 Sand	Red	Brown/Gray	Slip	Fine-Very Fine
N 929E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	6 Sand	None	Gray	None	Fine-Very Fine
N 929E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	Red/Brown	Brown/Red	Slip	Fine-Very Fine
N 929E	0-10cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	4.5 Sand	Tan	Brown/Red	Slip	Fine-Very Fine
N 929E	0-10cm	Body	Smoothed	Light Gray	10YR 6/1	5 Sand	None	Gray/Brown	None	Fine-Very Fine
N 929E	0-10cm	Body	Smoothed	Gray/Black	Gley2 5/10B	6 Sand	None	Brown	None	Fine-Very Fine
N 929E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	Red	Brown	Slip	Fine-Very Fine
N 929E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	Red/Brown	Brown	Slip	Fine
N 932E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	5 Sand	None	Gray	None	Fine-Very Fine
N 926E	10-20cm	Handle	Smoothed	Light Gray	10YR 6/1	11.5 Sand	Light Gray	Gray/brown	Slip	Fine
N 926E	10-20cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	5.5 Sand	Black	Brown/Red	Slip	Fine-Very Fine
N 926E	10-20cm	Neck	Smoothed	Black	Gley1 2.5/N	5 Sand	Black	Brown/Gray	Slip	Fine-Very Fine
N 926E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	5.5 Sand	Red	Brown	Slip	Fine-Very Fine

986N 926E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	5 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5 Sand	None	Brown	None	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Red/Gray	10R 5/2	6 Sand	Red	Brown/Gray	Slip	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Black	Gley1 2.5/N	8 Sand	Black	Gray/Brown	slip	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	8 Sand	None	Gray	None	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	4 Sand	Black/Gray	Brown/Gray	Slip	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Gray/Black	Gley2 5/10B	7 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 926E	10-20cm	Rim	Smoothed	Red/Brown	2.5YR 4/8	7.5 Sand	None	Red/Brown	None	Fine
986N 926E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	7 Sand	None	Brown	None	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	6 Sand	None	Red/Brown	None	Fine
986N 926E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	None	Brown/Gray	Slip	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	7 Sand	None	Brown	None	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Brown	None	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Black/Brown	7.5YR 3.2	8.5 Sand	None	Red/Brown	None	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	Red/Brown	Brown/Red	Slip	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Light Gray	10YR 6/1	6 Sand	None	Light Gray/Tan	None	Fine
986N 926E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	Red/Brown	Brown	Noen	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5.5 Sand	None	Brown/Red	None	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	4 Sand	Red	Brown/Red	Slip	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7.5 Sand	Red/Brown	Brown	Slip	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	4 Sand	Red	Brown	Slip	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	4 Sand	Red	Brown	Slip	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Red/Brown	7.5YR 4/6	6 Sand	Red/Brown	Gray/Red	Slip	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Brown/Red	2.5YR 4/6	5 Sand	None	Brown/Red	None	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	8 Sand	Red/Brown	Red/Brown	None	Medium-Fine
986N 926E	10-20cm	Body	Smoothed	Red/Gray	10R 5/2	5 Sand	Red/Gray	Brown/Red	Slip	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	8 Sand	Red	Brown/Gray	Slip	Fine
986N 926E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	6 Sand	None	Brown/Red	None	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Red/Gray	10R 5/2	6 Sand	None	Brown/RED	None	Fine
986N 926E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Brown/Gray	Slip	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	7 Sand	None	Brown/Red	None	Fine
986N 926E	10-20cm	Body	Smoothed	Brown/Red	2.5YR 4/6	6 Sand	None	Brown/Red	None	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	None	Brown	None	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	7.5 Sand	None	Brown/Gray	None	Fine
986N 926E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	4.5 Sand	None	Brown	None	Very Fine
986N 926E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	4.5 Sand	None	Brown/Red	None	Fine
986N 926E	10-20cm	Body	Smoothed	Red/Brown	10YR 5/4	8 Sand	None	Gray	None	Medium-Fine
986N 926E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	7 Sand	None	Brown	None	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Gray	None	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Brown/Red	None	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	10.5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	Red/Brown	Brown/Red	Slip	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	6 Sand	None	Brown/RED	None	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	6.5 Sand	Red	Brown/Red	Slip	Fine
986N 926E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	9 Sand	None	Brown	None	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	7 Sand	Red	Brown/Red	None	Fine-Very Fine
986N 926E	10-20cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	3.5 Sand	Black	Brown	None	Very Fine
986N 926E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	9 Sand	Gray/Black	Brown/Gray	Slip	Fine
926N 927E	30-40cm	Body	Smoothed	Brown/Red	7.5YR 4/6	8 Sand	None	Brown/Red	None	Medium-Fine
926N 927E	30-40cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	None	Brown	None	Fine-Very Fine
926N 927E	30-40cm	Body	Smoothed	Gray/Brown	10YR 5/2	5 Sand	None	Brown/Red	None	Medium-Fine
926N 927E	30-40cm	Body	Smoothed	Red/Gray	10R 5/2	7 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 929E	20-30cm	Handle	Smoothed	Black	Gley1 2.5/N	12.5 Sand	Black	Gray	Slip	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Red	2.5YR 4/6	4 Sand	Red	Brown	Slip	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Red	2.5YR 4/6	4 Sand	Red	Brown	Slip	Fine-Very Fine

986N 929E	20-30cm	Body	Smoothed	Red	2.5YR 4/6	4.5 Sand	Red	Brown	Slip	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Brown	Slip	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Red	2.5YR 4/6	4.5 Sand	Red	Brown	Slip	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6.5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Gray/Red	10R 4/1	8 Sand	None	Brown/Red	None	Medium-Fine
986N 929E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	Red/Brown	Brown	Slip	Fine-Very Fine
986N 929E	20-30cm	Neck	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	Red	Brown/Red	Slip	Fine-Very Fine
986N 929E	20-30cm	Base	Smoothed	Brown/Gray	10YR 5/4	6 Sand	None	Brown	None	Fine
986N 929E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	9 Sand	Brown	Red/Gray	Slip	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	Black	Red/Gray	Slip	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	Red/Brown	Gray/Brown	Slip	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Gray/Brown	10YR 5/2	5 Sand	None	Brown/Gray	None	Medium-Fine
986N 929E	20-30cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	None	Brown/Red	None	Fine-Very Fine
986N 929E	20-30cm	Body	Smoothed	Gray	Gley2 6/10B	6 Sand	None	Brown	None	Medium-Fine
986N 929E	20-30cm	Body	Smoothed	Gray/Red	10R 4/1	6 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 926E	30-40cm	Handle	Smoothed	Red/Gray	10R 5/2	12.5 Sand	Red	Brown/Gray	Slip	Fine-Very Fine
986N 926E	30-40cm	Body	Smoothed	Black	10R 5/2	7.5 Sand	None	Red/Brown	None	Medium-Fine
986N 926E	30-40cm	Body	Smoothed	Gray/Black	Gley1 2.5/N	6 Sand	Black	Dark Gray	Slip	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Red	Gley2 5/10B	5 Sand	Red	Red/Brown	Slip	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Brown/Red	2.5YR 4/6	4 Sand	Red	Red/Brown	Slip	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Red/Brown	7.5YR 4/6	7 Sand	None	Red/Brown	None	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Red/Gray	None	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Tan/Gray	Slip	Fine
986N 929E	30-40cm	Body	Smoothed	Gray	Gley2 6/10B	7.5 Sand	None	Red/Gray	None	Medium-Fine
986N 929E	30-40cm	Body	Smoothed	Gray/Red	10R 4/1	5 Sand	Gray/Red	Brown/Red	Slip	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Red/gray	10R 5/2	7 Sand	Red/Gray	Brown/Red	Slip	Fine
986N 929E	30-40cm	Body	Smoothed	Red	2.5YR 4/6	6 Sand	Red	Red/Brown	Slip	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Red/Gray	10R 5/2	5 Sand	None	Red/Brown	None	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Red/Brown	None	Medium-Fine
986N 929E	30-40cm	Body	Smoothed	Black	Gley1 2.5/N	6.5 Sand	None	Red/Brown	None	Fine
986N 929E	30-40cm	Rim	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	Brown/Red	Brown/Red	Slip	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Gray/Black	Gley2 5/10B	5 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Gray	Gley2 6/10B	6.5 Sand	Brown/Red	Brown	Slip	Fine-Very Fine
986N 929E	30-40cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	None	Red/Brown	None	Fine-Very Fine
986N 928E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 928E	0-10cm	Rim	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	Brown/Red	Red/Brown	Slip	Fine-Very Fine
986N 928E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	8 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 928E	0-10cm	Body	Corrugated	Gray/Brown	10YR 5/2	5.5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 928E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	None	Brown/Gray	None	Medium-Fine
986N 928E	0-10cm	Body	Smoothed	Brown/Gray	10YR 4/6	6 Sand	None	Brown	None	Fine-Very Fine
986N 928E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	7.5 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 928E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	6 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 928E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	5 Sand	None	Gray	None	Fine-Very Fine
986N 928E	0-10cm	Body	Smoothed	Light Gray	10YR 6/1	8 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 928E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	7 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 928E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	7 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 928E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	8 Sand	None	Red/Brown	None	Medium-Fine
986N 928E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	7.5 Sand	None	Brown	None	Fine-Very Fine
986N 928E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	8 Sand	None	Red/Brown	None	Medium-Fine
986N 926E	20-30cm	Body	Smoothed	Red/Gray	10R 5/2	6 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 926E	20-30cm	Body	Smoothed	Red	2.5YR 4/6	4 Sand	Red	Brown	Slip	Fine-Very Fine
986N 926E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	Red	Brown/Red	Slip	Fine
986N 926E	20-30cm	Body	Smoothed	Brown/Gray	10YR 5/4	6.5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 926E	20-30cm	Body	Smoothed	Brown/Red	7.5YR 4/6	4.5 Sand	None	Brown	None	Fine-Very Fine
986N 926E	20-30cm	Handle	Smoothed	Red/Brown	2.5YR 4/8	9 Sand	None	Red/Brown	None	Fine-Very Fine
986N 926E	20-30cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	None	Brown/Red	None	Fine-Very Fine
986N 926E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/6	3.5 Sand	Brown/Red	Red/Brown	Slip	Fine-Very Fine

986N 926E	20-30cm	Neck	Smoothed	Black/Gray	Gley2 4/5PB	6 Sand	Black/Gray	Brown	Slip	Medium-Fine
986N 926E	20-30cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6.5 Sand	None	Red/Brown	None	Fine-Very Fine
986N 926E	20-30cm	Body	Smoothed	Gray	Gley2 6/10B	5 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 926E	20-30cm	Body	Smoothed	Brown/Gray	10YR 5/4	5.5 Sand	None	Brown/Red	None	Fine-Very Fine
986N 926E	20-30cm	Body	Smoothed	Gray/Brown	10YR 5/2	5 Sand	None	Red/Brown	None	Fine-Very Fine
986N 926E	20-30cm	Body	Smoothed	Brown/Red	7.5YR 4/6	7 Sand	None	Brown/Red	Noen	Medium-Fine
986N 926E	20-30cm	Body	Smoothed	Red	2.5YR 4/6	3.5 Sand	Red	Brown/Red	Slip	Fine-Very Fine
986N 926E	20-30cm	Body	Smoothed	Red/Gray	10R 5/2	8.5 Sand	None	Red/Brown	None	Medium-Fine
986N 926E	20-30cm	Body	Smoothed	Gray	Gley2 6/10B	5.5 Sand	None	Brown/Red	None	Fine-Very Fine
986N 926E	20-30cm	Body	Smoothed	Red	2.5YR 4/6	6 Sand	None	Brown/Red	Slip	Fine-Very Fine
986N 926E	20-30cm	Body	Smoothed	Gray/Red	10R 4/1	6 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 926E	20-30cm	Body	Smoothed	Gray/Brown	10YR 5/4	7 Sand	None	Brown/Red	None	Fine
986N 926E	20-30cm	Body	Smoothed	Gray/Brown	10YR 5/2	5.5 Sand	None	Brown/Red	None	Fine-Very Fine
986N 926E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Brown	None	Fine-Very Fine
986N 926E	20-30cm	Body	Smoothed	Red/Brown	7.5YR 4/6	5 Sand	None	Brown	None	Fine-Very Fine
986N 926E	20-30cm	Body	Smoothed	Gray	Gley2 6/10B	5 Sand	None	Brown	None	Fine-Very Fine
986N 926E	20-30cm	Body	Smoothed	Brown/Red	7.5YR 4/6	7 Sand	None	Red/Brown	None	Fine-Very Fine
986N 926E	20-30cm	Body	Smoothed	Red	2.5YR 4/6	3.5 Sand	Red	Brown/Gray	Slip	Fine-Very Fine
986N 926E	20-30cm	Body	Smoothed	Red	2.5YR 4/6	5.5 Sand	Red	Brown/Red	Slip	Fine-Very Fine
986N 926E	20-30cm	Body	Smoothed	Gray	Gley2 6/10B	5.5 Sand	None	Gray	None	Fine
986N 926E	20-30cm	Body	Smoothed	Gray/Red	10R 4/1	6 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 926E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Brown/Red	None	Medium-Fine
986N 926E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6.5 Sand	None	Brown/Red	Noen	Medium-Fine
986N 926E	0-10cm	Body	Smoothed	White/Red	2.5YR 7/2	8 Sand	White	Red/Brown	Painted	Medium-Fine
986N 926E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	7 Sand	None	Brown	None	Fine-Very Fine
986N 926E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 926E	0-10cm	Body	Smoothed	Gray/Red	10R 4/1	7 Sand	Gray	Brown/Gray	Slip	Fine-Very Fine
986N 926E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	9 Sand	None	Red/Brown	None	Fine
986N 926E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Red/Brown	None	Fine-Very Fine
986N 926E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	6 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 926E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	5.5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 926E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	4.5 Sand	None	Red/Brown	None	Fine-Very Fine
986N 926E	0-10cm	Body	Smoothed	Gray/Black	Gley2 5/10B	5 Sand	None	Gray/Black	None	Medium-Fine
986N 926E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	8 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 926E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	5.5 Sand	Red	Brown/Red	None	Fine-Very Fine
986N 926E	0-10cm	Body	Corrugated	Black/Gray	Gley2 4/5PB	5 Sand	Black	Brown/Gray	None	Fine-Very Fine
986N 926E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	6.5 Sand	None	Brown	None	Fine-Very Fine
986N 926E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 926E	0-10cm	Body	Smoothed	Light Gray	10YR 6/1	4 Sand	Light Gray	Brown/Gray	Slip	Fine-Very Fine
986N 926E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Brown/Red	None	Very Fine
986N 926E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	7 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 926E	0-10cm	Body	Corrugated	Gray	Gley2 6/10B	5 Sand	None	Gray	None	fine
986N 926E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Dark Gray/Brown	None	Fine-Very Fine
986N 926E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5 Sand	None	Brown/Gray	None	Fine
986N 926E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6.5 Sand	None	Brown/Red	None	Fine-Very Fine
986N 926E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	Red/Brown	Brown/Red	None	Fine-Very Fine
986N 926E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	9 Sand	None	Brown	None	Fine-Very Fine
986N 926E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Brown/Red	Slip	Medium-Fine
986N 926E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	10 Sand	Red	Brown/Red	Slip	Fine-Very Fine
986N 926E	40-50cm	Handle	Smoothed	Gray/Red	10R 4/1	11 Sand	None	Gray/Brown	None	Medium-Fine
986N 926E	40-50cm	Rim	Smoothed	Gray/Brown	10YR 5/2	5 Sand	Gray	Brown/Gray	Slip	Fine
986N 926E	40-50cm	Body	Smoothed	Brown/Gray	10YR 5/4	6.5 Sand	None	Red/Brown	None	Fine
986N 926E	40-50cm	Body	Smoothed	Black	Gley1 2.5/N	6.5 Sand	Black	Brown	Slip	Fine-Very Fine





986N 927E	10-20cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	8 Sand	Gray/Black	Brown/Gray	Slip	Medium-Fine
986N 927E	10-20cm	Body	Smoothed	Light Gray	10YR 6/1	4.5 Sand	Light Gray	Gray	Slip	Fine-Very Fine
986N 927E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	7.5 Sand	None	Brown/Red	None	Fine-Very Fine
986N 927E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5 Sand	Brown	Gray/Brown	Slip	Fine-Very Fine
986N 927E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	5.5 Sand	Red	Brown/Gray	Slip	Fine-Very Fine
986N 929E	40-50cm	Neck	Smoothed	Brown/Gray	10YR 5/4	6.5 Sand	Brown/Gray	Gray/Brown	Slip	Fine-Very Fine
986N 929E	40-50cm	Body	Smoothed	Brown/Gray	10YR 5/4	6 Sand	None	Brown/Gray	None	Medium-Fine
986N 929E	40-50cm	Body	Smoothed	Red/Gray	10R 5/2	5 Sand	Red/Gray	Red/Brown	Slip	Fine-Very Fine
986N 929E	40-50cm	Handle	Smoothed	Black	Gley1 2.5/N	5 Sand	Black	Gray/Brown	Slip	Fine-Very Fine
986N 927E	40-50cm	Body	Smoothed	Gray/Brown	10YR 5/2	8.5 Sand	Black	Brown/Gray	slip	Fine
986N 927E	40-50cm	Body	Smoothed	Red/Gray	10R 5/2	5 Sand	Red/Gray	Red/Brown	Slip	Fine-Very Fine
986N 927E	40-50cm	Body	Smoothed	Brown/Gray	10YR 5/4	5.5 Sand	Brown/Gray	Brown/Red	Slip	Fine-Very Fine
986N 927E	40-50cm	Body	Smoothed	Brown/Gray	10YR 5/4	5 Sand	Brown/Gray	Brown/Red	Slip	Fine-Very Fine
986N 927E	40-50cm	Body	Smoothed	Brown/Gray	10YR 5/4	5 Sand	Brown/Gray	Brown/Red	Slip	Fine-Very Fine
986N 927E	40-50cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6.5 Sand	Red/Brown	Brown/Red	Red/Brown	Fine
986N 927E	40-50cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Red/Brown	Slip	Fine-Very Fine
986N 927E	40-50cm	Body	Smoothed	Red/brown	2.5YR 4/8	5.5 Sand	Red/Brown	Brown/Red	Slip	Fine-Very Fine
986N 927E	40-50cm	Body	Smoothed	Red/Gray	10R 5/2	6 Sand	Red/Gray	Red/Brown	Slip	Fine-Very Fine
986N 926E	20-30cm	Body	Smoothed	Brown/Gray	10YR 5/4	24 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 925E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	6 Sand	Red	Brown/Red	Slip	Fine-Very Fine
986N 925E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	4.5 Sand	Red	Brown/Red	Slip	Fine-Very Fine
986N 925E	10-20cm	Body	Smoothed	Light Gray	10YR 6/1	5 Sand	Light Gray	Gray/Brown	slip	Fine-Very Fine
986N 925E	10-20cm	Neck	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	Brown/Red	Brown/Gray	Slip	Fine-Very Fine
986N 925E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	8.5 Sand	Brown/Red	Brown/Gray	Slip	Fine-Very Fine
986N 925E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	5.5 Sand	None	Red/Brown	None	Fine-Very Fine
986N 925E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	Red/Brown	Brown/Gray	Slip	Medium
986N 925E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	Red/Brown	Brown/Gray	Slip	Fine-Very Fine
986N 925E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	8 Sand	None	Gray/Red	Slip	Fine
986N 925E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	Brown/Red	Brown/Red	Slip	Fine-Very Fine
986N 925E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	None	Brown/Red	Slip	Fine-Very Fine
986N 925E	10-20cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	5 Sand	Black	Brown/Red	Slip	Fine-Very Fine
986N 925E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	8.5 Sand	None	Brown/Gray	Slip	Fine
986N 925E	10-20cm	Body	Smoothed	Light Gray	10YR 6/1	8 Sand	Light Gray	Brown	Slip	Fine-Very Fine
986N 925E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5 Sand	None	Red/Brown	None	Medium-Fine
986N 925E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	5 Sand	None	Brown	None	Fine-Very Fine
986N 925E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	6 Sand	Red	Brown/Gray	Slip	Fine-Very Fine
986N 925E	10-20cm	Body	Smoothed	Black/Brown	7.5YR 3.2	6.5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 925E	10-20cm	Rim	Smoothed	Red	2.5YR 4/6	6 Sand	Red	Brown/Red	None	Fine
986N 925E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	5 Sand	None	Brown/Red	None	Fine-Very Fine
986N 925E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5.5 Sand	None	Brown/Red	None	Fine-Very Fine
986N 925E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	9 Sand	None	Brown/Red	None	Fine-Very Fine
986N 925E	10-20cm	Body	Smoothed	Gray/Black	Gley2 5/10B	5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 925E	10-20cm	Body	Smoothed	Gray/Black	Gley2 5/10B	7 Sand	None	Brown	None	Fine-Very Fine
986N 925E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	5.5 Sand	Red	Gray/Brown	Slip	Fine-Very Fine
986N 925E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	None	Red/Brown	None	Medium-Fine
986N 925E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	9.5 Sand	Brown/Red	Brown/Red	Slip	Fine-Very Fine
986N 925E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	4 Sand	Red	Brown	Slip	Fine-Very Fine
986N 925E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Brown/Gray	Slip	Fine-Very Fine
986N 925E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	7 Sand	Brown/Red	Brown	Slip	Fine-Very Fine
986N 925E	10-20cm	Body	Smoothed	Light Gray	10YR 6/1	4.5 Sand	Light Gray	Brown/Gray	Slip	Fine-Very Fine
986N 925E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	3.5 Sand	None	Gray	none	Fine
986N 925E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	7.5 Sand	None	Gray	None	Fine-Very Fine
986N 925E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5 Sand	None	Brown	None	Fine-Very Fine
986N 925E	10-20cm	Body	Smoothed	Light Gray	10YR 6/1	4.5 Sand	None	Gray/Brown	None	Fine
986N 925E	10-20cm	Body	Smoothed	Gray/Red	10R 4/1	6 Sand	None	Gray/Red	None	Fine-Very Fine
986N 925E	10-20cm	Rim	Smoothed	Gray	Gley2 6/10B	5 Sand	Black	Brown/Gray	Slip	Fine-Very Fine
986N 925E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 925E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Red/Brown	None	Medium

986N 925E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	7 Sand	Red	Slip	Fine-Very Fine
986N 925E	30-40cm	Handle	Smoothed	Red/Brown	2.5YR 4/8	10 Sand	Red/Brown	None	Medium-Fine
986N 925E	30-40cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Brown/Red	Painted	Fine-Very Fine
986N 925E	30-40cm	Body	Smoothed	Red/Gray	10YR 5/2	6.5 Sand	Brown/Gray	Slip	Fine-Very Fine
986N 925E	30-40cm	Body	Smoothed	Brown/Black	10YR 3/2	7.5 Sand	Brown/Gray	None	Fine
986N 925E	30-40cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	Brown/REd	None	Fine-Very Fine
986N 925E	30-40cm	Rim	Smoothed	Red	2.5YR 4/6	4.5 Sand	Brown/Red	Slip	Fine-Very Fine
986N 925E	30-40cm	Body	Smoothed	Brown/Gray	10YR 5/4	6.5 Sand	Red/Brown	None	Fine-Very Fine
986N 925E	30-40cm	Rim	Smoothed	Black/Brown	7.5YR 3.2	5 Sand	Black/Brown	Slip	Fine-Very Fine
986N 925E	30-40cm	Body	Smoothed	Black	Gley1 2.5/N	5 Sand	Black	Slip	Fine-Very Fine
986N 925E	30-40cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red/Brown	Slip	Fine-Very Fine
986N 925E	30-40cm	Body	Smoothed	Red	2.5YR 4/6	3.5 Sand	Brown/Red	Slip	Fine-Very Fine
986N 925E	30-40cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	Brown/Red	None	Fine
986N 925E	30-40cm	Rim	Smoothed	Black/Gray	Gley2 4/5PB	6 Sand	Brown/Gray	Slip	Fine-Very Fine
986N 925E	30-40cm	Body	Smoothed	Black	Gley1 2.5/N	5 Sand	Brown/Gray	Slip	Fine-Very Fine
986N 925E	30-40cm	Body	Smoothed	Gray	Gley2 6/10B	4.5 Sand	Gray/Brown	None	Fine-Very Fine
986N 925E	30-40cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	Red/Brown	None	Fine-Very Fine
986N 925E	30-40cm	Body	Smoothed	Gray/Brown	10YR 5/2	7.5 Sand	Brown/Red	None	Medium-Fine
986N 925E	40-50cm	Rim	Smoothed	Brown/Gray	10YR 5/4	7 Sand	Brown/Gray	slip	Fine-Very Fine
986N 925E	40-50cm	Rim	Smoothed	Gray/Brown	10YR 5/2	5 Sand	Brown/Gray	Slip	Fine-Very Fine
986N 925E	40-50cm	Body	Smoothed	Red/Gray	10R 5/2	6 Sand	Gray/Brown	Slip	Fine-Very Fine
986N 925E	40-50cm	Body	Smoothed	Red/Gray	10R 5/2	4 Sand	Gray/Brown	Slip	Fine-Very Fine
986N 925E	40-50cm	Body	Smoothed	Red/Gray	10R 5/2	5 Sand	Gray/Brown	Slip	Fine-Very Fine
986N 925E	40-50cm	Body	Smoothed	Red/Gray	10R 5/2	5 Sand	Red/Gray	Slip	Fine-Very Fine
986N 925E	40-50cm	Body	Smoothed	Gray	Gley2 6/10B	7.5 Sand	Noen	None	Fine
986N 925E	40-50cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	Brown/Gray	None	Fine-Very Fine
986N 925E	40-50cm	Rim	Smoothed	Gray	Gley2 6/10B	7 Sand	Gray/Brown	None	Fine-Very Fine
986N 925E	40-50cm	Body	Smoothed	Gray/Black	Gley2 5/10B	5.5 Sand	Gray	None	Fine-Very Fine
986N 925E	40-50cm	Body	Smoothed	Black/Brown	7.5YR 3.2	5 Sand	Brown/Red	None	Fine-Very Fine
986N 925E	20-30cm	Body	Smoothed	Brown/Red	7.5YR 4/6	4.5 Sand	Brown/Gray	Slip	Fine-Very Fine
986N 925E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	Red/Brown	Slip	Fine-Very Fine
986N 925E	20-30cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	Brown/Red	None	Fine-Very Fine
986N 925E	20-30cm	Body	Smoothed	Gray	Gley2 6/10B	7.5 Sand	Gray/Brown	None	Fine-Very Fine
986N 925E	20-30cm	Body	Smoothed	Red/brown	2.5YR 4/8	4.5 Sand	Brown/Red	None	Fine-Very Fine
986N 925E	20-30cm	Handle	Smoothed	Red	2.5YR 4/6	8.5 Sand	Brown/Red	Slip	Fine-Very Fine
986N 925E	20-30cm	Body	Smoothed	Gray/Brown	10YR 5/2	5.5 Sand	Brown	None	Very Fine
986N 925E	20-30cm	Body	Smoothed	Gray/Brown	10YR 5/2	7 Sand	Gray/Brown	None	Medium-Fine
986N 925E	20-30cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Brown/Red	None	Fine-Very Fine
986N 925E	20-30cm	Body	Smoothed	Red/Brown	7.5YR 5/2	5 Sand	Brown/Red	Painted	Fine
986N 925E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	Brown/Red	None	Fine
986N 925E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	Brown/Red	Slip	Medium-Fine
986N 925E	20-30cm	Body	Smoothed	Brown/Gray	10YR 5/4	7 Sand	Brown/Red	None	Fine-Very Fine
986N 925E	20-30cm	Body	Smoothed	Gray	Gley2 6/10B	6.5 Sand	Brown	None	Fine-Very Fine
986N 925E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	8 Sand	Brown/Red	None	Fine-Very Fine
986N 925E	20-30cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	5.5 Sand	Brown/Gray	None	Fine-Very Fine
986N 925E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	Brown/Red	None	Fine-Very Fine
986N 925E	20-30cm	Rim	Smoothed	Red	2.5YR 4/6	7 Sand	Brown/REd	None	Fine-Very Fine
986N 925E	20-30cm	Body	Smoothed	Red/Gray	10R 5/2	6.5 Sand	Brown	Slip	Fine
986N 925E	20-30cm	Body	Smoothed	Brown/Red	7.5YR 4/6	4 Sand	Brown/Red	None	Fine-Very Fine
986N 925E	20-30cm	Body	Smoothed	Gray	Gley2 6/10B	5 Sand	Brown/red	None	Fine-Very Fine
986N 925E	20-30cm	Body	Smoothed	Gray/Black	Gley2 5/10B	6.5 Sand	Brown	Noen	Fine-Very Fine
986N 925E	20-30cm	Body	Smoothed	Brown/Gray	10YR 5/4	6.5 Sand	Brown/Red	None	Fine-Very Fine
986N 925E	20-30cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Brown/Gray	None	Fine-Very Fine
986N 925E	20-30cm	Rim	Smoothed	Black	10YR 5/2	5.5 Sand	Gray	None	Fine-Very Fine
986N 925E	0-10cm	Body	Smoothed	Black	Gley1 2.5/N	4.5 Sand	Brown/Gray	None	Fine-Very Fine
986N 925E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5 Sand	Brown/REd	None	Medium

986N 925E	0-10cm	Body	Smoothed	Brown/REd	7.5YR 4/6	6.5 Sand	None	Brown/Red	None	Fine-Very Fine
986N 925E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	8 Sand	none	Brown/REd	None	Fine-Very Fine
986N 925E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	4 Sand	Brown/Red	Brown	Slip	Fine-Very Fine
986N 925E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	8 Sand	None	Red/Brown	None	Fine-Very Fine
986N 925E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	6.5 Sand	None	Brown	None	Fine-Very Fine
986N 925E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	Red/Brown	Brown/REd	Slip	Fine-Very Fine
986N 925E	0-10cm	Body	Smoothed	Red	7.5YR 4/6	5 Sand	Red	Red/Brown	Slip	Fine
986N 925E	0-10cm	Body	Smoothed	Brown/Red	2.5YR 4/6	3.5 Sand	Brown/Red	Brown	Slip	Fine-Very Fine
986N 925E	0-10cm	Body	Corrugated	Gray/Brown	10YR 5/2	6 Sand	None	Gray	None	Fine-Very Fine
986N 925E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	Red/Brown	Brown	Slip	Fine-Very Fine
986N 925E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	5 Sand	Light Gray	Brown/Gray	Slip	Fine
986N 925E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5 Sand	Brown/REd	Red/Brown	Slip	Very Fine
986N 925E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	5.5 Sand	None	Brown/Red	None	Fine-Very Fine
986N 929E	50-60cm	Body	Smoothed	Black	Gley1 2.5/N	5.5 Sand	Black	Gray	Slip	Medium-Fine
986N 929E	50-60cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5 Sand	Brown/Red	Gray/Brown	Slip	Fine-Very Fine
986N 929E	50-60cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	None	Red/Brown	None	Medium
985N 931E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	7 Sand	None	Brown/Gray	None	Fine
985N 931E	10-20cm	Body	Smoothed	Gray/Tan	10YR 6/2	5.5 Sand	None	Brown/Gray	None	Fine
985N 931E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	6 Sand	None	Brown/Gray	None	Fine-Very Fine
985N 931E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	6 Sand	None	Gray/Brown	None	Fine-Very Fine
985N 931E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	4.5 Sand	None	Red/Brown	None	Fine
985N 931E	10-20cm	Body	Smoothed	Red/Gray	10R 5/2	6.5 Sand	None	Red/Gray	None	Medium-Fine
985N 931E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	4.5 Sand	None	Brown/Gray	None	Medium-Fine
985N 931E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	4 Sand	None	Brown	None	Fine-Very Fine
985N 931E	10-20cm	Body	Smoothed	Red/Gray	10R 5/2	7 Sand	Red/gray	Gray/Brown	Slip	Fine-Very Fine
985N 931E	10-20cm	Body	Smoothed	Gray/Red	10R 4/1	8.5 Sand	None	Gray/Red	None	Fine
985N 931E	10-20cm	Body	Smoothed	Gray/Black	Gley2 5/10B	6 Sand	None	Brown/Red	None	Medium-Fine
985N 931E	10-20cm	Body	Smoothed	Gray/Red	10R 4/1	7 Sand	None	Red/Brown	None	Medium-Fine
985N 931E	10-20cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	6 Sand	Black	Gray/Brown	Slip	Fine-Very Fine
985N 931E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Red/Gray	None	Fine
985N 931E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	4.5 Sand	None	Gray/Brown	None	Fine-Very Fine
985N 931E	10-20cm	Body	Smoothed	Light Gray	10YR 6/1	4.5 Sand	Light Gray	Brown/Gray	Slip	Fine-Very Fine
985N 931E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	Red/Brown	Red/Brown	Slip	Fine-Very Fine
985N 931E	10-20cm	Body	Corrugated	Gray/Red	10R 4/1	7 Sand	None	Gray/Red	Painted	Fine-Very Fine
985N 931E	10-20cm	Body	Smoothed	Gray/Brown	Gley2 6/10B	5.5 Sand	None	Gray	None	Fine-Very Fine
985N 931E	10-20cm	Handle	Smoothed	Red/Brown	10YR 5/2	7 Sand	None	Gray/Brown	None	Fine-Very Fine
985N 931E	10-20cm	Handle	Smoothed	Red/Brown	2.5YR 4/8	9.5 Sand	None	Brown/Red	None	Fine-Very Fine
985N 931E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5 Sand	Brown/Red	Gray	Slip	Fine-Very Fine
985N 931E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	None	Red/Brown	None	Fine-Very Fine
985N 931E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	4.5 Sand	Red	Brown/Red	Slip	Fine-Very Fine
985N 931E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	Red/Brown	Brown	Slip	Fine-Very Fine
985N 931E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	7.5 Sand	None	Red/Brown	None	Medium-Fine
985N 931E	10-20cm	Body	Smoothed	Gray/Black	Gley2 5/10B	6 Sand	None	Gray	Slip	Fine-Very Fine
985N 931E	10-20cm	Neck	Smoothed	Gray	Gley2 6/10B	5 Sand	Gray	Brown/Red	Slip	Fine-Very Fine
985N 931E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	8 Sand	None	Red/Brown	None	Medium-Fine
985N 931E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	7 Sand	None	Red/Brown	None	Fine
985N 931E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	9.5 Sand	None	Red/Brown	None	Medium
985N 931E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	6.5 Sand	None	Brown/Gray	None	Fine-Very Fine
985N 931E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Brown/Red	None	Fine-Very Fine
985N 931E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	4.5 Sand	Red/Brown	Brown/REd	Slip	Fine-Very Fine
985N 931E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	None	Brown/Red	None	Fine-Very Fine
985N 931E	10-20cm	Body	Smoothed	Black	Gley1 2.5/N	6 Sand	Black/Gray	Red/Brown	Slip	Medium-Fine
985N 931E	10-20cm	Body	Smoothed	Brown/REd	7.5YR 4/6	7.5 Sand	None	Brown/Red	None	Fine

985N 931E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	3.5 Sand	None	Gray/Brown	None	Fine-Very Fine
985N 931E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	Red/Brown	Gray	Slip	Fine
985N 931E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Brown/Red	None	Fine-Very Fine
985N 931E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	None	Red/Brown	None	Fine
985N 931E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	10.5 Sand	None	Red/Brown	None	Medium
985N 931E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Brown/Red	Slip	Fine-Very Fine
985N 931E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5 Sand	None	Brown/Red	None	Fine-Very Fine
985N 931E	0-10cm	Body	Smoothed	Red/Gray	10R 5/2	6 Sand	Red	Red/Brown	Slip	Medium-Fine
985N 931E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	Red/Brown	Brown/Red	Slip	Fine-Very Fine
985N 931E	0-10cm	Body	Smoothed	Gray/Black	Gley2 5/10B	4.5 Sand	None	Gray	None	Fine
985N 931E	0-10cm	Rim	Smoothed	Gray	Gley2 6/10B	5.5 Sand	None	Gray	None	Fine-Very Fine
985N 931E	0-10cm	Body	Smoothed	Brown/red	7.5YR 4/6	6 Sand	None	Brown/Red	None	Fine-Very Fine
985N 931E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	Red/Brown	Brown	Slip	Fine-Very Fine
985N 931E	0-10cm	Body	Smoothed	Black	Gley1 2.5/N	4 Sand	Black	Red/Brown	slip	Fine-Very Fine
985N 931E	0-10cm	Body	Smoothed	Red/Gray	10R 5/2	4 Sand	Red/Gray	Brown	Slip	Medium
985N 931E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	None	Red/Brown	None	Fine-Very Fine
985N 931E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	6.5 Sand	None	Red/Brown	None	Fine-Very Fine
985N 931E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	5 Sand	None	Brown	None	Fine-Very Fine
985N 931E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 sand	Red/Brown	Brown/Red	None	Fine-Very Fine
985N 931E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	10.5 Sand	None	Red/Brown	None	Medium
985N 931E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Brown/Red	Slip	Fine-Very Fine
985N 931E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	7 Sand	None	Brown	None	Fine
985N 931E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5 Sand	None	Brown/red	None	Fine-Very Fine
985N 931E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	6.5 Sand	Red	Brown/Gray	None	Fine-Very Fine
985N 931E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	6 Sand	Red	Brown/Red	Slip	Fine
985N 931E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	7 Sand	Red	Brown/red	Slip	Medium-Fine
985N 931E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	7.5 Sand	Gray	Red/Brown	Slip	Medium
985N 931E	0-10cm	Body	Smoothed	Light gray	10YR 6/1	4.5 Sand	None	Gray	None	Fine-Very Fine
985N 931E	0-10cm	Body	Smoothed	Gray/Black	Gley2 5/10B	5 Sand	Gray/Black	Red/Brown	Slip	Fine
985N 931E	0-10cm	Body	Corrugated	Gray	Gley2 6/10B	4 Sand	None	Gray	None	Fine-Very Fine
985N 931E	0-10cm	Body	Smoothed	White/Red	2.5YR 7/2	8 Sand	White	Red/Brown	Painted	Medium
986N 927E	50-60cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Red/Brown	None	Medium-Fine
986N 929E	60-70cm	Rim	Smoothed	Black	Gley1 2.5/N	4 Sand	Black	Brown	Slip	Fine-Very Fine
986N 926E	50-60cm	Body	Smoothed	Red/Gray	10R 5/2	8 Sand	Red/Gray	Brown/Gray	Slip	Fine-Very Fine
986N 928E	50-60cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Red/Brown	None	Medium
986N 928E	50-60cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Red/Brown	None	Medium
986N 928E	50-60cm	Body	Smoothed	Brown/Gray	10YR 5/4	7 Sand	Brown	Red/Brown	Slip	Fine-Very Fine
986N 928E	50-60cm	Body	Smoothed	Gray/Black	Gley2 5/10B	4.5 Sand	Gray/Black	Red/Brown	Slip	Fine
986N 928E	50-60cm	Body	Smoothed	Gray/black	Gley2 5/10B	6 Sand	Gray/Black	Brown	Slip	Fine
987N 928E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	6.5 Sand	Red	Brown/Red	Slip	Fine-Very Fine
987N 928E	10-20cm	Body	Smoothed	Gray/Red	10R 4/1	5.5 Sand	None	Red/Brown	none	Fine-Very Fine
987N 928E	10-20cm	Rim	Smoothed	Brown/Red	7.5YR 4/6	10 Sand	None	Brown/Red	None	Fine
987N 928E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	6 Sand	None	Gray/Brown	None	Fine-Very Fine
987N 928E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Brown/Red	None	Fine-Very Fine
987N 928E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	Red	Brown/Red	None	Fine-Very Fine
987N 928E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5.5 Sand	Brown/Red	Brown	Slip	Fine-Very Fine
987N 928E	10-20cm	Handle	Smoothed	Brown/Gray	10YR 5/4	8.5 Sand	None	Red/Brown	None	Fine
987N 928E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	None	Red/Brown	None	Medium
987N 928E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	Red	Red/Brown	Slip	Fine-Very Fine
987N 928E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	3.5 Sand	Red	Red/Brown	Slip	Fine-Very Fine
987N 928E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	6 Sand	None	Brown/Red	None	Medium
987N 928E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5 Sand	None	Red/Brown	None	Fine
987N 928E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	5 Sand	Red/Brown	Brown/Red	Slip	Fine-Very Fine
987N 928E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Red/Brown	None	Fine
987N 928E	10-20cm	Rim	Smoothed	Gray/Red	10R 4/1	7 Sand	None	Gray/Red	None	Fine-Very Fine
987N 928E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Red/Brown	None	Fine-Very Fine
987N 928E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6.5 Sand	None	Brown/Red	None	Fine-Very Fine

987N 928E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	6.5 Sand	None	Brown/Red	None	Fine
987N 928E	10-20cm	Body	Smoothed	Red/Gray	10R 5/2	6 Sand	Red	Red/Brown	Slip	Medium-Fine
987N 928E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	3.5 Sand	Red	Red/Brown	Slip	Fine
987N 928E	10-20cm	Body	Corrugated	Gray/Brown	10YR 5/2	5 Sand	None	Gray	None	Fine-Very Fine
987N 928E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	7 Sand	None	Red/Brown	None	Medium
987N 928E	10-20cm	Body	Smoothed	Gray/Black	Gley2 5/10B	7 Sand	None	Brown/Gray	None	Fine-Very Fine
987N 928E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	7 Sand	None	Red/Brown	None	Fine-Very Fine
987N 928E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	Red	Brown/Red	Slip	Fine-Very Fine
987N 928E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Brown/red	Slip	Fine
987N 928E	10-20cm	Body	Smoothed	Light Gray	10YR 6/1	4 Sand	Light Gray	Brown/Gray	Slip	Fine-Very Fine
987N 928E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	4.5 Sand	None	Gray/Brown	None	Fine-Very Fine
987N 928E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	None	Red/Brown	None	Medium-Fine
987N 928E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	6.5 Sand	Red	Brown/Red	Slip	Fine-Very Fine
987N 928E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	4.5 Sand	None	Gray	None	Fine-Very Fine
987N 928E	10-20cm	Body	Smoothed	Red/Gray	10R 5/2	4.5 Sand	None	Red/Gray	Slip	Fine-Very Fine
987N 928E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	None	Red/Gray	None	Fine-Very Fine
987N 928E	10-20cm	Body	Smoothed	White/Red	10R 4/1	11 Sand	White	Red/Brown	Slip	Fine
987N 928E	10-20cm	Body	Smoothed	Red/Red	2.5YR 7/2	7.5 Sand	White	Red/Brown	Painted	Fine
987N 928E	20-30cm	Rim	Smoothed	Red/Brown	2.5YR 4/8	8 Sand	None	Red/Brown	None	Fine
987N 928E	20-30cm	Body	Smoothed	Red	2.5YR 4/6	5.5 Sand	Red	Brown/Red	Slip	Fine-Very Fine
987N 928E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	Red/Brown	Red/Brown	Slip	Fine-Very Fine
987N 928E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Red/Brown	None	Medium
987N 928E	20-30cm	Body	Smoothed	Brown/Gray	10YR 5/4	7 Sand	None	Brown	None	Fine
987N 928E	20-30cm	Body	Smoothed	Black	Gley1 2.5/N	7.5 Sand	Black	Red/Brown	Slip	Fine-Very Fine
987N 928E	20-30cm	Body	Smoothed	Black/Gray	Gley2 4.5/PB	7 Sand	Black/Gray	Red/Brown	Slip	Fine
987N 928E	20-30cm	Handle	Smoothed	Gray/Black	Gley2 5/10B	8 Sand	Gray/Black	Gray	Slip	Fine-Very Fine
987N 928E	20-30cm	Body	Smoothed	Gray/Red	10R 4/1	7.5 Sand	Gray/Red	Red/Gray	Slip	Medium-Fine
987N 928E	20-30cm	Rim	Smoothed	Gray	Gley2 6/10B	8 Sand	None	Gray	None	Medium-Fine
987N 928E	30-40cm	Body	Smoothed	Gray	Gley2 6/10B	7.5 Sand	Gray	Red/Brown	Slip	Fine-Very Fine
986N 925E	50-60cm	Body	Smoothed	Dark Red	2.5YR 3/4	5.5 Sand	Dark Red/Gray	Red/Gray	Slip	Fine-Very Fine
986N 925E	50-60cm	Body	Smoothed	Gray	Gley2 6/10B	5.5 Sand	Black	Brown/Red	Slip	Fine-Very Fine
986N 925E	50-60cm	Body	Smoothed	Black	Gley1 2.5/N	5 Sand	Black	Gray	Slip	Medium-Fine
986N 925E	50-60cm	Body	Smoothed	Black	Gley1 2.5/N	5.5 Sand	Black	Gray	Slip	Medium-Fine
986N 925E	50-60cm	Body	Smoothed	Black	Gley1 2.5/N	5 Sand	Black	Gray	Slip	Medium-Fine
986N 930E	70-80cm	Rim	Smoothed	Brown/Gray	10YR 5/4	6 Sand	Black	Gray	Slip	Medium-Fine
986N 930E	70-80cm	Rim	Smoothed	Gray	Gley2 6/10B	7 Sand	Gray	Brown/Gray	Slip	Fine-Very Fine
986N 930E	70-80cm	Body	Smoothed	Black	Gley1 2.5/N	5 Sand	Black	Brown	Slip	Fine
986N 930E	70-80cm	Body	Smoothed	Black	Gley1 2.5/N	4 Sand	Black	Brown	Slip	Fine-Very Fine
986N 930E	70-80cm	Body	Smoothed	Red	2.5YR 4/6	4 Sand	Red	Red/Brown	Slip	Fine-Very Fine
986N 930E	70-80cm	Body	Smoothed	Black	Gley1 2.5/N	6 Sand	Black	Brown/Gray	Slip	Fine
986N 930E	70-80cm	Body	Smoothed	Black	Gley1 2.5/N	6.5 Sand	Black	Brown/Gray	Slip	Fine
986N 930E	70-80cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5 Sand	None	Brown/Red	None	Fine-Very Fine
986N 930E	70-80cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	Red/Brown	Brown/Red	slip	Fine-Very Fine
987N 928E	0-10cm	Body	Corrugated	Gray/Black	Gley2 5/10B	5 Sand	None	Gray/Brown	None	Fine-Very Fine
987N 928E	0-10cm	Body	Corrugated	Black/Brown	7.5YR 3.2	6 Sand	Black	Gray/Brown	slip	Fine-Very Fine
987N 928E	0-10cm	Body	Smoothed	Gray/Red	10R 4/1	8.5 Sand	Gray	Brown/Red	Slip	Medium-Fine
987N 928E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	Red/Brown	Red/Brown	Slip	Fine-Very Fine
985N 930E	0-10cm	Body	Smoothed	Black	Gley1 2.5/N	4.5 Sand	Black	Brown	Slip	Fine-Very Fine
985N 930E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	8 Sand	None	Brown/Red	None	Medium-Fine
985N 930E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	6 Sand	Red	Brown/Red	None	Fine-Very Fine
985N 930E	0-10cm	Body	Smoothed	Black	Gley1 2.5/N	5 Sand	Black	Gray/Brown	Slip	Fine-Very Fine
985N 930E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	6 Sand	None	Brown/Red	None	Medium-Fine
985N 930E	0-10cm	Body	Smoothed	Gray/Black	Gley2 5/10B	4.5 Sand	None	Gray	None	Fine-Very Fine
985N 930E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	4.5 Sand	None	Gray/Brown	None	Fine-Very Fine
985N 930E	0-10cm	Rim	Smoothed	Gray/Red	10R 4/1	6 Sand	Red	Red/Brown	Slip	Fine-Very Fine
985N 930E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	4.5 Sand	None	Gray	None	Fine
985N 930E	0-10cm	Body	Smoothed	Light Gray	10YR 6/1	4 Sand	Light Gray	Brown/Gray	Slip	Fine-Very Fine
985N 930E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6.5 Sand	Red/Brown	Gray/Brown	Slip	Fine-Very Fine

985N 931E	Body	30-40cm	Smoothed	Brown/Gray	10YR 5/4	6.5 Sand	None	Brown	None	Fine
985N 931E	Body	30-40cm	Smoothed	Black/Gray	Gley2 4/5PB	6 Sand	Black/Gray	Brown/Red	Slip	Fine-Very Fine
985N 931E	Body	30-40cm	Smoothed	Black/Gray	Gley2 4/5PB	7 Sand	Black/Gray	Brown/Red	Slip	Fine-Very Fine
985N 931E	Body	30-40cm	Smoothed	Black/Gray	Gley2 4/5PB	6 Sand	Black	Brown/Red	Slip	Fine-Very Fine
985N 931E	Body	30-40cm	Smoothed	Red	Gley1 2.5/N	6 Sand	Black	Brown/Gray	Slip	Fine-Very Fine
985N 931E	Body	30-40cm	Smoothed	Red/Brown	2.5YR 4/6	4 Sand	Red	Red/Brown	Slip	Fine
985N 931E	Body	30-40cm	Smoothed	Gray/Black	2.5YR 4/8	8.5 Sand	None	Red/Brown	None	Medium
985N 931E	Body	30-40cm	Smoothed	Gray/Black	Gley2 5/10B	6 Sand	Gray/Black	Brown	Slip	Fine-Very Fine
985N 931E	Body	30-40cm	Smoothed	Gray/Black	Gley2 5/10B	5 Sand	gray/Brown	Brown/red	Slip	Fine-Very Fine
985N 931E	Body	30-40cm	Smoothed	Red/Brown	2.5YR 4/8	7.5 Sand	red/Brown	Red/Brown	Slip	Medium
985N 931E	Body	30-40cm	Smoothed	Black/Gray	Gley2 4/5PB	7 Sand	Black/Gray	Gray/Brown	Slip	Fine-Very Fine
985N 931E	Body	30-40cm	Smoothed	Brown/Gray	10YR 5/4	5.5 Sand	None	Brown/Red	None	Fine-Very Fine
985N 929E	Rim	0-10cm	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Red/Brown	None	Fine
985N 929E	Rim	0-10cm	Smoothed	Red	2.5YR 4/6	6 Sand	Red	Red/Brown	Slip	Fine
985N 929E	Body	0-10cm	Smoothed	Brown/Red	7.5YR 4/6	5.5 Sand	None	Brown/Red	None	Fine-Very Fine
985N 929E	Body	0-10cm	Smoothed	Brown/Gray	10YR 5/4	6 Sand	None	Brown/Red	None	Fine-Very Fine
985N 929E	Body	0-10cm	Smoothed	Black/Gray	Gley2 4/5PB	4 Sand	none	Brown/Gray	None	Fine
985N 929E	Body	0-10cm	Smoothed	Black	Gley1 2.5/N	7 Sand	Black	Gray	Slip	Fine-Very Fine
985N 931E	Body	20-30cm	Smoothed	Red	2.5YR 4/6	4 Sand	Red	Red/Brown	Slip	Fine
985N 931E	Body	20-30cm	Smoothed	Gray/Black	Gley2 5/10B	6.5 Sand	Gray/Black	Brown/red	Slip	Fine
985N 931E	Body	20-30cm	Smoothed	Black	Gley1 2.5/N	6 Sand	Black	Brown/Gray	Slip	Fine-Very Fine
985N 931E	Body	20-30cm	Smoothed	Gray/Black	Gley2 5/10B	7 Sand	Gray/Black	Brown/Red	Slip	Fine-Very Fine
985N 931E	Body	20-30cm	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	Gray/Black	Brown/Red	Slip	Fine-Very Fine
985N 931E	Body	20-30cm	Smoothed	Gray	Gley2 6/10B	7.5 Sand	None	Red/Brown	Slip	fine
985N 932E	Body	20-30cm	Smoothed	Brown/Gray	10YR 5/4	6 Sand	None	Brown/Gray	None	Fine-Very Fine
985N 932E	Body	20-30cm	Smoothed	Red/Gray	10R 5/2	4 Sand	Brown/Gray	Gray	Slip	Fine-Very Fine
985N 932E	Body	50-60cm	Smoothed	Black	Gley1 2.5/N	6 Sand	Red/Gray	Brown/Gray	Slip	Fine-Very Fine
985N 931E	Body	50-60cm	Smoothed	White/Red	2.5YR 7/2	6 Sand	Black	Gray/Brown	Slip	Fine-Very Fine
985N 931E	Body	50-60cm	Smoothed	Gray/Red	10R 4/1	3 Sand	White	Red/Brown	Slip	Medium-Fine
985N 931E	Body	40-50cm	Smoothed	Black/Brown	7.5YR 3.2	7 Sand	Gray/Red	Red/Brown	Slip	Fine
985N 931E	Body	40-50cm	Smoothed	Gray/Black	Gley2 5/10B	6.5 Sand	Black/Black	Brown	Slip	Fine-Very Fine
985N 931E	Body	40-50cm	Smoothed	Gray	Gley2 6/10B	8 Sand	Noen	Gray/Brown	None	Fine-Very Fine
985N 931E	Body	40-50cm	Smoothed	Gray/Black	Gley2 5/10B	6 Sand	None	Red/Brown	None	Medium
985N 931E	Body	40-50cm	Smoothed	Black/Gray	Gley2 4/5PB	6 Sand	Gray/Black	Red/Gray	Slip	Medium-Fine
985N 931E	Body	40-50cm	Smoothed	Red	2.5YR 4/6	4 Sand	Black/Gray	Gray/Brown	Slip	Medium-Fine
985N 931E	Body	40-50cm	Smoothed	Gray/Black	Gley2 5/10B	5.5 Sand	Noen	Brown/Gray	None	Fine-Very Fine
985N 932E	Body	40-50cm	Smoothed	Red	2.5YR 4/6	4 Sand	Red	Brown/Red	Slip	Fine-Very Fine
985N 932E	Body	30-40cm	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	Gray	Red/Brown	Slip	Fine-Very Fine
985N 932E	Body	30-40cm	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	Noen	Brown/Red	Noen	Fine-Very Fine
985N 932E	Body	30-40cm	Smoothed	Brown/red	7.5YR 4/6	4 Sand	None	Red/Brown	None	Fine-Very Fine
985N 932E	Rim	30-40cm	Smoothed	Gray	Gley2 6/10B	5 Sand	Gray	Brown/Gray	Slip	Fine-Very Fine
985N 930E	Body	10-20cm	Smoothed	Red	10YR 5/4	8 Sand	Red	Gray/Brown	Slip	Fine
985N 930E	Body	10-20cm	Smoothed	Gray	2.5YR 4/6	4 Sand	None	Red/Brown	None	Fine
985N 930E	Body	10-20cm	Smoothed	Red/Brown	Gley2 6/10B	6.5 Sand	None	Brown/Gray	Incised	Fine-Very Fine
985N 930E	Body	10-20cm	Smoothed	Gray/Black	2.5YR 4/8	5 Sand	None	Red/Brown	Raised	Fine
985N 930E	Body	10-20cm	Smoothed	Red/Brown	Gley2 5/10B	4.5 Sand	Gray	Brown/Gray	Slip	Fine
985N 930E	Body	10-20cm	Smoothed	Red/Brown	2.5YR 4/8	7.5 Sand	None	Red/Brown	None	Fine-Very Fine
985N 930E	Body	10-20cm	Smoothed	Gray	Gley2 6/10B	4 Sand	None	Brown/Gray	Noen	Fine-Very Fine
985N 930E	Body	10-20cm	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	Red/Brown	Red/Brown	Slip	Fine-Very Fine
985N 930E	Body	10-20cm	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Red/Brown	Slip	Fine-Very Fine
985N 930E	Body	10-20cm	Smoothed	Gray/Brown	10YR 5/2	7 Sand	Black	Gray/Brown	Slip	Medium
985N 930E	Body	10-20cm	Smoothed	Brown/Gray	10YR 5/4	4 Sand	None	Brown	None	Fine-Very Fine
985N 930E	Neck	10-20cm	Smoothed	Light Gray	10YR 6/1	5 Sand	None	Gray/Brown	None	Fine
985N 930E	Body	10-20cm	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Red/Brown	None	Fine-Very Fine
985N 930E	Body	10-20cm	Smoothed	Brown/Red	7.5YR 4/6	5 Sand	Brown/Red	Brown/Gray	Slip	Fine-Very Fine
985N 930E	Body	10-20cm	Smoothed	Red/Gray	10R 5/2	6 Sand	Red/Gray	Red/Brown	Slip	Fine-Very Fine
985N 929E	Body	30-40cm	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	Red/Brown	Red/Brown	slip	Fine-Very Fine

985N 929E	30-40cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Red/Brown	None	None	Fine-Very Fine
985N 929E	30-40cm	Body	Smoothed	Light Gray	10YR 6/1	6 Sand	None	Gray	None	None	Fine
985N 929E	30-40cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5.5 Sand	Brown/red	Red/Brown	Slip	Slip	Fine-Very Fine
985N 929E	30-40cm	Body	Smoothed	Brown/Red	7.5YR 4/6	7 Sand	Gray/Black	Red/Brown	Slip	Slip	Fine-Very Fine
985N 929E	30-40cm	Body	Smoothed	Gray	Gley2 6/10B	6.5 Sand	Gray	Brown/gray	Slip	Slip	Fine-Very Fine
985N 929E	30-40cm	Rim	Smoothed	Brown/Gray	10YR 5/4	6.5 Sand	None	Brown/Gray	Noen	Noen	Fine-Very Fine
985N 929E	30-40cm	Neck	Smoothed	Black	Gley1 2.5/N	3.5 Sand	black	Gray	Slip	Slip	Fine-Very Fine
985N 929E	30-40cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Red/Brown	None	None	Fine
985N 929E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	7.5 Sand	None	Brown	None	None	Fine
985N 929E	10-20cm	Body	Smoothed	White/Red	2.5YR 7/2	7 Sand	White	Red/Brown	Painted	Painted	Fine-Very Fine
985N 929E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	5.5 Sand	None	Gray	Noen	Noen	Fine
985N 929E	10-20cm	Body	Smoothed	Black	Gley1 2.5/N	6.5 Sand	Black	Gray	slip	slip	Fine-Very Fine
985N 929E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	8.5 Sand	None	Gray	None	None	Medium-Fine
985N 929E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	7 Sand	Red	Red/Brown	slip	slip	Medium
985N 929E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	3.5 Sand	Red	Brown/Red	Slip	Slip	Fine-Very Fine
985N 929E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Red/Brown	Slip	Slip	Fine-Very Fine
985N 929E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	4.5 Sand	Red	Red/Brown	Slip	Slip	Fine-Very Fine
985N 929E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Red/Brown	None	None	Medium
985N 929E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	6 Sand	None	Gray	None	None	Medium
985N 929E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	8 Sand	None	Gray	Noen	Noen	Medium
985N 930E	30-40cm	Body	Smoothed	Black	Gley1 2.5/N	5 Sand	black	Red/Gray	Slip	Slip	Fine-Very Fine
985N 930E	30-40cm	Body	Smoothed	Gray/Red	10R 4/1	7 Sand	None	Red/gray	None	None	Medium
985N 929E	20-30cm	Body	Smoothed	Black	Gley1 2.5/N	7 Sand	Black	Gray	Slip	Slip	Fine-Very Fine
985N 929E	20-30cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	Brown/Red	Red/Brown	Slip	Slip	Fine-Very Fine
985N 929E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	Red/Brown	Red/Brown	Slip	Slip	Fine-Very Fine
985N 929E	20-30cm	Body	Smoothed	Red	2.5YR 4/6	6 Sand	Red	Red/Brown	Slip	Slip	Fine-Very Fine
985N 929E	20-30cm	Body	Smoothed	Red	2.5YR 4/6	3.5 Sand	Red	Gray/Brown	Slip	Slip	Fine-Very Fine
985N 929E	20-30cm	Body	Smoothed	Red	2.5YR 4/6	6.5 Sand	Gray/Red	Gray/Red	Slip	Slip	Fine-Very Fine
985N 929E	20-30cm	Rim	Smoothed	Brown/Gray	10YR 4/1	7.5 Sand	None	Brown/Gray	None	None	Medium-Fine
985N 929E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	Red/Brown	Brown/Red	Slip	Slip	Fine-Very Fine
985N 929E	20-30cm	Body	Smoothed	Black	Gley1 2.5/N	7 Sand	Black	Gray	Slip	Slip	Medium-Fine
985N 929E	20-30cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	8.5 Sand	Gray?	Gray/Brown	Slip?	Slip?	Medium-Fine
985N 929E	20-30cm	Body	Smoothed	Light Gray	10YR 6/1	5.5 Sand	None	Gray	None	None	Fine-Very Fine
985N 929E	20-30cm	Body	Smoothed	Light Gray	10YR 6/1	7 Sand	None	Gray	None	None	Fine
985N 929E	20-30cm	Body	Smoothed	Red	2.5YR 4/6	6 Sand	Red	Red/Brown	Slip	Slip	Fine-Very Fine
985N 930E	40-50cm	Body	Smoothed	Dark Red	2.5YR 3/4	6 Sand	Dark Red	Brown/Red	Slip	Slip	Fine-Very Fine
985N 930E	40-50cm	Body	Smoothed	Dark Red	2.5YR 3/4	5.5 Sand	Dark Red	Brown/Red	Slip	Slip	Fine-Very Fine
985N 930E	40-50cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	Brown/Red	Brown/Red	Slip	Slip	Fine-Very Fine
985N 930E	40-50cm	Body	Smoothed	Gray/Red	10R 4/1	6 Sand	Gray	Red/Gray	Slip	Slip	Fine-Very Fine
985N 930E	40-50cm	Body	Smoothed	Gray/Black	Gley2 5/10B	6 Sand	Gray/Black	Red/Brown	Slip	Slip	Fine-Very Fine
985N 930E	20-30cm	Body	Smoothed	Red	2.5YR 4/6	7 Sand	Red	Brown/Red	Slip	Slip	Fine-Very Fine
985N 930E	20-30cm	Body	Smoothed	Gray	Gley2 6/10B	6 Sand	None	Brown/Red	None	None	Fine-Very Fine
985N 930E	20-30cm	Body	Smoothed	Red/Gray	10R 5/2	8 Sand	Gray	Brown/Red	Slip	Slip	Fine-Very Fine
985N 930E	20-30cm	Rim	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	Red/Brown	Red/Brown	Slip	Slip	Fine-Very Fine
985N 930E	20-30cm	Body	Smoothed	Red	2.5YR 4/6	3.5 Sand	Red	Red/Brown	slip	slip	Fine-Very Fine
985N 930E	20-30cm	Rim	Smoothed	Gray/Red	10R 4/1	5.5 Sand	Gray/Red	Red/Brown	Slip	Slip	Very Fine
985N 930E	20-30cm	Body	Smoothed	Red	2.5YR 4/6	4 Sand	Red	Brown/red	Slip	Slip	Fine-Very Fine
985N 930E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	Red/Brown	Red/Brown	Slip	Slip	Fine-Very Fine
985N 929E	40-50cm	Body	Smoothed	black	Gley1 2.5/N	5 Sand	Black	Gray	Slip	Slip	Fine-Very Fine
985N 929E	40-50cm	Body	Smoothed	Brown/Red	7.5YR 4/6	7.5 Sand	None	Brown/Red	none	none	Fine-Very Fine
985N 929E	40-50cm	Body	Smoothed	Gray	Gley2 6/10B	5.5 Sand	None	Gray/Red	None	None	Medium
985N 929E	40-50cm	Body	Smoothed	Red	2.5YR 4/6	7 Sand	Red	Red/Brown	Slip	Slip	Fine
986N 926E	Fill in F47	Base	Smoothed	Gray/Black	Gley2 5/10B	6.5 Sand	None	Gray	None	None	Fine-Very Fine
986N 926E	Fill in F47	Body	Smoothed	Gray/Brown	10YR 5/2	6 Sand	Gray/Brown	Red/Brown	Slip	Slip	Medium-Fine
986N 926E	Fill in F47	Body	Smoothed	Gray/Brown	10YR 5/2	7 Sand	Gray/Brown	Red/Brown	slip	slip	Medium-Fine
986N 926E	Fill in F47	Body	Smoothed	Gray/Red	10R 4/1	6 Sand	Gray/Red	Brown/Red	Slip	Slip	fine
986N 926E	Fill in F47	Body	Smoothed	Black	Gley1 2.5/N	4.5 Sand	Black	Red/Brown	Slip	Slip	Fine-Very Fine
986N 926E	Fill in F47	Body	Smoothed	Black/Gray	Gley2 4/5PB	5 Sand	None	Gray	Noen	Noen	Fine-Very Fine





986N 923E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Red/Brown	None	Fine
986N 923E	20-30cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	Brown	Red/Gray	Slip	Fine-Very Fine
986N 923E	20-30cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	6 Sand	Black/Gray	Gray/Brown	slip	Fine-Very Fine
986N 923E	20-30cm	Body	Smoothed	Light Gray	10YR 6/1	5 Sand	None	Gray	None	Fine
986N 923E	20-30cm	Body	Smoothed	Gray/Black	Gley2 5/10B	5.5 Sand	Black	Gray/Brown	Slip	fine
986N 923E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Red/Gray	none	Fine-Very Fine
986N 924E	30-40cm	Rim	Smoothed	Brown/Gray	10YR 5/4	4.5 Sand	Brown	Gray/Brown	Slip	Fine-Very Fine
986N 924E	30-40cm	Body	Smoothed	Gray/Red	10R 4/1	5.5 Sand	Gray/Red	Red/Brown	Slip	Fine
986N 924E	30-40cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	5 Sand	Black/Gray	Gray	Slip	Medium-Fine
986N 924E	30-40cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	Red/Brown	Brown/Red	Slip	Fine-Very Fine
986N 924E	30-40cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	Red/Brown	Brown/Red	Slip	Fine-Very Fine
986N 924E	30-40cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	Red/Brown	Brown/Red	Slip	Fine-Very Fine
986N 924E	30-40cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5.5 Sand	None	Red/Brown	None	Fine
986N 924E	30-40cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	Red/Brown	Red/Brown	Slip	Medium-Fine
986N 924E	30-40cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	Red/Brown	Brown/Gray	Slip	Fine-Very Fine
986N 923E	10-20cm	Body	Smoothed	Black	Gley1 2.5/N	4.5 Sand	Black/Gray	Brown	Slip	Fine-Very Fine
986N 923E	10-20cm	Body	Smoothed	Gray/Black	Gley2 5/10B	4.5 Sand	None	Gray	None	Fine-Very Fine
986N 923E	10-20cm	Rim	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	None	Brown/Red	None	Fine
986N 923E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	4.5 Sand	None	Brown/Red	None	Fine-Very Fine
986N 923E	10-20cm	Body	Smoothed	Brown/Black	10YR 3/2	5 Sand	None	Brown	None	Fine-Very Fine
986N 923E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	6 Sand	None	Gray	None	Fine
986N 923E	10-20cm	Body	Smoothed	Gray/Black	Gley2 5/10B	4.5 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 923E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	4 Sand	Red	Brown/Red	Slip	Fine-Very Fine
986N 929E	Fill in F53	Body	Smoothed	Red	2.5YR 4/6	3.5 Sand	Red	Gray	Slip	Fine-Very Fine
986N 924E	40-50cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Brown/Red	Slip	Very Fine
986N 924E	40-50cm	Body	Smoothed	Red/Brown	2.5YR 4/6	6 Sand	Red/Brown	Gray/Brown	Slip	Fine-Very Fine
986N 924E	40-50cm	Body	Smoothed	Red	2.5YR 4/6	6 Sand	Red	Red/Brown	Slip	Fine-Very Fine
986N 924E	40-50cm	Body	Smoothed	Red/Gray	10R 5/2	7.5 Sand	Red/Gray	Red/Brown	Slip	Fine-Very Fine
986N 924E	40-50cm	Body	Smoothed	Dark Red	10R 5/2	4.5 Sand	Dark Red	Red/Brown	Slip	Fine-Very Fine
986N 924E	40-50cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	Red	Gray/Brown	Slip	Fine-Very Fine
986N 924E	40-50cm	Body	Smoothed	Red/Gray	10R 5/2	6 Sand	Red/Gray	Gray/Brown	Slip	Fine-Very Fine
986N 924E	40-50cm	Body	Smoothed	Dark Red	10YR 5/2	6.5 Sand	None	Brown/Red	Slip	Fine-Very Fine
986N 924E	50-60cm	Rim	Smoothed	Gray/Brown	10YR 5/2	5 Sand	None	Gray/Brown	None	Fine
986N 924E	50-60cm	Body	Smoothed	Dark Red	2.5YR 3/4	5 Sand	Dark Red	Gray/Brown	Slip	Fine-Very Fine
986N 924E	50-60cm	Body	Smoothed	Dark Red	2.5YR 3/4	4.5 Sand	Dark Red	Gray/Brown	Slip	Fine-Very Fine
986N 924E	50-60cm	Body	Smoothed	Red	2.5YR 4/6	6 Sand	Red	Red/Brown	Slip	Fine
986N 924E	50-60cm	Rim	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	Red	Red/Brown	Slip	Fine-Very Fine
986N 924E	50-60cm	Body	Smoothed	Red/Gray	10R 5/2	5 Sand	Red/Gray	Red/Brown	Slip	Fine-Very Fine
986N 934E	0-10cm	Handle	Smoothed	Red/Gray	10YR 5/2	10 Sand	None	Gray/Brown	None	Fine
986N 934E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	5 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 934E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Red/Brown	Slip	Medium-Fine
986N 934E	0-10cm	Body	Smoothed	Brown/red	7.5YR 4/6	5.5 Sand	None	Brown/red	None	Fine-Very Fine
986N 934E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	6.5 Sand	None	Red/Brown	None	Fine-Very Fine
986N 934E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	10 Sand	Red	Brown/Red	Slip	Medium-Fine
986N 934E	0-10cm	Body	Smoothed	White/Red	2.5YR 7/2	6 Sand	White	Red/Brown	Painted	Fine
986N 934E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	Red	Red/Brown	Slip	Medium-Fine
986N 934E	0-10cm	Body	Smoothed	Gray/Black	Gley2 5/10B	5 Sand	None	Gray/Brown	None	Fine
986N 934E	0-10cm	Rim	Smoothed	Gray/Brown	10YR 5/2	5 Sand	None	Brown/Red	None	Fine
986N 934E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	5.5 Sand	None	Gray/Brown	none	Fine-Very Fine
986N 934E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	5 Sand	Gray	Brown/Red	Slip	Fine-Very Fine
986N 933E	0-10cm	Rim	Smoothed	White/Red	2.5YR 7/2	8.5 Sand	White	Red/Brown	Painted	Medium-Fine
986N 933E	0-10cm	Body	Smoothed	White/Red	2.5YR 7/2	8 Sand	White	Red/Brown	Painted	Medium-Fine
986N 933E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	Red/Brown	Brown/Red	Slip	Fine-Very Fine
986N 933E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	8 Sand	Black	Brown/Red	Slip	Fine-Very Fine
986N 933E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Red/Brown	None	Fine
986N 933E	0-10cm	Rim	Smoothed	Gray/Black	Gley2 5/10B	4.5 Sand	None	Gray	None	Fine-Very Fine
986N 933E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	Red/Brown	Brown/Gray	Slip	Fine-Very Fine
986N 933E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Red/Brown	Slip	Fine-Very Fine

986N 933E	0-10cm	Rim	Smoothed	Gray/Red	10R 4/1	6 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 933E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Red/Brown	Slip	Fine-Very Fine
986N 933E	0-10cm	Body	Smoothed	Gray/Black	Gley2 5/10B	7.5 Sand	Gray/Black	Gray/Brown	Slip	Fine
986N 933E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	5.5 Sand	None	Gray	None	Fine-Very Fine
986N 933E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	6.5 Sand	None	Brown/Gray	Slip	Fine
986N 933E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5 Sand	None	Red/Brown	None	Fine-Very Fine
986N 933E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	None	Brown/Red	Slip	Fine-Very Fine
986N 934E	30-40cm	Body	Smoothed	Brown/Gray	10YR 5/4	9 Sand	None	Brown/Gray	None	Fine
986N 934E	30-40cm	Body	Smoothed	Red/Gray	10R 5/2	5.5 Sand	Red/Gray	Brown/Red	Slip	Fine
986N 932E	20-30cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	6 Sand	Black/Gray	Red/Brown	Slip	Fine-Very Fine
986N 932E	20-30cm	Body	Smoothed	Gray/Black	Gley2 5/10B	5 Sand	Gray/Black	Brown/Gray	Slip	Fine-Very Fine
986N 932E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	Red	Brown/Gray	Slip	Fine
986N 932E	20-30cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Red/Brown	Slip	Medium-Fine
986N 932E	20-30cm	Body	Smoothed	Gray/Red	10R 4/1	4.5 Sand	Gray/Red	Gray/Brown	Slip	Fine-Very Fine
986N 932E	20-30cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	Brown/Red	Gray	Slip	Fine
986N 932E	20-30cm	Body	Smoothed	Gray/Brown	10YR 5/2	4.5 Sand	None	Brown/Gray	None	Fine
986N 932E	20-30cm	Body	Smoothed	Brown/Gray	10YR 5/4	5.5 Sand	Brown/Gray	Brown/Gray	Slip	Fine
986N 932E	20-30cm	Body	Smoothed	Red	2.5YR 4/6	6 Sand	Red	Brown/Gray	Slip	Fine-Very Fine
986N 932E	20-30cm	Body	Smoothed	Red/Gray	10R 5/2	5 Sand	Red/Gray	Brown/Gray	Slip	Fine-Very Fine
986N 924E	40-50cm	Body	Smoothed	Red	2.5YR 4/6	5.5 Sand	Red	Gray/Brown	slip	Fine-Very Fine
986N 924E	40-50cm	Body	Smoothed	Red	2.5YR 4/6	4.5 Sand	Red	Brown/Gray	slip	Fine-Very Fine
986N 924E	40-50cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	Brown/Red	Brown/Gray	Slip	Fine-Very Fine
986N 924E	40-50cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Red/Brown	None	Medium-Fine
986N 924E	40-50cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5 Sand	Red/Brown	Gray/Brown	Slip	Fine
986N 924E	40-50cm	Body	Smoothed	Brown/Gray	10YR 5/4	5.5 Sand	Black/Gray	Gray/Brown	Slip	Fine-Very Fine
986N 924E	40-50cm	Body	Smoothed	Brown/Red	7.5YR 4/6	8 Sand	None	Red/Brown	None	Medium-Fine
986N 924E	40-50cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Red/Brown	None	Fine
986N 924E	40-50cm	Body	Smoothed	Brown/Gray	10YR 5/4	8 Sand	None	Brown/Red	None	Medium-Fine
986N 933E	40-50cm	Rim	Smoothed	Brown/Gray	10YR 5/4	6 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 933E	40-50cm	Body	Smoothed	Gray/Black	Gley2 5/10B	7 Sand	None	Brown/Gray	None	Fine
986N 933E	40-50cm	Body	Smoothed	Brown/Red	7.5YR 4/6	3.5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 933E	40-50cm	Body	Smoothed	Brown/Red	7.5YR 4/6	7.5 Sand	None	Brown/Red	Slip	Fine
986N 933E	40-50cm	Body	Smoothed	Gray/Red	10R 4/1	6 Sand	Gray/Red	Brown/Red	Slip	Medium-Fine
986N 934E	50-60cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Red/Brown	Slip	Medium-Fine
986N 934E	50-60cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6.5 Sand	Brown/Red	Brown/Red	Slip	Fine-Very Fine
986N 935E	0-10cm	Body	Smoothed	Dark Red	2.5YR 3/4	5.5 Sand	Dark Red	Brown/Red	Slip	Fine
986N 935E	0-10cm	Body	Smoothed	white/Red	2.5YR 7/2	7.5 Sand	White	Brown/Gray	Painted	Medium-Fine
986N 935E	0-10cm	Body	Smoothed	Black	Gley1 2.5/N	5 Sand	Black	Gray/Brown	Slip	Fine-Very Fine
986N 935E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	None	Red/Brown	None	Medium-Fine
986N 935E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	5.5 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 935E	0-10cm	Body	Corrugated	Gray/Brown	10YR 5/2	4.5 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 935E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	6 Sand	None	Brown/red	None	Fine-Very Fine
986N 935E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 935E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 924E	50-60cm	Body	Smoothed	Black	Gley1 2.5/N	5.5 Sand	Black	Dark Gray/Brown	Slip	Medium-Fine
986N 933E	20-30cm	Handle	Smoothed	Red/Brown	2.5YR 4/8	10 Sand	None	Red/Brown	None	Fine
986N 933E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	8 Sand	None	Gray/Brown	Slip	Medium-Fine
986N 933E	20-30cm	Body	Smoothed	Brown/Gray	10YR 5/4	7.5 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 933E	20-30cm	Body	Smoothed	Gray/Red	10R 4/1	5.5 Sand	None	Brown/Red	Slip	Fine-Very Fine
986N 933E	20-30cm	Body	Smoothed	Red	2.5YR 4/6	7 Sand	Red	Red/Brown	Slip	Fine-Very Fine
986N 933E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	8 Sand	None	Red/Brown	None	Medium-Fine
986N 924E	30-40cm	Rim	Smoothed	Red/Brown	2.5YR 4/8	7.5 Sand	None	Red/Brown	None	Fine-Very Fine
986N 934E	20-30cm	Rim	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Gray/Red	Slip	Fine-Very Fine
986N 934E	20-30cm	Body	Smoothed	White/Red	2.5YR 7/2	6 Sand	White	Red/Brown	Painted	Medium-Fine
986N 934E	20-30cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Gray/Red	Slip	Fine-Very Fine

986N 934E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	Black	Red/Brown	Noen	Medium-Fine
986N 934E	20-30cm	Body	Smoothed	Black	Gley1 2.5/N	8 Sand	Black	Brown/Gray	Slip	Fine
986N 934E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Red/Brown	None	Fine-Very Fine
986N 934E	10-20cm	Body	Corrugated	Red/Brown	2.5YR 4/8	4 sand	None	Red/Brown	None	Fine-Very Fine
986N 934E	10-20cm	Rim	Corrugated	Black	Gley1 2.5/N	4 Sand	Black	Gray/Brown	Slip	Fine-Very Fine
986N 934E	10-20cm	Body	Corrugated	Brown/Red	7.5YR 4/6	5.5 Sand	None	Brown/Red	None	Fine-Very Fine
986N 934E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	4.5 Sand	None	Gray	Noen	Fine-Very Fine
986N 934E	10-20cm	Body	Smoothed	White/Red	2.5YR 7/2	6 Sand	White	Red/Brown	Painted	Medium-Fine
986N 934E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5.5 Sand	None	Brown	None	Fine-Very Fine
986N 934E	10-20cm	Body	Smoothed	gray/Black	Gley2 5/10B	5.5 Sand	Gray/Black	Brown	Slip	Fine
986N 934E	10-20cm	Body	Smoothed	Light gray	10YR 6/1	4 Sand	None	Gray	None	Fine-Very Fine
986N 934E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	5.5 Sand	Red	Red/Brown	Slip	Fine-Very Fine
986N 934E	40-50cm	Body	Smoothed	Brown/Red	7.5YR 4/6	7 Sand	Brown/Red	Brown/Red	Slip	Fine-Very Fine
986N 934E	40-50cm	Body	Smoothed	Brown/Red	7.5YR 4/6	7 Sand	Black	Red/Brown	Slip	Fine-Very Fine
986N 934E	40-50cm	Rim	Smoothed	Black	Gley1 2.5/N	7.5 Sand	black	Brown/Red	Slip	Fine-Very Fine
986N 934E	40-50cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	Brown/Red	Brown/Red	Slip	Fine-Very Fine
986N 934E	40-50cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	Brown/Red	Brown/Red	Slip	Fine-Very Fine
986N 934E	40-50cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	Brown/Red	Brown/Red	Slip	Fine-Very Fine
986N 934E	40-50cm	Body	Smoothed	White/Red	7.5YR 7/2	5.5 Sand	White	Brown/Red	Painted?	Fine-Very Fine
986N 933E	10-20cm	Rim	Smoothed	Black/Gray	Gley2 4/5PB	10 Sand	White	Red/Brown	Painted	Fine-Very Fine
986N 933E	10-20cm	Base	Smoothed	Gray/Black	Gley2 5/10B	9.5 Sand	Gray/Black	Red/Gray	Slip	Medium-Fine
986N 937E	10-20cm	Neck	Smoothed	Gray	Gley2 6/10B	4 Sand	None	Brown/Gray	Slip	Fine
986N 937E	10-20cm	Body	Corrugated	Gray	Gley2 6/10B	5 Sand	None	Gray	Incised	Fine-Very Fine
986N 937E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6.5 Sand	Light Gray	Red/Brown	Slip	Fine-Very Fine
986N 937E	10-20cm	Body	Smoothed	Gray/Black	Gley2 5/10B	5 Sand	Brown/Red	Red/Brown	Slip	Fine-Very Fine
986N 937E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6.5 Sand	None	Brown/Red	Slip	Fine-Very Fine
986N 937E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	None	Brown/Red	None	Fine-Very Fine
986N 937E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7.5 Sand	Red/Brown	Brown/Red	Slip	Fine-Very Fine
986N 936E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	5.5 Sand	None	Brown	None	Fine
986N 936E	0-10cm	Body	Smoothed	Red/Gray	10R 5/2	7 Sand	Red	Gray/Brown	wedged	Fine-Very Fine
986N 936E	0-10cm	Body	Smoothed	Red/Gray	10R 5/2	7 Sand	Red/Gray	Brown/gray	Slip	Fine-Very Fine
986N 936E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	4.5 Sand	None	Gray	None	Fine-Very Fine
986N 936E	0-10cm	Rim	Smoothed	Red/Brown	2.5YR 4/8	4 Sand	Red/Brown	Brown/Red	Slip	Fine
986N 936E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	7 Sand	Red	Red/Brown	Slip	Fine-Very Fine
986N 936E	0-10cm	Body	Smoothed	Black	Gley1 2.5/N	6 Sand	Black	Red/Brown	Slip	Fine-Very Fine
986N 936E	0-10cm	Body	Smoothed	Black	Gley1 2.5/N	4.5 Sand	Black	Brown/Red	slip	Medium-Fine
986N 936E	0-10cm	Body	Corrugated	Light Gray	10YR 6/1	4.5 Sand	None	Gray	None	Fine-Very Fine
986N 936E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	6.5 Sand	None	Gray	None	Fine-Very Fine
986N 936E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	4.5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 936E	40-50cm	Body	Smoothed	Black	Gley1 2.5/N	6 Sand	Black	Brown/Red	None	Fine
986N 936E	40-50cm	Body	Smoothed	Black	Gley1 2.5/N	5.5 Sand	Black	Brown/Red	Slip	Fine
986N 936E	40-50cm	Body	Smoothed	Gray/Black	Gley2 5/10B	5.5 Sand	Gray/Black	Brown/Red	Slip	Fine
986N 936E	40-50cm	Body	Smoothed	Red/Gray	10R 5/2	4 Sand	Red/gray	Brown/Red	Slip	Fine-Very Fine
986N 936E	40-50cm	Body	Smoothed	Red/Gray	10R 5/2	5 Sand	Red/Gray	Brown/Red	Slip	Fine-Very Fine
986N 936E	40-50cm	Body	Smoothed	Gray	Gley2 6/10B	5 Sand	None	Gray	None	Fine-Very Fine
986N 936E	40-50cm	Body	Smoothed	Brown/Gray	10YR 5/4	6.5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 936E	40-50cm	Body	Smoothed	Black	Gley1 2.5/N	5.5 Sand	Black	Brown/Red	None	Fine
986N 936E	40-50cm	Body	Smoothed	Black	Gley1 2.5/N	5.5 Sand	Black	Brown/Red	Slip	Fine
986N 936E	40-50cm	Body	Smoothed	Gray/Black	Gley2 5/10B	5.5 Sand	Gray/Black	Brown/Red	Slip	Fine
986N 936E	40-50cm	Body	Smoothed	Red/Gray	10R 5/2	4 Sand	Red/gray	Brown/Red	Slip	Fine-Very Fine
986N 936E	40-50cm	Body	Smoothed	Red/Gray	10R 5/2	5 Sand	Red/Gray	Brown/Red	Slip	Fine-Very Fine
986N 936E	40-50cm	Body	Smoothed	Gray	Gley2 6/10B	5 Sand	None	Gray	None	Fine-Very Fine
986N 936E	40-50cm	Body	Smoothed	Brown/Gray	10YR 5/4	6.5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 936E	40-50cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7.5 Sand	Red/Brown	Gray/Brown	Slip	Fine-Very Fine
986N 936E	40-50cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	Gray	Red/Brown	Slip	Fine-Very Fine
986N 936E	40-50cm	Body	Smoothed	Gray	Gley2 6/10B	4 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 936E	40-50cm	Body	Smoothed	Gray	Gley2 6/10B	4 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 937E	30-40cm	Body	Smoothed	white/Red	2.5YR 7/2	8 Sand	White	Brown/Gray	None	Medium-Fine
986N 937E	30-40cm	Rim	Smoothed	Black	Gley1 2.5/N	7 Sand	Black?	Red/Brown	Slip	Fine-Very Fine
986N 937E	30-40cm	Body	Smoothed	Black	Gley1 2.5/N	4.5 Sand	Black	Red/Brown	Slip	Fine
986N 937E	30-40cm	Body	Smoothed	Red	2.5YR 4/6	6 Sand	Red	Brown/Gray	Slip	Fine-Very Fine
986N 937E	30-40cm	Body	Smoothed	Gray	Gley2 6/10B	6 Sand	Gray	Brown/Red	Slip	Very Fine
986N 937E	30-40cm	Body	Smoothed	Red/Gray	10R 5/2	6 Sand	Red/Gray	Brown/Gray	Slip	Fine-Very Fine
986N 935E	50-60cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	5.5 Sand	Black/Gray	Gray	Slip	Fine-Very Fine

986N 936E	10-20cm	Body	Corrugated	Black/Gray	Gley2 4/5PB	5 Sand	None	Gray	None	Fine-Very Fine
986N 936E	10-20cm	Body	Corrugated	Gray/Brown	10YR 5/2	4.5 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 936E	10-20cm	Body	Corrugated	Black/Gray	Gley2 4/5PB	5.5 Sand	None	Gray	None	Fine
986N 936E	10-20cm	Rim	Smoothed	Gray/Red	10R 4/1	6.5 Sand	Gray/Red	Brown/Red	Slip	Fine-Very Fine
986N 936E	10-20cm	Rim	Smoothed	Brown/Red	7.5YR 4/6	5 Sand	Red	Brown/Red	Slip	Fine-Very Fine
986N 936E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	11 Sand	Red	Brown/Red	Slip	Medium-Fine
986N 936E	10-20cm	Body	Smoothed	white/Red	2.5YR 7/2	6.5 Sand	White	Red/Brown	Painted	Medium-Fine
986N 936E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	5.5 Sand	None	Brown/Gray	Painted	Very Fine
986N 936E	10-20cm	Neck	Smoothed	Gray/Black	Gley2 5/10B	4 Sand	None	Gray/Brown	None	Fine
986N 935E	10-20cm	Body	Smoothed	White/Red	2.5YR 7/2	7.5 Sand	White	Gray/Brown	Painted	Medium-Fine
986N 935E	10-20cm	Body	Corrugated	Brown/Gray	10YR 5/4	5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 935E	10-20cm	Body	Corrugated	Gray/Black	Gley2 5/10B	4.5 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 935E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Red/Brown	None	Fine-Very Fine
986N 935E	30-40cm	Body	Smoothed	Black	Gley1 2.5/N	3.5 Sand	Black	Gray	Slip	Fine-Very Fine
986N 935E	30-40cm	Body	Smoothed	Black	Gley1 2.5/N	5 Sand	Black?	Brown	Slip?	Fine-Very Fine
986N 935E	30-40cm	Body	Smoothed	Red	2.5YR 4/6	6.5 Sand	Red	Red/Brown	Slip	Fine-Very Fine
986N 935E	30-40cm	Body	Corrugated	Gray	Gley2 6/10B	5 Sand	None	Gray	None	Fine
986N 937E	20-30cm	Body	Corrugated	Black/Gray	Gley2 4/5PB	5 Sand	None	Gray	None	Fine-Very Fine
986N 937E	20-30cm	Body	Corrugated	Black/Gray	Gley2 4/5PB	5 Sand	None	Gray	None	Fine
986N 937E	20-30cm	Body	Corrugated	Light Gray	10YR 6/1	5 Sand	none	Gray	None	Fine-Very Fine
986N 937E	20-30cm	Body	Smoothed	Red	2.5YR 4/6	5.5 Sand	Red	Gray	Slip	Fine-Very Fine
986N 937E	20-30cm	Body	Smoothed	Light Gray	10YR 6/1	9 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 937E	20-30cm	Body	Smoothed	Brown/Red	7.5YR 4/6	7 Sand	Brown/Red	Red/Brown	Slip	Fine-Very Fine
986N 937E	20-30cm	Rim	Smoothed	Black	Gley1 2.5/N	5 Sand	Brown/Red	Gray/Brown	Slip	Fine-Very Fine
986N 937E	20-30cm	Handle	Smoothed	Brown/Gray	10YR 5/4	7.5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 937E	0-10cm	Body	Corrugated	Light Gray	10YR 6/1	4.5 Sand	Noen	Gray/Brown	Noen	Fine-Very Fine
986N 937E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	7.5 Sand	None	Brown/Gray	None	Fine
986N 937E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7.5 Sand	Brown/Gray	Red/Brown	Slip	Fine-Very Fine
986N 935E	40-50cm	Body	Smoothed	Gray/Brown	10YR 5/2	5 Sand	Black/Gray	Brown/Gray	Slip	Fine
986N 935E	40-50cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	Red/Brown	Brown	Slip	Fine-Very Fine
986N 935E	40-50cm	Body	Smoothed	Gray	Gley2 6/10B	7 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 935E	40-50cm	Body	Smoothed	Brown/Gray	10YR 5/4	5.5 Sand	None	Brown/Gray	noen	Fine-Very Fine
986N 936E	50-60cm	Body	Smoothed	Red	2.5YR 4/6	4 Sand	Red	Red/Brown	Slip	Fine-Very Fine
987N 927E	0-10cm	Body	Smoothed	White/Gray	10R 7/1	7.5 Sand	White	Gray	Slip	Medium-Fine
987N 927E	0-10cm	Rim	Smoothed	Red/Gray	10R 5/2	6 Sand	Red/Gray	Gray	Incised/Worked	Fine-Very Fine
987N 927E	10-20cm	Rim	Smoothed	Red/Brown	2.5YR 4/8	7.5 Sand	Red	Brown/Red	Slip	Fine-Very Fine
987N 927E	10-20cm	Handle	Smoothed	Gray	Gley2 6/10B	12 Sand	Gray	Red/Brown	Slip	Fine
987N 927E	10-20cm	Body	Smoothed	Red/Brown	10YR 5/2	10 Sand	None	Brown/Red	None	Fine-Very Fine
987N 927E	10-20cm	Rim	Smoothed	Gray/Brown	10YR 4/8	7 Sand	None	Brown/Gray	None	Fine-Very Fine
987N 927E	10-20cm	Body	Smoothed	Red	2.5YR 4/6	5.5 Sand	Red	Brown/Red	Slip	Fine-Very Fine
987N 927E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	Red	Brown/Red	Slip	Medium-Fine
987N 927E	10-20cm	Neck	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	Red	Brown/Red	Slip	Fine-Very Fine
987N 927E	10-20cm	Body	Smoothed	Light Gray	10YR 6/1	4.5 Sand	Light Gray	Gray	Slip	Fine-Very Fine
986N 937E	40-50cm	Rim	Smoothed	Gray	Gley2 6/10B	4.5 Sand	Gray	Brown/Gray	Slip	Fine
986N 937E	40-50cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Red/Brown	Slip	Fine-Very Fine
986N 937E	40-50cm	Body	Corrugated	Gray/Red	10R 4/1	5.5 Sand	Gray/Red?	Red/Brown	slip	Fine-Very Fine
987N 928E	Fill in F43	Body	Smoothed	Black/Gray	Gley2 4/5PB	7 Sand	None	Brown/Gray	Noen	Fine
987N 928E	Fill in F43	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	None	Red/Brown	none	Fine
987N 928E	Fill in F43	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	Black	Red/Brown	Slip	Fine-Very Fine
987N 928E	Fill in F43	Body	Smoothed	Black	Gley1 2.5/N	6 Sand	Black	Brown/Gray	Slip	Fine
987N 928E	Fill in F43	Body	Smoothed	Black	Gley1 2.5/N	6.5 Sand	black	Gray	Slip	Fine
987N 928E	Fill in F43	Body	Smoothed	Brown/Red	7.5YR 4/6	5.5 Sand	Brown/Red	Brown	Slip	Fine-Very Fine
987N 928E	Fill in F43	Body	Smoothed	Red/Gray	10R 5/2	8 Sand	Red/Gray	Red/Brown	Slip	Medium
987N 928E	Fill in F43	Neck	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Red/Brown	Slip	Fine-Very Fine
987N 928E	Fill in F43	Body	Smoothed	Black/Gray	Gley2 4/5PB	8 Sand	None	Brown/Gray	None	Medium-Fine
987N 928E	Fill in F43	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	Brown/Red	Red/Brown	Slip	Fine-Very Fine
987N 928E	Fill in F43	Body	Smoothed	Black/Gray	Gley2 4/5PB	6.5 Sand	Black	Red/Brown	Slip	Fine-Very Fine

987N 928E	Fill in F43	Body	Smoothed	Black/Gray	Gley2 4/5PB	7 Sand	Black	Red/Brown	Slip	Fine
987N 928E	Fill in F43	Body	Smoothed	Brown/Red	7.5YR 4/6	5.5 sand	None	Brown/Red	None	Fine-Very Fine
987N 928E	Fill in F43	Body	Smoothed	Gray	Gley2 6/10B	5 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 937E	50-60cm	Rim	Smoothed	Brown/Red	7.5YR 4/6	6.5 Sand	Brown/Red	Gray/Brown	Slip	Fine-Very Fine
986N 937E	50-60cm	Body	Smoothed	Gray/Brown	10YR 5/2	5 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 937E	50-60cm	Neck	Smoothed	Gray	Gley2 6/10B	5 Sand	Gray	Brown/Red	Slip	Fine-Very Fine
986N 937E	50-60cm	Body	Smoothed	Gray	Gley2 6/10B	7.5 Sand	None	Gray	None	Fine
986N 937E	50-60cm	Body	Smoothed	Gray	Gley2 6/10B	5.5 Sand	None	Gray	None	Fine
987N 925E	20-30cm	Rim	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Brown/Gray	Slip	Fine-Very Fine
987N 925E	20-30cm	Body	Smoothed	White/Red	2.5YR 7/2	7.5 Sand	White	Red/Brown	Painted	Medium
987N 925E	20-30cm	Rim	Smoothed	Red/Gray	10R 5/2	7 Sand	Red	Brown/Gray	Slip	Medium
987N 925E	20-30cm	Body	Smoothed	Black	Gley1 2.5/N	6 Sand	Black	Gray/Brown	Slip	Fine-Very Fine
987N 925E	20-30cm	Body	Smoothed	Brown/Red	7.5YR 4/6	7 Sand	None	Gray/Brown	Slip	Fine-Very Fine
987N 925E	20-30cm	Neck	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	None	Brown/Red	None	Fine-Very Fine
987N 926E	30-40cm	Body	Smoothed	Black	Gley1 2.5/N	5.5 Sand	Black	Brown/Red	Slip	Fine-Very Fine
987N 926E	30-40cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	Red/Brown	Red/Brown	Slip	Fine-Very Fine
987N 926E	20-30cm	Handle	Smoothed	Red/Brown	2.5YR 4/8	7.5 Sand	None	Red/Brown	None	Fine
987N 926E	20-30cm	Body	Corrugated	Black	Gley1 2.5/N	5 Sand	Black	Gray/Brown	Slip	Fine-Very Fine
987N 926E	40-50cm	Rim	Smoothed	Black/Gray	Gley2 4/5PB	6 Sand	Black/Gray	Gray/Brown	Slip	Fine-Very Fine
987N 926E	40-50cm	Body	Smoothed	Black	Gley1 2.5/N	6.5 Sand	Black	Brown/Gray	Slip	Fine-Very Fine
987N 926E	40-50cm	Body	Smoothed	Gray/Black	Gley2 5/10B	5.5 Sand	Gray/Black	Red/Brown	Slip	Fine-Very Fine
987N 926E	40-50cm	Body	Smoothed	Red/Gray	10R 5/2	5 Sand	Red/Gray	Red/Brown	Slip	Fine-Very Fine
987N 926E	40-50cm	Neck	Smoothed	Gray/Black	Gley2 5/10B	5 Sand	Gray/Black	Red/Brown	Slip	Fine-Very Fine
986N 925E	Fill in F49	Body	Smoothed	Light Gray	10YR 6/1	6 Sand	None	Gray	None	Fine-Very Fine
987N 924E	30-40cm	Handle	Smoothed	Red/Brown	2.5YR 4/8	10 Sand	None	Red/Brown	None	Fine-Very Fine
986N 938E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	5 Sand	None	Brown	None	Fine-Very Fine
986N 938E	0-10cm	Body	Corrugated	Gray/Brown	10YR 5/2	4 Sand	None	Brown/Gray	None	Fine-Very Fine
986N 938E	0-10cm	Body	Smoothed	Black/Brown	7.5YR 3.2	4.5 Sand	Black?	Red/Brown	Slip?	Fine
986N 938E	40-50cm	Rim	Smoothed	Black/Gray	Gley2 4/5PB	7 Sand	Black/Gray?	Brown/Gray	Slip	Fine-Very Fine
986N 938E	40-50cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	7 Sand	None	Brown	None	Medium
986N 938E	40-50cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	6.5 Sand	None	Red/Brown	None	Medium
986N 938E	40-50cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	6 Sand	None	Red/Brown	None	Medium
986N 938E	40-50cm	Body	Smoothed	Gray/Brown	10YR 5/2	6 Sand	Gray/Brown	Brown/Gray	Slip	Fine-Very Fine
986N 938E	40-50cm	Body	Smoothed	Brown/Red	7.5YR 4/6	7 Sand	Brown/Red	Red/Brown	Slip	Fine-Very Fine
986N 938E	40-50cm	Body	Smoothed	Red/Brown	2.5YR 4/8	8 Sand	None	Gray/Red	None	Fine-Very Fine
985N 930E	50-60cm	Handle	Smoothed	Gray/Red	10R 4/1	8 Sand	None	Red/Gray	None	Medium-Fine
985N 930E	50-60cm	Body	Smoothed	Black	Gley1 2.5/N	7 sand	Black	Brown/Gray	Slip	Very Fine
985N 930E	50-60cm	Body	Smoothed	Red/Gray	10R 5/2	6.5 Sand	Black/Gray	Red/Gray	Slip	Fine-Very Fine
985N 930E	50-60cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	6 Sand	Black/Gray	Red/Gray	Slip	Fine-Very Fine
986N 940E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	Red/Brown	Red/Brown	Painted	Medium
986N 940E	20-30cm	Body	Corrugated	Black/Gray	Gley2 4/5PB	3 Sand	None	Gray	None	Fine-Very Fine
986N 940E	20-30cm	Rim	Smoothed	Black/Gray	Gley2 4/5PB	5 Sand	Black	Brown	Slip	Fine-Very Fine
985N 929E	50-60cm	Body	Smoothed	Black	Gley1 2.5/N	7 Sand	Black	Red/Brown	Slip	Fine
986N 941E	10-20cm	Body	Smoothed	Red/Gray	10R 5/2	9 Sand	Dark Red/Gray	Red/Gray	Slip	Medium-Fine
986N 941E	30-40cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Brown	Painted	Fine-Very Fine
986N 941E	30-40cm	Neck	Smoothed	Red	2.5YR 4/6	6 Sand	Red	Brown/Gray	Slip	Fine-Very Fine
986N 941E	30-40cm	Neck	Smoothed	Red	2.5YR 4/6	6 Sand	Red	Red/Brown	Slip	Fine-Very Fine
986N 941E	30-40cm	Body	Smoothed	Red	2.5YR 4/6	6 Sand	Red	Brown/Red	Slip	Fine-Very Fine
986N 941E	30-40cm	Neck	Smoothed	Gray/Black	Gley2 5/10B	5.5 Sand	None	Red/Brown	None	Fine-Very Fine
986N 941E	30-40cm	Body	Smoothed	Gray/Brown	10YR 5/2	5.5 Sand	Black	Brown/Gray	None	Fine-Very Fine
986N 941E	40-50cm	Body	Smoothed	Black	Gley1 2.5/N	5 Sand	Black	gray/Brown	Slip	Fine-Very Fine
986N 941E	40-50cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Brown/Red	None	fine
986N 941E	40-50cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Red/Brown	None	Fine-Very Fine
986N 941E	40-50cm	Body	Smoothed	Brown/Gray	10YR 5/4	4.5 Sand	None	Gray/Brown	None	Fine-Very Fine
986N 941E	40-50cm	Body	Smoothed	Black	Gley1 2.5/N	7.5 Sand	Black	Gray/Brown	Slip	Fine-Very Fine
986N 941E	40-50cm	Body	Corrugated	Gray	10YR 5/2	3 Sand	None	Gray	None	Fine-Very Fine
986N 939E	20-30cm	Handle	Smoothed	Gray	Gley2 6/10B	10.5 Sand	None	Gray/Brown	None	Fine-Very Fine

985N 927E	0-10cm	Rim	Smoothed	Red	2.5YR 4/6	8 Sand	Red	Red/Brown	Slip	Brown/red	Red/Brown	Slip	Fine-Very Fine
985N 928E	20-30cm	Handle	Smoothed	Red/Brown	2.5YR 4/8	10 Sand	Red/Brown	Red/Brown	Slip	Red/Brown	Red/Brown	Slip	Fine-Very Fine
985N 928E	20-30cm	Handle	Smoothed	Gray	Gley2 6/10B	12 Sand	Gray	Gray	None	Gray	Gray	None	Fine-Very Fine
985N 928E	20-30cm	Handle	Smoothed	Red	2.5YR 4/6	8 Sand	Red	Red	Slip	Brown/Gray	Brown/Gray	Slip	Fine-Very Fine
985N 928E	30-40cm	Body	Smoothed	Black	Gley1 2.5/N	6.5 Sand	Black	Black	Slip	Brown/red	Brown/red	Slip	Fine-Very Fine
985N 928E	30-40cm	Body	Smoothed	Gray	Gley2 6/10B	7.5 Sand	None	None	none	Gray	Gray	none	Medium-Fine
985N 928E	40-50cm	Body	Smoothed	Red/Gray	10R 5/2	4.5 Sand	None	Red/Gray	None	Red/Gray	Red/Gray	None	Fine-Very Fine
985N 928E	30-40cm	Handle	Smoothed	Red/Brown	2.5YR 4/8	7.5 Sand	Red/Brown	Red/Brown	Slip	Brown/Gray	Brown/Gray	Slip	Fine-Very Fine
985N 926E	10-20cm	Body	Smoothed	White/Red	2.5YR 7/2	7 Sand	White	White	Painted	Red/Brown	Red/Brown	Painted	Fine-Very Fine
985N 926E	10-20cm	Body	Smoothed	Gray	Gley2 6/10B	4 Sand	None	None	None	Gray	Gray	None	Fine-Very Fine
985N 926E	10-20cm	neck	Smoothed	Black/Gray	Gley2 4/5PB	9 Sand	Black	Black	Slip	Brown/Gray	Brown/Gray	Slip	Fine
985N 926E	40-50cm	Body	Smoothed	Black	Gley1 2.5/N	6 Sand	Black	Black	Slip	Brown/Gray	Brown/Gray	Slip	Very Fine
985N 926E	40-50cm	Rim	Smoothed	Black/Gray	Gley2 4/5PB	5 Sand	Black/Gray	Black/Gray	Slip	Brown/Gray	Brown/Gray	Slip	Fine-Very Fine
985N 926E	40-50cm	Body	Smoothed	Gray	Gley2 6/10B	6.5 Sand	None	None	None	Gray	Gray	None	Medium-Fine
985N 926E	40-50cm	Body	Smoothed	Black	Gley1 2.5/N	4.5 Sand	Black	Black	Slip	Brown/Gray	Brown/Gray	Slip	Fine-Very Fine
985N 925E	40-50cm	Body	Smoothed	Red	2.5YR 4/6	6 Sand	Red	Red	Slip?	Brown/Red	Brown/Red	Slip	Fine
985N 924E	0-10cm	Neck	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	Red	Red	None	Brown/Red	Brown/Red	None	Fine
985N 924E	0-10cm	Body	Smoothed	White/Red	2.5YR 7/2	7 Sand	White	White	Painted	Red/Brown	Red/Brown	Painted	Fine-Very Fine
985N 924E	0-10cm	Body	Smoothed	White/Red	2.5YR 7/2	7 Sand	White	White	Painted	Red/Brown	Red/Brown	Painted	Fine-Very Fine
985N 924E	0-10cm	Body	Smoothed	White/Red	2.5YR 7/2	7 Sand	White	White	Painted	Red/Brown	Red/Brown	Painted	Fine-Very Fine
985N 924E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	13.5 Sand	None	None	None	Red/Brown	Red/Brown	None	Fine
985N 924E	0-10cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Red	Slip	Brown/Red	Brown/Red	Slip	Fine-Very Fine
985N 924E	0-10cm	Rim	Smoothed	Red	2.5YR 4/6	7 Sand	Red	Red	Slip	Brown/Red	Brown/Red	Slip	Fine-Very Fine
985N 924E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	5 Sand	None	None	none	Gray	Gray	none	Fine-Very Fine
985N 924E	0-10cm	Body	Corrugated	Black	Gley1 2.5/N	6 Sand	Black	Black	Slip	Gray/Brown	Gray/Brown	Slip	Fine-Very Fine
985N 924E	0-10cm	Body	Smoothed	Light Gray	10YR 6/1	5 Sand	None	None	None	Gray	Gray	None	Fine
985N 926E	20-30cm	Body	Smoothed	White/Red	2.5YR 7/2	8 Sand	White	White	Painted	Red/Brown	Red/Brown	Painted	Medium
985N 926E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	Red	Red	Incised	Brown/Red	Brown/Red	Incised	Medium
985N 926E	20-30cm	Body	Smoothed	Light Gray	10YR 6/1	5 Sand	None	None	None	Gray	Gray	None	Fine
987N 922E	20-30cm	Handle	Smoothed	Red/Gray	10R 5/2	10 Sand	None	None	None	Red/Gray	Red/Gray	None	Fine
987N 922E	20-30cm	Body	Smoothed	Red/Brown	2.5YR 4/8	9 Sand	Red/Brown	Red/Brown	Slip	Red/Gray	Red/Gray	Slip	Fine-Very Fine
987N 922E	20-30cm	Handle	Smoothed	Brown/Red	7.5YR 4/6	8 Sand	None	None	None	Red/Brown	Red/Brown	None	fine
985N 926E	40-45cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	6.5 Sand	Black/Gray	Black/Gray	slip	Gray	Gray	slip	Medium-Fine
985N 923E	20-30cm	Rim	Smoothed	Red	2.5YR 4/6	5.5 Sand	Red	Red	Slip	Red/Brown	Red/Brown	Slip	Fine-Very Fine
985N 923E	20-30cm	Handle	Smoothed	Brown/Red	7.5YR 4/6	12.5 Sand	None	None	None	Red/Brown	Red/Brown	None	Fine
985N 923E	20-30cm	Rim	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Red	Slip	Brown/Red	Brown/Red	Slip	Fine-Very Fine
985N 922E	20-30cm	Handle	Smoothed	Red/Brown	2.5YR 4/8	15.5 Sand	None	None	None	Red/Brown	Red/Brown	None	Medium
985N 922E	20-30cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	7 Sand	Black/Gray	Black/Gray	Slip	Brown/Red	Brown/Red	Slip	Fine-Very Fine
985N 922E	20-30cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	5 Sand	Black/Gray	Black/Gray	Slip	Brown/Gray	Brown/Gray	Slip	Fine-Very Fine
985N 921E	0-10cm	Base	Smoothed	Red/Gray	10R 5/2	8 Sand	Red/Black?	Red/Black?	Slip?	Gray/Red	Gray/Red	Slip?	Fine
985N 921E	0-10cm	Rim	Smoothed	Gray/Brown	10YR 5/2	7 Sand	None	None	None	Brown/Gray	Brown/Gray	Slip	Fine-Very Fine
985N 921E	20-30cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	6.5 Sand	Black/Gray	Black/Gray	Slip	Red/Brown	Red/Brown	Slip	Fine-Very Fine
987N 921E	10-20cm	Handle	Smoothed	White/Gray	10YR 5/4	7.5 Sand	None	None	None	Brown/Red	Brown/Red	None	Fine-Very Fine
986N 921E	40-45cm	Rim	Smoothed	Black	Gley1 2.5/N	12 Sand	black	black	Slip	Red/Brown	Red/Brown	Slip	Medium
986N 921E	0-10cm	Handle	Smoothed	Brown/Red	7.5YR 4/6	16.5 Sand	None	None	None	Red/Brown	Red/Brown	None	Fine
985N 924E	40-50cm	Body	Smoothed	Red	2.5YR 4/6	4 Sand	Red	Red	Slip	Brown/Red	Brown/Red	Slip	Fine-Very Fine
985N 920E	20-30cm	Neck	Smoothed	Light Gray	10YR 6/1	7 Sand	None	None	None	Gray	Gray	None	Fine
985N 924E	40-50cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	None	None	Red/Brown	Red/Brown	None	Fine-Very Fine
985N 923E	30-40cm	Body	Smoothed	Red/Gray	10R 5/2	8 Sand	Red/Gray	Red/Gray	slip	Red/Brown	Red/Brown	slip	Medium-Fine
985N 923E	30-40cm	Neck	Smoothed	Gray/Black	Gley2 5/10B	5 Sand	Gray	Gray	Slip	Brown/Gray	Brown/Gray	Slip	Fine-Very Fine
985N 923E	30-40cm	Body	Smoothed	Red/Gray	10R 5/2	6 Sand	Red/Gray	Red/Gray	Slip	Gray	Gray	Slip	fine
985N 923E	30-40cm	Body	Smoothed	Gray/Brown	10YR 5/2	5 Sand	None	None	None	Gray/Brown	Gray/Brown	None	Fine-Very Fine
985N 923E	30-40cm	Body	Smoothed	Red	2.5YR 4/6	7 Sand	Red	Red	Slip	Brown/Red	Brown/Red	Slip	Fine-Very Fine
985N 923E	40-50cm	Body	Smoothed	Red	2.5YR 4/6	5.5 Sand	Red	Red	Slip	Red/Brown	Red/Brown	Slip	Fine-Very Fine
985N 923E	40-50cm	Body	Smoothed	Red	2.5YR 4/6	4 Sand	Red	Red	Slip	Red/Brown	Red/Brown	Slip	Fine-Very Fine

985N 923E	40-50cm	Body	Smoothed	Gray/Black	Gley2 5/10B	7 Sand	None	Gray/Whiet	Noen	Medium-Fine
985N 923E	40-50cm	Body	Smoothed	Red/Gray	10R 5/2	7 Sand	Red/Gray	Red/Brown	Slip	Fine-Very Fine
986N 920E	0-10cm	Handle	Smoothed	Brown/Gray	10YR 5/4	16.5 Sand	None	Brown/Red	none	Fine-Very Fine
987N 920E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	9 Sand	None	Brown/Gray	Incised	Fine
987N 920E	0-10cm	Body	Corrugated	Brown/Red	7.5YR 4/6	5 Sand	None	Brown/Red	None	Fine-Very Fine
987N 920E	20-30cm	Body	Smoothed	Gray/Red	10R 4/1	7 Sand	Red?	Red/Brown	Slip	Fine
985N 923E	40-50cm	Body	Smoothed	Gray	Gley2 6/10B	5.5 Sand	Gray	Brown/Red	Slip	Fine-Very Fine
985N 923E	40-50cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	Red/Brown	Brown/Red	Slip	Fine
985N 924E	40-50cm	Handle	Smoothed	Red/Brown	2.5YR 4/8	12.5 Sand	Red/Brown	Red/Brown	Slip	Fine-Very Fine
985N 924E	40-50cm	Body	Smoothed	Black	Gley1 2.5/N	7 Sand	Black	Brown	Slip	Fine-Very Fine
985N 924E	40-50cm	Body	Smoothed	Red	10YR 5/4	6.5 Sand	Red/Gray	Red/Brown	Slip	Fine-Very Fine
985N 924E	40-50cm	Body	Smoothed	Red	2.5YR 4/6	5.5 Sand	Red	Gray	Slip	Fine-Very Fine
987N 919E	10-20cm	Body	Corrugated	Red/Brown	2.5YR 4/8	5 Sand	black	Brown	Slip	Fine-Very Fine
964N 920E	40-50cm	Body	Smoothed	Brown/Gray	10YR 5/4	6 Sand	None	Red/Brown	None	Fine-Very Fine
964N 920E	40-50cm	Body	Smoothed	Red	2.5YR 4/6	4 Sand	Red	Red/Brown	None	Fine-Very Fine
1005N 922E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	4.5 Sand	None	Brown	Slip	Fine-Very Fine
1005N 922E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5 Sand	None	Brown/Red	None	Fine-Very Fine
1005N 922E	20-30cm	Handle	Smoothed	Red	2.5YR 4/6	6 Sand	Red	Red/Brown	Slip	Fine-Very Fine
964N 920E	50-60cm	Body	Smoothed	Gray	Gley2 6/10B	6 Sand	None	Gray	None	Medium-Fine
986N 940E	20-30cm	Handle	Smoothed	Red/Brown	2.5YR 4/8	18.5 Sand	None	Red/Brown	None	Fine
986N 940E	20-30cm	Body	Smoothed	Red	2.5YR 4/6	5 Sand	Red	Red/Brown	Slip	Fine-Very Fine
986N 933E	Fill in F60	Body	Smoothed	Red	2.5YR 4/6	6.5 Sand	Red	Red/Brown	Slip	Fine
986N 938E	50-60cm	Body	Corrugated	Gray	Gley2 6/10B	5 Sand	None	Gray	None	Fine-Very Fine
986N 918E	20-30cm	Handle	Smoothed	Red/Brown	2.5YR 4/8	8 Sand	None	Red/Brown	None	Fine
985N 929E	Fill in F90	Body	Smoothed	Gray/Red	10R 4/1	5 Sand	Gray/Red	Brown	Slip	Fine-Very Fine
985N 929E	Fill in F90	Body	Smoothed	Black	Gley1 2.5/N	4.5 Sand	Black	Gray	Slip	Fine
985N 929E	Fill in F90	Body	Smoothed	Gray	Gley2 6/10B	5 Sand	Black	Brown/Gray	slip	Fine-Very Fine
984N 933E	Fill in F90	Body	Smoothed	Black	Gley1 2.5/N	6 Sand	Black	Brown	Slip	Fine-Very Fine
984N 933E	Fill in F90	Body	Smoothed	Gray/Brown	10YR 5/2	7 Sand	Gray/Brown	Brown	slip	Fine-Very Fine
984N 933E	Fill in F90	Body	Smoothed	Gray/Black	Gley2 5/10B	5 Sand	Gray/Black	Gray/Brown	slip	Fine-Very Fine
984N 933E	Fill in F90	Body	Smoothed	Brown/Gray	10YR 5/4	7 Sand	None	Brown/Gray	None	Fine
984N 933E	Fill in F90	Neck	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	Red/Brown	Brown/Red	Slip	Fine-Very Fine
984N 933E	Fill in F90	Body	Smoothed	Gray/black	Gley2 5/10B	5.5 Sand	Gray/Black	Brown/Red	Slip	Fine-Very Fine
984N 933E	50-60cm	Body	Smoothed	Black	Gley1 2.5/N	4.5 Sand	Black	Dark Gray	Slip	fine
984N 933E	50-60cm	Body	Corrugated	Gray	Gley2 6/10B	5 Sand	None	Gray	None	Fine
985N 930E	0-10cm	Handle	Smoothed	Red/Brown	2.5YR 4/8	6.5 Sand	None	Gray	None	Fine-Very Fine
986N 926E	70-80cm	Body	Smoothed	Red	2.5YR 4/6	7.5 Sand	None	Red/Brown	Noen	Fine
985N 932E	60-70cm	Body	Smoothed	Gray/Brown	10YR 5/2	5 Sand	Red	Red/Brown	Slip	Fine-Very Fine
985N 932E	60-70cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7 Sand	None	Brown/Gray	None	Fine-Very Fine
985N 932E	60-70cm	Body	Smoothed	Light Gray	10YR 6/1	6 Sand	None	Brown/Gray	Slip	Fine-Very Fine
985N 932E	60-70cm	Body	Smoothed	Gray	Gley2 6/10B	4 Sand	Black/Gray	Gray/Brown	Slip	Fine-Very Fine
985N 932E	70-80cm	Rim	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	None	Red/Brown	None	Fine-Very Fine
985N 932E	70-80cm	Body	Smoothed	Gray	Gley2 6/10B	6.5 Sand	None	Gray	None	Fine-Very Fine
875N 1055E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6 Sand	None	Red/Brown	None	Fine-Very Fine
875N 1055E	10-20cm	Handle	Smoothed	Brown/Gray	10YR 5/4	18.5 Sand	None	Red/brown	None	Fine
875N 1055E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	5.5 Sand	None	Brown	None	Fine-Very Fine
875N 1056E	20-30cm	Body	Smoothed	Brown/Gray	10YR 5/4	6 Sand	None	Brown/Gray	None	Fine-Very Fine
875N 1056E	20-30cm	Body	Smoothed	Gray/Brown	10YR 5/2	6.5 Sand	None	Brown	None	Fine
875N 1056E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7.5 Sand	None	Red/Brown	None	Fine-Very Fine
875N 1056E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	6 Sand	None	Red/Brown	None	Medium-Fine
875N 1056E	0-10cm	Body	Smoothed	Red/Brown	2.5YR 4/8	7.5 Sand	None	Red/Brown	Slip?	Fine
875N 1056E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	6 Sand	None	Brown/Red	None	Fine-Very Fine
875N 1056E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	5 Sand	None	Brown	None	Fine-Very Fine
875N 1058E	10-20cm	Rim	Smoothed	Red/Brown	2.5YR 4/8	5 Sand	Red	Gray	Slip	Fine-Very Fine

875N 1058E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	5.5 Sand	None	Brown	None	Fine-Very Fine
875N 1058E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/8	4 Sand	None	Red/Brown	None	Fine
875N 1059E	10-20cm	Body	Smoothed	Red/Brown	2.5YR 4/6	4.5 Sand	Red	Red/Brown	Slip	Fine-Very Fine
875N 1059E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	5 Sand	None	Brown/Gray	None	Fine-Very Fine
875N 1059E	10-20cm	Body	Smoothed	Red/Gray	10R 5/2	5.5 Sand	Red?	Red/Brown	Slip?	Fine
875N 1059E	10-20cm	Body	Smoothed	Gray/Black	Gley2 5/10B	6 Sand	Gray?	Brown/Red	Slip?	Fine
875N 1059E	10-20cm	Body	Smoothed	Gray	Gley2 5/10B	5.5 Sand	Gray?	Brown/Red	Slip?	Fine
875N 1057E	10-20cm	Body	Smoothed	Gray/Brown	10YR 5/2	4 Sand	None	Gray/Brown	None	Fine-Very Fine
875N 1057E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	4.5 Sand	None	Brown/Gray	None	Fine-Very Fine
875N 1059E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	9 Sand	None	Brown/REd	None	Fine-Very Fine
875N 1057E	0-10cm	Body	Smoothed	Light Gray	10YR 6/1	6.5 Sand	None	Brown	None	Fine
875N 1057E	0-10cm	Body	Smoothed	Red/Brown	10YR 5/2	7 Sand	None	Gray	None	Fine
875N 1057E	0-10cm	Rim	Smoothed	Red/Brown	2.5YR 4/8	8 Sand	None	Gray	None	Fine-Very Fine
875N 1057E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	7 Sand	None	Red/Brown	None	Fine-Very Fine
875N 1057E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	5 Sand	None	Brown	none	fine
875N 1057E	0-10cm	Body	Smoothed	Gray	Gley2 6/10B	6.5 Sand	None	Gray	None	Fine-Very Fine
875N 1057E	0-10cm	Body	Smoothed	Brown/Gray	10YR 5/4	5.5 Sand	none	Gray/Brown	None	Fine
875N 1057E	0-10cm	Body	Smoothed	Gray/Red	10R 4/1	4.5 Sand	None	Brown/red	None	Fine-Very Fine
875N 1057E	0-10cm	Body	Smoothed	Gray/Brown	10YR 5/2	5 Sand	None	Brown	None	Fine-Very Fine
875N 1054E	0-10cm	Body	Smoothed	Brown/Red	7.5YR 4/6	5.5 Sand	None	Red/Brown	None	Fine
875N 1054E	40-50cm	Body	Smoothed	Gray	Gley2 6/10B	8 Sand	Black	Gray	Slip	Fine
875N 1055E	30-40cm	Body	Smoothed	Black/Gray	Gley2 4/5PB	6 Sand	black	Brown/Gray	Slip	Fine-Very Fine
875N 1054E	10-20cm	Rim	Smoothed	Brown/Red	7.5YR 4/6	6.5 Sand	None	Red/Brown	None	Fine-Very Fine
875N 1054E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	6.5 Sand	None	Red/Brown	None	Fine
875N 1054E	10-20cm	Body	Smoothed	Brown/Red	7.5YR 4/6	8 Sand	None	Red/Brown	None	Fine
875N 1054E	10-20cm	Body	Smoothed	Brown/Gray	10YR 5/4	7 Sand	None	Gray	None	Fine-Very Fine
985N 938E	Fill in F159	Body	Smoothed	Red	2.5YR 4/6	5.5 Sand	Red	Red/Gray	Slip	Medium-Fine
875N 1054E	30-40cm	Rim	Smoothed	Red/Gray	10R 5/2	9 Sand	None	Red/Gray	None	Fine
985N 925E	50-60cm	Body	Smoothed	Gray	Gley2 6/10B	6.5 Sand	Black	Gray	Slip	Fine-Very Fine
875N 1054E	40-50cm	Body	Smoothed	Black/Brown	7.5YR 3.2	6 Sand	None	Brown	None	Fine



## APPENDIX G

### LITHIC ANALYSIS RAW DATA

## Summary

The following appendix is a table of the raw lithic data analyzed for this project. Lithics were broken down by material (granite, chert, andesite, basalt, and sandstone), section (primary, secondary, tertiary, and shatter) and color based on the Munsell 2000 charts. Sections were determined in the following manner: primary flakes had 50%-75% cortex; secondary had 25%-50% cortex on the surface; tertiary had less than 25% cortex; and shatter were generally devoid of cortex and were the smallest fragments. As noted in Chapter 8, no lithic materials were recovered that indicated use wear or temporal affiliation, though more analysis will be done and presented in future publications.

Location	Depth	Material	Color	Munsell	Section
985N 992E	10-20cm	Granite	Gray	5Y 6/1	Primary
985N 992E	0-10cm	Granite	Black/Gray	Gley2 3/10B	Shatter
985N 993E	0-10cm	Basalt	Gray/Brown	10YR 5/2	Core?
985N 994E	10-20cm	Basalt	Black/Gray	Gley2 3/10B	Core
985N 994E	10-20cm	Basalt	Black/Gray	Gley2 3/10B	Core
985N 994E	10-20cm	Basalt	Black/Gray	Gley2 3/10B	Core
985N 994E	10-20cm	Basalt	Gray/Black	Gley2 4/5B	Primary
985N 994E	10-20cm	Basalt	Gray	5Y 6/1	Primary
985N 995E	10-20cm	Granite	Gray	5Y 6/1	Secondary
985N 995E	20-30cm	Basalt	Black/Gray	Gley2 3/10B	Shatter
985N 995E	20-30cm	Basalt	Black/Gray	Gley2 3/10B	Shatter
985N 995E	20-30cm	Basalt	Black/Gray	Gley2 3/10B	Shatter
985N 999E	0-10cm	Granite	Gray	5Y 6/1	Secondary
985N 999E	0-10cm	Granite	Gray/Brown	10YR 5/2	Secondary
985N 997E	20-30cm	Granite	Gray	5Y 6/1	Secondary
985N 997E	20-30cm	Basalt	Brown/Gray	10YR 6/2	Core
985N 999E	10-20cm	Granite	Gray	5Y 6/1	Secondary
985N 995E	30-40cm	Basalt	Gray/Black	Gley2 4/5B	Primary
985N 995E	30-40cm	Basalt	Gray	5Y 6/1	Primary
985N 993E	20-30cm	Granite	Dark Gray	Gley1 3/N	Tertiary
985N 997E	40-50cm	Granite	Purple/Gray	10R 5/3	Tertiary
985N 997E	40-50cm	Granite	Dark Gray	Gley1 3/N	Tertiary
985N 997E	40-50cm	Granite	Dark Gray	Gley1 3/N	Tertiary
985N 995E	40-50cm	Granite	Gray	5Y 6/1	Shatter
985N 995E	40-50cm	Granite	Light Gray	2.5Y 7/1	Secondary
985N 995E	40-50cm	Granite	Gray	5Y 6/1	Shatter
985N 995E	40-50cm	Granite	Gray	5Y 6/1	Shatter
985N 995E	40-50cm	Granite	Gray	5Y 6/1	Tertiary
985N 995E	40-50cm	Basalt	Gray	5Y 6/1	Shatter
985N 995E	40-50cm	Granite	Gray	5Y 6/1	Shatter
985N 995E	40-50cm	Granite	Gray	5Y 6/1	Shatter
985N 995E	40-50cm	Granite	Gray	5Y 6/1	Secondary
985N 999E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
985N 999E	30-40cm	Granite	Gray	5Y 6/1	Secondary
985N 999E	30-40cm	Granite	Gray	5Y 6/1	Secondary
985N 999E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
985N 999E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
985N 999E	30-40cm	Granite	Gray	5Y 6/1	Secondary
985N 999E	30-40cm	Basalt	Black/Gray	Gley2 3/10B	Secondary
985N 999E	30-40cm	Basalt	Black/Gray	Gley2 3/10B	Core
985N 996E	40-50cm	Basalt	Black/Gray	Gley2 3/10B	Secondary
985N 996E	40-50cm	Basalt	Black/Gray	Gley2 3/10B	Primary
985N 1000E	30-40cm	Granite	Gray	5Y 6/1	Shatter
985N 1000E	30-40cm	Granite	Gray	5Y 6/1	Shatter
985N 1003E	30-40cm	Granite	Gray	5Y 6/1	Shatter
985N 1003E	30-40cm	Chert	Dark Gray	Gley1 3/N	Shatter

985N 1003E	10-20cm	Granite	Gray	5Y 6/1	Shatter
985N 1003E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 1003E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 1003E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 1003E	20-30cm	Granite	Gray	5Y 6/1	Shatter
985N 1002E	20-30cm	Basalt	Dark Gray	Gley1 3/N	Tertiary
985N 1002E	20-30cm	Basalt	Gray	5Y 6/1	Shatter
985N 1002E	20-30cm	Basalt	Dark Gray	Gley1 3/N	Secondary
985N 1002E	20-30cm	Granite	Gray	5Y 6/1	Core
985N 1000E	20-30cm	Granite	Light Gray	2.5Y 7/1	Secondary
985N 1000E	20-30cm	Granite	Light Gray	2.5Y 7/1	Secondary
985N 1000E	20-30cm	Granite	Gray	5Y 6/1	Shatter
985N 1001E	10-20cm	Granite	Gray	5Y 6/1	Primary
985N 1001E	30-40cm	Granite	Light Gray	2.5Y 7/1	Primary
985N 1000E	30-40cm	Granite	Gray	5Y 6/1	Core
985N 998E	50-60cm	Granite	Gray	5Y 6/1	Secondary
985N 996E	50-60cm	Granite	Gray	5Y 6/1	Tertiary
985N 1000E	40-50cm	Granite	Gray	5Y 6/1	Shatter
985N 1000E	40-50cm	Granite	Gray	5Y 6/1	Shatter
985N 1000E	50-60cm	Granite	Gray	5Y 6/1	Secondary
985N 1003E	40-50m	Granite	Gray	5Y 6/1	Shatter
985N 1004E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 1004E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 1005E	20-30cm	Chert	Dark Gray	Gley1 3/N	Secondary
985N 1005E	20-30cm	Basalt	Gray	5Y 6/1	Shatter
985N 1003E	50-60cm	Granite	Gray	5Y 6/1	Shatter
985N 1003E	50-60cm	Granite	Gray	5Y 6/1	Shatter
985N 1003E	50-60cm	Granite	Gray	5Y 6/1	Core
985N 1008E	0-10cm	Chert	Dark Gray	Gley1 3/N	Secondary
985N 1007E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
985N 1006E	30-40cm	Granite	Gray	5Y 6/1	Secondary
985N 1006E	30-40cm	Granite	Gray	5Y 6/1	Shatter
985N 1006E	30-40cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 1007E	40-50cm	Granite	Gray	5Y 6/1	Core
985N 1007E	20-30cm	Basalt	Gray	5Y 6/1	Shatter
985N 1007E	20-30cm	Granite	Gray	5Y 6/1	Shatter
985N 1007E	0-10cm	Granite	Brown/Gray	10YR 6/2	Core
985N 1005E	50-60cm	Sedimentary	Gray/Black	Gley2 4/5B	Core
985N 1005E	40-50cm	Granite	Gray	5Y 6/1	Tertiary
985N 1005E	40-50cm	Granite	Gray	5Y 6/1	Secondary
985N 1005E	40-50cm	Basalt	Brown/Gray	10YR 6/2	Core
985N 1004E	50-60cm	Granite	Gray	5Y 6/1	Core
985N 1006E	60-70cm	Chert	Yellow	2.5Y 5/6	Tertiary
985N 1007E	60-70cm	Granite	Gray	5Y 6/1	Shatter
985N 994E	60-70cm	Granite	Gray	5Y 6/1	Tertiary
985N 994E	60-70cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 994E	60-70cm	Chert	Dark Gray	Gley1 3/N	Tertiary

985N 994E	60-70cm	Granite	Dark Gray	Gley1 3/N	Tertiary
985N 994E	60-70cm	Granite	Gray	5Y 6/1	Shatter
985N 1006E	80-90cm	Granite	Gray	5Y 6/1	Secondary
985N 1006E	80-90cm	Granite	Dark gray	Gley1 3/N	Tertiary
985N 1008E	50-60cm	Granite	Dark Gray	Gley1 3/N	
985N 1008E	50-60cm	Granite	Gray	5Y 6/1	Tertiary
985N 1008E	50-60cm	Basalt	Dark Gray	Gley1 3/N	Tertiary
985N 1008E	50-60cm	Granite	Dark Gray	Gley1 3/N	Primary
985N 1008E	40-50cm	Basalt	Gray	5Y 6/1	Primary
985N 1008E	40-50cm	Granite	Gray	5Y 6/1	Secondary
985N 1008E	40-50cm	Granite	Gray	5Y 6/1	Tertiary
984N 994E	0-10cm	Basalt	Gray/Brown	10YR 5/2	Primary
984N 994E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
984N 994E	0-10cm	Granite	Gray	5Y 6/1	Secondary
985N 1009E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
984N 995E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
984N 995E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
984N 996E	0-10cm	Granite	Gray/Brown	10YR 5/2	Primary
984N 996E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 1009E	50-60cm	Granite	Gray/Brown	10YR 5/2	Secondary
985N 1009E	50-60cm	Basalt	Gray	5Y 6/1	Tertiary
985N 1009E	50-60cm	Granite	Gray	5Y 6/1	Primary
985N 1009E	40-50cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 1009E	40-50cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 1009E	20-30cm	Granite	Gray	5Y 6/1	Secondary
985N 1009E	20-30cm	Granite	Dark Gray	Gley1 3/N	Primary
984N 997E	10-20cm	Granite	Gray	5Y 6/1	Secondary
984N 996E	10-20cm	Granite	Brown/Gray	10YR 6/2	Primary
984N 996E	10-20cm	Granite	Brown/Gray	10YR 6/2	Core
984N 996E	10-20cm	Granite	Dark Gray	Gley1 3/N	Primary
1003N 951E	0-10cm	Granite	Gray/Brown	10YR 5/2	Secondary
1004N 951E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
1003N 951E	10-20cm	Granite	Gray	5Y 6/1	Primary
1003N 951E	20-30cm	Granite	Gray	5Y 6/1	Secondary
1003N 951E	20-30cm	Granite	Gray	5Y 6/1	Secondary
1003N 951E	20-30cm	Granite	Gray	5Y 6/1	Core
984N 993E	0-10cm	Granite	Gray	5Y 6/1	Secondary
985N 995E	80-90cm	Basalt	Gray/Brown	10YR 5/2	Secondary
985N 995E	80-90cm	Basalt	Dark Gray	Gley1 3/N	Tertiary
984N 992E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
985N 1010E	0-10cm	Granite	Gray	5Y 6/1	Primary
985N 1010E	0-10cm	Granite	Dark Gray	Gley1 3/N	Secondary
983N 996E	20-30cm	Granite	Gray/Brown	10YR 5/2	Primary
984N 993E	70-80cm	Granite	gray	5Y 6/1	Tertiary
983N 996E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
1007N 951E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1007N 951E	10-20cm	Granite	Light Gray	2.5Y 7/1	Shatter

1005N 951E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1003N 952E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1003N 952E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
1003N 952E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1006N 951E	10-20cm	Sedimentary	Gray	5Y 6/1	Tertiary
1014N 951E	Surface	Granite	Gray	5Y 6/1	Tertiary
1007N 951E	0-10cm	Granite	Light Gray	2.5Y 7/1	Secondary
1007N 951E	0-10cm	Granite	Light Gray	2.5Y 7/1	Secondary
1005N 951E	40-50cm	Granite	Light Gray	2.5Y 7/1	Secondary
1005N 951E	10-20cm	Basalt	Dark Gray	Gley1 3/N	Tertiary
1006N 951E	0-10cm	Chert	Dark Gray	Gley1 3/N	Shatter
1002N 952E	0-10cm	Chert	Dark Gray	Gley1 3/N	Secondary
1002N 952E	10-20cm	Granite	Gray	5Y 6/1	Primary
1011N 951E	10-20cm	Granite	Gray/Brown	10YR 5/2	Primary
1011N 951E	10-20cm	Granite	Brown	7.5YR 5/3	Secondary
1011N 951E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
1010N 951E	20-30cm	Granite	Gray	5Y 6/1	Shatter
1010N 951E	20-30cm	Granite	Gray	5Y 6/1	Shatter
1010N 951E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1010N 951E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1011N 951E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
1011N 951E	20-30cm	Granite	Gray	5Y 6/1	Shatter
1011N 951E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1003N 953E	10-20cm	Granite	Gray/Brown	10YR 5/2	Shatter
1003N 953E	10-20cm	Granite	Brown/Gray	10YR 6/2	Tertiary
1003N 953E	10-20cm	Granite	Brown/Gray	10YR 6/2	Shatter
1003N 953E	10-20cm	Granite	Brown/Gray	10YR 6/2	Shatter
1003N 953E	10-20cm	Basalt	Brown/Gray	10YR 6/2	Core
1003N 953E	10-20cm	Granite	Gray/Brown	10YR 5/2	Core
1013N 951E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1013N 951E	10-20cm	Granite	Gray	5Y 6/1	Primary
1013N 951E	10-20cm	Granite	Gray	5Y 6/1	Shatter
1012N 951E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1012N 951E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1012N 951E	10-20cm	Granite	Gray	5Y 6/1	Secondary
1012N 951E	10-20cm	Granite	Gray	5Y 6/1	Secondary
1012N 951E	0-10cm	Basalt	Gray/Brown	10YR 5/2	Secondary
1004N 951E	140-150cm	Chert	Dark Gray	Gley1 3/N	Secondary
1002N 951E	10-20cm	Chert	Dark Gray	Gley1 3/N	Secondary
1002N 951E	10-20cm	Granite	Gray	5Y 6/1	Primary
1013N 951E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1013N 951E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1010N 951E	30-40cm	Granite	Gray	5Y 6/1	Secondary
1015N 951E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1015N 951E	10-20cm	Granite	Gray	5Y 6/1	Secondary
1015N 951E	10-20cm	Granite	Gray	5Y 6/1	Shatter
1014N 951E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary

1014N 951E	20-30cm	Basalt	Brown/Gray	10YR 6/2	Secondary
1014N 951E	20-30cm	Granite	Gray	5Y 6/1	Primary
1014N 951E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
1014N 951E	20-30cm	Granite	Gray	5Y 6/1	Shatter
1014N 951E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
1014N 951E	20-30cm	Granite	Gray	5Y 6/1	Secondary
1014N 951E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1014N 951E	20-30cm	Chert	Dark Gray	Gley1 3/N	Secondary
1014N 951E	20-30cm	Granite	Gray	5Y 6/1	Shatter
1014N 951E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1014N 951E	10-20cm	Granite	Gray	5Y 6/1	Shatter
1014N 951E	10-20cm	Granite	Gray	5Y 6/1	Secondary
1002N 953E	20-30cm	Chert	Dark Gray	Gley1 3/N	Shatter
1002N 953E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1002N 953E	20-30cm	Chert	Dark Gray	Gley1 3/N	Secondary
1014N 951E	0-10cm	Granite	Gray/Brown	10YR 5/2	Shatter
1014N 951E	0-10cm	Granite	Gray/Brown	10YR 5/2	Shatter
1014N 951E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
1018N 951E	30-40cm	Granite	Gray	5Y 6/1	Core
1018N 951E	30-40cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1018N 951E	30-40cm	Chert	Dark Gray	Gley1 3/N	Secondary
1010N 951E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1010N 951E	20-30cm	Chert	Dark Gray	Gley1 3/N	Secondary
1010N 951E	20-30cm	Granite	Dark Gray	Gley1 3/N	Shatter
1010N 951E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1010N 951E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1010N 951E	20-30cm	Granite	Brown/Gray	10YR 6/2	Core
1010N 951E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
1010N 951E	20-30cm	Granite	Gray	5Y 6/1	Shatter
1010N 951E	20-30cm	Sedimentary	Brown/Gray	10YR 6/2	Shatter
1010N 951E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1010N 951E	0-10cm	Granite	Gray/Brown	10YR 5/2	Core
1010N 951E	0-10cm	Basalt	Brown/Gray	10YR 6/2	Secondary
1010N 951E	0-10cm	Granite	Gray	5Y 6/1	Secondary
1010N 951E	0-10cm	Granite	Brown	7.5YR 5/3	Secondary
1010N 951E	0-10cm	Granite	Gray	5Y 6/1	Shatter
1010N 951E	0-10cm	Granite	Gray	5Y 6/1	Secondary
1010N 951E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1020N 951E	10-20cm	Granite	Gray	5Y 6/1	Shatter
1020N 951E	10-20cm	Granite	Dark Gray	Gley1 3/N	Tertiary
1020N 951E	10-20cm	Granite	Gray	5Y 6/1	Secondary
1020N 951E	10-20cm	Granite	Gray	5Y 6/1	Shatter
1020N 951E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1017N 951E	0-10cm	Basalt	Purple/Gray	10R 5/3	Secondary
1017N 951E	0-10cm	Granite	Gray/Brown	10YR 5/2	Secondary
1017N 951E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
1017N 951E	0-10cm	Basalt	Gray/Brown	10YR 5/2	Tertiary

1017N 951E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1004N 951E	130-140cm	Basalt	Dark Gray	Gley1 3/N	Tertiary
1004N 951E	130-140cm	Granite	Dark Gray	Gley1 3/N	Tertiary
1018N 951E	10-20cm	Chert	Dark Gray	Gley1 3/N	Secondary
1018N 951E	10-20cm	Chert	Gray/Brown	10YR 5/2	Tertiary
1018N 951E	10-20cm	Chert	Dark Gray	Gley1 3/N	Secondary
1018N 951E	10-20cm	Basalt	Brown/Gray	10YR 6/2	Tertiary
1017N 951E	10-20cm	Granite	Gray	5Y 6/1	
1016N 951E	10-20cm	Granite	Gray	5Y 6/1	Shatter
1016N 951E	10-20cm	Granite	Brown	7.5YR 5/3	Primary
1016N 951E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
1016N 951E	10-20cm	Chert	Dark Gray	Gley1 3/N	Shatter
1017N 951E	20-30cm	Chert	Dark Gray	Gley1 3/N	Core
1016N 951E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1016N 951E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1016N 951E	0-10cm	Granite	Gray	5Y 6/1	Core
1016N 951E	0-10cm	Granite	Brown/Gray	10YR 6/2	Tertiary
1019N 951E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
1019N 951E	20-30cm	Granite	gray	5Y 6/1	Shatter
1019N 951E	20-30cm	Basalt	Brown/Gray	10YR 6/2	Shatter
1019N 951E	20-30cm	Granite	Gray	5Y 6/1	Shatter
1019N 951E	20-30cm	Granite	Gray	5Y 6/1	Shatter
1019N 951E	20-30cm	Granite	Gray	5Y 6/1	Shatter
1019N 951E	20-30cm	Granite	Brown/Gray	10YR 6/2	Secondary
1019N 951E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
1019N 951E	20-30cm	Granite	Gray	5Y 6/1	Shatter
1014N 951E	30-40cm	Granite	Gray	5Y 6/1	Core
1023N 951E	10-20cm	Granite	Gray	5Y 6/1	Core
1023N 951E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
1023N 951E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1023N 951E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
1022N 951E	10-20cm	Granite	Gray	5Y 6/1	Shatter
1022N 951E	10-20cm	Granite	Gray	5Y 6/1	Secondary
1022N 951E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1022N 951E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
1022N 951E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
1022N 951E	0-10cm	Granite	Gray	5Y 6/1	Shatter
1022N 951E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
1022N 951E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1002N 950E	10-20cm	Granite	Gray	5Y 6/1	Core
1017N 951E	30-40cm	Basalt	Purple/Gray	10R 5/3	Secondary
1017N 951E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
1017N 951E	30-40cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1017N 951E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
1017N 951E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
1015N 951E	40-50cm	Granite	Gray	5Y 6/1	Shatter
1015N 951E	50-60cm	Basalt	Dark Gray	Gley1 3/N	Secondary



1023N 952E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1023N 952E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1023N 952E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
1023N 952E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1023N 952E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
1023N 952E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1023N 952E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
1024N 951E	10-20cm	Granite	Gray	5Y 6/1	Secondary
1024N 951E	0-10cm	Granite	Gray	5Y 6/1	Shatter
1024N 951E	0-10cm	Granite	Gray	5Y 6/1	Shatter
1023N 952E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1023N 952E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1023N 952E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
1023N 952E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1023N 952E	10-20cm	Basalt	Purple/Gray	10R 5/3	Core
1023N 952E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
1024N 952E	30-40cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1024N 952E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
1024N 952E	30-40cm	Chert	Dark Gray	Gley1 3/N	Shatter
1024N 952E	10-20cm	Granite	Gray	5Y 6/1	Primary
1024N 952E	10-20cm	Granite	Gray	5Y 6/1	Shatter
1024N 952E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1024N 952E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1024N 952E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
1024N 952E	0-10cm	Chert	Dark Gray	Gley1 3/N	Shatter
1024N 952E	0-10cm	Granite	Gray	5Y 6/1	Secondary
1016N 951E	40-50cm	Chert	Dark Gray	Gley1 3/N	Secondary
1016N 951E	40-50cm	Granite	Gray	5Y 6/1	Shatter
1024N 951E	50-60cm	Granite	Gray	5Y 6/1	Tertiary
1022N 952E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
1022N 952E	30-40cm	Granite	Gray	5Y 6/1	Shatter
1022N 952E	30-40cm	Chert	Dark Gray	Gley1 3/N	Secondary
1022N 952E	30-40cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 931E	0-10cm	Granite	Gray	5Y 6/1	Shatter
986N 931E	0-10cm	Granite	Gray	5Y 6/1	Shatter
986N 931E	0-10cm	Granite	Gray	5Y 6/1	Shatter
986N 931E	0-10cm	Granite	Gray	5Y 6/1	Shatter
986N 931E	0-10cm	Granite	Dark Gray	Gley1 3/N	Primary
986N 931E	0-10cm	Granite	Gray	5Y 6/1	Shatter
986N 931E	0-10cm	Granite	Gray	5Y 6/1	Shatter
986N 931E	0-10cm	Granite	Gray	5Y 6/1	Shatter
986N 931E	0-10cm	Granite	Gray	5Y 6/1	Shatter
986N 931E	0-10cm	Granite	Gray	5Y 6/1	Shatter
986N 931E	0-10cm	Granite	Gray	5Y 6/1	Shatter
986N 931E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
986N 931E	0-10cm	Granite	Gray	5Y 6/1	Shatter
986N 931E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
986N 931E	0-10cm	Granite	Gray	5Y 6/1	Shatter
986N 931E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary

986N 931E	0-10cm	Chert	Gray	5Y 6/1	Tertiary
986N 931E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 931E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 931E	10-20cm	Granite	Gray	5Y 6/1	Secondary
986N 931E	10-20cm	Granite	Gray	5Y 6/1	Secondary
986N 931E	10-20cm	Granite	Gray	5Y 6/1	Primary
986N 931E	10-20cm	Granite	Gray/Brown	10YR 5/2	Shatter
986N 931E	10-20cm	Granite	Gray	5Y 6/1	Shatter
986N 931E	10-20cm	Chert	Dark Gray	Gley1 3/N	Secondary
986N 931E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 931E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 931E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 931E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 931E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 931E	10-20cm	Granite	Gray	5Y 6/1	Secondary
986N 931E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 931E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 931E	10-20cm	Granite	Gray/Brown	10YR 5/2	Secondary
986N 931E	10-20cm	Granite	Brown	7.5YR 5/3	Tertiary
986N 931E	10-20cm	Granite	Gray	5Y 6/1	Shatter
986N 931E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 931E	10-20cm	Granite	Gray	5Y 6/1	Shatter
986N 930E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 930E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 930E	10-20cm	Granite	Gray	5Y 6/1	Secondary
986N 930E	10-20cm	Granite	Gray	5Y 6/1	Shatter
986N 930E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 930E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 930E	10-20cm	Granite	Gray	5Y 6/1	Secondary
986N 930E	10-20cm	Granite	Dark Gray	Gley1 3/N	Secondary
986N 930E	10-20cm	Basalt	Brown	7.5YR 5/3	Primary
986N 930E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
9686N 932E	0-10cm	Chert	Dark Gray	Gley1 3/N	Shatter
9686N 932E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
9686N 932E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
9686N 932E	0-10cm	Granite	Dark Gray	Gley1 3/N	Shatter
9686N 932E	0-10cm	Sedimentary	Light Gray	2.5Y 7/1	Secondary
9686N 932E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
9686N 932E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
9686N 932E	0-10cm	Chert	Dark Gray	Gley1 3/N	Shatter
9686N 932E	0-10cm	Chert	Dark Gray	Gley1 3/N	Core
986N 930E	0-10cm	Granite	Gray	5Y 6/1	Shatter
986N 930E	0-10cm	Granite	Gray	5Y 6/1	Secondary
986N 930E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 930E	0-10cm	Granite	Gray	5Y 6/1	Secondary
986N 930E	0-10cm	Granite	Gray	5Y 6/1	Shatter
986N 930E	0-10cm	Granite	Gray	5Y 6/1	Secondary

986N 930E	0-10cm	Chert	Dark Gray	Gley1 3/N	Shatter
986N 930E	0-10cm	Granite	Gray	5Y 6/1	Shatter
986N 930E	0-10cm	Granite	Gray	5Y 6/1	Shatter
986N 930E	0-10cm	Granite	Brown/Gray	10YR 6/2	Core
986N 930E	0-10cm	Granite	Brown/Gray	10YR 6/2	Secondary
986N 930E	20-30cm	Granite	Gray/Brown	10YR 5/2	Secondary
986N 930E	20-30cm	Granite	Gray	5Y 6/1	Shatter
986N 930E	20-30cm	Granite	Gray	5Y 6/1	Primary
986N 930E	20-30cm	Granite	Gray	5Y 6/1	Shatter
986N 930E	20-30cm	Granite	Gray	5Y 6/1	Secondary
986N 930E	20-30cm	Chert	Dark Gray	Gley1 3/N	Core
986N 930E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
986N 930E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
986N 930E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
986N 930E	30-40cm	Granite	Gray/Brown	10YR 5/2	Tertiary
986N 930E	30-40cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 930E	30-40cm	Granite	Gray	5Y 6/1	Shatter
985N 932E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 932E	0-10cm	Granite	Brown/Gray	10YR 6/2	Shatter
985N 932E	0-10cm	Granite	Gray	5Y 6/1	Secondary
985N 932E	0-10cm	Chert	Dark Gray	Gley1 3/N	Shatter
985N 932E	0-10cm	Granite	Brown	7.5YR 5/3	Shatter
985N 932E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
985N 932E	0-10cm	Chert	Dark Gray	Gley1 3/N	Shatter
985N 932E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 932E	0-10cm	Granite	Gray/Brown	10YR 5/2	Tertiary
985N 932E	0-10cm	Granite	Brown	7.5YR 5/3	Shatter
985N 932E	0-10cm	Basalt	Gray/Brown	10YR 5/2	Secondary
985N 932E	0-10cm	Granite	brown	7.5YR 5/3	Tertiary
985N 932E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
986N 932E	10-20cm	Granite	Gray	5Y 6/1	Secondary
986N 932E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 932E	10-20cm	Granite	Brown/Gray	10YR 6/2	Secondary
986N 932E	10-20cm	Granite	Gray	5Y 6/1	Shatter
986N 932E	10-20cm	Chert	Dark Gray	Gley1 3/N	Shatter
986N 932E	10-20cm	Chert	Dark Gray	Gley1 3/N	Core
986N 932E	10-20cm	Granite	Brown/Gray	10YR 6/2	Shatter
986N 932E	10-20cm	Granite	Gray	5Y 6/1	Secondary
986N 932E	10-20cm	Granite	Gray	5Y 6/1	Shatter
986N 932E	10-20cm	Granite	Gray	5Y 6/1	Secondary
986N 932E	10-20cm	Chert	Dark Gray	Gley1 3/N	Shatter
986N 932E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 932E	10-20cm	Chert	Dark Gray	Gley1 3/N	Shatter
986N 932E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 932E	10-20cm	Granite	Gray	5Y 6/1	Core
986N 932E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 932E	10-20cm	Granite	Gray	5Y 6/1	Tertiary

986N 932E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 932E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 930E	50-60cm	Granite	Gray	5Y 6/1	Secondary
986N 930E	50-60cm	Granite	Gray	5Y 6/1	Tertiary
986N 930E	50-60cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 930E	50-60cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 930E	40-50cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 928E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 928E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 928E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 928E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 928E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 928E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 928E	10-20cm	Granite	Brown/Gray	10YR 6/2	Shatter
986N 928E	10-20cm	Granite	Gray	5Y 6/1	Primary
986N 928E	10-20cm	Granite	Gray	5Y 6/1	Shatter
986N 928E	10-20cm	Chert	Dark Gray	Gley1 3/N	Secondary
986N 928E	10-20cm	Granite	Gray	5Y 6/1	Secondary
986N 928E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
986N 928E	0-10cm	Basalt	Black/Gray	Gley2 3/10B	Tertiary
986N 928E	0-10cm	Granite	Gray	5Y 6/1	Secondary
986N 928E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 928E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 928E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 928E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 928E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
986N 929E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
986N 929E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 929E	0-10cm	Granite	Brown/Gray	10YR 6/2	Secondary
986N 929E	0-10cm	Soapstone	Brown	7.5YR 5/3	Secondary
986N 929E	0-10cm	Granite	Brown/Gray	10YR 6/2	Tertiary
986N 929E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 929E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
986N 930E	60-70cm	Granite	Gray	5Y 6/1	Tertiary
986N 930E	60-70cm	?	Gray	5Y 6/1	Shatter
986N 930E	60-70cm	Chert	Dark Gray	Gley1 3/N	Secondary
986N 930E	60-70cm	Granite	Gray	5Y 6/1	Shatter
986N 929E	20-30cm	Chert	Dark Gray	Gley1 3/N	Secondary
986N 929E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
986N 929E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
986N 929E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 929E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
986N 929E	20-30cm	Chert	Gray	5Y 6/1	Tertiary
986N 929E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
986N 929E	20-30cm	Granite	Gray	5Y 6/1	Shatter
986N 929E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
986N 929E	20-30cm	Granite	Gray	5Y 6/1	Tertiary

986N 929E	20-30cm	Granite	Gray	5Y 6/1	Core
986N 929E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
985N 932E	10-20cm	Basalt	Black/Gray	Gley2 3/10B	Secondary
985N 932E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
985N 932E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
985N 932E	10-20cm	Granite	Gray	5Y 6/1	Primary
985N 932E	10-20cm	Granite	Gray	5Y 6/1	Secondary
985N 932E	10-20cm	Granite	Gray	5Y 6/1	Shatter
985N 932E	10-20cm	Granite	Gray	5Y 6/1	Primary
985N 932E	10-20cm	Granite	Gray	5Y 6/1	Shatter
985N 932E	10-20cm	Granite	Gray	5Y 6/1	Secondary
985N 932E	10-20cm	Chert	Dark Gray	Gley1 3/N	Secondary
985N 932E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 932E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 932E	10-20cm	Granite	Gray	5Y 6/1	Shatter
985N 932E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 932E	10-20cm	Chert	Dark Gray	Gley1 3/N	Secondary
985N 932E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 932E	10-20cm	Granite	Brown/Gray	10YR 6/2	Secondary
985N 932E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
985N 932E	10-20cm	Granite	Gray	5Y 6/1	Secondary
985N 932E	10-20cm	Granite	Gray	5Y 6/1	Secondary
985N 932E	10-20cm	Granite	Gray	5Y 6/1	Secondary
986N 929E	30-40cm	Granite	Gray	5Y 6/1	Core
986N 929E	30-40cm	Granite	Gray	5Y 6/1	Primary
986N 929E	30-40cm	Chert	Yellow/Brown	10YR 5/6	Tertiary
986N 929E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
986N 929E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
986N 929E	30-40cm	Granite	Gray/Brown	10YR 5/2	Secondary
986N 929E	40-50cm	Granite	Gray	5Y 6/1	Tertiary
986N 929E	40-50cm	Basalt	Gray	5Y 6/1	Core
986N 929E	40-50cm	Granite	Gray	5Y 6/1	Tertiary
986N 929E	40-50cm	Granite	Gray	5Y 6/1	Tertiary
986N 929E	40-50cm	Granite	Gray	5Y 6/1	Tertiary
986N 929E	40-50cm	Granite	Gray	5Y 6/1	Tertiary
986N 929E	40-50cm	Granite	Gray	5Y 6/1	Tertiary
986N 929E	40-50cm	Granite	Gray	5Y 6/1	Tertiary
986N 929E	40-50cm	Granite	Gray	5Y 6/1	Shatter
986N 929E	40-50cm	Granite	Gray	5Y 6/1	Tertiary
986N 929E	10-20cm	Granite	Gray	5Y 6/1	Shatter
986N 929E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 929E	10-20cm	Granite	Gray/Brown	10YR 5/2	Tertiary
986N 929E	10-20cm	Chert	Dark Gray	Gley1 3/N	Secondary
986N 929E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 929E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 929E	10-20cm	Basalt	Gray/Brown	10YR 5/2	Secondary
986N 929E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 926E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 926E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
986N 926E	20-30cm	Granite	Gray	5Y 6/1	Secondary

986N 926E	20-30cm	Granite	Gray	5Y 6/1	Secondary
986N 926E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
986N 926E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
986N 926E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
986N 926E	20-30cm	Granite	Gray	5Y 6/1	Shatter
986N 926E	20-30cm	Granite	Gray	5Y 6/1	Secondary
986N 926E	20-30cm	Granite	Gray	5Y 6/1	Shatter
986N 926E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
986N 929E	40-50cm	Granite	Gray/Brown	10YR 5/2	Tertiary
986N 929E	40-50cm	Granite	Brown	7.5YR 5/3	Primary
986N 928E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
986N 928E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 928E	20-30cm	Chert	Yellow	2.5Y 5/6	Tertiary
986N 928E	20-30cm	Granite	Gray	5Y 6/1	Secondary
986N 928E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 928E	20-30cm	Basalt	Brown	7.5YR 5/3	Shatter
986N 928E	20-30cm	Chert	Brown/Gray	10YR 6/2	Tertiary
986N 926E	10-20cm	Chert	Dark Gray	Gley1 3/N	Secondary
986N 926E	10-20cm	Chert	Dark Gray	Gley1 3/N	Shatter
986N 926E	10-20cm	Chert	Dark Gray	Gley1 3/N	Shatter
986N 926E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 926E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 926E	10-20cm	Granite	Gray	5Y 6/1	Secondary
986N 926E	10-20cm	Basalt	Light Gray	2.5Y 7/1	Core
986N 926E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 926E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 926E	10-20cm	Granite	Gray	5Y 6/1	Shatter
986N 926E	10-20cm	Granite	Brown	7.5YR 5/3	Tertiary
986N 926E	10-20cm	Granite	Brown/Gray	10YR 6/2	Tertiary
986N 926E	10-20cm	Granite	Gray	5Y 6/1	Core
986N 926E	10-20cm	Granite	Gray	5Y 6/1	Shatter
986N 926E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 926E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 926E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
986N 926E	30-40cm	Granite	Gray/Brown	10YR 5/2	Shatter
986N 926E	30-40cm	Granite	Gray	5Y 6/1	Core
986N 926E	30-40cm	Granite	Gray	5Y 6/1	Core
986N 927E	30-40cm	Granite	Gray	5Y 6/1	Secondary
986N 927E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
986N 926E	40-50cm	Granite	Gray	5Y 6/1	Core
986N 926E	40-50cm	Chert	Yellow/Brown	10YR 5/6	Secondary
986N 926E	40-50cm	Chert	Dark Gray	Gley1 3/N	Secondary
986N 927E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 927E	10-20cm	Granite	Gray	5Y 6/1	Secondary
986N 927E	10-20cm	Granite	Gray	5Y 6/1	Shatter
986N 927E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 927E	10-20cm	Granite	Gray	5Y 6/1	Tertiary

986N 927E	10-20cm	Chert	Yellow/Brown	10YR 5/6	Tertiary
986N 927E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 927E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 927E	10-20cm	Granite	Gray	5Y 6/1	Shatter
986N 927E	10-20cm	Granite	Brown/Gray	10YR 6/2	Primary
986N 927E	10-20cm	Granite	Gray	5Y 6/1	Secondary
986N 927E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 927E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 927E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 929E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
986N 929E	20-30cm	Chert	Dark Gray	Gley1 3/N	Secondary
986N 929E	20-30cm	Granite	Gray	5Y 6/1	Core
986N 929E	20-30cm	Granit	Gray	5Y 6/1	Core
986N 929E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 929E	20-30cm	Chert	Dark Gray	Gley1 3/N	Secondary
986N 928E	0-10cm	Chert	Dark Gray	Gley1 3/N	Secondary
986N 928E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
986N 928E	0-10cm	Granite	Gray	5Y 6/1	Primary
986N 928E	0-10cm	Granite	Gray	5Y 6/1	Primary
986N 928E	0-10cm	Chert	Dark Gray	Gley1 3/N	Primary
986N 928E	0-10cm	Granite	Gray	5Y 6/1	Shatter
986N 928E	0-10cm	Granite	Brown/Gray	10YR 6/2	Primary
986N 928E	0-10cm	Granite	Gray	5Y 6/1	Shatter
986N 928E	0-10cm	Granite	Brown/Gray	10YR 6/2	Shatter
986N 928E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
986N 929E	30-40cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 929E	30-40cm	Granite	Gray	5Y 6/1	Secondary
986N 929E	30-40cm	Granite	Gray	5Y 6/1	Secondary
986N 929E	30-40cm	Granit	Light Gray	2.5Y 7/1	Secondary
986N 926E	0-10cm	Granite	Gray	5Y 6/1	Shatter
986N 926E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 926E	0-10cm	Chert	Gray	5Y 6/1	Tertiary
986N 926E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
986N 926E	0-10cm	Granite	Light Gray	2.5Y 7/1	Secondary
986N 926E	0-10cm	Granite	Gray/Brown	10YR 5/2	Secondary
986N 926E	0-10cm	Granite	Gray/Brown	10YR 5/2	Tertiary
986N 926E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 925E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 925E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
986N 925E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
986N 925E	20-30cm	Granite	Brown/gray	10YR 6/2	Secondary
986N 925E	20-30cm	Granite	Gray	5Y 6/1	Secondary
986N 925E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 925E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
986N 925E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 925E	20-30cm	Granite	Gray	5Y 6/1	Shatter
986N 925E	10-20cm	Granite	Brown/Gray	10YR 6/2	Secondary

986N 925E	10-20cm	Granite	Gray	5Y 6/1	Secondary
986N 925E	10-20cm	Chert	Dark Gray	Gley1 3/N	Secondary
986N 925E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 925E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 925E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 925E	10-20cm	Granite	Gray/Brown	10YR 5/2	Secondary
986N 925E	10-20cm	Granite	Light Gray	2.5Y 7/1	Secondary
986N 925E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 925E	10-20cm	Granite	Brown	7.5YR 5/3	Shatter
986N 925E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 925E	40-50cm	Granite	Gray	5Y 6/1	Tertiary
986N 925E	40-50cm	Granite	Gray	5Y 6/1	Primary
986N 925E	40-50cm	Granite	Brown/Gray	10YR 6/2	Secondary
986N 925E	30-40cm	Granite	Brown/Gray	10YR 6/2	
986N 925E	30-40cm	Granite	Gray	5Y 6/1	Core
986N 925E	30-40cm	Basalt	Brown/Gray	10YR 6/2	Shatter
986N 925E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
986N 925E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
986N 925E	0-10cm	Granite	Brown/Gray	10YR 6/2	Tertiary
986N 925E	0-10cm	Granite	Gray	5Y 6/1	Secondary
986N 925E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
986N 925E	0-10cm	Granite	Brown/Gray	10YR 6/2	Tertiary
986N 925E	0-10cm	Granite	Gray	5Y 6/1	Shatter
986N 925E	0-10cm	Chert	Dark Gray	Gley1 3/N	Secondary
986N 925E	0-10cm	Granite	Gray	5Y 6/1	Shatter
986N 928E	60-70cm	Chert	Dark Gray	Gley1 3/N	Secondary
986N 928E	60-70cm	Chert	Brown/Gray	10YR 6/2	Primary
986N 926E	50-60cm	Granite	Gray	5Y 6/1	Tertiary
986N 926E	50-60cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 926E	50-60cm	Granite	Gray	5Y 6/1	Tertiary
985N 931E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
985N 931E	10-20cm	Granite	Light Gray	2.5Y 7/1	Primary
985N 931E	10-20cm	Granite	Brown/Gray	10YR 6/2	Secondary
985N 931E	10-20cm	Basalt	Brown/Gray	10YR 6/2	Secondary
985N 931E	10-20cm	Granite	Light Gray	2.5Y 7/1	Shatter
985N 931E	10-20cm	Granite	Brown/Gray	10YR 6/2	Shatter
985N 931E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
985N 931E	10-20cm	Chert	Dark Gray	Gley1 3/N	Secondary
985N 931E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
985N 931E	0-10cm	Granite	Brown/Gray	10YR 6/2	Tertiary
985N 931E	0-10cm	Granite	Light Gray	2.5Y 7/1	Secondary
985N 931E	0-10cm	Granite	Gray	5Y 6/1	Shatter
985N 931E	0-10cm	Granite	Gray	5Y 6/1	Secondary
985N 931E	0-10cm	Granit	Brown/Gray	10YR 6/2	Secondary
985N 931E	0-10cm	Granite	Gray	5Y 6/1	Shatter
985N 931E	0-10cm	Granite	Brown/Gray	10YR 6/2	Shatter
985N 931E	0-10cm	Granite	Gray	5Y 6/1	Tertiary



985N 931E	0-10cm	Basalt	Brown/Gray	10YR 6/2	Secondary
985N 931E	0-10cm	Granite	Gray	5Y 6/1	Primary
985N 931E	0-10cm	Granite	Gray	5Y 6/1	Secondary
985N 931E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
985N 931E	0-10cm	Granite	Gray	5Y 6/1	Secondary
985N 931E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 931E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
987N 928E	10-20cm	Chert	Dark Gray	Gley1 3/N	Shatter
987N 928E	10-20cm	Chert	Dark Gray	Gley1 3/N	Secondary
987N 928E	10-20cm	Granite	Gray	5Y 6/1	Shatter
987N 928E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
987N 928E	10-20cm	Basalt	Brown/Gray	10YR 6/2	Secondary
987N 928E	10-20cm	Granite	Gray	5Y 6/1	Shatter
987N 928E	10-20cm	Granite	White	Gley1 8/N	Shatter
987N 928E	10-20cm	Granite	Gray/Brown	10YR 5/2	Primary
987N 928E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
987N 928E	10-20cm	Chert	Dark Gray	Gley1 3/N	Shatter
987N 928E	10-20cm	Granite	Gray	5Y 6/1	Shatter
987N 928E	10-20cm	Granite	Dark Gray	Gley1 3/N	Tertiary
987N 928E	10-20cm	Granite	Gray	5Y 6/1	Primary
987N 928E	10-20cm	Granite	Gray	5Y 6/1	Shatter
987N 928E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
987N 928E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
987N 928E	10-20cm	Granite	Gray/Brown	10YR 5/2	Shatter
986N 930E	70-80cm	Granite	Gray	5Y 6/1	Tertiary
987N 928E	20-30cm	Granite	Gray/Brown	10YR 5/2	Core
987N 928E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
987N 928E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
987N 928E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
987N 928E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
987N 928E	20-30cm	Granite	Gray	5Y 6/1	Secondary
987N 928E	20-30cm	Granite	Gray	5Y 6/1	Secondary
987N 928E	20-30cm	Granite	Gray	5Y 6/1	Primary
987N 928E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
987N 928E	20-30cm	Chert	Dark Gray	Gley1 3/N	Core
986N 925E	50-60cm	Granite	Brown/Gray	10YR 6/2	Core
986N 925E	50-60cm	Quartz	White	Gley1 8/N	Tertiary
987N 928E	30-40cm	Chert	Dark Gray	Gley1 3/N	Tertiary
987N 928E	30-40cm	Chert	Dark Gray	Gley1 3/N	Shatter
987N 928E	30-40cm	Granite	Gray	5Y 6/1	Core
987N 928E	30-40cm	Sedimentary	Gray	5Y 6/1	Shatter
987N 928E	30-40cm	Chert	Dark Gray	Gley1 3/N	Tertiary
987N 928E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
987N 928E	30-40cm	Granite?	White	Gley1 8/N	Shaped
987N 928E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
987N 928E	0-10cm	Granite	Brown/Gray	10YR 6/2	Secondary
987N 928E	0-10cm	Granite	Gray	5Y 6/1	Tertiary

987N 928E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
987N 928E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
987N 928E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
985N 932E	50-60cm	Chert	Dark Gray	Gley1 3/N	Secondary
985N 932E	50-60cm	Granite	Dark Gray	Gley1 3/N	Shatter
985N 931E	20-30cm	Granite	Gray	5Y 6/1	Secondary
985N 931E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
985N 931E	20-30cm	Granite	Gray	5Y 6/1	FCR
985N 931E	20-30cm	Granite	Gray	5Y 6/1	Shatter
985N 931E	20-30cm	Granite	Gray	5Y 6/1	Core
985N 932E	40-50cm	Granite	Gray	5Y 6/1	Tertiary
985N 932E	40-50cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 931E	40-50cm	Granite	Gray	5Y 6/1	Shatter
985N 931E	40-50cm	Granite	Gray/Brown	10YR 5/2	Shatter
985N 931E	40-50cm	Basalt	Gray/Brown	10YR 5/2	Shatter
985N 931E	40-50cm	Granite	Gray	5Y 6/1	Tertiary
985N 931E	50-60cm	Granite	Gray	5Y 6/1	Tertiary
985N 931E	50-60cm	Granite	Gray	5Y 6/1	FCR
985N 931E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
985N 931E	30-40cm	Granite	Gray	5Y 6/1	FCN
985N 931E	30-40cm	Chert	Dark Gray	Gley1 3/N	Secondary
985N 931E	30-40cm	Chert	Dark Gray	Gley1 3/N	Shatter
985N 931E	30-40cm	Granite	Gray/Brown	10YR 5/2	Core
985N 932E	20-30cm	Granite	Brown/Gray	10YR 6/2	Tertiary
985N 932E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
985N 932E	20-30cm	Chert	Red	10R 4/6	Tertiary
985N 932E	20-30cm	Granite	Purple/Gray	10R 5/3	Tertiary
985N 932E	30-40cm	Chert	Dark Gray	Gley1 3/N	Shatter
985N 932E	30-40cm	Chert	Dark Gray	Gley1 3/N	Secondary
985N 932E	30-40cm	Granite	Gray	5Y 6/1	Shatter
985N 932E	30-40cm	Granite	Brown	7.5YR 5/3	Secondary
985N 932E	30-40cm	Granite	Gray	5Y 6/1	Secondary
985N 930E	0-10cm	Granite	Dark Gray	Gley1 3/N	Tertiary
985N 930E	0-10cm	Granite	Gray	5Y 6/1	Shatter
985N 930E	0-10cm	Granite	Gray	5Y 6/1	Shatter
985N 930E	0-10cm	Granite	Gray	5Y 6/1	Shatter
985N 930E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
985N 930E	0-10cm	Basalt	Brown/Gray	10YR 6/2	Primary
985N 930E	0-10cm	Chert	Dark Gray	Gley1 3/N	Secondary
985N 930E	0-10cm	Granite	Brown/Gray	10YR 6/2	Secondary
985N 930E	0-10cm	Granite	Brown/Gray	10YR 6/2	Tertiary
985N 930E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
985N 929E	0-10cm	Granite	Dark Gray	Gley1 3/N	Shatter
985N 929E	0-10cm	Granite	Dark Gray	Gley1 3/N	Tertiary
985N 929E	0-10cm	Granite	Gray	5Y 6/1	Shatter
985N 929E	0-10cm	Granite	Gray	5Y 6/1	Shatter
985N 929E	0-10cm	Granite	Gray	5Y 6/1	Core

985N 929E	0-10cm	Granite	Dark Gray	Gley1 3/N	Shatter
985N 929E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 929E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 929E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 929E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 929E	10-20cm	Chert	Dark Gray	Gley1 3/N	Secondary
985N 929E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 929E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
985N 929E	10-20cm	Granite	Gray	5Y 6/1	Shatter
985N 929E	10-20cm	Granite	Gray	5Y 6/1	Shatter
985N 929E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
985N 929E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
985N 929E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
985N 929E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
985N 929E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 929E	10-20cm	Granite	Gray	5Y 6/1	Secondary
985N 929E	10-20cm	Granite	Gray	5Y 6/1	Shatter
985N 929E	20-30cm	Basalt	Gray/Brown	10YR 5/2	Primary
985N 929E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 929E	20-30cm	Granite	Gray	5Y 6/1	Shatter
985N 929E	20-30cm	Basalt	Gray/Brown	10YR 5/2	Secondary
985N 929E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 929E	20-30cm	Chert	Dark Gray	Gley1 3/N	Shatter
985N 929E	20-30cm	Granite	Gray	5Y 6/1	Shatter
985N 929E	20-30cm	Granite	Gray/Brown	10YR 5/2	Primary
985N 929E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
985N 929E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
985N 929E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
985N 929E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
985N 929E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
985N 929E	30-40cm	Granite	Gray	5Y 6/1	Shatter
985N 929E	30-40cm	Granite	Gray	5Y 6/1	Shatter
985N 929E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
985N 929E	30-40cm	Chert	Dark Gray	Gley1 3/N	Secondary
985N 929E	30-40cm	Chert	Dark Gray	Gley1 3/N	Secondary
985N 929E	30-40cm	Granite	Brown/Gray	10YR 6/2	Shatter
985N 929E	30-40cm	Chert	Dark Gray	Gley1 3/N	Shatter
985N 930E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
985N 930E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
985N 929E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
985N 930E	10-20cm	Granite	Gray	5Y 6/1	Shatter
985N 930E	10-20cm	Granite	Gray	5Y 6/1	Shatter
985N 930E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
985N 930E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
985N 930E	10-20cm	Granite	Dark Gray	Gley1 3/N	Tertiary
985N 930E	10-20cm	Granite	Gray	5Y 6/1	Secondary
985N 930E	10-20cm	Granite	Light Gray	2.5Y 7/1	Secondary



986N 923E	10-20cm	Granite	Gray	5Y 6/1	Secondary
986N 923E	10-20cm	Granite	Gray	5Y 6/1	Shatter
986N 923E	10-20cm	Granite	Gray	5Y 6/1	Secondary
986N 923E	10-20cm	Chert	Brown	7.5YR 5/3	Shatter
986N 923E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 923E	10-20cm	Granite	Brown/Gray	10YR 6/2	Shatter
986N 924E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
986N 924E	30-40cm	Chert	Dark Gray	Gley1 3/N	Core
986N 924E	50-60cm	Granite	Gray	5Y 6/1	Shatter
986N 924E	50-60cm	Granite	Gray	5Y 6/1	Shatter
986N 924E	50-60cm	Granite	Gray	5Y 6/1	Shatter
986N 924E	50-60cm	Granite	Gray	5Y 6/1	Shatter
986N 923E	20-30cm	Granite	Brown/Gray	10YR 6/2	Shatter
986N 923E	20-30cm	Granite	Gray	5Y 6/1	Primary
986N 923E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 923E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
986N 923E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
986N 923E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
986N 923E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
986N 923E	20-30cm	Granite	Gray	5Y 6/1	Shatter
986N 923E	20-30cm	Granite	Gray	5Y 6/1	Secondary
986N 923E	20-30cm	Granite	Gray	5Y 6/1	Core
986N 923E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 923E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 923E	0-10cm	Granite	Gray/Brown	10YR 5/2	Tertiary
986N 923E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
986N 923E	0-10cm	Granite	Gray	5Y 6/1	Primary
986N 923E	0-10cm	Granite	Gray	5Y 6/1	Shatter
986N 923E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
986N 923E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
986N 923E	0-10cm	Granite	Gray	5Y 6/1	Secondary
986N 928E	Fill in F45	Chert	Red	10R 4/6	Shatter
986N 933E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 933E	10-20cm	Basalt	Brown/Gray	10YR 6/2	Primary
986N 933E	10-20cm	Granite	Gray	5Y 6/1	Primary
986N 933E	10-20cm	Granite	Gray	5Y 6/1	Secondary
986N 933E	10-20cm	Granite	Gray	5Y 6/1	Secondary
986N 933E	10-20cm	Granite	Gray	5Y 6/1	Primary
986N 933E	10-20cm	Granite	Gray	5Y 6/1	Primary
986N 933E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 933E	10-20cm	Granite	Gray/Brown	10YR 5/2	Secondary
986N 933E	10-20cm	Granite	Brown/Gray	10YR 6/2	Shatter
986N 933E	10-20cm	Granite	Dark Gray	Gley1 3/N	Tertiary
986N 934E	0-10cm	Granite	Light Gray	2.5Y 7/1	Shatter
986N 934E	0-10cm	Granite	Gray/Brown	10YR 5/2	Secondary
986N 934E	0-10cm	Chert	Dark Gray	Gley1 3/N	Shatter
986N 934E	0-10cm	Granite	Gray	5Y 6/1	Shatter

986N 934E	0-10cm	Granite	Gray/Brown	10YR 5/2	Core
986N 934E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
986N 934E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
986N 934E	0-10cm	Granite	Gray/Brown	10YR 5/2	Core
986N 934E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 934E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
986N 934E	0-10cm	Granite	Gray	5Y 6/1	Shatter
986N 934E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
986N 934E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
986N 934E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 934E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 933E	40-50cm	Granite	Gray	5Y 6/1	Tertiary
986N 933E	40-50cm	Granite	Brown/Gray	10YR 6/2	Tertiary
986N 933E	40-50cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 933E	40-50cm	Granit	Gray	5Y 6/1	Secondary
986N 933E	40-50cm	Chert	Dark Gray	Gley1 3/N	Secondary
986N 924E	50-60cm	Granite	Gray	5Y 6/1	Secondary
986N 924E	50-60cm	Granite	Gray	5Y 6/1	Primary
986N 924E	40-50cm	Granite	Gray	5Y 6/1	Tertiary
986N 924E	40-50cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 924E	40-50cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 924E	40-50cm	Granite	Gray	5Y 6/1	Tertiary
986N 924E	40-50cm	Granite	Gray	5Y 6/1	Shatter
986N 924E	40-50cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 932E	20-30cm	Granite	Gray/Brown	10YR 5/2	Core
986N 932E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
986N 934E	50-60cm	Chert	Dark Gray	Gley1 3/N	Shatter
986N 934E	50-60cm	Granite	Gray	5Y 6/1	Secondary
986N 934E	50-60cm	Granite	Gray	5Y 6/1	Primary
986N 934E	50-60cm	Basalt	Brown	7.5YR 5/3	Secondary
986N 934E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 934E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 934E	10-20cm	Chert	Red	10R 4/6	Tertiary
986N 934E	10-20cm	Granite	Brown/Gray	10YR 6/2	Core
986N 934E	10-20cm	Granite	Gray	5Y 6/1	Core
986N 934E	10-20cm	Granite	Gray	5Y 6/1	Shatter
986N 934E	10-20cm	Granite	Gray	5Y 6/1	Shatter
986N 934E	10-20cm	Granite	Gray	5Y 6/1	Primary
986N 934E	10-20cm	Granite	Gray	5Y 6/1	Secondary
986N 934E	10-20cm	Granite	Gray	5Y 6/1	Secondary
986N 934E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 935E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 935E	0-10cm	Chert	Dark Gray	Gley1 3/N	Secondary
986N 935E	0-10cm	Chert	Dark Gray	Gley1 3/N	Shatter
986N 935E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
986N 935E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
986N 934E	40-50cm	Granite	Gray	5Y 6/1	Tertiary

986N 934E	40-50cm	Granite	Gray	5Y 6/1	Tertiary
986N 934E	40-50cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 934E	40-50cm	Granite	Gray	5Y 6/1	Tertiary
986N 924E	30-40cm	Granite	Gray	5Y 6/1	Shatter
986N 924E	30-40cm	Granite	Gray	5Y 6/1	Shatter
986N 924E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
986N 924E	30-40cm	Granite	Dark Gray	Gley1 3/N	Tertiary
986N 924E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
986N 924E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
986N 924E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
986N 934E	20-30cm	Chert	Dark Gray	Gley1 3/N	Core
986N 934E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 934E	20-30cm	Chert	Dark Gray	Gley1 3/N	Secondary
986N 934E	20-30cm	Chert	Dark Gray	Gley1 3/N	Shatter
986N 934E	20-30cm	Chert	Yellow	2.5Y 5/6	Secondary
986N 934E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
986N 934E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
986N 934E	20-30cm	Granite	Gray	5Y 6/1	Secondary
986N 934E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 934E	20-30cm	Granite	Gray	5Y 6/1	Shatter
986N 934E	20-30cm	Granite	Light Gray	2.5Y 7/1	Secondary
986N 934E	20-30cm	Granite	Gray	5Y 6/1	Secondary
986N 933E	20-30cm	Granite	Gray	5Y 6/1	Core
986N 933E	20-30cm	Granite	Gray	5Y 6/1	Shatter
986N 933E	20-30cm	Sedimentary	Brown/Gray	10YR 6/2	Shatter
986N 934E	30-40cm	Granite	Gray	5Y 6/1	Secondary
986N 934E	30-40cm	Basalt	Brown	7.5YR 5/3	Tertiary
986N 934E	30-40cm	Granite	Gray	5Y 6/1	Secondary
986N 934E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
986N 934E	30-40cm	Granite	Gray	5Y 6/1	Core
986N 933E	0-10cm	Granit	Dark Gray	Gley1 3/N	Shatter
986N 933E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 933E	0-10cm	Granite	Dark Gray	Gley1 3/N	Shatter
986N 933E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
986N 933E	0-10cm	Granite	Gray	5Y 6/1	Shatter
986N 933E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
986N 933E	0-10cm	Basalt	Brown/Gray	10YR 6/2	Core
986N 933E	0-10cm	Basalt	Gray	5Y 6/1	Primary
986N 935E	30-40cm	Basalt	Light Gray	2.5Y 7/1	Secondary
986N 935E	30-40cm	Granite	Brown/Gray	10YR 6/2	Core
986N 935E	30-40cm	Basalt	Brown/Gray	10YR 6/2	Secondary
986N 935E	30-40cm	Chert	Dark Gray	Gley1 3/N	Secondary
986N 935E	30-40cm	Sedimentary	Gray	5Y 6/1	Secondary
986N 935E	30-40cm	Chert	Dark Gray	Gley1 3/N	Secondary
986N 935E	30-40cm	Chert	Dark Gray	Gley1 3/N	Secondary
986N 935E	30-40cm	Granite	Gray	5Y 6/1	Shatter
986N 935E	30-40cm	Granite	Gray	5Y 6/1	Tertiary

986N 936E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 936E	20-30cm	Granite	Gray	5Y 6/1	Secondary
986N 936E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 936E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 936E	20-30cm	Granite	Gray	5Y 6/1	Secondary
986N 936E	20-30cm	Granite	Brown	7.5YR 5/3	Tertiary
986N 936E	20-30cm	Granite	Gray	5Y 6/1	Shatter
986N 936E	20-30cm	Chert	Dark Gray	Gley1 3/N	Shatter
986N 936E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 936E	20-30cm	Chert	Dark Gray	Gley1 3/N	Shatter
986N 936E	20-30cm	Granite	Brown/Gray	10YR 6/2	Tertiary
986N 936E	20-30cm	Granite	Brown/Gray	10YR 6/2	Tertiary
986N 936E	20-30cm	Granite	Brown/Gray	10YR 6/2	Tertiary
986N 936E	20-30cm	Granite	Brown/Gray	10YR 6/2	Tertiary
986N 936E	30-40cm	Granite	Gray	5Y 6/1	Shatter
986N 936E	30-40cm	Basalt	Gray	5Y 6/1	Shatter
986N 936E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
986N 936E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
986N 936E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
986N 937E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 937E	10-20cm	Chert	Gray	5Y 6/1	Secondary
986N 937E	10-20cm	Granite	Gray	5Y 6/1	Shatter
986N 937E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 937E	0-10cm	Granite	Gray	5Y 6/1	Secondary
986N 936E	0-10cm	Chert	Dark Gray	Gley1 3/N	Secondary
986N 936E	0-10cm	Granite	Gray	5Y 6/1	Core
986N 936E	0-10cm	Granite	Brown/Gray	10YR 6/2	Shatter
986N 936E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
986N 936E	0-10cm	Granite	Brown/Gray	10YR 6/2	Secondary
986N 936E	0-10cm	Granite	Brown/Gray	10YR 6/2	Shatter
986N 936E	0-10cm	Granite	Brown/Gray	10YR 6/2	Shatter
986N 936E	0-10cm	Granite	Brown/Gray	10YR 6/2	Shatter
986N 936E	0-10cm	Granite	Brown/Gray	10YR 6/2	Shatter
986N 936E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 936E	0-10cm	Granite	Brown/Gray	10YR 6/2	Core
986N 935E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 935E	10-20cm	Granite	Brown	7.5YR 5/3	Shatter
986N 935E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 935E	10-20cm	Granite	Gray	5Y 6/1	Secondary
986N 935E	10-20cm	Granite	Gray	5Y 6/1	Secondary
986N 935E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 935E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 935E	10-20cm	Granite	Brown/Gray	10YR 6/2	Primary
986N 933E	50-60cm	Granite	Gray	5Y 6/1	Tertiary
986N 933E	50-60cm	Granite	Gray	5Y 6/1	Tertiary
986N 937E	30-40cm	Granite	Gray	5Y 6/1	
986N 935E	20-30cm	Granite	Gray	5Y 6/1	Shatter



986N 935E	20-30cm	Granite	Brown/Gray	10YR 6/2	Shatter
986N 935E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
986N 935E	20-30cm	Granite	Brown/Gray	10YR 6/2	Shatter
986N 935E	20-30cm	Granite	Brown/Gray	10YR 6/2	Shatter
986N 935E	20-30cm	Granite	Brown/Gray	10YR 6/2	Shatter
986N 935E	20-30cm	Granite	Gray	5Y 6/1	Secondary
986N 935E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 935E	20-30cm	Granite	Brown/Gray	10YR 6/2	Secondary
986N 935E	20-30cm	Chert	Yellow/Brown	10YR 5/6	Tertiary
986N 935E	20-30cm	Granite	Brown/Gray	10YR 6/2	Shatter
986N 937E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
986N 937E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
986N 937E	20-30cm	Chert	Brown	7.5YR 5/3	Secondary
986N 937E	20-30cm	Chert	Dark Gray	Gley1 3/N	Secondary
986N 937E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
987N 927E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
987N 927E	0-10cm	Granite	Gray/Brown	10YR 5/2	Shatter
987N 927E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
987N 927E	0-10cm	Granite	Gray	5Y 6/1	Shatter
987N 927E	0-10cm	Granite	Brown/gray	10YR 6/2	Primary
987N 927E	0-10cm	Granite	Gray	5Y 6/1	Secondary
987N 927E	0-10cm	Granite	Gray	5Y 6/1	Shatter
987N 927E	20-30cm	Granite	Gray	5Y 6/1	Secondary
987N 927E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
987N 927E	20-30cm	Basalt	Gray/brown	10YR 5/2	Secondary
987N 927E	20-30cm	Granite	Dark Gray	Gley1 3/N	Secondary
987N 927E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
987N 927E	20-30cm	Granite	Gray	5Y 6/1	Shatter
987N 927E	20-30cm	Granite	Gray	5Y 6/1	Shatter
987N 927E	20-30cm	Granite	Dark Gray	Gley1 3/N	Tertiary
987N 927E	20-30cm	Granite	Gray/Brown	10YR 5/2	Primary
987N 927E	30-40cm	Granite	Gray	5Y 6/1	Core
987N 927E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
987N 927E	30-40cm	Granite	Brown	7.5YR 5/3	Tertiary
987N 927E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
987N 927E	30-40cm	Chert	Dark Gray	Gley1 3/N	Tertiary
987N 927E	30-40cm	Granite	Brown	7.5YR 5/3	Tertiary
986N 937E	40-50cm	Granite	Gray	5Y 6/1	Tertiary
986N 937E	40-50cm	Granite	Gray	5Y 6/1	Secondary
986N 937E	40-50cm	Granite	Gray	5Y 6/1	Tertiary
987N 928E	Fill in F43	Granite	Gray	5Y 6/1	Secondary
987N 928E	Fill in F43	Chert	Gray	5Y 6/1	Secondary
987N 928E	Fill in F43	Chert	Gray	5Y 6/1	Shatter
987N 928E	Fill in F43	Basalt	Brown	7.5YR 5/3	Shatter
987N 928E	Fill in F43	Basalt	Light Gray	2.5Y 7/1	Primary
987N 928E	Fill in F43	Granite	Gray	5Y 6/1	Secondary
987N 924E	20-30cm	Granite	Dark Gray	Gley1 3/N	Tertiary

987N 924E	20-30cm	Granite	White	Gley1 8/N	Tertiary
987N 924E	20-30cm	Granite	Gray	5Y 6/1	Core
987N 924E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
987N 924E	20-30cm	Granite	Gray	5Y 6/1	Shatter
987N 924E	20-30cm	Chert	Brown	7.5YR 5/3	Secondary
987N 924E	20-30cm	Chert	Dark Gray	Gley1 3/N	Secondary
987N 924E	20-30cm	Granite	Brown/Gray	10YR 6/2	Primary
987N 924E	20-30cm	Granite	Gray	5Y 6/1	Secondary
987N 925E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
987N 925E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
987N 925E	10-20cm	Chert	Dark Gray	Gley1 3/N	Shatter
987N 925E	10-20cm	Chert	Dark Gray	Gley1 3/N	Core
987N 925E	10-20cm	Granite	Brown	7.5YR 5/3	Shatter
987N 925E	10-20cm	Chert	Gray	5Y 6/1	Shatter
987N 925E	10-20cm	Granite	Light Gray	2.5Y 7/1	Secondary
987N 925E	10-20cm	Granite	Dark Gray	Gley1 3/N	Shatter
987N 925E	10-20cm	Granite	gray	5Y 6/1	Tertiary
987N 925E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
987N 925E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
987N 925E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
987N 925E	10-20cm	Granite	Gray	5Y 6/1	Secondary
987N 925E	10-20cm	Granite	Gray/Brown	10YR 5/2	Tertiary
987N 925E	10-20cm	Chert	Dark Gray	Gley1 3/N	Core
987N 925E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
987N 925E	30-40cm	Granite	Gray	5Y 6/1	Shatter
987N 925E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
987N 925E	30-40cm	Granite	Gray	5Y 6/1	Core
987N 925E	30-40cm	Chert	Dark Gray	Gley1 3/N	Shatter
987N 925E	30-40cm	Chert	Gray	5Y 6/1	Tertiary
987N 925E	30-40cm	Granite	Gray	5Y 6/1	Shatter
987N 925E	30-40cm	Granite	Brown/Gray	10YR 6/2	Primary
987N 925E	40-45cm	Granite	Brown/Gray	10YR 6/2	Core
986N 938E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
986N 938E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 938E	0-10cm	Granite	Gray	5Y 6/1	Core
986N 938E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 938E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 938E	10-20cm	Granite	Gray	5Y 6/1	Shatter
986N 938E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 938E	10-20cm	Granite	Gray	5Y 6/1	Shatter
986N 938E	10-20cm	Chert	Dark Gray	Gley1 3/N	Secondary
986N 938E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 938E	10-20cm	Chert	Dark Gray	Gley1 3/N	Shatter
986N 938E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 938E	10-20cm	Granite	Brown/Gray	10YR 6/2	Secondary
986N 938E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 938E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
986N 938E	40-50cm	Granite	Gray	5Y 6/1	Tertiary

986N 938E	40-50cm	Granite	Gray	5Y 6/1	Tertiary
986N 939E	10-20cm	Granite	Dark Gray	Gley1 3/N	Tertiary
986N 939E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 939E	10-20cm	Granite	Gray	5Y 6/1	Core
986N 939E	10-20cm	Granite	Gray	5Y 6/1	Shatter
986N 940E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 940E	0-10cm	Chert	Dark Gray	Gley1 3/N	Shatter
986N 939E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 939E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
986N 940E	10-20cm	Chert	Yellow/Brown	10YR 5/6	Tertiary
986N 940E	10-20cm	Chert	Dark Gray	Gley1 3/N	Primary
986N 940E	20-30cm	Basalt	Brown/Gray	10YR 6/2	Core
986N 940E	20-30cm	Granite	gray	5Y 6/1	Shatter
986N 940E	20-30cm	Granite	Dark Gray	Gley1 3/N	Tertiary
986N 941E	0-10cm	Granite	Dark Gray	Gley1 3/N	Tertiary
986N 941E	0-10cm	Granite	Gray	5Y 6/1	Secondary
986N 941E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 941E	10-20cm	Granite	Gray	5Y 6/1	Core
986N 941E	10-20cm	Basalt	Brown/Gray	10YR 6/2	Core
986N 941E	20-30cm	Chert	Yellow/Brown	10YR 5/6	Tertiary
986N 941E	20-30cm	Granite	Gray	5Y 6/1	Core
986N 941E	20-30cm	Chert	Dark Gray	Gley1 3/N	Core
986N 941E	50-60cm	Granite	Gray	5Y 6/1	Shatter
986N 941E	50-60cm	Granite	Gray	5Y 6/1	Tertiary
985N 927E	0-10cm	Chert	Yellow/Brown	10YR 5/6	Secondary
985N 927E	20-30cm	Chert	Dark Gray	Gley1 3/N	Shatter
985N 927E	20-30cm	Sedimentary	Gray	5Y 6/1	Secondary
985N 927E	20-30cm	Granite	Brown	7.5YR 5/3	Core
985N 927E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 927E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 927E	20-30cm	Granite	gray	5Y 6/1	Shatter
985N 927E	20-30cm	Granite	Gray	5Y 6/1	Tertiary
985N 928E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 928E	10-20cm	Granite	Brown	7.5YR 5/3	Primary
985N 928E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
985N 928E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 928E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 928E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
985N 928E	10-20cm	Sedimentary	White/Red	10R 8/2	FCR
985N 928E	10-20cm	Granite	Brown	7.5YR 5/3	Secondary
985N 928E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 928E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
985N 928E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
985N 924E	0-10cm	Chert	Yellow	2.5Y 5/6	Tertiary
985N 925E	0-10cm	Chert	Dark Gray	Gley1 3/N	Core
985N 925E	0-10cm	Granite	Brown	7.5YR 5/3	Tertiary
985N 925E	0-10cm	Chert	Dark Gray	Gley1 3/N	Shatter

985N 926E	20-30cm	Chert	Gray/Brown	10YR 5/2	Tertiary
985N 926E	30-40cm	Granite	Gray	5Y 6/1	Tertiary
985N 926E	30-40cm	Granit	Dark Gray	Gley1 3/N	Secondary
985N 926E	30-40cm	Granite	Gray	5Y 6/1	Core
985N 924E	30-40cm	Chert	Gray	5Y 6/1	Tertiary
987N 922E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
987N 922E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
987N 922E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
987N 922E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
987N 922E	0-10cm	Chert	Dark Gray	Gley1 3/N	Secondary
987N 922E	0-10cm	Granite	Gray	5Y 6/1	Tertiary
987N 922E	0-10cm	Granite	Gray	5Y 6/1	Shatter
987N 922E	10-20cm	Granite	Gray/Brown	10YR 5/2	Tertiary
987N 922E	10-20cm	Granite	Gray	5Y 6/1	Shatter
987N 922E	10-20cm	Chert	Red	10R 4/6	Tertiary
987N 922E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
987N 922E	20-30cm	Granite	Light Gray	2.5Y 7/1	Shatter
987N 922E	20-30cm	Chert	White	Gley1 8/N	Tertiary
987N 922E	20-30cm	Granite	Dark Gray	Gley1 3/N	Tertiary
985N 922E	20-30cm	Chert	Dark Gray	Gley1 3/N	Core
985N 922E	20-30cm	Granite	Gray	5Y 6/1	Secondary
985N 922E	20-30cm	Chert	Dark Gray	Gley1 3/N	Secondary
985N 922E	20-30cm	Granite	Gray	5Y 6/1	Shatter
985N 922E	20-30cm	Granite	gray	5Y 6/1	Tertiary
985N 921E	20-30cm	Chert	Red	10R 4/6	Shatter
985N 921E	20-30cm	Chert	Red	10R 4/6	Tertiary
986N 922E	30-40cm	Granite	Gray	5Y 6/1	Core
986N 922E	30-40cm	Chert	Dark Gray	Gley1 3/N	Tertiary
986N 922E	30-40cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 924E	40-50cm	Basalt	Gray	5Y 6/1	Secondary
985N 924E	40-50cm	Chert	Red	10R 4/6	Tertiary
985N 920E	20-30cm	Granit	Gray	5Y 6/1	Tertiary
985N 920E	20-30cm	Basalt	Brown	7.5YR 5/3	Tertiary
985N 920E	20-30cm	Chert	Dark Gray	Gley1 3/N	Shatter
985N 920E	20-30cm	Chert	Dark Gray	Gley1 3/N	Shatter
985N 920E	20-30cm	Chert	Dark Gray	Gley1 3/N	Secondary
986N 918E	0-10cm	Quartz	White	Gley1 8/N	Tertiary
986N 918E	0-10cm	Granite?	Gray	5Y 6/1	Tertiary
986N 919E	20-30cm	Chert	Yellow/Brown	10YR 5/6	Secondary
985N 923E	40-50cm	Chert	Dark Gray	Gley1 3/N	Core
987N 919E	10--20cm	Chert	Red	10R 4/6	Tertiary
987N 919E	10--20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
987N 919E	20-30cm	Chert	Yellow	2.5Y 5/6	Tertiary
964N 920E	30-40cm	Granite	Gray	5Y 6/1	Core
964N 920E	40-50cm	Chert	Dark Gray	Gley1 3/N	Shatter
964N 920E	40-50cm	Chert	Dark Gray	Gley1 3/N	Tertiary
964N 920E	40-50cm	Basalt	Brown/Gray	10YR 6/2	Core

964N 920E	40-50cm	Chert	Dark Gray	Gley1 3/N	Tertiary
964N 920E	40-50cm	Granite	Gray	5Y 6/1	Tertiary
875N 1054E	0-10cm	Chert	Dark Gray	Gley1 3/N	Core
875N 1054E	10-20cm	Granite	Gray	5Y 6/1	Tertiary
875N 1056E	50-60cm	Granite	Light Gray	2.5Y 7/1	Tertiary
875N 1056E	50-60cm	Granite	Light Gray	2.5Y 7/1	Secondary
875N 1058E	50-60cm	Granite	Gray	5Y 6/1	Shatter
875N 1058E	50-60cm	Granite	Gray/Brown	10YR 5/2	Secondary
875N 1055E	0-10cm	Chert	Dark Gray	Gley1 3/N	Tertiary
875N 1055E	10-20cm	Chert	Dark Gray	Gley1 3/N	Shatter
875N 1055E	10-20cm	Basalt	Brown/Gray	10YR 6/2	Secondary
875N 1055E	10-20cm	Granite	Gray	5Y 6/1	Primary
875N 1055E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
875N 1055E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
875N 1055E	20-30cm	Granite	Gray	5Y 6/1	Secondary
875N 1055E	20-30cm	Chert	Dark Gray	Gley1 3/N	Secondary
875N 1055E	20-30cm	Granite	Light Gray	2.5Y 7/1	Tertiary
875N 1055E	20-30cm	Granite	Light Gray	2.5Y 7/1	Core
875N 1055E	20-30cm	Chert	Dark Gray	Gley1 3/N	Shatter
875N 1055E	20-30cm	Granite	Gray	5Y 6/1	Shatter
875N 1055E	20-30cm	Basalt	Brown/Gray	10YR 6/2	Secondary
875N 1056E	20-30cm	Chert	Dark Gray	Gley1 3/N	Core
875N 1059E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
875N 1059E	10-20cm	Chert	Dark Gray	Gley1 3/N	Tertiary
875N 1059E	10-20cm	Chert	Dark Gray	Gley1 3/N	Secondary
875N 1059E	20-30cm	Basalt	Light Gray	2.5Y 7/1	Primary
875N 1057E	10-20cm	Granite	Gray	5Y 6/1	Shatter
875N 1058E	0-10cm	Granite	Dark Gray	Gley1 3/N	Tertiary
875N 1058E	20-30cm	Chert	Dark Gray	Gley1 3/N	Secondary
875N 1058E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985 N 1008 E	60-70cm	Granite	Gray	5Y 6/1	Tertiary
985N 923E	40-50cm	Granite	Gray	5Y 6/1	Shatter
985N 923E	40-50cm	Chert	Dark Gray	Gley1 3/N	Tertiary
985N 923E	40-50cm	Granite	Gray	5Y 6/1	Tertiary
987N 920E	20-30cm	Chert	Dark Gray	Gley1 3/N	Shatter
987N 920E	20-30cm	Chert	Dark Gray	Gley1 3/N	Secondary
987N 920E	20-30cm	Chert	Dark Gray	Gley1 3/N	Shatter
987N 920E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary
987N 920E	20-30cm	Chert	Dark Gray	Gley1 3/N	Tertiary

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