THE ARCHAEOLOGY of WORLD WAR II KARST DEFENCES in the PACIFIC

by

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Front photograph: Inside SPS39 facing north at E1.

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Declaration of Candidate

I certify that this thesis does not incorporate without acknowledgment any material previously submitted for a degree or diploma at any university and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in the text.

Julie Mushynsky
November 2017

Abstract

During World War II (WWII) the Japanese military, themselves or by using civilian labour, excavated tunnels into the limestone of many Pacific islands and modified natural caves to use as command posts, hospitals and for combat, storage and shelter. Civilians also used caves to shelter themselves during WWII. In this thesis, caves and tunnels are considered a specific type of site constructed within a karst topography and are referred to as “karst defences.”

This study investigates karst defences in Saipan, Commonwealth of the Northern Mariana Islands. The thesis seeks to explore the defensive strategies people employed at karst defences and what influenced these tactics during the Battle for Saipan from June 15 to July 9, 1944. The research also examines how these strategies changed as the Battle for Saipan progressed and how they relate to the overall Japanese WWII defensive strategy in the Pacific.

Analysis incorporates archival research and archaeological fieldwork. Fieldwork included the detailed recording of over 50 sites across Saipan and their material remains. Data from Saipan was also compared to previous studies, particularly on Peleliu in Palau and Chuuk Lagoon (formerly Truk Lagoon) in the Caroline Islands. Collaborative methods were used during fieldwork which included collecting oral histories from civilians in Saipan who hid within caves during the battle, working with local co-researchers and employing volunteers. Through collaboration, this thesis also examined the significance of karst defences to people in the present.

Through an examination of material remains and site construction, comparative analysis and reconstructing the battlefield, this study argues that people’s behaviour during conflict is not motivated by sheer survival. This study revealed a range of defensive behaviours and strategies used by the Japanese military, the United States military and civilians. Strategies were influenced by military culture and changing war conditions and attitudes. The study also contributed new knowledge to and clarified popular historical understandings of overall Japanese and civilian defence strategy during the Pacific War. This is the first systematic, island-wide study of karst defences in Saipan and the first study in the Pacific to use karst defences to archaeologically analyse and interpret defensive strategies through space and time.

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Chapter 1 – Introduction

1.1 The Legacy Surrounding Us

“Saipan,” explains the Huffington Post “is the most beautiful place in America you’ve never heard of” (Greenwood 2014). Located in the Northern Pacific Ocean, Saipan is a 120km^2 volcanic island in the Mariana Island group of Micronesia, which is administered as a self-governing Commonwealth under the United States (U.S.) (Office of Historic Preservation 2011:1; Spoehr 2000:21) (Figure 1.1). Saipan’s economy relies on tourism and has become a popular destination for Asian tourists seeking sun, sand and sea (McKinnon 2015a:14–15; Turner and Ash 1975:11–12, 97).

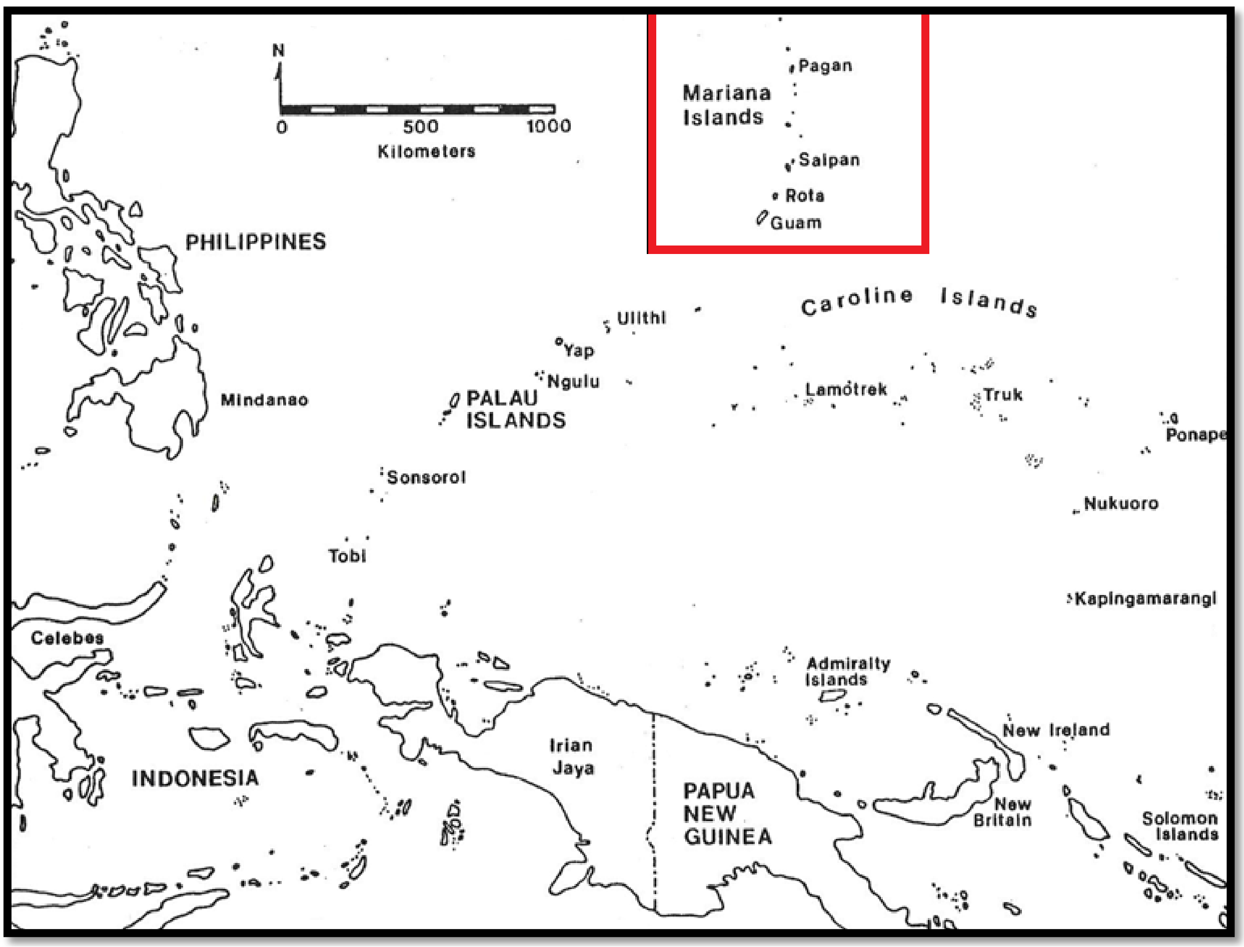

Figure 1.1: The Marianas in relation to the Pacific (Butler and DeFant 1991:6).

If Saipan itself is relatively unknown, then the World War II (WWII) battle that occurred there between the U.S. and Japan from June 15 to July 9, 1944 is probably even more so. But for those who visit the island and certainly those who live there, the legacy of that past is all around them (Carman 2002:11). Most activity, tourist and local, is concentrated on the land and water on Saipan's western coast and in Garapan—Saipan's largest village (Thompson 2002:31) (Figure 1.2). Without having to search, people are reminded of the island's role in WWII. The Saipan International Airport is built on the same airfield used by both the Japanese and the U.S. during WWII and is also surrounded by air-raid shelters and bunkers, some of which have been adaptively reused (Cabrera 2005:7; Denfeld and Russell 1984:27). Driving north from Saipan's airport in the south along the road next to the western beaches, there are war period Japanese tanks and bunkers on land and U.S. Sherman tanks peeking out of the shallow waters in the adjacent lagoon (McKinnon and Carrell 2011:103). Nearly every day in the pelagic waters just beyond the western reef sit five U.S. maritime prepositioning ships (MPS) (Figure 1.3). This squadron is ready to be deployed within 12–24 hours to any war zone or devastated area and carries enough equipment and supplies for 30 days of combat (Bagnol 2014a; Military Sealift Command Public Affairs 1997).

Away from the coast, within Saipan's limestone interior, are hundreds of caves once used by both the Japanese military and civilians during WWII. WWII-related caves come in various, forms from natural open cavities and rock shelters to large, intricate, human-excavated tunnels. These sites are often hidden in Saipan's jungle, away from the main roads and located on private property. The lack of accessibility helps preserve the sites' archaeological integrity, but has also prevented researchers from conducting any in-depth study to help understand the role these sites played during WWII. This thesis is a result of the first systematic, island-wide archaeological study to focus specifically on this poorly understood aspect of Saipan's WWII heritage.

1.2 Location and Background

The fifteen island archipelago known as the Mariana Islands was first populated by seafarers from Island Southeast Asia about 4,000 years ago (Hung et al. 2011:923; Vilar et al. 2012:6) (Figure 1.4). The descendants of these first settlers are the Chamorro people. The prehistory of

Figure 1.2: Saipan villages (Smoot 2015).


Figure 1.3: Three prepositioning ships in Saipan's western waters.

the Marianas is divided into two periods before and after the construction of *latte* structures—paired, two-piece foundational stones of limestone or basalt used to support residences made of wood (Russell 1998:104–107). The Pre-*Latte* phase of prehistory dates from when the first people arrived to the Mariana Islands to 1,100 BP. The subsequent *Latte* Phase lasted until European contact in 1521 (Russell and Fleming 1986:116, 120).

The first European to encounter the Mariana Islands was Ferdinand Magellan in 1521 (Barratt 2003:5) and since then the islands have been occupied by four different colonial powers. Forty-four years after Magellan, the Mariana Islands were claimed by Spain and a mission was established on Guam (the southernmost island) in 1668 (Spoehr 2000:6, 8). In order to attain better control of the Chamorro people the Spanish government relocated the population of the Marianas to Guam for approximately 200 years (Coomans 2000:4–5). Political unrest and natural

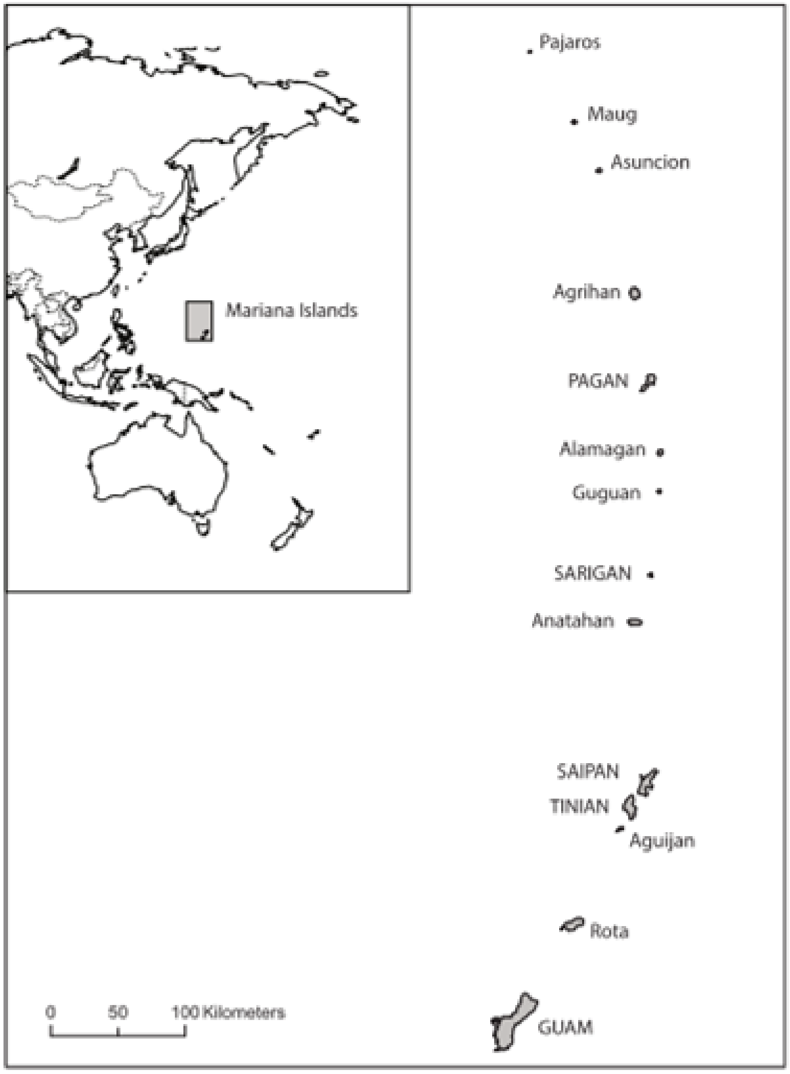

Figure 1.4: The Marianas Islands (Dixon and Schaefer 2014:53).

disasters caused a group of Carolinian people from the Caroline Islands to the south, who had connections to the Marianas prior to Spanish arrival, to request permission from Spain to resettle Saipan, Tinian and Rota in the early-1800s (D'Arcy 2006:157–161). Chamorro people from Guam joined the Carolinian people and resettled the northern Mariana Islands in the mid-1800s (Spoehr 2000:40–41).

After the Spanish-American War of 1898, the U.S. claimed Guam and Germany took over the remaining Mariana Islands in 1899 and the Caroline Islands in 1907 (Fritz 2001:10; Spoehr 2000:44–45). The German Period was short-lived due to the outbreak of World War I (WWI) in 1914 (O'Neill and Spennemann 2001:46–47). Japan saw the opportunity to expand its empire and seized all previously German-held territory in the Pacific north of the equator

(Higuchi 2013:5; Peattie 1988:39–40). All of Micronesia, except Guam, was under Japanese control until the end of WWII in 1945 (Peattie 1988:309–310). Post-war, Guam became an unincorporated U.S. territory in 1950 and the northern Mariana Islands were administered by the U.S. as a United Nations (U.N.) Trust Territory (the Trust Territory of the Pacific Islands or TTPI) in 1947 (Spoehr 2000:67–68, 98–99). In 1976, the northern Mariana Islands became the Commonwealth of the Northern Mariana Islands (CNMI), which is self-governing in internal affairs, although foreign affairs and defence are still a U.S. responsibility (Olopai and Flinn 2005:97–101).

1.3 The Japanese Period in the Pacific

This thesis is concerned primarily with the Japanese Period of Saipan's history, between 1914 and 1945, including the Battle for Saipan. A narrower date range cannot be established because, although caves and tunnels were used during the war and constructed during the Japanese Period, exactly when they were constructed remains a topic of historical debate.

After the Japanese navy seized all previously German-held territory, Japanese control was acknowledged by the League of Nations at the Paris Peace Conference in 1919 which designated Micronesia as a Class C mandate (Higuchi 2013:5). Fully approved in 1920, Article 4 of the Mandate Agreement prohibited the installation of military bases and fortifications and the military training of locals except for civic purposes (Higuchi 2013:41). In 1922, administration of the area shifted from naval to civilian under the South Seas Government or *Nan'yo-cho* (Peattie 1988:68). Exactly what went on during Japanese rule and whether Japan complied with the non-fortification clause is still unclear. Interestingly, no inspection plan was in place to ensure Japan followed the Mandate rules, instead Japan submitted periodic reports to the League of Nations (Petty 2002:6). Furthermore, in the 1920s and early 30s, the Japanese refused a number of foreign visits (although not all), made foreign business opportunities difficult to pursue, requested to increase their naval tonnage and started war with China (Denfeld 1981b:2; Peattie 1988:236–240, 242–243; Rottman 2004:9). To this day, there is speculation about the Japanese Period in Micronesia, as much of the original documentation was intentionally or unintentionally destroyed or hidden during WWII (Bradsher 2006b:156–157; Chung 1995:11).

The U.S. first accused Japan of violating Article 4 in 1921 after Japan cut the means with which the U.S. and China could communicate. The Guam-Yap-Shanghai cable was disconnected after Japan acquired Yap (an island south of Guam) under the Mandate which sparked increased suspicion by the U.S. (Higuchi 2013:30–31). Over time the U.S. gathered information from business people, travelers, missionaries, islanders, scientists, journalists and U.S. spies coming out of Micronesia on whether the Japanese were fortifying the mandated territory, but this information led to little more than suspicions (Peattie 1988:235–240). However, the 1920s and 30s was a transitional period in the conduct of war which favoured airpower over other forms of military power and, as a result, "visitors" to Micronesia were on the lookout for facilities that would support aircraft (Peattie 1988:231). For example, in 1934 British journalist R.V.C. Bodley reported no signs of airfields, moorings for seaplanes, or fuel depots on his visit to "practically every island" under the Japanese Mandate (Bodley 1934:104–107; Peattie 1988:246). Any form of defence hidden in the jungle, would have been missed.

Japan eventually withdrew from the League of Nations in 1935 (Peattie 1988:243–244) and were therefore free from any restrictions. Despite this, Japan continued to report to the League up until 1937 (Higuchi 2013:36). Prior to withdrawal, in Saipan the Japanese began dredging Tanapag Harbour in 1927 and constructing the Tanapag seaplane base and the Aslito Airfield in 1933 (Denfeld 1997:6; Higuchi 2013:165; Peattie 1988:248). These facilities were funded by the *Nan'yo-cho* and described as part of "civilian and commercial development" until they were eventually used for military purposes during WWII (Denfeld 1997:6; Higuchi 2013:35; Peattie 1988:245, 248). In her recent study of the Japanese administration of Guam, Higuchi (2013:30) argues that the Japanese policies in Micronesia were chiefly economic and not militaristic, as the Japanese navy wanted to avoid conflict with, and criticism from, foreign countries. Even after Japan eventually invaded Guam in 1941, they did not begin to fortify the island until 1943 (Higuchi 2013:30). Higuchi argues that unconcealed bases for war purposes were not built until 1936 and the first time the Japanese military took action in Micronesia was May 1940 (Higuchi 2013:26, 43).

1.4 Karst Defences

This thesis examines caves and tunnels used during WWII in the Pacific. A specific type of defence, such sites should not be confused with bunkers or pillboxes which are built of concrete and steel and exist *on top* of the landscape and typically in coastal areas. Caves and tunnels on Saipan and many other Pacific islands are different because they are constructed *within* a karst topography—a landscape made of water soluble bedrock, such as limestone, characterised by caves and sinkholes (Stafford et al. 2002:11; Taboroši 2004:2; Taboroši and Jenson 2002:2). In this thesis such features are referred to as "karst defences."

The literature on karst defences seldom differentiates between caves and tunnels, but the two are distinct. Caves are spaces within bedrock, including rock shelters, alcoves and sinkholes, that are natural or were once natural and then modified and used during WWII. Tunnels are openings in bedrock that are completely excavated by humans or were once natural openings and then excavated by humans for WWII defence. Both caves and tunnels were modified in various ways through the addition of materials such as wood, concrete and stacked limestone or the removal of natural obstructions (Peattie 1988:263–264, 282).

Tunnels were constructed and caves modified using both military and civilian labour (Denfeld 1997:xi; Micronesian Area Research Center 1981b:65; Peattie 1988:263). U.S. government documents report that the Japanese used these defences as gun emplacements, communication centres, for combat, storage, shelter and living quarters (27th Infantry Division G-2 Section 1944:4, 16, 99, 150, 154, 178, 210; Military Intelligence Service 1944:157; Phelan 1945:16–17, 26). Civilians also used karst defences during the war and the U.S. also adapted sites for their own purposes post-war.

1.5 Conflict Archaeology and the Remains of Defence

Brief descriptions of karst defences in Saipan do appear in some cultural heritage management (CHM) reports (see Denfeld 1981b; Eakin et al. 2012) and other studies (see Lotz 1998; Spoehr 1957), but to date, no karst defence-specific study in Saipan has been completed by archaeologists. Since little is known about karst defences in Saipan both historically and archaeologically, the primary research question asks how people used these sites and what their planned purpose was, or in other words, what defence strategies and tactics did people employ at a range of different sites? The construction of these sites, their placement and function and the artefacts within and surrounding them will be used to identify strategies and tactics such as shelter, combat, command post and who employed them. This will then establish basic archaeological facts, or building blocks, for broader archaeological enquiry (Smith 1994:16–17).

The second part of the primary research question asks why or what influenced people to employ particular defence strategies at these sites. The premise of this thesis is that war as a human activity does not reduce people to behave in fundamental ways motivated by sheer survival (Lubkemann 2008:5; Smith 1991:104). This study argues that human behaviour during conflict is complex and why people behave in a particular way needs to be understood within the social conditions or atmosphere before, during and after a particular battle. The relationships within a military culture are an example of a type of social atmosphere that would influence particular defensive behaviours. Gojak (2002:159), for example, has argued that since the provision of defence is one of the defining purposes of nations, defence construction can reveal aspects of national or military culture. By analysing the spatial layout of defensive structures, archaeologists have found they reflect the differences in military cultures between different countries (Cocroft 2007:116–117; Gojak 2002:162–167). Archaeologists have also demonstrated how military rankings and hierarchy within a single military culture influenced the spatial organisation of defensive structures (Anderton 2002:192–193).

Studying the variations in the construction of Saipan's karst defences can contribute to further understanding defensive Japanese military behaviour. Historians have explained that during WWII the Japanese military was fragmented in that the navy and army routinely operated independently of one another (Rottman 2004:19; Spennemann 2013:140). W.C. Phelan, a Lieutenant in the U.S. Naval Reserve, recorded caves and tunnels on Peleliu, an island southwest of Saipan in order to educate troops still fighting in the war about Japanese defences. He found that the fragmented nature of the Japanese military resulted in the construction of distinct army and navy karst defences. Through a comprehensive recording and classification of a large sample of karst defences, construction techniques and related artefacts in Saipan, designs and variations can be compared to the data on Peleliu to reveal whether Saipan's karst defences also reflect army and navy differences and to what degree.

Archaeologists have also examined portable artefacts on battlefields and at conflict sites to determine how particular war period conditions influence daily life within conflict-related sites (Branton 2000; Shew and Kamp-Whittaker 2013:310; Skiles and Clark 2010:188) and how people react to and cope with war (Gojak 2002:165; Moshenska 2008c:109; Saunders 2000:48–49). Additionally, because of their personal and individual nature and since temporal deposition on battlefields occurs over days, weeks or months, rather than years, archaeologists can use portable artefacts to identify individual behaviours and movements (Banks and Pollard 2011:131; Scott and McFeaters 2011:107) as well as moments of micro-change (Schofield

2009a:1–2). “Micro-change” refers to specific human behaviours and choices reflected in material remains known to have been deposited over a narrow temporal period. In order to understand why people employed particular defence strategies, structures and artefacts will also be used to examine individual and group behaviours and interpret them by relating them to larger and changing social conditions and attitudes as the Battle for Saipan progressed and WWII in the Pacific unfolded.

1.6 Modern Conflict Archaeology

The study of karst defences falls into a time period known as “modern” or recent conflict which refers to a time period still within living memory (Harrison and Schofield 2010:5). Due to its temporal proximity, the remains of modern conflict can be a politically charged and highly emotive subject (Sutherland and Holst 2005:4), especially for those who experienced the conflict. To combat any dissonance and discomfort, Moshenska (2009b:49–51) argues that the archaeology of recent and highly emotive pasts must be inclusive. Archaeologists should record the memories of those who experienced the conflict and engage with people and their understandings of these pasts today. Therefore, the study of karst defences must also be a study of the relationship between these sites and people in the present.

Collaborating with non-archaeologists and collecting oral histories enhances the study of modern conflict sites in two ways. First, and most important, collaboration reconnects people with their past and, in the case of WWII, takes sites of rather painful memories and gives them resonance and understanding (Moshenska 2009b:49–51; Schofield 2009b:39). By recording the memories of those who took part in their WWII past, and incorporating their information in the dissemination of research during and after fieldwork, the public is then heard, seen, felt and responded to through the existence of these sites (Moshenska 2009b:51; 2010b:45). Sites then become commemorative and mnemonic devices (Moshenska 2009b:49–51) where people remember the local stories of WWII, not just the details from regional or larger scale historical accounts (Schofield 2009b:57). Conducting archaeology openly and collaboratively is how archaeologists can make the archaeology of a rather sensitive subject a more productive and worthwhile endeavour (Moshenska 2010b:45–46).

Second, from a heritage management perspective, consulting the community on the significance of karst defences can produce a more comprehensive analysis on how people relate to WWII heritage and whether these sites require protection. Many significance studies conducted on underwater or coastal WWII sites have identified that, generally speaking, Pacific Islanders do not consider WWII heritage as "their heritage," and thus heritage organisations do not heavily enforce legislation to protect WWII sites (see for example Christiansen 2002; Jeffery 2006; McKinnon 2014:178–180; Spennemann 2006a). One exception is Palau (see Ngirmang 2010:77). McKinnon et al. (2014b), however, identified strong local support in Saipan for protecting WWII karst defences. Karst defences are complex sites of shared heritage (Harrison 2004:219) and collaboration can identify the significance of karst defences to different cultural groups, which can, in turn, assist in site management.

1.7 Research Questions and Aims

This thesis seeks to answer the following questions:

- What were the defence and survival strategies and tactics employed by people at karst defences and what influenced these choices?
- How did karst defences change as the war progressed in Saipan?
- How do karst defences in Saipan relate to the wider Japanese defence strategy in the Pacific?

The research questions aim to do the following:

- To determine what variations are present in the placement, design and construction of karst defences in Saipan and the materials associated with them.
- To examine how closely Saipan's karst defences (including their form, function and change over time) resemble similar fortifications in other parts of the Pacific.
- To understand the human behaviour around karst defences, including individual and group responses to the Battle for Saipan as it progressed.
- To identify the contemporary significance of karst defences to various communities.

1.8 Study Area

Saipan was chosen as the study area for this thesis because of local and archaeological need. The author has previously worked with community members and heritage organisations in Saipan under the guidance of Dr Jennifer McKinnon. During a research project initiated by Dr McKinnon on the preservation of karst defences in Saipan in 2013, locals expressed the need to know more about the sites on the island. Additionally, no comprehensive archaeological recording of karst defences in Saipan had been completed.

For comparative purposes this thesis also includes discussions and descriptions of karst defences in other areas of the Pacific under Japanese occupation between 1914 and 1945 (Figure 1.5). In this study, the term, "the Pacific" includes not only the island states and territories within and surrounding the Pacific Ocean, but also some places generally conceived as Asia that were occupied by Japan pre-WWII, such as mainland Japan, China, Hong Kong and Taiwan. The term excludes places such as Australia, New Zealand, the continental U.S. and Canada. Moreover, the term "Pacific War" in this thesis refers to war conducted in this same area.

Many areas in the Pacific discussed in this thesis have changed their names post-WWII. For example, Truk, a group of islands in the Caroline Island archipelago, was renamed Chuuk in 1986 (Law 1999:243) and the Gilbert Islands became the Republic of Kiribati after independence in 1979 (Lansford 2017:808). Iwo To, was erroneously pronounced Iwo Jima during WWII, but changed its name back to Iwo To in 2007 (McCurry 2007). To help avoid confusion, this thesis uses the place names of areas in the Pacific as they were during WWII.

1.9 Methods

Methods for this research include reviewing a range of historical, archaeological and environmental studies related to karst defences from several islands in the Pacific. Documents include heritage management reports, U.S. government documents, unpublished surveys, U.S. Army Corps of Engineers reports and previously recorded oral histories.

As part of a continuing community archaeology partnership between Dr McKinnon, various heritage organisations and local participants in Saipan, the author also partnered with two local co-researchers for the project: Fred Camacho, a local Chamorro man and avocational archaeologist, and Genevieve Cabrera, a Chamorro woman and cultural historian. Site selection was determined by local co-researchers and the public. Public presentations and radio interviews were given, newspaper advertisements were placed and flyers were distributed to encourage people to contact the primary and co-researchers if they had sites on their property that could be recorded for the project.

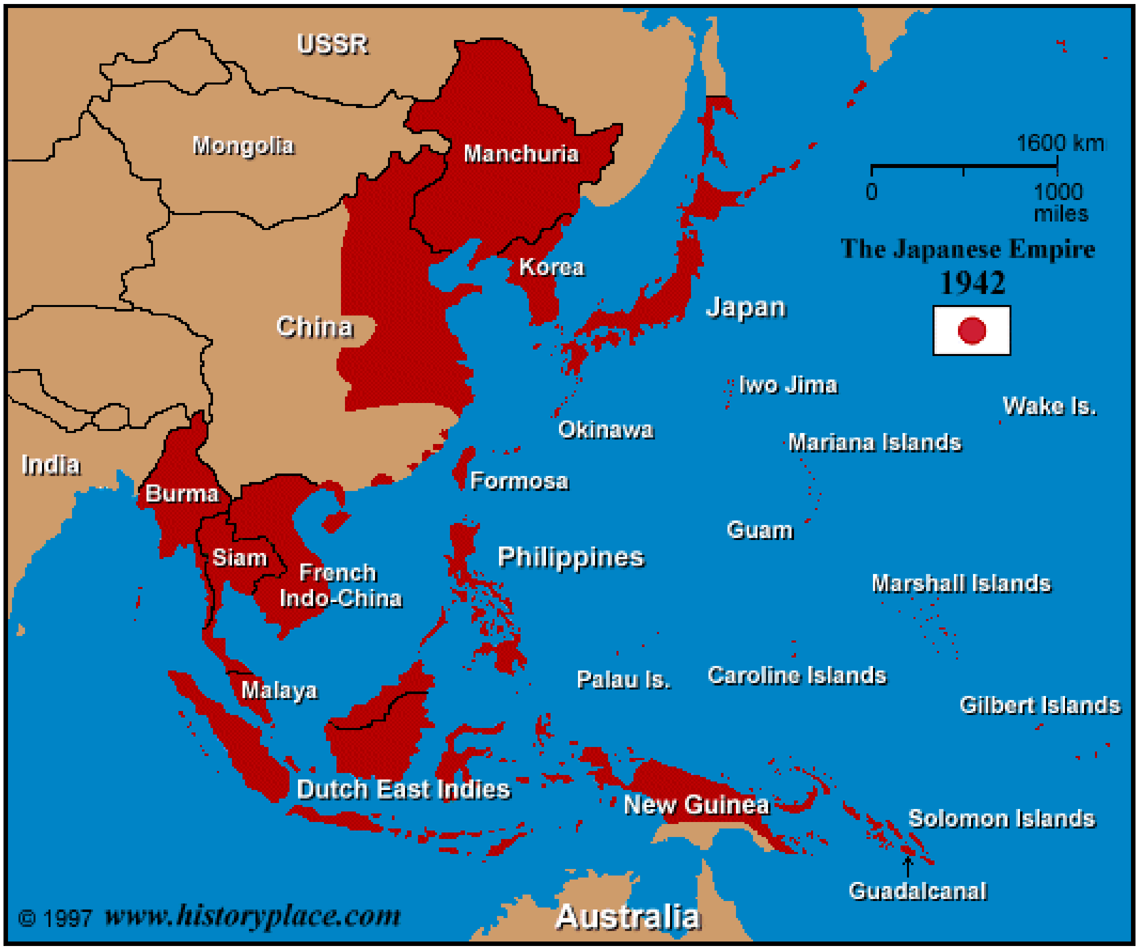

Figure 1.5: "The Pacific" (areas in red) referred to in this thesis (The History Place 1999).

1.10 Significance

There are a number of scientific and social benefits deriving from this research. The major scientific benefit is that this project fills a major historical and archaeological knowledge gap. Many archaeologists and historians call for more archaeological studies on WWII in the Pacific (Spennemann 1992:283), especially on Japanese life and defence (Bulgrin 2005:14; Peattie 1988:xvi) and a more balanced war story (Peattie 1988:xvi; Spennemann 1992:283). This research helps establish a more comprehensive WWII story in the Pacific and furthers the understanding of how the Japanese military approached the issue of defence in the Pacific during WWII as well as how the military and civilians responded to war and prepared and utilised the natural landscape for defence.

This project also contributes to the historical debate on pre-war Japanese fortifications. Although karst defences cannot be dated to establish whether or not the Japanese ignored their non-fortification clause, this research brings a more substantial discussion of inland defences into the debate. Rather than focusing on structures that supported aerial warfare, it explores the possibility of early Japanese defences inland, which would have been less accessible and visible to visitors.

Socially, this research gives local people more knowledge about the caves on their island and can assist locals who are considering developing their sites for tourism. Tourism is the only major industry to support the CNMI (Commonwealth Economic Development Strategic Planning Commission 2009:10) and based on previous research in 2013, some locals have expressed their interest in promoting karst defences for tourism (McKinnon et al. 2014b). However, the use of karst defences for touristic consumption is a form of "dark tourism" which uses sites associated with death, disaster and atrocity as attractions (Lennon and Foley 2000:1–12). Developing and managing dark tourism sites comes with a particular set of issues, including what information is conveyed, how it is promoted and who profits (Sharpley 2009b:8–9). This is further compounded when considering karst defence's various stakeholders. The information gathered from this project will be disseminated to locals through presentations, posters and reports for property owners, which can assist in effectively managing these sites.

1.11 Chapters

The thesis is divided into eleven chapters. Chapter 2 critically reviews previous karst defence related studies and also situates the research within two sub-disciplines of archaeology: conflict archaeology and archaeology of the contemporary past. Chapter 3 describes the history of Japanese occupation in Micronesia, provides background into the Imperial Japanese military and contextualises Japanese war strategy during WWII. The methodology and archaeological methods used during fieldwork are described in Chapter 4. Chapters 5 and 6 present the data recorded during fieldwork. Chapters 7, 8 and 9 provide three separate levels of analysis. Chapter 7 discusses how Japanese military culture is reflected in karst defence construction. Chapter 8 discusses individual and group behaviours at karst defences in Saipan and analyses how sites changed over time and across the island. Chapter 9 places the analysis from the previous two chapters into a historical discussion on how karst defences relate to the changing Japanese strategy during the war from 1941–1945. The meaning of karst defences to people today is discussed in Chapter 10. Finally, Chapter 11 restates the research aims and assembles the ideas and perspectives into a concluding discussion about WWII karst defences in the Pacific.

Chapter 2 – Literature Review

2.1 Introduction

The research questions in Chapter 1 are informed by three different bodies of literature: reports related to karst defences, conflict archaeology and the archaeology of the contemporary past. This chapter will critically analyse the literature from these three areas.

2.2 Reports Related to Karst Defences

Much of the archaeological literature on karst defences is consultancy-driven and sites are described when encountered as part of larger environmental, observational and post-war studies (DeFant and Fulmer 1998; DeFant et al. 2001a; Dixon and Schaefer 2014; Lotz 1998; Price and Knecht 2012; Spoehr 1957; Taboroši and Jenson 2002; U.S. Pacific Fleet and Pacific Ocean Areas 1946). In the late 1970s and early 1980s, historian D. Colt Denfeld conducted the first systematic historical and archaeological surveys of WWII sites and features in the Pacific. Over the course of five years, he conducted fieldwork on several Pacific islands, including Truk, Guam, Saipan, Tinian, Rota, Peleliu, Ponape, Kwajalein and Yap to document WWII weapons, emplacements and buildings (Denfeld 1981a, 1981b, 1988, 1992, 2002). Denfeld's data includes descriptions of karst defences, but no exploration of their meanings in relation to each other and their material remains. Nonetheless, Denfeld's publications are useful in attempting to determine the specific functions of karst defences, as he often lists attributes in the construction of specific types of caves. For example, he describes communication and command post caves as generally concrete-lined, longer and exhibiting several rooms or chambers (Denfeld 1981b:60). However, it is often unclear exactly how Denfeld knows that particular caves were used for specific purposes, as he makes no reference to any artefacts to support his claims.

Overall, Denfeld argues that Japanese defence fortifications, including karst defences, had standardised designs, although local variations existed due to the nature of the local terrain, the availability of construction materials and individual agency (Denfeld 1981b:1; 1992:1; 2002:1). He also argues that Japanese defences in the Pacific were rudimentary for two reasons. First, the Japanese military philosophy to always be on the offensive was so ingrained that any sophistication behind defence construction did not exist (Denfeld 1981b:5). Some historians argue that the concept of defence was not part of the ethos of the Japanese officer corps which was to fight offensively. The Japanese showed contempt for defensive plans, withdrawals or retirements, refrained from using the word “defence” and simply refused to admit that a defensive situation could arise (Fellers 1935:31; Harries and Harries 1991:386). Second, in the Marianas specifically, the Japanese suffered from a shortage of construction materials, which was largely due to successful U.S. submarine operations that destroyed a number of ships bringing in supplies from the mainland (Crowl 1960:62; Higuchi 2001:27; Peattie 1988:278, 282; Rottman 2004:20). Consequently, defence construction was rushed and some defences in Saipan were left unfinished (Denfeld 1981b:5). For example, a U.S. engineer’s post-war survey in Saipan noted that three guns were still loaded on rail cars, three were lying on the ground near their emplacements, 45 guns were still at the Garapan Naval Depot and only four of the 14 planned airfields were constructed (Denfeld 1992:27; 1997:17; 2002:27). Limited time also meant that the quality and strength of Japanese concrete in the region suffered. The strength of Japanese concrete at defence sites in the Pacific was 0.180kg per square metre, which is half the strength of U.S. concrete, meaning projectiles could penetrate through Japanese concrete much more easily (Denfeld 1981b:11).

Several archaeologists suggest that the use of stacked limestone, fuel barrels and local materials in place of what could have been constructed with concrete at karst defences in the Marianas was a consequence of time and material shortages (Denfeld 1981b:1). Eakin et al. (2012:131–132), for example, in their study of the Sabanettan I Toru area in the northwest portion of Saipan interpreted the use of local rocks to construct walls at karst defences as indicating a shortage of construction materials on the basis that concrete was used in features known to have been built earlier on (the coastal fortifications near the beaches). Therefore, the absence of concrete implied that the caves had been modified later in 1944 after the U.S. had sunk the ships bringing in supplies to Saipan. Similarly, Mohlman (2011:165–167) argues that the Chudang Palii tunnel complex on Rota was built after the Japanese lost their supply ships in 1944. Again, Mohlman (2011) based this on the use of stacked limestone and the lack of concrete, rebar and aggregate in its construction.

The above interpretations are problematic, however, as several war documents discuss a preference for local materials, such as coral rock and tree logs because they provided better camouflage (Denfeld 1981b:13–14; Dissemination Division G-2 Section 1945a:3; Military Intelligence Service 1944:158; Miller 2008:102, 106, 119), even on islands where battles occurred much later and did not suffer from a shortage of supplies, such as Peleliu and Iwo Jima

(CINCPAC-CINCPOA Bulletin No. 136-45 1945:4, 21, 25, 55, 69, 82, 86, 95, 102; Phelan 1945:4–16). A translation of Japanese documents located in Okinawa asserted that camouflage from local materials was preferred and considered superior to concrete (Dissemination Division G-2 Section 1945b:3). Gun fire from a cave could reveal the general location of a soldier and thus camouflage was important, as it hindered the U.S.' ability to discover the specific location of karst defences during close combat warfare (Dissemination Division G-2 Section 1945c:1). Additionally, concrete served more specific purposes than making a fortification more structurally sound. For example, in Truk, to reduce deterioration of weaponry, ammunition storage caves were to be lined with 30cm (1 foot) of concrete to prevent water from leaking in (U.S. Pacific Fleet and Pacific Ocean Areas 1946:82).

According to some historians, karst defence construction was not given serious attention until after the fall of Saipan in July 1944 (Denfeld 1988; Peattie 1988; Rottman 2004). After Saipan, the Japanese military developed new strategies for defending islands which still called for destroying the enemy at the beaches, as they did before the Saipan invasion, but also for organising defences inland (Denfeld 1988:9). The new plan would enable the Japanese to fall back on these positions should the enemy advance past the beaches. These fallback positions were to be defended to the death. No suicide charges would be allowed; rather the Japanese would weaken the U.S. military from these positions and take away their will to fight (Denfeld 1988:9). Mohlman (2011:165) concludes that two major defensive complexes in Rota demonstrate the shift in Japanese defence strategy from purely coastal and offensive before the fall of Saipan and Guam in 1944, to one that was multi-layered, inland and defensive afterwards. He argues that the focus on coastal defence is reflected in Saipan, Tinian and Guam and the change in focus to inland is evident in Rota, Peleliu, Iwo Jima and Okinawa, which have both coastal and inland defensive networks (Mohlman 2011:162).

Several sources, however, refer to inland defences featuring more prominently than coastal ones on other islands and areas in the Pacific before the invasion of Saipan. For example, the landings on Tulagi and Guadalcanal, in the Solomon Islands in 1942 were unopposed and the U.S. captured the airfields on both islands quickly (Miller 1949:61, 69). The U.S. landings in Makin in 1943 were also largely unopposed and considered a "pushover" (Crowl and Love 1955:81–82). The landings in the Aleutians and New Guinea between 1942 and 1943 were all easy, with light or no opposition (Crowl and Love 1955:159). The toughest resistance on all of the above-mentioned locations was inland where the Japanese hid out and battled from caves and tunnels (Crowl and Love 1955:113; Miller 1949:63). This evidence calls into question the overall Japanese defensive plan and when karst defences were constructed. Also, considering Rota's small size, it is not useful to explain its defenses in the context of the "beaches first" strategy used on other islands. In other words, given its size its "inland" defences may have operated more like "coastal" defences. This is something that Mohlman (2011:26, 167) acknowledges when considering the long and wide firing range of the Type 10-120mm gun found at Rota's inland Chudang Palii complex. This firing range enabled the site to be used for inland and coastal defence. Furthermore, Japanese defences had to be different on Rota because the island did not have landing beaches (Mohlman 2011:17).

Peleliu is considered to have the most extensive cave-type defences in the Pacific and many historians explain that the U.S. had never encountered such considerable defences until the Battle for Peleliu in September 1944 (Denfeld 1992:80; 2002:80). Phelan's (1945) survey in Peleliu, revealed over 500 caves in an area known to the U.S. as Bloody Nose Ridge, made up of rugged coralline-limestone located on the island's upper western peninsula. The 500 sites consisted of 200 tunnels and 300 natural caves. Phelan (1945:3) argues that tunnels were of more significant to the Japanese, as they appeared to contain most of the major defence installations and, since tunnels were excavated and not naturally occurring, they reflected a precise choice made by the Japanese military in terms of where they were located and their size (Phelan 1945:3).

Phelan (1945:3) also explains that there were distinct army and navy caves and tunnels in Peleliu. Based on information gathered from Japanese prisoners, the presence of a Naval Tunnel Constructing Unit (*Suidotai*) and "other sources of information" that remain nameless, he argues that the tunnels in Peleliu were primarily dug as navy air-raid shelters and that the army constructed them for combat purposes (Phelan 1945:3). Each unit was required to prepare tunnels in unit-specific areas. The army and navy could not share construction battalions and were not permitted to use each others' shelters, although this was likely not strictly adhered to in the actual throes of battle. Phelan (1945:3) argued that most of the tunnels had been dug within the last 12 months prior to his visit, although he did not explain how he knew this.

Some tunnels in Peleliu were simple and only had one leg, while others were made up of networks of 10 to 12 connected tunnels. Tunnels never had more than two levels (Phelan

1945:14). Phelan divides them into seven different navy types based on their shape: H, E, U, Y, I, L, T (Figure 2.1) (Phelan 1945:4–15). The internal width and height of navy tunnels in Peleliu were approximately 3.05m (10 feet) and 1.83m (6 feet), respectively. The army, on the other hand, built tunnels to augment their concrete pillboxes, entrenchments and gun emplacements (Phelan 1945:42). There were fewer army tunnels and they were primarily used for combat and storage. Phelan (1945:17–24) divides army tunnels into I-, L-, T-, U-, W-, J- and Y-shapes (Figure 2.2). Overall, army tunnels were smaller and more crudely constructed yet better camouflaged than the navy tunnels (Phelan 1945:3, 19).

Only the army appeared to use natural caves while, for unknown reasons, the navy appeared to completely ignore them (Phelan 1945:3). Unmodified natural caves were also used opportunistically and both the army and navy hurriedly piled supplies and took refuge in natural caves (Phelan 1945:25). Modified natural caves were strategically chosen to serve particular purposes. For example, weapons caves were chosen for their field of fire, personnel caves for their protection and location and storage caves for their accessibility and dispersal (Phelan 1945:25). Every modified cave had levelled floors, hanging rocks removed, camouflage, protection against seepage, enlarged entrances or internal sections (Phelan 1945:14, 25). Further modifications were required depending on intended function (Phelan 1945:25–26). Phelan (1945:4) hypothesises that the wide dispersal of karst defences and supplies led to the Japanese demise, as they could not maintain sufficient coordination or communication.

Denfeld (1988:37) argues that tunnels in Peleliu were the result of pre-war Japanese phosphate mining (also known as adits in mining terminology [Hardesty 2010:38]) as well as wartime construction, which were then modified to fulfill specialised functions. A CHM report from a survey of the Kagman area in eastern Saipan also speculates that Saipan’s tunnels were formed as a result of manganese mining activity (Mazurek and Kaschko 1991:65). Guano, phosphate and manganese mining was initiated in Saipan and Tinian by the Japanese in the early 1930s and continued up until the U.S. attack (Bowers 2001:211). However, according to Bowers (2001:211) all mining installations in the Marianas were destroyed during the war. Still, it is possible that some tunnels may have started out as mining tunnels, but more research is required to confirm whether this may be the case.

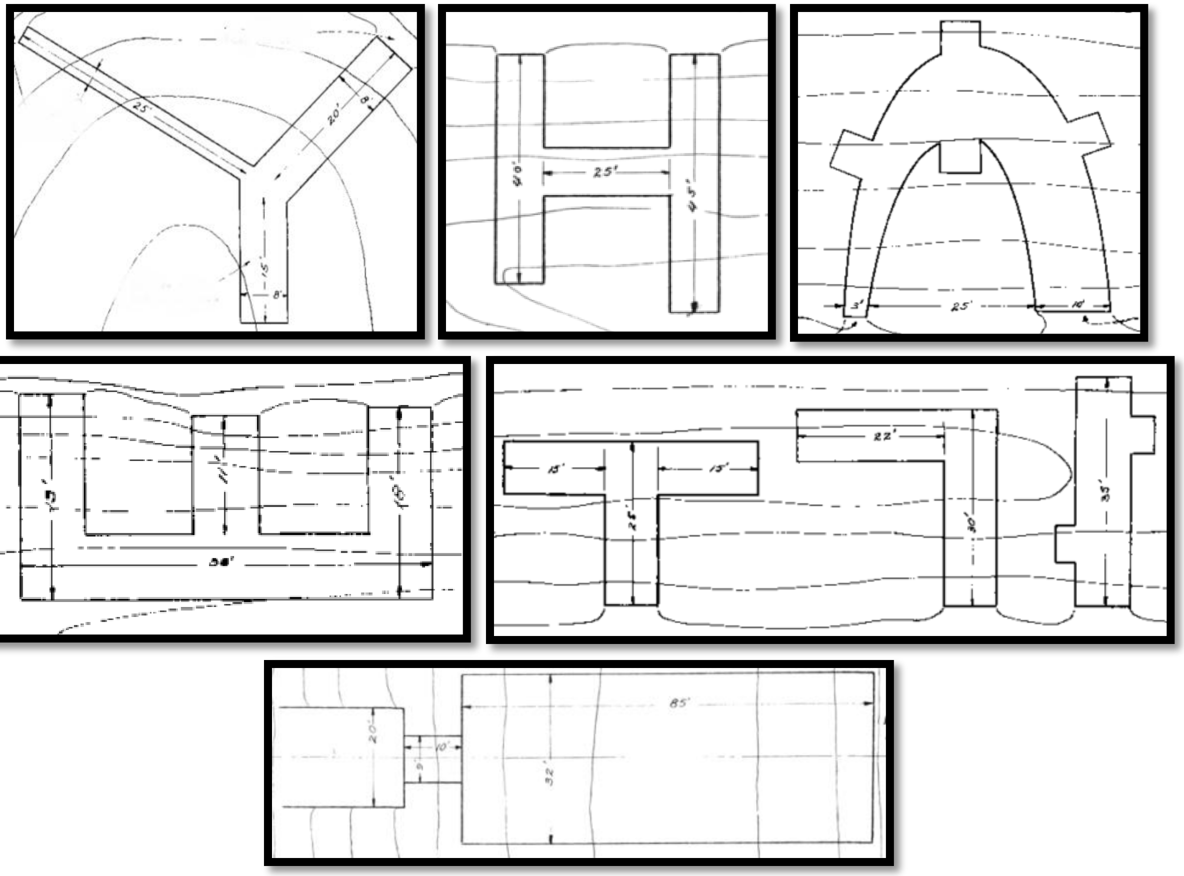

Figure 2.1: Navy tunnels in Peleliu. Top (left to right): Y, H, U. Middle: E, T, L, I. Bottom: rectangular (Phelan 1945).

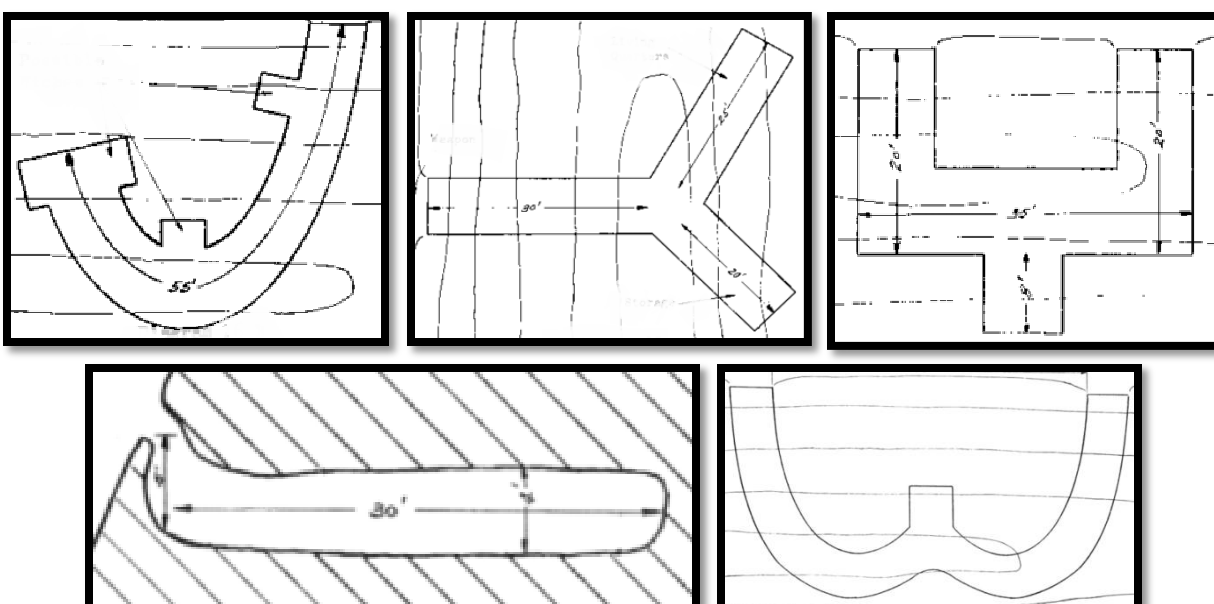

Figure 2.2: Army tunnels in Peleliu. Top (left to right): J, Y, U. Bottom: I, W (Phelan 1945).

Recently, the Peleliu Historical Society initiated a study of all WWII archaeological sites on Peleliu. In 2010 archaeologists Rick Knecht, Neil Price, and PhD student Gavin Lindsay, under a National Park Service American Battlefield Protection Program Grant awarded to the Peleliu War Historical Society, documented 285 WWII sites on Peleliu over a nine-day period, including karst defences (Knecht et al. 2012:3; Price and Knecht 2013:196). The report is descriptive and re-locates sites reported in Denfeld's (1988) survey as well as identifying 102 new sites (Knecht et al. 2012:29, 61, 83, 90, 142, 190–191, 229, 241). Two subsequent publications about the project were produced. The first is an historical summary of the battle and discusses the obstacles in promoting the sites to tourists (Price and Knecht 2012). Something often forgotten and not discussed in master narratives of the war, the second publication discusses the many cultural groups who participated in the Battle for Peleliu. Using oral histories and archival research, Price and Knecht (2013:193–194) found that Japanese, American, Korean, Okinawan, African-American, Hispanic, Native American and Indigenous Pacific Island people all participated in the battle. Archaeologically, they were able to identify the presence of Hispanic soldiers in the battle from a bayonet scabbard marked "S. Gomez Jr." left in a cave. Knowing Gomez was injured during the war, this cave was likely the spot where Gomez was injured then stripped of his gear and treated by a medic (Price and Knecht 2013:200–201).

One scholarly article by Dixon et al. (2012) looked at cave use by Japanese stragglers on Guam. After the U.S. reclaimed Guam on August 10, 1944, uncaptured Japanese military continued to seek refuge in Guam's caves (Dixon et al. 2012:117). The last Japanese straggler, Sergeant Soichi Yakoi, was captured in 1972 by two Chamorro hunters southeast of the Naval Ordnance Annex while he was setting up shrimp traps (Dixon et al. 2012:122; Taboroši and Jenson 2002:4). Using ethnographic evidence and past surveys of 11 caves in the Naval Ordnance area in Guam, Dixon et al. (2012:114–117) were able to determine where these stragglers established camps and estimate how long they intended to stay in certain locations. Dixon et al. (2012:124) argue that these stragglers reflect the Bushido Code, a Japanese samurai code of conduct enacted by the Japanese military in WWII which called for true courage and for many soldiers this meant never surrendering (Dixon et al. 2012:124). One problem with their analysis is that the authors do not consider disturbance by contemporary visitors. For example, they interpret artefacts hidden in crevasses of caves as possibly a straggler's way of storing goods in anticipation of future visits (Dixon et al. 2012:123–124). While conducting fieldwork for this project, contemporary visitors to caves in Saipan were known to hide items in crevasses to ensure no one else took them or destroyed them. Dixon et al. (2012) do not note whether this area of Guam was accessible by contemporary visitors.

The most recent study by Petchey (2015) documents eight tunnels on Watom Island in today's Papua New Guinea. The survey was informally conducted on the northern portion of Watom Island, but the eight tunnels are representative of "dozens" of sites observed in other areas (Petchey 2015:30, 32). The island was subject to some Allied bombing in 1942, but never invaded, so while defences are intact, most of the karst defences have been cleared by military or locals salvaging metal (Petchey 2015:34). Petchey (2015:46–47) concludes that the defences on Watom Island are typical of other islands in that there were fortifications set up to defend the beaches first then inland karst defences for the Japanese to retreat to. Petchey (2015:43, 48) also concludes that Watom Island was fortified with a Type 96, 150mm howitzer to defend and observe Rabaul, a major Japanese naval base, located on an adjacent island. The gun had a massive 12km range and was situated within a tunnel pointing in the opposite direction to where U.S. forces would have approached the island and the island's potential landing beaches (Petchey 2015:48). Watom Island also has some unfinished tunnels, suggesting excavation was still going on up until the end of the war in 1945 (Petchey 2015:31, 47).

2.3 Battlefield and Conflict Archaeology

Battlefield archaeology first emerged as an area of study by amateur groups and individuals looking to document the spatial layout and details of warfare. Historian William Hutton's search for evidence of the Battle of Bosworth in 1788 and Edward Fitzgerald's artefact recording and grave excavation at the Battle of Naseby in 1842 are often credited as the first battlefield archaeology projects (Carman 2013:43; Ferguson 2013:42; Pollard and Banks 2010:414–415). These studies made positive contributions to understanding past battles and similar investigations by avocational archaeologists persist today, often with the use of metal detectors and other geophysical equipment.

For as long as amateurs have been documenting past battles, there have been looters and collectors with a keen interest in profiting from the sale of artefacts left behind from previous battles. These groups have also conducted their own "investigations" under the guise of battlefield archaeology (Saunders 2002:103) (see for example Laffin 1987).

Interest amongst professional archaeologists in battlefield archaeology increased in the 1960s and 70s in tandem with the movement towards CHM and the need to protect historic sites (Burke et al. 2011:141; Schofield 2004:3). A move towards “conflict archaeology” not only distanced itself from battlefield pilferers, but also emerged out of the realisation that merely determining the boundaries and locations of battlefields and war-related sites had little to do with analysing past human behaviour (Scott and McFeaters 2011:104). Battles needed to be considered and interpreted in the context of events and activities before and after warfare (Scott and McFeaters 2011:105). Conflict archaeology aims to take the evidence of conflict and interpret how and why combat occurs, or what is referred to as the “culture of conflict” (Scott and McFeaters 2011:104). The term battlefield archaeology still persists, but is often used to refer to the archaeology of the specific event (Sutherland and Holst 2005:2) with the aim of reconstructing the battlefield to help understand it with greater precision (Farrell 2011).

Battlefield reconstruction is a prominent theme in conflict archaeology (Gilchrist 2003:3). One of the most influential studies conducted from 1983–1985 was the spatial analysis of various artefacts on the site of the Battle of Little Big Horn (Fox 1993; Fox and Scott 1991; Scott et al. 2000:8). This project mapped the specific locations of firearms components, ammunition and human remains in order to analyse the details of events at an otherwise poorly historically documented battle. Archaeologists were able to reconstruct a portion of the battle and analyse and model behaviours over a span of 60–90 minutes (Scott et al. 2000). Since then, archaeologists have been able to use artefacts to reconstruct behaviours and moments from battlefields around the world with varying levels of detail on various scales (from single sites to entire landscapes) (see, for example, Bulgrin 2005; Fox 1993; Lees 1994; Podruczny and Wrzosek 2014; Ramos et al. 2014).

The ability to reconstruct a battlefield and identify individual behaviours in detail depends on precisely locating particular skirmishes, the abundance of artefacts and the level of artefact and site preservation (Fox and Scott 1991:96–97; Scott et al. 2016:6). Not all conflict can be identified and reconstructed in such a manner, however, as studies of violent encounters between Aboriginal and white Australians during colonisation have pointed out (e.g. Grguric 2008:79–80). Little archaeological evidence exists for such events because they were widely dispersed, on a smaller scale and, due to the traditional interment of Aboriginal victims by Aboriginal people, the skeletal remains from such conflict are not present (Barker 2007:9–10;

Litster and Wallis 2011:108). Therefore, the artefact densities required to identify frontier conflict archaeologically will only be present in exceptional circumstances. Moreover, the ability to identify the precise locations of frontier violence relies on knowledge from Aboriginal peoples (Barker 2007:11; Long and Memmott 1998; Trigger and Martin 2016:828–830), as the locational information in European documentation of the time is absent because of the language used to conceal, minimise or deny the existence of such events (Foster 2009; Rowland 2004).

Archaeologists also reconstruct battlefields through the use of GIS and KOCOA or OKOCA. Originally used by the U.S. military as a framework to evaluate the military significance of battlefield terrain, KOCOA stands for **K**ey terrain, **O**bservation and field of fire, **C**over and concealment, **O**bstacles, and **A**venues of approach and withdrawal (Maio et al. 2013:323). First introduced to archaeology in 1998, it aims to help archaeologists better understand the landscape, how it was used, how the soldiers viewed it in times of battle and military strategy and tactics (Maio et al. 2013:323; McKinnon and Carrell 2011:7; NPS 2000:6; Scott and McFeaters 2011:115). Archaeologists are able to reconstruct military strategy and behaviours on a larger scale by studying how structures and artefacts relate to the physical terrain. To conduct this type of study, different pertinent areas and sites need to be evaluated and identified as belonging to the categories mentioned in the KOCOA acronym and then mapped to establish boundaries and make sense of how the battlefield appeared to the soldiers. However, there are limitations to using KOCOA. McKinnon and Carrell (2011:151–154), for example found that defining areas of battle, such as "core areas" where combat took place, was too restrictive and ineffective when trying to analyse a battle that also occurred in the air and in the water, as was the case in Saipan where their study took place. Furthermore, since it is based on U.S. military strategy, KOCOA is biased and may not be as applicable to non-U.S. battlefields. Similar GIS-based analysis is available without the KOCOA framework and has been applied to non-U.S. battlefields. For example, Rubio Campillo (2008) used GIS and statistical analysis on a 1714 Spanish battlefield in an effort to understand what types of weapons these armies were using and thus what threat they presented. Additionally, McNutt's (2014) PhD dissertation considers how culturally distinct ways of conducting warfare can be used with KOCOA for battlefield reconstruction and predictive modelling in Scotland.

Part of battlefield reconstruction includes experimental artefact studies. Roberts et al. (2008:2–3), for example, used a replica of an 18th century Brown Bess Musket to test the accuracy of historical records about the weapon. Using ballistic experiments and computer modelling they were able to clarify historical references to the weapon (Roberts et al. 2008). Although experimentation can elaborate on the range of different weaponry and help in reconstructing older battlefields, such studies of nineteenth and twentieth century artefacts of war is typically not a fruitful endeavour for archaeologists (Smith 1994:13). Often these objects are well-documented by collectors and technologists, and details are readily available (Harrison and Schofield 2010:59; Smith 1994:13).

Battlefield reconstruction and experimentation studies are sometimes criticised for being too descriptive and simply critiquing or filling in the historical record rather than answering questions about behaviours in intense, life-or-death situations (Scott and McFeaters 2011:109–110). Some archaeologists argue that conflict archaeology studies should be taken a step further to examine the impact the technology had on people and the relationships of the artefacts to each other and the people who used them (Smith 1994:13–14). Roberta Gilchrist (2003:4) calls for a broader interpretation of the impact of and meaning of war instead of focusing specifically on violence and battlefields.

In response to this, archaeologists have analysed military site construction in order to further understand the military as a social institution (Carman 2013:89). Anderton (2002:189–190) argues that since space is both a reflection of social codes and meanings as well as practical activities and functional requirements, military sites can reflect the military's social, political and cultural attitudes and aspirations. Similarly, Smith (1994:15) argues that, since military site construction happens within a closed cultural system (a specific military culture) archaeologists are able to identify variations in those expected patterns. Following this, comparisons of ideology, status and morale can be made (Smith 1994:15–16). Archaeologist Wayne Cocroft (2007:116–117), for example, found a contrast between Western and Eastern military culture when comparing the layout of living conditions between U.S. and Soviet bases. The primary difference was the amount of space allocated to individuals, which was more evident in Western bases. By examining anti-aircraft and coastal battery plans, Anderton (2002:192–193) found that military rankings and hierarchy influenced the spatial organisation of these facilities. The officers' quarters were placed close to the entrance, which enabled the officers to exercise military and social control over soldiers whose quarters were near the operational centre.

The call for more behavioural analysis has resulted in a number of studies on how features and artefacts at conflict-related sites reflect people's fear and perceptions of threat. Gojak (2002:163), for example, used portable artefacts, including the presence of a piano at a WWI gun emplacement in Sydney, to suggest that the soldiers at the site had plenty of time to spare and thus a low level of threat and fear existed (Gojak 2002:165). Similarly, engravings in sandstone and evidence of gardening near other defensive structures in Sydney also suggest periods of idle time and a low level of threat (Gojak 2002:165).

The archaeology of emotion, such as fear, is in its infancy and there has been some debate about whether archaeologists can identify emotions from material remains. There is some argument about whether emotions are physical and biological reactions or are culturally constructed, or both (Tarlow 2000:717). Furthermore, if emotions are cultural, are they individual or collective (Tarlow 2000:736)? Although emotions are not separated from the material world (Harris and Sørensen 2010:150), it is difficult to determine exactly which emotion is reflected in material or which emotion it evokes. There is also debate over whether archaeologists should approach the archaeology of emotion from psychological, sociological or anthropological perspectives (see Harris and Sørensen 2010; Tarlow 2012).

Working through the archaeology of emotions, Tarlow (2012) explains that perhaps pinpointing a specific emotion is not the way archaeologists can make meaningful interpretations about emotions of the past. She points out that simply identifying an emotion is not what archaeologists should aim to do and is not a particularly useful conclusion (Tarlow 2012:181). She argues that materials need to be related to the emotional content of historical processes through examining the emotional meaning of objects (Tarlow 2012:179–181). When referring to fear, in particular:

> ...identifying a period, place, and a group of people as living in a climate of fear, or an environment where their fear was manipulated and directed to promote group cohesion, or conformity to certain beliefs or social practices is a contextual and historical conclusion that enhances our knowledge of the past (Tarlow 2012:181).

Internment or confinement studies in archaeology are also situated within conflict archaeology (Mytum and Carr 2013:4) and is an area that can be identified as representing people living in climates of particular emotions, such as fear, through state-sanctioned deprivation. Institutional life occurs within a manipulated environment and people are directed to conform to certain beliefs and practices through the imposed deprivation of: liberty and freedom of movement, goods and services, gendered and sexual identity, and autonomy and personal security (Casella 2007:77; Sykes 1958:64). The assemblages found at sites of confinement are often interpreted as responses that ameliorate the pains of such conditions (Casella 2007:77). For example, Carr's (2011) study of Channel Islander internees during WWII found that internees used materials from Red Cross food parcels to create their own art. She argues that making new objects was a way for internees to preserve mental and emotional health and to distract them from their circumstances (Carr 2011:130). Internees also painted images of the English landscape and covertly drew the V-symbol to symbolise Allied victory, which was interpreted as a reflection of pride and defiance (Carr 2011:134–135, 138–139).

Not all studies of confinement deal with such personal forms of material culture. Other internment studies examined the material conditions of everyday life in places of confinement and how people coped (Casella 2011:285). For example, a large body of work on Japanese internment camps in North America has interpreted the presence of Japanese ceramics as a form of everyday resistance and the assertion of Japanese cultural identity *vis-a-vis* Euro-American culture (Branton 2000; Shew and Kamp-Whittaker 2013:310; Skiles and Clark 2010:188). At the Amache Japanese internment camp Slaughter (2013) revealed illicit sake drinking. Sake consumption was restricted by the camp administration and so the presence of sake marked not only deliberate revolt against camp administration, but also a way of preserving cultural tradition and normalcy (Slaughter 2013:286–287, 300). Mytum (2013) uses psychological research conducted on the coping strategies of people in confinement to help explain how internees arranged their living quarters in order to manage the stress of internment.

Studies like the above "reveal a profound dissonance between ideal designed landscapes of disciplinary intention and embodied landscapes of insubordination and compromise" (Casella 2011:286) or, in other words, what really happened at these places and how people behaved under the unusual pressures in these circumstances (Mytum and Carr 2013:7). What often results are signatures of diversity against powerful forces of uniformity (Casella 2011:289), showing that perhaps it is more fruitful to analyse the range of behaviours from people inhabiting a particular emotional climate, environment or landscape rather than identifying specific emotions.

In line with Casella (2011), anthropologist Stephen Lubkemann (2008:14) argues that in order to provide a more meaningful discussion of war, it needs to go beyond its definition as a period of violent contest for political power to evaluate how the social lives of participants were shaped and changed by war.

> Rather than treating war as an 'event' that suspends social processes, anthropologists should study the realization and transformation of social relations and cultural practices *throughout* conflict, investigating war as a transformative social condition and not simply as a political struggle conducted through organized violence (Lubkemann 2008:1, italics in the original).

Too often war-time behaviours are assumed to be driven by economic and geopolitical forces, devoid of individual agency and reducing people to actions described as fundamental and a period of time where individuals lose their autonomy and agency (Lubkemann 2008:5; Smith 1991:103–104). Such reductionist positions view people's behaviour during conflict as motivated by sheer survival or propaganda (Lubkemann 2008:5; Smith 1991:104). To Lubkemann (2008:13, 15, 42), war is a social condition of heightened uncertainty with violent punctuations. Therefore war as an area of anthropological enquiry needs to focus on how this condition influences the social, economic, cultural and political life of warscape inhabitants.

Archaeologists have also addressed the social condition or climate of war in their interpretation of conflict material culture. Johnson (2002) for example, examines how courage was reflected in building construction during the Cold War. Based on civil effect tests conducted by the U.S. Federal Civil Defence Administration (FCDA), the public was advised to cover themselves with reinforced concrete and earthen enclosures for the best chance of survival during nuclear war (Johnson 2002:230). Despite this advice, he found that several commercial buildings exhibited floor-to-ceiling, plate-glass windows. He concluded that this refusal to establish coverage in "the face of an apocalyptic future" was an act of bravery, which he relates to the patriotic cultural landscape established in the U.S. as a result of winning WWII (Johnson 2002:233–234). Similarly, Grguric (2008) related the differences in Australian and British 19th century homestead construction to the relationships between white and Aboriginal Australians at the time. Usually based on standardised plans from Britain, Australians modified their homesteads with smaller windows, thicker walls and small apertures (Wallis et al. in press). Grguric (2008:63–71, 79–80) interprets these changes as a result of violent encounters between white and Aboriginal Australians and an overall sense of fear and open conflict felt during Australia's turbulent colonial past.

Not all human behaviour during war can be considered autonomous, however. Military behaviour by comparison can be considered less autonomous as political indoctrination was a fundamental program for many militaries during WWII including the U.S. and Japanese militaries (DeRosa 2006:2; Fellers 1935:19; Gilmore 2000:122). Many military psychological studies discuss obedience to authority (Saltzman 2000), "groupthink" (Puckett and Atwood 2012:92) and "deindividuation" (Festinger et al. 1952) which all refer to the loss of agency amongst soldiers during war. Such states of mind and loyalty allow groups and individuals to act unlawfully against target groups regardless of consequences (Dutton 2007:20). In the 1970s, social psychologist Stanley Milgram found that decent and well-meaning people can behave cruelly to a stranger when "conscience, which regulates impulsive aggressive action, is diminished at the point of entering a hierarchical structure such that the person enters an agentic state (obedience to authority) in contrast to the usual autonomous state" (Milgram 1974:132–134). This is not to suggest that all soldiers are blindly obedient to authority, but to express that military culture does influence behaviour and some level of individual agency can decrease during war particularly for those in an organisation that aims to diminish autonomy. A story about U.S. army tank commander Lester Tenney on the day the Japanese surrendered helps illustrate the influence of military doctrine in human behaviour. Tenney spent the last three years of WWII suffering in a Japanese prisoner of war (POW) camp. But the treatment of POWs and behaviour of some of the Japanese guards changed as soon as the Japanese emperor surrendered and the military influence decreased:

> On the morning of August 15, Lester Tenney and other prisoners on the brink of death at the Fukuoka Camp No. 17 were about to enter the coal mine when the guards told them to turn around and walk back to camp. The Japanese ordered everyone into the mess hall and passed out full Red Cross boxes. Everyone knew they were about to be freed. But when? Would it be that night? They were looking for a sign. Tenney, who spoke Japanese better than most of the other prisoners, was prodded to go out into the prison yard and greet one of the guards without saluting or bowing. "I took the challenge. Out of the barracks I went and I walked on the parade ground until I saw a guard. With one mighty heave of my hand, I waved at him and said, 'Hello.' He smiled at me, bowed, and said in English, 'Hello.' The war was over (Miller 2008:367–368).

2.4 Archaeology of the Contemporary Past

More recent conflict archaeological studies fall into a category of archaeology referred to as the archaeology of the contemporary past. Post-processual paradigms asserted that archaeological interpretations were bound up in the politics of the present (Buchli and Lucas 2001a:3; David and Kramer 2001:9, 37; Harrison and Schofield 2010:22; Johnson 2010:11, 15), and became the impetus for studying an archaeology of the recent past. During this period, archaeologists were looking at how interpretations of the past were never objective or detached from the real world. Harrison and Schofield (2010:29) argue that this particular reality was the necessary precondition for the emergence of a new archaeological sub-discipline.

Emerging from a Theoretical Archaeology Group (TAG) in 1997, the archaeology of the contemporary past generally refers to archaeology conducted on a time period between about 1950 to the present, or within living memory (Harrison and Schofield 2010:5). It is a marriage of archaeology *in* the modern world with archaeology *of* the modern world (Holtorf and Piccini 2011:16). The archaeology of the contemporary past generally focuses on developed, post-industrial societies from the twentieth century onwards and:

> is that period with which we are most closely familiar: the present, the age that we live in and have lived through, whose fabric and landscapes we shape and that influences our everyday lives and actions. The contemporary past is the past of our generation, and the generations immediately before and after, as the period of time we can most closely and clearly envisage and recall. It is called contemporary not simply because it is 'now' and recent but because it is not 'closed' in interpretation nor emotional influence. Further, the contemporary past is about lived experience; about human life. In this sense, the archaeology of the contemporary past overlaps with heritage...(Harrison and Schofield 2010:4–5).

Where the archaeology of the contemporary past differs from historical archaeology is in its additional focus on "heritage," or aspects of the past the matter to people and provide connections between past and present (Little and Shackel 2014:39). Because of the short temporal distance between the topics studied and people in the present, archaeological studies of recent events also seeks to analyse how archaeology engages with contemporary, modern life (Holtorf and Piccini 2011:14, 25). Not all studies of recent events explicitly develop methods for evaluating such a relationship, but most acknowledge its place in the present in some way. Understanding how people relate to particular sites and material culture is accomplished in a variety of ways using oral histories and interviews (Beck et al. 2011; McKinnon et al. 2014b), through public engagement with local organisations and interested groups (Branton 2004; Jarvis 2002; Kauppi 2002), as material culture studies (Moshenska 2008c, 2010a; Saunders 2000; Walters 1997), through the analysis of how sites and materials relate to politics and current events (Beazley 2007; Gokee and León 2014; Jarvis 2002) and through ways of memorialisation and commemoration (DezhamKhooy and Papoli Yazdi 2010; Moshenska 2010b; Stephens 2010).

The remains of conflict, as a part of the archaeology of the contemporary past, come with a particular set of challenges. If archaeology of recent events is concerned with people in the present, conflict archaeology as a study of the “dark” past needs to be concerned with the emotions it evokes and the potential political impacts it has (Moshenska 2013:352; Sutherland and Holst 2005:4). The term dark heritage and the dark tourism (also thanatourism) that sometimes follows refers to a site’s relationship with death, disaster and atrocity (Lennon and Foley 2000:3). Researchers in this field have discussed the spectrum of dark heritage, with some sites being considered “darker” or “lighter” (Sharpley 2009b:19–20) and the motivations behind consumers of such heritage (Raine 2013:247–252; Tarlow 2005). What distinguishes dark heritage from other types is the intense emotions it can elicit, which has also been a reason why many archaeologists have avoided studies of recent conflict (Spennemann 1992:282).

Modern conflict archaeology is still in its infancy (Price 2005:7), and as a result its ethical challenges have not been sufficiently addressed (Moshenska 2008b:160). This is because there is no specific standard or code of practice for conflict archaeologists. The way it is practiced is situational and context specific (Giblin 2015:44; Moshenska 2008b:172). Moshenska (2009b:49–51) argues that in order to justify a modern conflict archaeology study and decrease any potential trepidation arising from a painful past, archaeologists must engage in ethical discourse at the outset of a research project and people’s relationships to sites in the present *must* be a part of highly contentious, political, evocative and impactful topics such as modern conflict (Moshenska 2008b:163; Schofield et al. 2002:1). Archaeologists must therefore collaborate and engage with people and their understandings of these pasts in the present and address the difficult issues that may arise. Community collaboration is an effective way of understanding modern conflict as it assists in answering questions about the past through oral histories and memories which creates a more inclusive history and conveys the diversity of experiences (Harrison and Schofield 2010:13–14). Moreover, through collaboration, the public becomes involved in creating the commemorative meanings of sites (Moshenska 2009b:49–51).

What Moshenska is essentially proposing is the use of community archaeology research strategies in combination with archaeological studies of recent conflict. Community archaeology projects are extremely diverse, but consultation and collaboration with the community (however that is defined) at all stages of research are key components (Moser et al. 2002:229; Tully 2007:176–178).

Giblin (2015:34) argues that ethics should not only be considered in the context of methods, but also interpretations (Mytum and Carr 2013:10). In some instances, archaeological interpretations have been evoked politically and used as propaganda to promote nationalist identities (Arnold 2002; Dezhamkhooy et al. 2015; Sen 2002). While the representations and uses of archaeological research are largely outside of the archaeologist's control (Giblin 2015:44; Moshenska 2008b:165), archaeologists should move beyond simply reporting results and consider its consumers (Hamilakis 2003:108). This is not to say that archaeologists should ignore unpleasant findings, but archaeologists should explicitly identify the potential political positions of their interpretations in order to lend direction and intention (Giblin 2015:47).

2.5 Conclusion

Due to the dearth of archaeological studies that focus specifically on karst defences, the project required examining a wide-range of studies from different areas and sub-disciplines of archaeology. The research questions developed for the archaeological study of WWII karst defences combines ideas from historical and consultancy-driven research on WWII sites, various studies in battlefield and conflict archaeology and objectives from the archaeology of the contemporary past.

Chapter 3 – Historical Analysis

3.1 Introduction

This chapter will focus on contextualising the events that relate to karst defence construction, including Japanese defence strategies, describing the people who constructed and used karst defences, including the Japanese military and civilians, and identifying the landscape of war. The chapter begins with Japan's Meiji Restoration. An explanation of this time period helps assist in understanding the material remains located within karst defences and the advent of the Imperial Japanese military. The chapter will then enter into a discussion of the Japanese presence in Asia and Micronesia and the progression of WWII as well as how karst defences fit into the Japanese strategy and where they are located.

3.2 Japan's Meiji Restoration and the Formation of the Imperial Japanese Military

The formation of the Imperial Japanese military began as a result of the Meiji Restoration in the late 1800s, triggered by the arrival of U.S. Commodore Matthew Perry to Japan in 1853. Perry demanded that Japan, which had been isolated for hundreds of years, open its ports to trade with the U.S. (Jansen 2000:275–278). Japan's only military strength at the time consisted of the sword-wielding samurai, who could not contend with Western military power (Jansen 2000:274, 279; Ogawa 2009:32). Unprepared and lacking in competitive weaponry, Japan had no choice but to open its ports or have them destroyed (Fellers 1935:17).

With Japan now open to foreign trade, confidence in the feudal leaders' (*shoguns*) ability to defend the country against the West and handle foreign affairs was low (Jansen 2000:297). Two of Japan's largest and most powerful clans, the Satsuma and Choshu, organised the Imperial Japanese military under the Satcho Alliance to overthrow the feudal Tokugawa government (*shogunate*) (Jansen 2000:310). The alliance's goals were to end feudalism, return political power to the emperor, enlarge the Japanese navy and establish an Imperial guard to defend the country (Gordon 2003:61–68, 123; Jansen 2000:310). The military defeated the Tokugawa forces during the Boshin War, resulting in the restoration to Imperial rule under Emperor Meiji in 1868 (Jansen 2000:336).

Men of non-samurai descent from any clan were eligible and encouraged to undertake military service during the Restoration (Bellah 2008:24–25; Harries and Harries 1991:3; Jansen 2000:122–123, 397–398). In order to bring together this new organisation of men from different backgrounds, the Imperial government needed to awaken a sense of common purpose (Harries and Harries 1991:24). The government selected components of the samurai traditional code (Harries and Harries 1991:24), the *Bushido Shoshinshu* or “the way of the warrior for beginners” (Cleary 1999:xiv), to write the Soldier’s Code of 1872. A set of moral principles that the samurai were instructed to observe, the *Bushido* focused on loyalty, obedience, honour, bravery and simplicity (Harries and Harries 1991:24). The later 1882 Imperial Rescript to Soldiers and Sailors drew from the same principles (Dixon et al. 2012:112–113; Fellers 1935:22; Harries and Harries 1991:4, 24; Jansen 2000:398–399). In terms of loyalty, the emphasis was on allegiance to the emperor. Taught in school and accelerated in military preparatory school, giving one’s life for the emperor and nation was considered noble and part of the Japanese spirit (Fellers 1935:21; Gilmore 2000:2; Harries and Harries 1991:24–25, 170; Jansen 2000:601). The military system was analogised as a body of which the emperor was the head and the military the limbs (Jansen 2000:398). If soldiers died during battle, they were promised to be remembered, honoured and worshipped at Tokyo’s Yasukuni Shrine (Harries and Harries 1991:25).

One of the key issues that originated during the Meiji Restoration and persisted until 1945 was a distinct division between how the Imperial Japanese Army (IJA) and the Imperial Japanese Navy (IJN) operated. During the Restoration the early Imperial Japanese military primarily consisted of samurai from the Choshu clan who controlled the army and the Satsuma clan, who controlled the navy (Evans and Peattie 1997:9; Fellers 1935:18; Harries and Harries 1991:21; Jansen 2000:397). Each sought to adopt military systems and weapons from different Western powers. The IJA borrowed from the French military and French advisors were invited to Japan to assist in military training and establish a military academy (Harries and Harries 1991:24). The IJN, however, acquired British support and models (Evans and Peattie 1997:10–12; Fellers 1935:18; Harries and Harries 1991:3; Jansen 2000:397). During the Meiji Restoration the army was considered the necessary force for national security. For many years, Japan was an insular country with little need for a maritime defence (Evans and Peattie 1997:2). Although the build-up of maritime strength was incredibly important for the Meiji government, the domestic situation in Japan warranted more attention to the army in the 1870s (Evans and Peattie 1997:2, 7). Domestic rebellions posed a more immediate threat to the government and thus army forces were more important than naval ones, which held true for Japan’s immediate defence needs after the rebellions subsided (Evans and Peattie 1997:7). The navy as a consequence received less funding and did not become autonomous until 1903 (Evans and Peattie 1997:22–23, 49; Harries and Harries 1991:104).

Over the years, the army considered itself the more senior service. It was older, better financed, more popular and had deeper roots in Japanese history (Harries and Harries 1991:104). The army had disparaged the navy, calling it a ferry service for troops with a minor role in coastal defence (Harries and Harries 1991:104). The navy considered itself more liberal and progressive than the army, seeking to keep pace with Western powers and technology and were less involved in politics (Evans and Peattie 1997:70; Harries and Harries 1991:104). In the lead up to, and during WWII, the army and navy competed for funds and strategic priorities. The army and navy had different primary enemies during WWII and different approaches to dealing with them. The army considered the protection of its people, territory and government as vital to national security, while the navy argued that Japan's interests as an island nation should seek to defend Japanese seas and attack the enemy as far from the nation's waters as possible (Evans and Peattie 1997:23, 134). The U.S. was the navy's WWII rival and they advocated moving southeast and into the Pacific. The army had two rivals, Russia and China, and would rather make a move into China and the Asian continent (Evans and Peattie 1997:50; Harries and Harries 1991:105).

Throughout WWII the army and navy failed to coordinate plans or share information and supplies. Each would dispute or outright ignore the others' orders, especially if it left them subordinate to the other (Denfeld 1997:70, 89). A German naval attaché recollected the lack of cooperation between the IJN and IJA while on a tour of the Nakajima aircraft plant in Japan. He was first taken by naval officers through their manufacturing and development division and at the end the navy guides stopped at a door and left him. On the other side of that door, army guides took him around their facility, but the navy guides were forbidden to enter the area (Evans and Peattie 1997:498–499). Even in desperate times, the army and navy failed to coordinate plans (Jansen 2000:649).

3.3 The Imperial Japanese Military Prior to WWI

Prior to WWI, the purpose of the Japanese Imperial forces was not only national defence, but also to display the Japanese nation's power and, when necessary, to execute national policy (Jansen 2000:400). The national policy was imperial expansion. Looking to gather the resources required for industrial and economic growth, the early Meiji government encouraged movement outward into Asia (Gordon 2003:49; Nila and Rolfe 2006:2; Peattie 1988:2). Japan turned to Korea and called for the restructuring of the Korean government to eliminate Chinese influence and become a modern industrial state (Jansen 2000:431–432). The Japanese occupied Korea, resulting in the first Sino-Japanese War in 1894 between Japan and China (Jansen 2000:432–435). In the end, a treaty was signed, Japan acquired portions of China and Korea became "independent," albeit with a large Japanese economic and political influence (Hasegawa 2005:8; Jansen 2000:433–434).

Other countries also had interests in the Asia-Pacific region. Interested in Port Arthur, a Japanese occupied ice-free port on China's Liaotung Peninsula, Russia convinced France and Germany to demand that Japan withdraw from the area (Evans and Peattie 1997:52; Hasegawa 2005; Jansen 2000:433, 438). At the time, the Japanese military was too small to reject the demands of the three countries and withdrew (Jansen 2000:43). Three years later Russia obtained a lease for the Liaotung Peninsula and the rights to build a railway to their naval fortress on Port Arthur (Hasegawa 2005:8; Jansen 2000:438). The U.S. also expanded into the region, occupying Samoa and Hawaii and defeating Spain for control over Guam and the Philippines. Likewise, Germany took control of the northern Mariana Islands and Caroline Islands from Spain and occupied the western islands of Samoa (Jansen 2000:436; Spoehr 2000:44–45). This Western presence countered Japan's imperial expansion efforts.

Japan was not the only nation concerned with the presence of various European nations in Asian territory. Great Britain also felt uneasy about Russia's expansionist efforts (Jansen 2000:437–438; Nila and Rolfe 2006:3). As a result, Great Britain and Japan signed the Anglo-Japanese Alliance in 1902, which ensured back-up if another power joined Russia (Evans and Peattie 1997:65; Jansen 2000:439). Protected by Great Britain, Japan then felt able to propose a plan to Russia and negotiate both country's interests in China and Korea (Jansen 2000:439). The Russians, however, were not responding to Japanese requests, and to Japan, appeared to be deliberately delaying negotiation (Jansen 2000:439). As a result, Japan launched a surprise naval attack against Russia's fleet at Port Arthur (Hasegawa 2005:8). Known as the Russo-Japanese War, Japan won, but only after significant losses—116,000 Russians and 128,000 Japanese (Jansen 2000:440). Japan was granted the Liaotung Peninsula (Hasegawa 2005:8) and gradually turned southern Manchuria (northeast China) into a Japanese colony administered under the Kwantung Government (Harries and Harries 1991:100). Army troops known as the Kwantung

Army were stationed to protect the territory (Gordon 2003:187; Hasegawa 2005:10). By 1912 Japan had also annexed Korea (Jansen 2000:445).

The Japanese victory over Russia in 1905 informed Imperial Japanese military doctrine and organisation for the next 40 years (Denfeld 2002:3; Evans and Peattie 1997:49; Ness 2014:14). Amongst those lessons learned was the need for Japan to shape war for themselves (Harries and Harries 1991:82). To do this they needed to be on the offensive. The most costly strategy to oppose a passive defence, as practiced by the Russians, was the surprise attack on an unprepared enemy (Harries and Harries 1991:83). The Japanese also learned to be determined to win at any cost. The army had won their battles by accepting a price in human life (Harries and Harries 1991:85, 88). Also apparent in the defeat of Russia was that a strong military needed naval superiority (Nila and Rolfe 2006:5). The navy dealt the final blow to the Russians, destroying the entire Russian Fleet (Harries and Harries 1991:91; Jansen 2000:440; Nila and Rolfe 2006:4). Fast, modern, homogeneous ships enabled the navy to cut across the enemy's path and perfectly time and fire upon the enemy's weakest vessels (Evans and Peattie 1997:48). Naval tactics and ideas, including the concept of the decisive fleet engagement, the strategy of attrition against a seemingly superior enemy, surprise attacks at night and the preference for quality over quantity of weaponry, would prevail up until WWII (Evans and Peattie 1997:49, 129).

3.4 Japan During WWI and Movement into Micronesia

Japan played a minor role in WWI (Ness 2014:14) and, rather than warfare, the Japanese government focused its efforts on taking advantage of opportunities to further expand its empire (Jansen 2000:447). Population growth in the late 19th and early 20th centuries increased so quickly that spreading its control into other areas of Asia was thought to be a solution to the problem (Gordon 2003:14, 61; Jansen 2000:447). Additionally, Japan saw itself as the role model in Asian reform (Jansen 2000:512–518).

The Japanese military was also interested in expansion efforts. Japan watched as other countries in Europe were gaining military strength, technology and becoming sensitised to new aspects of warfare (Evans and Peattie 1997:131; Harries and Harries 1991:119; Ness 2014:14). As Asia's most powerful military, Japan needed money and resources in order to keep up with Western powers (Evans and Peattie 1997:161, 185; Harries and Harries 1991:119–121). The IJA advocated for an expansion into northeast Asia (*hokushin*) (Evans and Peattie 1997:448; Harries and Harries 1991:105; Peattie 1988:37–38). As a counterpoint to the IJA, the IJN advocated for a southern expansion (*nanshin*) into southeast Asia and the Pacific (Evans and Peattie 1997:448). *Nanshin* would enable Japan to tap into the resources of southeast Asia, particularly oil (Evans and Peattie 1997:191). Additionally, a move into the Pacific made sense as Japanese merchants had already established a presence in Micronesia and controlled almost all commerce and shipping (Cabrera 2015b:16; McKinnon 2015b:152; Yanaihara 1976:26). Most importantly for the IJN, *nanshin* would ensure the navy received more financial support than the IJA (Evans and Peattie 1997:186, 448). Unfortunately for Japan, most islands in the Pacific were already occupied (Peattie 1988:4–5, 7).

The events of WWI provided an opportunity for Japan to follow through with both *nanshin* and *hokushin*. Under the guise of honouring the Anglo-Japanese Alliance, Japan eagerly joined Britain in WWI in August 1914, with the goal to occupy land held by British enemies (Gordon 2003:173). With Germany preoccupied in Europe, Japan seized Germany's colonies in Micronesia, despite British requests not to (Peattie 1988:39–40; Petty 2002:5). Japan justified the move as an Allied duty to secure sea-lanes in the Pacific (Gordon 2003:174). By the end of October 1914 the Japanese navy occupied the Marshall Islands, Caroline Islands, Palau, the Mariana Islands (except Guam) and the Gilbert Islands and administered the area under the South Seas Defence Force (Crowl 1960:53; Denfeld 1997:3; Peattie 1988:43; Rottman 2004:9; Smith 2007:54; Spoehr 2000:44, 51). To secure the islands, when Britain requested Mediterranean anti-submarine support from Japan in 1917, Japan agreed as long as Britain would support Japanese possession of Micronesia in the future (Peattie 1988:46). The army accomplished similar goals in China. In 1914, the IJA seized German holdings in the Chinese province of Shantung (Harries and Harries 1991:114, 121; Jansen 2000:515) and joined the Allies in Siberia (Jansen 2000:516–517). While the war continued in Europe, Japan coerced China into allowing Japan to occupy all of Manchuria and to control China's largest iron and steel complex (Harries and Harries 1991:114; Jansen 2000:515). When the war was over, Allied troops left Siberia, but Japan's remained (Jansen 2000:516–517).

In 1921 Japan was granted a Class C mandate under the newly established League of Nations (Peattie 1988:52–56). The Mandate allowed Japan to administer Micronesia, but it had to remain open to trade and Article 4 of the agreement prohibited Japan from fortifying the islands and establishing military and naval bases (Higuchi 2013:18; Petty 2002:6; Rottman 2004:9; Russell 1984:58; Smith 2007:54). A financially independent civil administration, the South Sea Bureau or *Nan'yo-cho*, replaced the IJN in Micronesia in 1922 and headquarters were established in Koror and Palau, with branch offices in Saipan, Yap, the Marshalls, Truk and Ponape (Denfeld 1997:4; Poyer et al. 2001:19; Russell 1984:58; Spoehr 2000:51).

Suspicions and distrust arose in 1921 after the Yap controversy (see Chapter 1) and the League of Nations began taking measures to restrict Japan's expansion efforts (Harries and Harries 1991:130–133; Jansen 2000:516). During the 1921–1922 Washington Conference, Japan was also told to withdraw from Russia (Jansen 2000:521) and to keep China open to trade with all nations (Harries and Harries 1991:133). Under the Naval Tonnage Limitation Treaty, Japan's naval tonnage was restricted to 60 percent of U.S. and British warship tonnage (Gordon 2003:187; Hasegawa 2005:11; Spennemann 2006b:113). Also, the Anglo-Japanese Alliance was terminated in 1923 (Harries and Harries 1991:132–133).

3.5 Japan in Micronesia

After WWI the Japanese *Nan'yo-cho* in Micronesia had two goals: to develop Micronesian industries to produce goods for the Japanese Empire and to become a "civilizer" of colonial people (Poyer et al. 2001:15). Six main industries were developed: sugar, dried bonito, mining, copra, alcohol and commercial fishing (Peattie 1988:118–152; Poyer et al. 2001:7, 19; Yanaihara 1976:50). Two companies controlled these industries: the *Nanyo Kohatsu Kaisha* (NKK, the South Seas Development Company) and *Nanyo Boeki Kaisha* (NBK, the South Seas Trading Company) (Dixon and Schaefer 2014:55; Poyer et al. 2001:19; Yanaihara 1976:55–56). Initially, Micronesians were employed in only mining and copra production and the increasing Japanese population (mainly Okinawans) supported these industries and other agricultural and manufacturing enterprises (Poyer et al. 2001:19–20; Yanaihara 1976:52). The Japanese also restructured the land tenure system, particularly in the Marianas where public land was used for agricultural development, and private property could be leased to the NKK to plant and cultivate sugarcane (Cabrera 2005:41; Spoehr 2000:52). By 1940, 90 percent of Saipan and Tinian's arable land was used for sugarcane (Higuchi 2013:98). In return, the Japanese promised a higher standard of living.

Japan believed that Indigenous Micronesians (and other non-Japanese Asian races) should be unified under the superior Japanese race (Higuchi 2001:20). A hierarchy of races existed under Japanese control which ranked Korean and Okinawan immigrants second to the Japanese, Chamorro people third and Carolinian and Marshallese people at the bottom (Poyer et al. 2001:27). Under the "Japanisation Policy" of assimilation, Micronesians underwent intensive language instruction (Higuchi 2001:22). Schools for Indigenous children were segregated, although some were able to attend Japanese schools after studying abroad in Japan (Higuchi 2001:20–22; Petty 2002:22, 25, 28–29). Teachers also taught students to be good children of the Japanese emperor and required them to recite an oath to him (Higuchi 2001:31; Petty 2002:25). Adults were also instructed in Japanese and offered familiarisation trips to Japan (Higuchi 2001:24). Children who misbehaved in school were sometimes physically abused by teachers, sometimes fatally (Petty 2002:25).

In general, many Micronesians have described the early Japanese Period as "peaceful" (Petty 2002:27). For many Micronesians the booming economy during the early Japanese Period meant access to more goods and services. Many islands underwent urbanisation and islanders had access to education, health care, utilities and imported goods (Petty 2002:7; Poyer et al. 2001:17; Russell 1984:67–68). Every Ponapean family, for example, owned china, glassware and cutlery, important status markers at the time, and Japanese-made furniture (Poyer et al. 2001:17). Some Micronesians even served as policemen or village heads (Poyer et al. 2001:18). However, they also suffered racial discrimination and segregation, especially as the war drew closer. Indigenous peoples received lower wages, lived under curfews, were required to wear Japanese-style clothing, were prohibited from practicing certain customs, consuming alcohol, gambling, having relationships with Japanese women, and endured restrictive working permits (Bowers 2001:55, 77; Petty 2002:29–30, 45; Poyer et al. 2001:17–20, 29; Yanaihara 1976:148, 288). Micronesian adults and children were often used for hard labour with little relief or compensation (Poyer et al. 2001:9; Yanaihara 1976:278) and disobedience could result in beatings and various forms of torture (Petty 2002:25; Poyer et al. 2001:18).

3.6 The Lead-Up to Pearl Harbour

While Micronesian industries were growing, the situation on the Japanese mainland was characterised by economic and political instability (Gordon 2003:182–187, 198–203). Economic downturn also meant significant decreases in military spending and troop reductions (Harries and Harries 1991:133–134). In despair, and despite financial cuts, several pro-war individuals moved towards more concrete war preparations (Evans and Peattie 1997:456), primarily because war was becoming a serious possibility on a number of fronts. Russia appeared to be preparing itself for war (Harries and Harries 1991:139) and aggressive U.S. policies against Japan seriously threatened Japan's interests in China (Evans and Peattie 1997:200).

The situation in China continued to worsen for the Japanese. The IJA, who struggled to control their hold in China, coaxed the Chinese Communist Army into war by blowing up a portion of its own railway and blaming it on the Chinese (Harries and Harries 1991:152). Known as the Manchurian Incident, the plan was unsuccessful and the train continued on unscathed (Harries and Harries 1991:152). The Japanese still blamed the Chinese and instigated a battle with their army and won (Harries and Harries 1991:153–155). The Japanese military took Manchuria and turned it into the Japanese puppet-state of Manchukuo (Beevor 2012:2; Gordon 2003:189; Harries and Harries 1991:159). Referred to as the "economic miracle," control over Manchuria's land and mineral resources helped Japan relieve population pressures, increase productivity, decrease unemployment and expand their empire (Gordon 2003:187–189, 192).

The Manchurian Incident of 1931 increased anti-Japanese sentiments throughout China. People boycotted Japanese goods and launched violent and non-violent protests in the streets (Johnstone 1937:274–275). The IJN, responsible for policing Japanese interests in Shanghai, dropped flares to frighten the opposition and surrounded the Shanghai shoreline (Harries and Harries 1991:160–161). When the Chinese army began to organise around the city, the IJN resorted to dropping bombs and IJA troops were sent in until the Chinese retreated (Harries and Harries 1991:160–161). The Lytton Commission, a group appointed by the League of Nations was sent to China to investigate Chinese-Japanese affairs, particularly the Manchurian Incident (Jansen 2000:584). In 1933 the Lytton Commission reported that Japan was infringing on China's sovereignty in Manchukuo and called for the demilitarisation of the area (Harries and Harries 1991:163). Japan withdrew from the League of Nations shortly thereafter in 1935 (Gordon 2003:190; Harries and Harries 1991:163).

Full-fledged war for the IJA in China began to take shape. The possibility of a communist, Russian-Chinese partnership resulted in Japan signing the Anti-Comintern Pact with Germany in 1936 to ensure no agreements with the Soviet Union were made without the other's consent (Harries and Harries 1991:205; Hasegawa 2005:12). In 1937 shots were fired at the IJA from an unknown assailant near the Marco Polo Bridge in Peking (Harries and Harries 1991:201). Japanese troops flooded the country with reinforcements (Harries and Harries 1991:208) and moved to occupy Shanghai and Nanking (Gordon 2003:204). To make matters worse, the Soviet Union attacked Japan in 1939 along the Chinese-Mongolian border (Harries and Harries 1991:263). The Kwantung Army fought and the Soviets called a cease-fire (Harries and Harries 1991:264–265).

Unable to fund and supply the war in China, Japan needed credit, loans and resources from other countries, but after the debacle in China many refused to assist (Harries and Harries 1991:254–255). To remedy this, the IJA planned to take the Dutch East Indies and British North Borneo and agreed that it was time to move and support *nanshin* into the oil rich countries in southeast Asia, although war with the U.S. and Britain would then be inevitable (Evans and Peattie 1997:408, 452; Harries and Harries 1991:270, 283). The government began mobilising citizens for war by enacting the National Spiritualisation Movement of 1937, which rallied the nation in preparation for war (Harries and Harries 1991:257; Higuchi 2013:79). Under the movement, civilian organisations were under government control, daily necessities became rationed and luxuries became illegal (Harries and Harries 1991:257). Civilian restrictions were justified through propaganda and news censorship claiming that this was the way people could help the country fight the "Holy War in Asia" (Harries and Harries 1991:257). Prime Minister Konoe called for a New Asian Order and an increase in anti-Western ways to renovate the nation (Gordon 2003:210–217) as well as the unification of other Asian nations with Japan under the Greater East Asia Co-Prosperity Sphere (Beevor 2012:247; Gordon 2003:210; Jansen 2000:633).

The situation in China led to a U.S. embargo that limited Japan's access to aviation fuel and scrap metal and the U.S. sent troops to the Philippines and moved the U.S. Pacific Fleet to Pearl Harbour in Hawaii (Harries and Harries 1991:284–285; Jansen 2000:626, 638–639). When France fell to Germany in May of 1940 Japan moved into formerly French-occupied northern southeast Asia, stationed troops and used it as a supply line (Gordon 2003:208; Harries and Harries 1991:272). In the autumn of 1940 the IJN accelerated its warship construction, mobilised its reserve personnel, stockpiled materials and equipped airfields, ports, depots and bases, especially in Micronesia (Evans and Peattie 1997:454). That same year the IJN's fourth fleet gathered in Palau and took part in anti-U.S. war games; the first time the navy took military action in Micronesia (Higuchi 2013:43).

In 1941 the U.S. issued a total embargo on foreign supplies to Japan (Gordon 2003:208; Jansen 2000:629). Just over fourth months later, in December 1941, over 350 Japanese dive bombers, fighters and torpedo planes bombed Pearl Harbour, destroying 188 U.S. aircraft, four battleships, three destroyers and damaging almost every U.S. ship in the harbour (Drea 2009:222; Gordon 2003:209; Poyer et al. 2001:10).

3.7 From Offence to Defence

War with the U.S. had been a possibility for Japan since WWI and the IJN planned it out into three stages (Evans and Peattie 1997:464). The first step would be to seek out and annihilate U.S. naval forces and bases already in the Pacific. Second, attrition operations would be planned against a westward moving U.S. fleet coming to relieve or reclaim bases. Finally, a decisive battle would be planned near the Japanese mainland which would force the U.S. to negotiate for peace (Bullard 2007:3; Evans and Peattie 1997:464). By the 1940s that decisive encounter location moved from northwest of the Mariana Islands to northwest of the Marshall Islands (Bullard 2007:3; Evans and Peattie 1997:464).

The navy had special construction units called *setsueitai* (composed of civilians and Japanese engineers) who helped accelerate military construction in Micronesia so that by 1941 there were eleven naval air bases equipped with command centres, communication facilities and ammunition and fuel dumps (Evans and Peattie 1997:401, 465; Pacific STAR Center for Young Writers 2004:178; Petty 2002:62–63). However, Micronesia lacked defences such as hardened facilities, coastal artillery, anti-aircraft weapons and offshore mines (Evans and Peattie 1997:465). This was because Japan's navy lacked equipment and were indecisive as to which islands should be fortified first (Evans and Peattie 1997:465). Bases in the Pacific were to act as a "tripwire" of sorts (Evans and Peattie 1997:464). Knowing the U.S. would move through the central Pacific, once the U.S. approached an island, the Japanese could launch a counterattack from the bases behind that island (Evans and Peattie 1997:466). Japan did not have enough men, planes and ships to cover every island, so strategic locations were selected and reinforced and when in need, the plan was to rush reinforcements from the nearest island (Evans and Peattie 1997:466).

Once the Pearl Harbour attack was complete, Japan took Wake Island, Guam, Thailand, Malaya, Hong Kong, a portion of the Philippines and the Gilbert Islands by the end of December 1941 (Bullard 2007:3). Burma, Manila and the Solomon Islands were occupied in January 1942, Singapore in February, Dutch East Indies in March, Borneo in April, the rest of the Philippines in May and the Aleutian Islands by June 1942 (Bullard 2007:ii, 3, 7; Gordon 2003:209; Poyer et al. 2001:9; Spennemann 2013:137). Palau, Saipan, Truk and other islands were raised as bases to help destroy the U.S., who would eventually be lured into the surrounding water (Bullard 2007:1).

In April 1942 Japanese plans began to fall apart. Referred to as the Doolittle Raid, the U.S. bombed the Japanese mainland for the first time (Ness 2014:35). Although the raid inflicted negligible material damage, Japan realised the weakness of the home islands' defence system and ordered a massive reorganisation and expansion of homeland defences (Jansen 2000:648; Ness 2014:35; Spennemann 2013:137). Japan planned to cut off the shipping and communication lanes between the U.S. and Australia by establishing bases in New Guinea and the Solomon Islands and turning Rabaul into a major airbase like Truk (Bullard 2007:ii, 3; Ness 2014:35). At the same time the IJA proposed establishing an outer defence perimeter pushed out to Midway in the centre, Samoa, Fiji and New Caledonia to the south and the Aleutians in the north (Ness 2014:34–35). While en route to New Guinea to initiate the plan (Harries and Harries 1991:397), the IJN encountered U.S. warships and fought the five-day Battle of the Coral Sea, which ended in a draw (Harries and Harries 1991:398; Ness 2014:35). Shortly after, the IJN orchestrated an attack on Midway Island to knock out the U.S. fleet (Spennemann 2013:140). The U.S. broke Japanese code, prepositioned their carriers and destroyed all four of Japan's carriers causing the IJN to abandon the operation (Spennemann 2013:141). Finally, in August 1942, U.S. troops landed on Guadalcanal in the Solomon Islands and fought the Japanese until February 1943 (Bullard 2007:2; Hiroyuki 2001:9).

Only one year into the Pacific War Japan was suffering from a lack of men and materials. The army had lost 25,000 of the 40,000 men it deployed to the south Pacific, almost 10,000 of them from starvation and disease in Guadalcanal and were left with only 60 to 70 operational aircraft (Harries and Harries 1991:403; Hawk 2006:336; Hiroyuki 2001:35). Supplies were so low that many of the soldiers were forced to live off enemy rations and even forced into cannibalism to survive (Harries and Harries 1991:405; Hawk 2006:336; Miller 2008:129; Moore

2013:124). The loss in Guadalcanal caused Japan to change course towards a more defensive position (Evans and Peattie 1997:491).

While the Japanese were being battered in New Guinea, the Japanese high command formulated the Absolute National Defence Sphere policy in September 1943 (Hiroyuki 2001:35). This called for delaying actions in the South Pacific while a new line of defence could be prepared stretching from Burma to the Philippines, across the Caroline Islands, then north to encompass the Mariana Islands and northern Japan (Figure 3.1) (Denfeld 1981b:5; 1997:12; Hiroyuki 2001:35; Peattie 1988:262–263). If the situation permitted, offensive actions in New Guinea would resume in mid-1944 (Hiroyuki 2001:35). Any Japanese occupied islands north, south or west of this line were to be held for six months to buy time for aircraft construction, rebuild the fleet and fortify places like Timor, New Guinea, the Carolines, the Marianas, the Bonins and the home islands (Harries and Harries 1991:407, 429). The *setsueitai* were directed toward the construction of defensive works including airfields, fortifications and gun emplacements (Evans and Peattie 1997:401; Higuchi 2013:60).

3.8 Karst Defences and Japan's Defence Strategy

The U.S. developed a two-pronged approach to the Japanese mainland. One moved northwest along the New Guniea coast towards the Philippines and the other island-hopped across the central Pacific towards Japan (Goldberg 2007:13–14; Hoffman 1950:1–2). The first U.S. invasion en route to the Philippines was in Guadalcanal in August of 1942 and the first in the central Pacific was Tarawa in November 1943 (Crowl and Love 1955:127–128; Miller 1949:59–61). In October 1944, while the U.S. was in the middle of fighting in Peleliu, a manual was printed regarding the Japanese military forces. In it the U.S. described the Japanese defence strategy. In general, defence was a "beaches first" plan of action which aimed to stop the invaders before they reached land or on the beaches before they could move inland (War Department 1944a:140). The IJN would set up coastal defensive positions on the island, lure the enemy into Japanese waters and ambush them from coastal defences and navy ships (Bullard 2007:3).

The U.S. had encountered different types of islands in the Pacific: high islands and atolls. High islands are volcanoes that have emerged out of the water while an atoll consists of a ring of raised coral reefs surrounding a sunken volcanic island typically enclosing a lagoon that is much shallower than the ocean on the outside of the reef ring (Nunn et al. 2016:6–7; Nunn 2010:349). High islands and atolls differ substantially in elevation. High islands can be thousands of metres high, whereas low-lying atolls rarely rise to more than 2m to 3m above sea level (Nunn 2010:353).

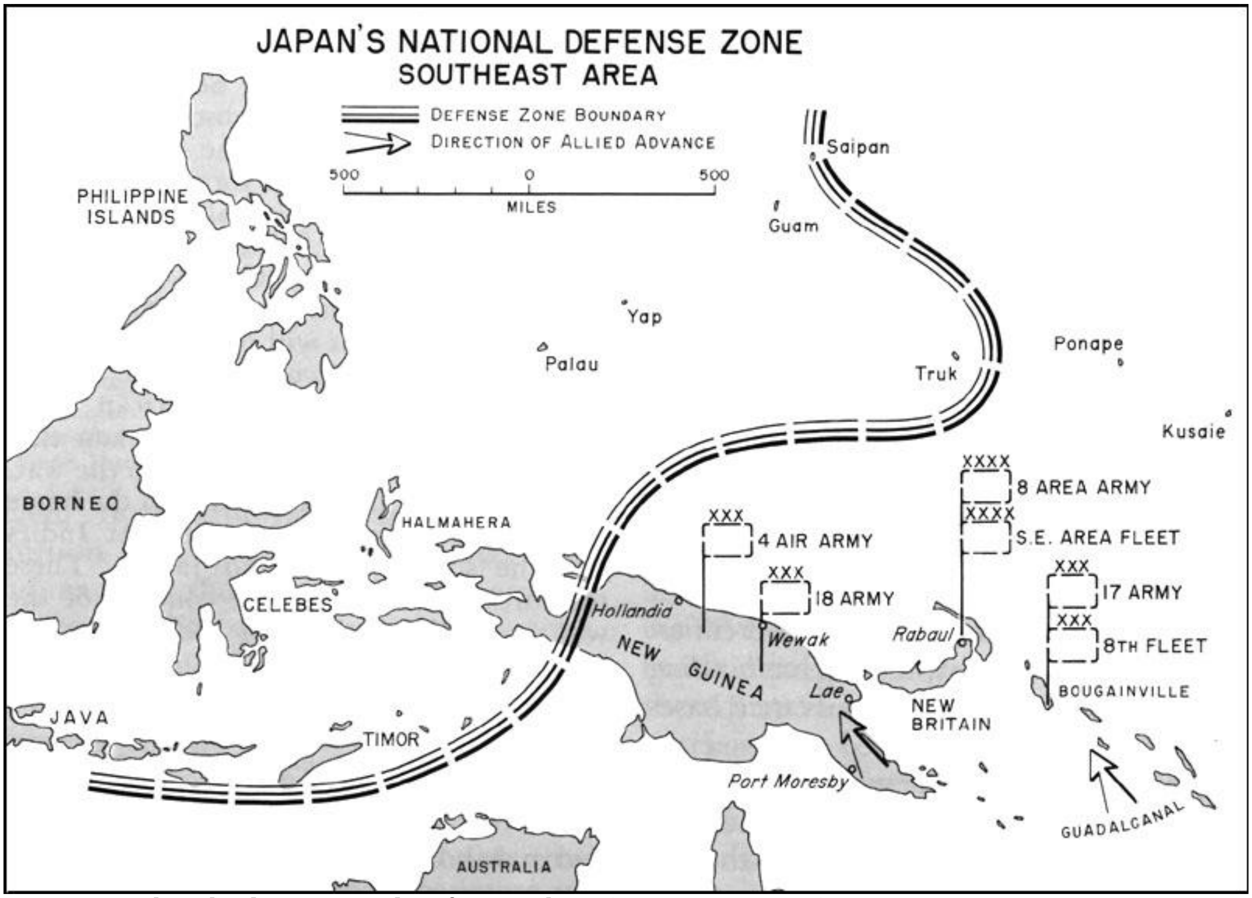

Figure 3.1: The Absolute National Defence Sphere (Morton 2000:548).

The U.S. found that, when large enough, atolls were fortified with a landing strip and a thin line of defensive works around the perimeter of the island (War Department 1944a:130). On long and narrow atolls, defences were grouped in a centralised area with no airstrip (War Department 1944a:131). On high, volcanic islands, defences were constructed at the beaches, which consisted of observation posts, strong points, obstacles and heavy naval guns. Both land-based and naval aircraft were used and anti-aircraft artillery deployed in the defence of harbours and landing fields. If driven into the hills the army and Special Naval Landing Forces (SNLF) (naval land troops made up of navy sailors) were to carry out harassing operations for long periods (Nila and Rolfe 2006:12; War Department 1944a:76, 128). Where the terrain permitted, caves were used as gun emplacements (War Department 1944a:123).

Karst defences in this manual are not described in any detail aside from a small mention of their use as gun emplacements. However, by October 1944 the U.S. had encountered karst defences on a number of islands. The first karst defences encountered by the U.S. were in Bataan, Philippines, during the Battle of the Pockets in late-January and early-February 1942 (Morton 1953:311, 339) (Figure 3.2). The Japanese had already dug foxholes and trenches and connected them with tunnels to move freely without observation (Morton 1953:339). The U.S. had also encountered Japanese tunnels and caves used for shelter in Tulagi and Gavutu (Solomon Islands) in May 1942 (Miller 1949:62–63; Petchey 2015:33). From June to August 1943 the U.S. drove the Japanese from caves and tunnels on New Georgia in the Solomon Islands, which were stocked with rice, currency and bales of clothing and blankets (Miller 1959:164, 285–286). The majority of the Japanese units on Rabaul in New Britain had departed the battlefields of the South Pacific by the autumn of 1943 (Bullard 2007:211). By then, 563km (350 miles) of caves and tunnels had been excavated in Rabaul (Miller 1959:312) (Figure 3.3). The U.S. troops in Saipan had also encountered karst defences, particularly on the southeastern side of Mount Tapochau (Saipan's highest point located in the centre of the island) infamously known as Death Valley, Hell's Pocket and Purple Heart Ridge (Denfeld 1997:70–73; Rottman 2004:63). U.S. military fired at caves using ships' artillery and then aimed to destroy each one with tanks, grenades and flamethrowers (106th Infantry 1944:11). Naftan Peninsula, in southeastern Saipan, was also difficult for the U.S. due to the dense jungle and rugged terrain filled with caves used by both the Japanese military and civilians (Denfeld 1997:61). U.S. troops also encountered caves in nearby Tinian and Guam from July to August 1944 (Crowl 1960:287, 297, 325, 344).

After the Japanese were defeated in the Marianas, the Japanese defence strategy changed once more. Articulated in the Japanese *Instruction Manual for Island Defence*, defenders were still to annihilate the enemy at the beaches and to launch counterattacks if the U.S. secured a beachhead (Denfeld 1988:9). The new element of their defensive plans was the tactic of organising defences in-depth. Strategic utilisation of the terrain, including cave and tunnel hideouts, would be the backbone of the defensive system (Harries and Harries 1991:439). Provisions were made to allow defenders to fall back to these positions should the enemy landing forces advance beyond the beaches (Denfeld 1988:5). Every foxhole and cave position would be

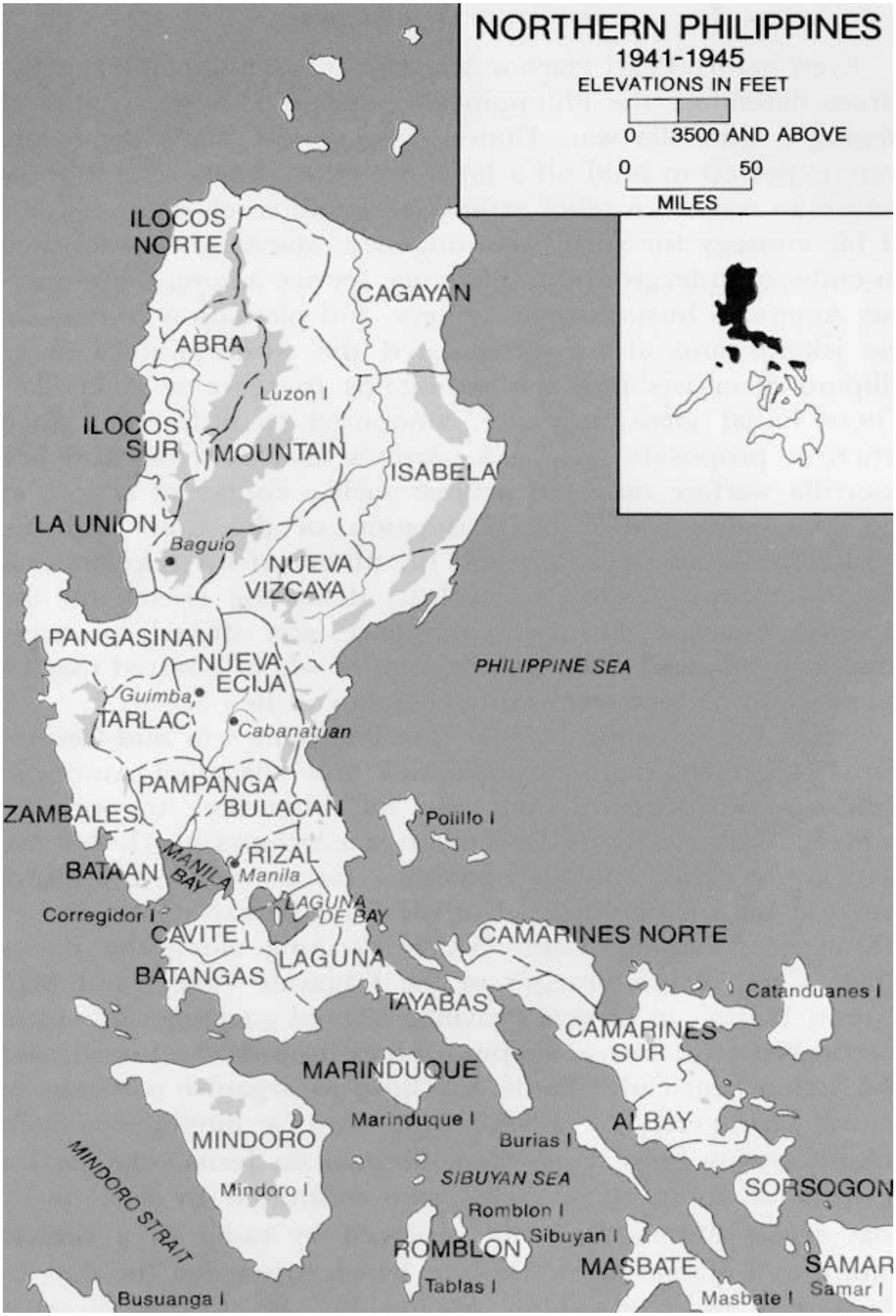

Figure 3.2: Location of karst defences in the Philippines (Hogan 1992).

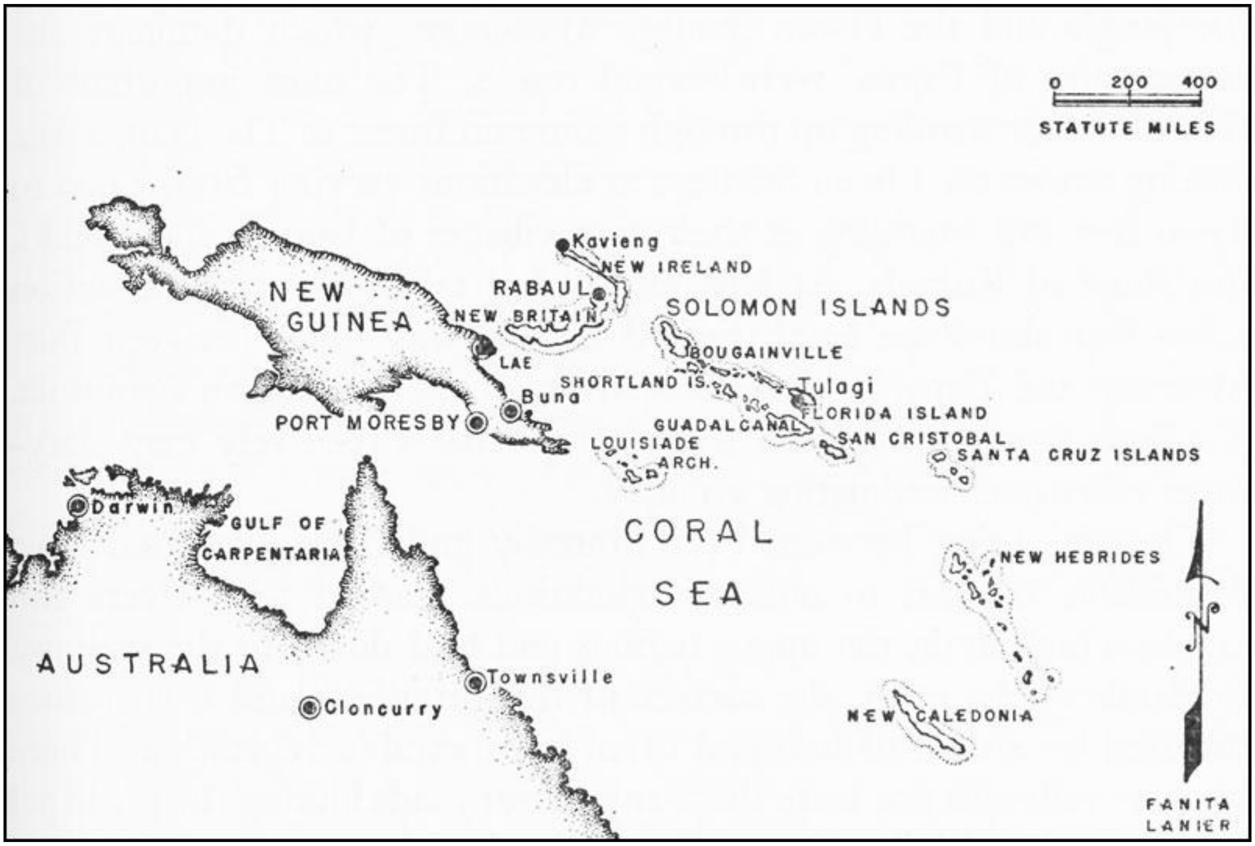

Figure 3.3: Locations of karst defences in the southern Pacific (Craven and Cate 1950:5).

defended to the death. Futile “suicide charges” would not be allowed to take place, although coordinated counter-charges would be employed if tactically advantageous (Denfeld 1988:9). This new policy was designed to inflict the maximum damage on invading forces. The Japanese believed that the heavy losses inflicted on the enemy would strain the enemy’s will to fight, while at the same time boost sagging morale at home (Denfeld 1988:5; Harries and Harries 1991:439; Price and Knecht 2012:9).

Places such as Leyte in the southern Philippines, Biak Island in the Dutch East Indies, Peleliu, Iwo Jima and Okinawa are examples of the new Japanese defence strategy. In October 1944 the U.S. found well-camouflaged, expertly dug cave and tunnel systems in several areas of the Philippines that were used as shelters, supply dumps and artillery positions (Cannon 1954:104, 251, 341, 343; Smith 1963:203). In Peleliu the U.S. expected to capture the island in two to four days, but due to the maze of interconnected caves and tunnels in the Omleblochel Mountain region on the western peninsula, the battle lasted 73 days (Denfeld 1988:5; Price and Knecht 2012:9–10).

The Japanese on Biak Island also designed a defence that included emplacements on terraces and the extensive use of caves as fortified defensive positions (General Headquarters Southwest Pacific Area Military Intelligence Section 1944:1, 3). Again, the battle on Biak was one that the U.S. planners expected to be short, but which lasted nearly three months due to an elaborate cave complex (Denfeld 1988:9; 1997:129). Like Peleliu, Iwo Jima had more than 1.6km of tunnels and the difficulty in taking the island was due to well-entrenched cave and tunnel systems, which were used immediately after the U.S. established a beachhead (Harries and Harries 1991:439; Smith 2008:1).

As the U.S. continued to move closer to the Japanese mainland and before the fighting on Iwo Jima finished, the Imperial General Headquarters decided that no further supplies would be sent to ground forces outside the home islands (Harries and Harries 1991:440). Seriously affected by chronic labour shortages, high school children were helping to build planes by the end of 1944 (Harries and Harries 1991:448). By 1945 there was virtually no fuel to fly any aircraft. The Japanese manufactured substitute fuels from potatoes and pine resin, but they expected to be all out of fuel by mid-1945 (Harries and Harries 1991:448).

3.9 Conclusion

What this chapter has aimed to do is contextualise the war in the Pacific with an emphasis on Japan’s military evolvement and strategy, its expansion into Micronesia and how karst defences fit into that strategy according to historians. The people who constructed and used karst defences during WWII were also identified in order to give a basis for interpretation.

The Japanese army and navy operated independently of one another for many years. Since there was an unwritten rule in the development of strategic planning that responsibility for operations in the Pacific was with the navy (Bullard 2007:4) and it appears that the naval *setsueitai* were the only construction battalions to build karst defences, there is a possibility that most of them were constructed for the IJN. There is also a possibility that there were distinct civilian caves as well.

This chapter also reveals that karst defences were constructed and used at least as early as 1942, but more extensive construction and use occurred later on. Unfortunately, there has been little comprehensive documentation or analysis of karst defences by historians. More detailed descriptions by archaeologists and Phelan (1945), however, suggest that these sites may have more strategic value and purpose than has previously been considered.

Chapter 4 – Methods

4.1 Introduction

This project is a part of a continuous community archaeology research initiative in Saipan led by Dr McKinnon since 2007. Community-based research methods were used for this project in order to continue the partnerships between researchers and Saipan's community members and to ensure that willing members could participate and contribute to the research. Community collaboration on modern conflict topics comes with a particular set of issues and sensitivities, which influenced the way this research engaged with the public. This chapter will discuss how the project employed community archaeology research strategies on a potentially delicate subject. The second section of this chapter will describe the customary research methods, including consulting various primary and secondary sources, site selection, participant and volunteer recruitment, oral history documentation and recording methods.

4.2 Community Archaeology

In Chapter 2 community archaeology research strategies were proposed as a useful way to guide data collection and methods for archaeology conducted on events of the more recent past and as an ethical way of conducting archaeological studies on modern conflict. The definition of community archaeology, however, is ambiguous (Moshenska and Dhanjal 2011:1) as archaeologists use a variety of adjectives to refer to the same idea, including public, collaborative, community-based, consultative, decolonising, Indigenous and post-colonial (Fowler 2015:122–126; Thomas 2014:25–26).

Despite the lack of a clear definition, the overall goal of all of the terms presented above when used in archaeological research is to move the discipline into a more socially engaged practice (Cohen and Swindler 2000:40–41; Colwell-Chanthaphohn and Ferguson 2008:2; Marshall 2002:212–213; Rowlands 2002:10; Wobst 2005:17–28) with the involvement of non-archaeologists (Moshenska 2008a:51). The primary difference between the above terms is the level of involvement and control non-archaeologists have. At one end, community archaeology advocates that at every step of a project at least partial control remains with the community (Clarke 2002:251–252; Colwell-Chanthaphohn and Ferguson 2008:8–9; Moser et al. 2002:220). This is often described as a "bottom-up" model rather than a "top-down" approach (Thomas 2014:25–26). At the other end is public archaeology for public consumption (Kador 2014:35–

36). Kador (2014:35–36) characterises ways of engaging with the public as part of a spectrum with superficial public involvement through publications, websites, public talks and television at one end and full-fledged, community-run archaeological initiatives at the other (Kador 2014:35–36) (Figure 4.1). The spectrum is similar to the "collaboration continuum" put forth by Colwell-Chanthaphohn and Ferguson (2008:1), which is also based on levels of involvement that range from simply communicating with people about a project to a synergy between archaeologists and non-archaeologists.

Moshenska (2009a:73, 79) argues that the most effective way to conduct an archaeology of modern conflict is to make community archaeology the core of the methodology. Historical accounts of conflict, particularly WWII, do not convey the diversity of experiences (Moshenska 2012:2). Collaboration adds pertinent data to such partiality and helps establish a multi-vocal and inclusive history (Buchli and Lucas 2001b:171; Harrison and Schofield 2010:13–14). By collecting oral histories and involving volunteers in projects, archaeological sites can become forums for education, debate and remembrance as well as provide opportunities to address and overcome conflict between divergent parties (Moshenska 2009b:53; Sturdy Colls 2015:106).

Collaborating with people and incorporating them into archaeological research that addresses sensitive topics can be a complicated endeavour. Sturdy Colls' (2015) research on the Holocaust provides a more detailed way of conducting a publicly-engaged modern conflict archaeology study. She argues that prior to instigating a project on a potentially controversial topic, a considerable amount of research needs to be done on possible sensitivities and the political, social, religious and cultural landscape surrounding the research (Little and Shackel 2014:42; Sturdy Colls 2015:89). Once this assessment is complete, researchers may find that public engagement might not be appropriate at certain stages of the project (Sturdy Colls 2015:106), or perhaps only a certain level of it can be accommodated. For example, archaeologists have a duty to record and handle particular artefacts, such as human remains, with the highest level of competency and they may not be appropriate for volunteers to record (Sturdy Colls 2015:106). Another issue is that conflict archaeology can attract those with sinister motivations, such as looters, illegal artefact traders and, in Sturdy Colls' (2015) case, Holocaust deniers and Fascist and Nationalist organisers who opposed the work (Sturdy Colls 2015:106). There is also the possibility that people do not want to be a part of a project at all because they are uninterested or the topic evokes unbearable emotions.

Publications; Public talks; Websites; TV programmes	Outreach activities; Open days; Limited fieldwork activities	Archaeology done intentionally in the public eye; Little public involvement in project decisions	Significant input from non-archaeologists regarding research design, but control, publication and presentation of findings remains with the primary (usually professional) archaeologist	Entirely community run projects with little professional archaeological input

Low Public Involvement **High Public Involvement**

Figure 4.1: The public involvement spectrum (Kador 2014).

In light of the complex issues that can arise in modern conflict archaeology, if an archaeologist seeks to apply community archaeology strategies, in some cases it may not be appropriate to have non-archaeologists in control at every step of the project. Rather than concluding that the project cannot or will not be deemed community or public archaeology, it is perhaps useful to apply the involvement spectrum. For this project, rather than applying the spectrum to the project as a whole, a strategy was to identify political, social, religious and cultural sensitivities first, then apply the spectrum to each stage of the project, including developing the research questions, field practices, data collection, analysis, storage and public dissemination (Marshall 2002:211). The identified sensitivities were used to determine an appropriate level of public involvement (Figure 4.2). For example, during the developing research questions stage, the primary task was to identify problems or knowledge gaps. The author simultaneously consulted a list of identified sensitivities and the involvement spectrum to determine what level of public engagement would be appropriate to identify answerable research problems. Some ways of identifying problems are to conduct a literature review and present the idea to others, which could include discussing the topic locally, presenting at a conference, writing a blog or other online communication through social media, etc. Given the sensitivities involved in this project, the topic was discussed with local co-researchers and extensively at the local level in the form of public presentations and radio interviews. Co-researchers contributed to the literature review, although the bulk of it was conducted by the author. The research questions were then formulated and discussed with co-researchers and the Saipan community using the same methods (presentations and radio) as well as an online "prezi" presentation of the questions that was created and shared on social media. Social media is not always the most appropriate way to involve a public (for example in the case of Holocaust projects, that might engender staunch opposition) or it may have to be approached in a particular way, perhaps with specific privacy settings or restricting the ability to comment (Sturdy Colls 2015:334–335). In this case only the prezi presentation was shared on social media. No photographs or videos of the fieldwork or artefacts were shared on social media and volunteers were asked to refrain from posting information and photographs related to the project.

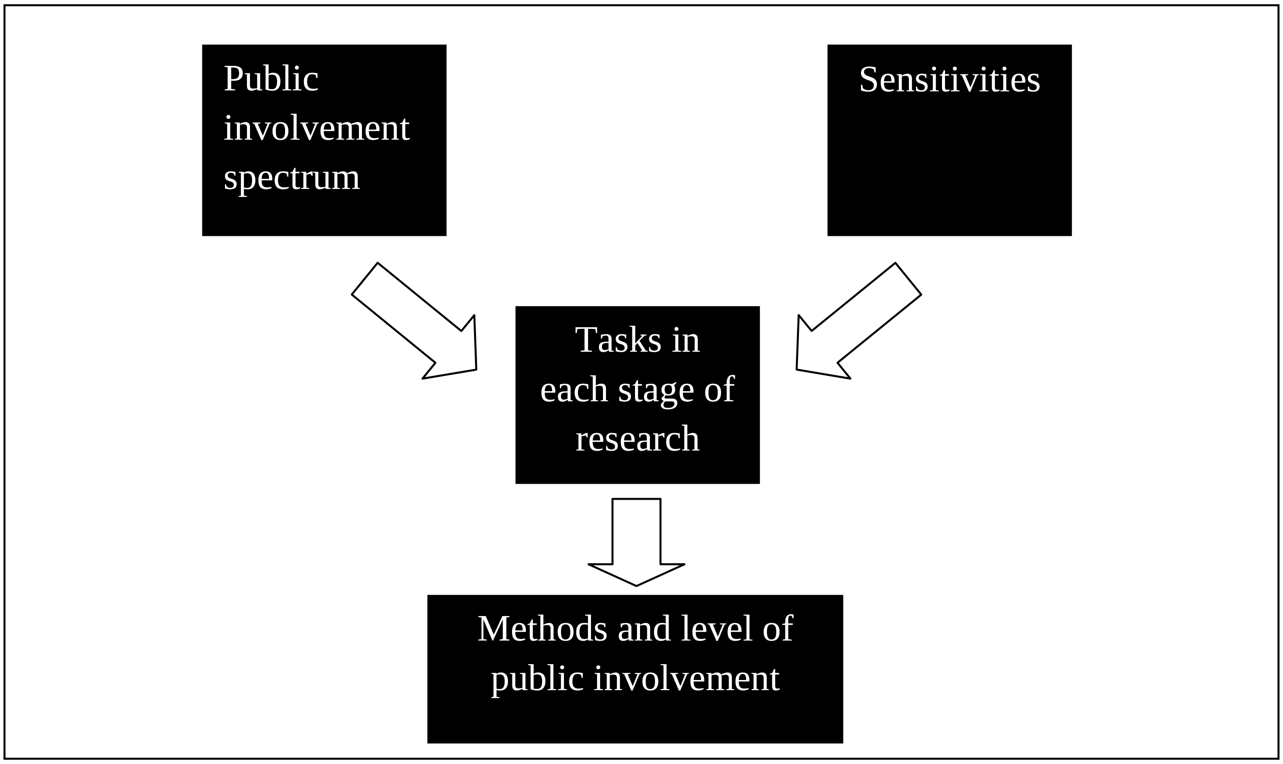

Figure 4.2: Process of determining public involvement for the current project.

The proposed approach is useful because, given the many nuances a project can have, it breaks the project down and helps identify where more engagement can be facilitated, allows for continuous discussion of ethics and ensures ethical implications are fully understood at every stage (Moshenska and González-Ruibal 2015:14; Sturdy Colls 2015:183). The impacts of research are not static and change over time and with different age groups (McKinnon 2015c:12), so this methodology allows analysis to occur at each stage, with new information gathered and learned from the previous stage(s). The approach also eliminates any hard dichotomy between public and community archaeology and allows for a more fluid understanding of how people are/can be involved in archaeological projects. Furthermore, the approach recognises that, despite intentions, sometimes not all stages of a project are bottom-up or top-down and that what intends to be an entirely bottom-up model sometimes ends up being partially top-down with archaeologists in control. Finally, the approach also enables archaeologists to be open, honest and flexible (the most important components of successful collaboration) (Nicholas et al. 2008:293), which means that if the opportunity for involvement exists, every effort is made to include non-archaeologists in some way, but is not forced.

Many authors argue that, rather than debating the definition of community archaeology, a more fruitful endeavour is to discuss exactly what archaeologists mean by "community" and who falls into that category and who does not (Isherwood 2011:74; Moshenska and Dhanjal 2011:1–2). A better way to advance the study of archaeology and its engagement with people is to examine how archaeologists decide on which groups of people to work with or how communities decide to work with archaeologists (Isherwood 2011:13; Moshenska and Dhanjal 2011:2). Additionally, archaeologists need to continue reviewing the impacts of public participation in archaeology (Lea and Thomas 2014:2). Useful contributions to the above can be made through the analysis of public involvement in the archaeology of modern events and specifically conflict archaeology projects.

4.3 Defining the Project's Communities and Sensitivities

The project defined communities and the public as groups and individuals who may be affected by this research (Sturdy Colls 2015:62). The groups and individuals identified for this project include: heritage organisations in Saipan, non-heritage organisations in Saipan, the Japanese community, the Indigenous community, the U.S. community, tourists to Saipan, tour companies in Saipan, Saipan property owners, co-researchers and local volunteers. The attributes of each are outlined below to reflect the initial assessment of the project prior to and at the beginning of fieldwork. How issues and sensitivities were addressed is discussed throughout this chapter. More complex issues materialised during fieldwork and further insights into the relationship each of these groups had with the heritage being studied emerged. These will be analysed and further discussed in Chapter 10.

The principal heritage organisation in Saipan is the CNMI Division of Historic Preservation (HPO), the organisation legally mandated to protect the CNMI's cultural and historic resources (King 2006:505; King 2008:89; Russell 2001:24). Although no permit is required from the HPO to conduct non-invasive archaeological surveys in the CNMI (Jennifer McKinnon pers. comm. 2014), archaeologists are required to contact the HPO if and when they encounter human remains in the field (Russell 2001:24). Two museums or interpretive centres exist in Saipan: the U.S. National Park Service's American Memorial Park (AMP) and the Northern Mariana Islands (NMI) Museum of History and Culture. AMP is a memorial and interpretive centre honouring the Allied forces who fought in the Battle for Saipan (NPS 2016), while the NMI museum is the legal repository of CNMI historic artefacts (NMI Museum of History and Culture n.d.). This project affected these two organisations as they are the primary interpreters of WWII heritage on the island.

Non-heritage organisations affected by the research included the Bureau of Environmental and Coastal Quality (BECQ), which manages the CNMI's natural resources through its two divisions: Coastal Resources Management (CRM) and the Division of Environmental Quality (DEQ) (BECQ n.d.). DEQ, in particular, ensures the assessment and clean up of sites contaminated by hazardous substances, including those at formerly used defence sites (FUDS) and authorises unexploded ordnance (UXO) detonation. Both hazardous substances and UXO are found within or near karst defence sites. The CNMI Department of Public Safety (DPS) also has personnel to deal with UXO detonation (McKinnon 2015a:15). The U.S. Fish and Wildlife Service (FWS) and the CNMI Department of Lands and Natural Resources (DLNR) Division of Fish and Wildlife (DFW) are primarily concerned with the Marianas Swiftlet, a protected bird that nests within caves (McKinnon et al. 2014b:80, 139–140). Other organisations affected by the research include the Department of Community and Cultural Affairs, which oversees historic conservation and preservation (CNMI Department of Community and Cultural Affairs 2014) and the Northern Marianas Humanities Council (NMHC), which administers humanities-related programs and provides grants for such projects (NMI Humanities Council 2016). The NMHC partially funds this project.

Given that the Battle for Saipan was fought between the Japanese and U.S. on Micronesian land, the effects of the research on all three of these groups, whether living on Saipan or outside of it, were considered. Japanese sensitivities lie in the number of lives lost during the battle and the nature of this loss (McKinnon 2014:179–180). As a result, since 1952 the Japanese government has organised teams, referred to as bone collection missions, to collect human remains from WWII battlefields, including at karst defences, and repatriate these remains to Japan (McKinnon et al. 2014b:68, 112). Only recently have these groups complied with local heritage legislation in the recovery of remains and since 2003 the Japanese government has organised DNA analysis on some remains (McKinnon et al. 2014b:68–69, 112). The government has also facilitated pilgrimages to, and memorial services on Saipan for war-bereaved relatives and survivors and have erected a number of monuments (McKinnon et al. 2014b:68–69). Due to the sensitivity surrounding the loss of life during the battle, many Asian visitors erect memorials and monuments across the island, including underwater and within karst defences (McKinnon 2014:182; McKinnon et al. 2014b:112). Some leave paper, food and candy as offerings, which tend to attract pests that often feed on organic artefacts (McKinnon et al. 2014b:112).

For some Indigenous people, the battle is something that happened *to* them, losing many family members in a war provoked and fought between two foreign powers on their land (King 2006:509; McKinnon 2014:179–180). Although Indigenous groups are said to be comparatively less interested in WWII heritage, "they want to preserve this history and to correct the imbalance that makes islands nearly invisible" in accounts of the Pacific War, which are repeatedly told from a U.S. perspective (Poyer et al. 2001:337). Indigenous people in Saipan and civilians in general, who lived through the battle, have arguably the most painful memories of the war, which needed to be addressed when collecting oral histories. Additionally, prior to the Battle for Saipan, some Indigenous people on the island were employed by the Japanese and sent to work on Guam as interpreters and police aides (Camacho 2008:221–222; McKinnon 2014:179), which is also a sensitive subject as this has negatively impacted the relationship between Saipan's and Guam's Indigenous populations (Cabrera 2015a:19; Higuchi 2001:26, 29, 34–35; Poyer et al. 2001:39).

The CNMI's economy relies on tourism (McKinnon 2015a:14) and several companies and travel agencies exist to accommodate this. Some promote visitation to cave sites. The government-funded, Marianas Visitors Authority office (MVA), which focuses on tourism development (McKinnon and Carrell 2011:155), promotes visits to some of Saipan's more well-known caves and hires locals to guide tourists to lesser-known caves and tunnels (Fred Camacho pers. comm. 2013). Some property owners promote their sites to tourists and have planted artefacts within their sites and/or developed ways to make their sites more accessible to visitors (McKinnon et al. 2014b:101). Others, however, would prefer that people not visit their sites at all (Joe Wobel pers. comm. 2014). Tourism is a major concern for the preservation of karst defences, as some tourists, or those promoting tourism, loot sites, move artefacts, intentionally or unintentionally damage artefacts and/or vandalise sites (McKinnon et al. 2014b:110–113). In fairness, all visitors, including archaeologists, can unintentionally damage artefacts. Many locals are concerned with visitors publicising cave locations or handling artefacts, including human remains (McKinnon et al. 2014b:23).

The primary sensitivity with co-researchers, property owners, fieldwork volunteers and any other participants in the project was trust. Co-researchers and volunteers did not require an in-depth knowledge of archaeology; all they needed were the same project goals and aspirations which were to record karst defence sites and artefacts around the island and treat the artefacts with dignity and respect. Co-researchers were people whom the archaeologists had worked with in the past and who knew a great deal about karst defences and their locations. Volunteers underwent a type of vetting process (Sturdy Colls 2015:106) and discussions between co-researchers tried to determine if volunteers had underlying motivations for volunteering on the project. These include potential for looting sites, disrespecting human remains, publicising locations or using site locations for their personal or commercial benefit. Trust between the archaeological team and the property owner was also an issue in terms of access to the property and keeping site locations confidential.

The project is a component of a PhD program undertaken by the author, which influenced the level of public involvement in fieldwork. No matter how much public involvement was intended or implemented, the primary, but not sole, motivation at each stage in the project was to complete a PhD. For example, some sites contained a large number of artefacts and required several full days' worth of artefact recording. Not all volunteers and co-researchers wished to revisit the same site or could spend entire days in the field. As a result, on several occasions, the author visited sites alone to complete surveys.

4.4 Project Emergence

One component of community archaeology is that collaboration should not end at the completion of a project, but continue to develop new archaeological projects for the community (Crosby 2002:363; Tully 2007:159). The project this thesis is based on is one of the most recent ones developed between archaeologists and the Saipan community since 2007 when Dr McKinnon first established a research programme on the island. Genevieve Cabrera is a community member who has been a collaborator and supporter of McKinnon’s and her affiliates’ projects over the last decade.

McKinnon directed the historical and archaeological work required for developing an underwater heritage trail of WWII sites and artefacts in the lagoon on Saipan’s western coast (McKinnon and Carrell 2011:1). As McKinnon continued to collaborate with the community, locals expressed the need to record more Indigenous maritime-related sites. In 2010, the author, under the supervision of McKinnon conducted a master’s research project to record such sites and study the topic of Indigenous seascapes and maritime cultural landscapes in Saipan (McKinnon et al. 2014a; Mushynsky 2011). During fieldwork in 2010, locals voiced their concerns about the preservation and visitation of cave sites on the island (McKinnon et al. 2014b:23). As a result, in 2013 McKinnon developed a project to meet with people in Saipan about their interest in protecting cave sites, conduct basic reconnaissance of sites on public and private property and develop a preservation plan (McKinnon et al. 2014b:115). Fieldwork, which the author was a part of, ran from January 10 to 27, 2013. During this project, several property owners with caves on their property and attendees at a public meeting discussed the need to record WWII-related caves and tunnels and the need to know more about them. Thus, the author decided to conduct the research as part of a PhD, with the support of Cabrera, a continuous co-researcher. During the 2013 field season, Fred Camacho introduced himself as an avid hiker who knew the locations of many caves, including one on his property.

The development of research questions and a research proposal began in June 2013 and were discussed with Cabrera, who suggested bringing Camacho on-board as another co-researcher (Figure 4.3). During another field season from April 4 to 13, 2014, the author was in Saipan to consult with land owners on sections of the report derived from the 2013 fieldwork and to conduct a public meeting on the recommendations of the report. The public meeting was held on April 9, 2014 at AMP and over 45 people attended. Questionnaires were also distributed, which asked about cave conservation and whether a cave preservation group would be a feasible way to protect karst defences. Thirty questionnaires were completed.

The season was also used to discuss the author’s PhD research with as many people as possible, including some of the land owners from the 2013 field season and the people at the public meeting as well as with listeners to two different radio shows: KKMP on April 3, 2014 and Power 99’s Humanities Half Hour on April 6, 2014. Both radio interviews lasted approximately 1-hour. The research was also discussed with Camacho and he was confirmed as a co-researcher. Camacho and the author were also able to conduct more reconnaissance on sites and work towards developing field methods for the next field season. Camacho was instrumental in terms of fieldwork logistics.

Safety was a consideration for this project and needed to be dealt with prior to fieldwork. On other islands, some karst defences were reported to be booby-trapped (see Price and Knecht 2012). A cave on Rota, for example, was found to contain boreholes filled with picric acid, an explosive detonated by heat, shock or friction, although its mechanism had deteriorated (Taboroši and Jenson 2002:6–7). The mechanisms of any booby-trapped caves today are unlikely to still be active, but during the 2014 field season the author visited Officer Eric David of the CNMI DPS to develop a strategy for identifying and dealing with UXO and other safety concerns. According to Officer David, who is also a UXO technician in Saipan, DPS recommends that when conducting fieldwork, researchers:

1. Accompany someone who is familiar with the landscape.
2. Keep at least 2m away from any UXO.
3. Conduct proper reconnaissance prior to entering a site.
4. Always be attentive to their surroundings.
5. Call 9-1-1 if there is an emergency.
6. Take a Global Positioning System (GPS) coordinate of where UXO is located and report it to DPS.
7. If going to a site they have never visited before, contact DPS prior to going out into the field to determine if that particular area has been flagged as an area with UXO, let DPS know how long they plan to be at a site and to call DPS before and after the survey.
8. If necessary, submit a request to have a DPS officer accompany the researcher into the site (Eric David pers. comm. 2014).

To guard against any unsafe encounters with booby-trapped sites and UXO, no sites were visited unless co-researchers, volunteers or property owners could confirm they had already visited the sites in the past and deemed them safe to enter for this project. The researchers did encounter UXO while in the field and a list of items and their GPS locations were compiled and emailed to Officer David.


Figure 4.3: Project co-researchers Fred Camacho (left) and Genevieve Cabrera (right).

A system for dealing with human remains also needed to be established. Human remains were dealt with in accordance with the CNMI's 1999 Standards for the Treatment of Human Remains. The HPO is legally mandated to protect human remains and follow proper protocol depending on the types of human remains found. As per the standards, all human remains were recorded during the survey, left in situ and reported to the HPO (Russell 2001:24). A list of human remains and their GPS locations were compiled and emailed to the HPO archaeologist.

The final field season ran from August 20, 2014 to February 13, 2015. Due to immigration laws, the author could only spend six months in Saipan. Prior to commencing the final season, community consent was obtained from Cabrera, Camacho and staff from the HPO (Appendix A). Funding and support were also obtained from the NMHC (Appendix B).

In the first few months of the 2014/2015 season, the author visited the HPO, AMP, BECQ, FWS and DFW. During the meeting with FWS, Camacho and the author discussed the areas they wished to visit during that field season. FWS was concerned with visitation to caves and tunnels known to have the Marianas Swiftlets inhabiting them, since extended human presence within such sites could disturb the birds and prevent them from returning to their nests (Shelly Kremer pers. comm. 2014; Tyler Willsey pers. comm. 2014). FWS decided that they and staff from the DFW would develop a protocol for entering sites known to have swiftlets and that the researchers would be prohibited from entering sites inhabited by the birds until the rules were established. The researchers also agreed to gather locations and GPS coordinates of swiftlets in the field and give these locations to FWS and DFW to improve their database. After meetings and correspondence with FWS and DFW through October and November 2014, researchers were told on December 1 that they would also be required to apply for a research permit, which was completed and submitted the first week of December. A draft protocol and permit were drawn up and given to the author on February 9, 2015, approximately one week prior to the end of the field season. Researchers never received a final protocol or permit from FWS or DFW and therefore, never entered any karst defences inhabited by swiftlets.

4.5 Site Selection, Participants and Public Appeal for Information

Site selection and participant recruitment were conducted in the same manner each field season. During the 2013 season, McKinnon placed a one quarter-page newspaper advertisement in two local newspapers, the *Saipan Tribune* and the *Marianas Variety*, to ask local people to attend a public meeting where they could share their stories and thoughts about WWII-related caves and tunnels. The meeting was also advertised on KKMP radio station. Contact details for McKinnon and Cabrera were listed in the advertisements. Four people responded and allowed the research team to visit caves and tunnels on their properties and some mentioned other sites they knew of on public property. Eighteen people attended the meeting and one person had a cave on his property that he allowed the researchers to visit. The remainder of the sites were introduced to the team by Cabrera, Herman Tudela (a local Chamorro man and previous HPO employee) and John San Nicholas (local Chamorro man and DPS officer) who had a family member with a site on his property and requested permission for the team to visit. The team also visited a well-known cave called Kalabera Cave. A list of 28 sites and private owners' contact details were made for future consultation. Cabrera also recommended and helped arrange for two people with memories of hiding inside caves to be interviewed.

During the 2014 field season, another quarter-page advertisement was placed in the *Saipan Tribune* and two radio advertisements invited people to attend a public meeting. Joe Limes, who conducted the Carolinian translation of the interview at KKMP referred the author to a family member who had three tunnels on his property. Camacho volunteered to take the author to conduct reconnaissance at the three sites referred to by Limes and on nine new sites on public and private property that he knew about. Camacho obtained property owners' consent prior to taking the author to the sites. As a result of meeting Limes, he invited the author to introduce herself and her proposed project at a Carolinian Affairs Office meeting on April 7, 2014. Rosemond Santos, co-owner of KKMP, also took the author to Santa Lourdes, a well-known cave site frequented by tourists.

The 2014/2015 field season anticipated involvement from four different types of participants: property owners with sites on their property; people with artefacts obtained from karst defence sites; oral history interviewees; and fieldwork participants. Prior to commencing fieldwork, ethics approval was obtained from the Flinders University Social and Behavioural Ethics Committee to recruit and involve all four types of participants (SBREC 6536). Approval for this project was granted on June 16, 2014 (Appendix C). Three forms were developed for each participant as part of the ethics approval process. One was a letter of introduction signed by two of the author's supervisors introducing the student to the participant, briefly summarising what each participant would be asked to do and providing the supervisors' contact details (Appendix D). The second was an information sheet (Appendix E) that briefly described the project, the methods of data collection and how recorded data would be used. The third was the consent form, which required participants to choose whether they wished to remain anonymous or be named in the thesis or any publications (Appendix F).

On October 17, 2014, the author and co-researcher, Camacho were interviewed about the project on Power 99's Humanities Half-Hour program, which aired on October 19, 2014. The researcher's email address and home phone number were mentioned on the program and left with the radio station, with a request for listeners to contact the researcher directly if they had any relevant information relating to this study, or if they wished to participate in any way. No one contacted the researchers as a result of the radio interview. An advertisement was also placed in the *Saipan Tribune* on October 24, 2014 (Figure 4.4) outlining the research and calling for four types of participants. Only one person responded to the advertisement as a potential fieldwork participant. Due to the low response rate, rather than continue to place more advertisements, the researchers decided to print copies of the previous one and distribute them to people whom they came into contact with. One person associated with the NMHC knew about the project through the author's grant application to the organisation. She contacted the author about a site on her uncle's property, which was subsequently recorded for the project. Camacho introduced the author to 28 new sites on both public and private property and facilitated meetings between the author and the property owners. Camacho and the author re-contacted five property owners known from previous seasons to record sites on their properties. Property owners who agreed to provide oral histories or who allowed sites on their properties to be recorded were given a $25 honorarium. One property owner refused the honorarium.

The author presented her project proposal at the Asia Pacific Academy of Science, Education and Environmental Management (APASEEM) Conference on November 18, 2014. The author's contact details were given at the end of the presentation and participants were encouraged to contact the author. One attendee offered to take the author to sites he knew about.

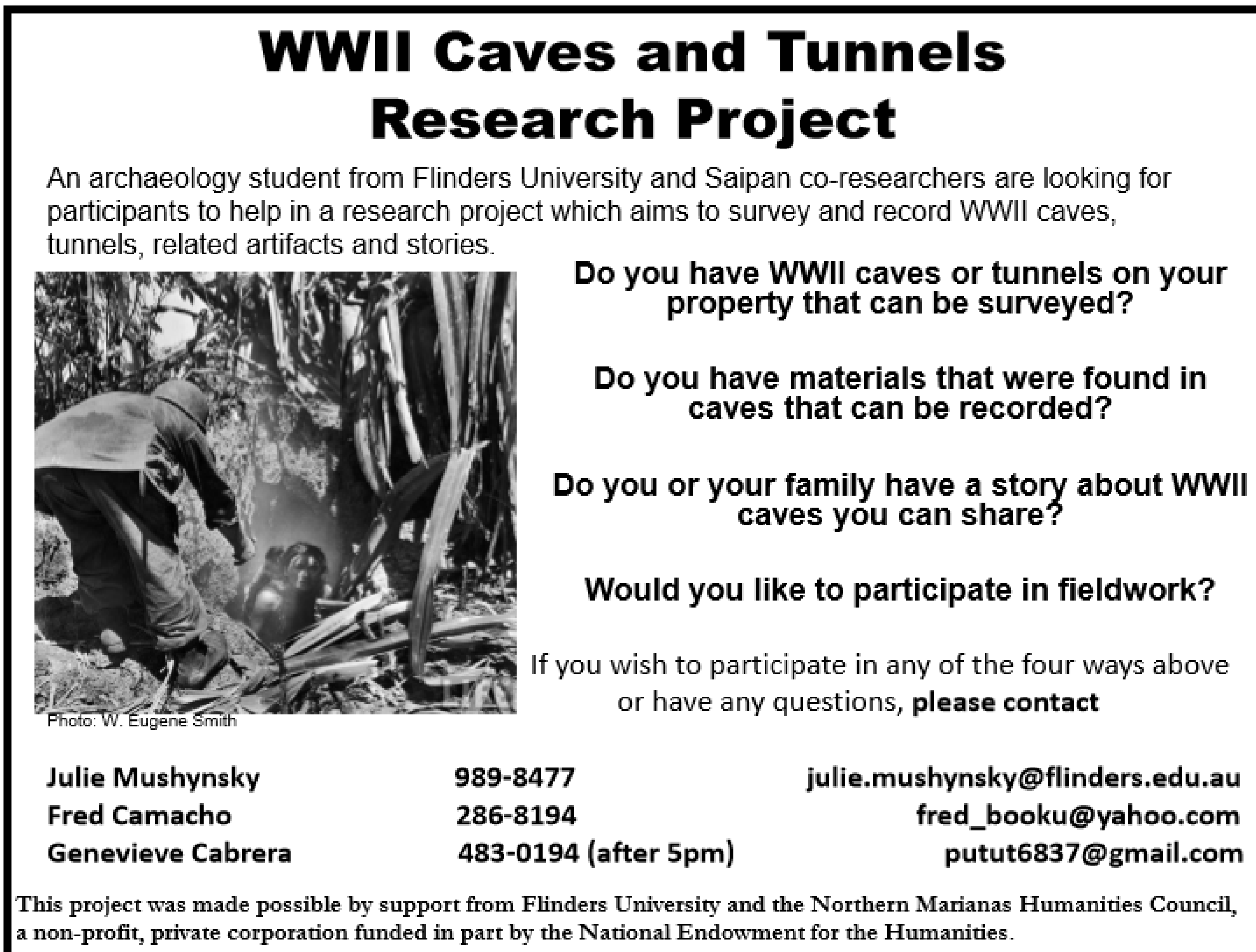

Figure 4.4: Newspaper advertisement to recruit participants.

Over the course of three field seasons, different methods proved effective at different points in the research. During the 2013 field season, the newspaper advertisement garnered a large response, whereas in the 2014/2015 field season, only one person responded. Public presentations, imperative for disseminating research, were not a useful way of recruiting participants. The best way was through partnerships, word-of-mouth and public interaction. All five fieldwork participants during the 2014/2015 field season and all four interviewees were recruited this way. Table 1 provides a summary of recruitment methods over the three field seasons, the desired respondents and the response rate for each recruitment method.

Table 2 outlines the total number of sites recorded and visited per field season. No in-depth recording occurred during the 2013 field season and therefore many of the sites visited then were only recorded in detail in subsequent seasons and thus are counted more than once. A total of 73 sites were visited and 52 of those sites were recorded in-depth as a part of this project. Since the author depended on co-researchers and community members for access to karst defence sites, this may have led to an emphasis on better-known sites and possibly excluded those which may have had better preservation.

Table 1: Number of Participants and Sites Recruited per Method (note, these numbers include those who responded to the method and not the number actually included in the project)

	Property owners	Sites on private property	Fieldwork participants	Interviewees	People with artefacts	**Total**
Newspaper advertisements	6	11	1	0	0	**12**
Public presentations	0	1	0	0	0	**1**
Word-of-mouth/public interaction	11	19	6	5	0	**30**
Radio interviews	0	0	0	0	0	**0**
Total	**17**	**31**	**7**	**5**	**0**	**43**

Table 2: Total Number of Sites Recorded and Reconnoitred during Each Field Season

Field Season	**Recorded**		**Reconnoitred**		**Total**
	Public	Private	Public	Private	
2013			7	21	**28**
2014			3	10	**13**
2014/2015	31	21	6	15	**73**
Total	**31**	**21**	**16**	**46**	**114**

4.6 Oral Histories

WWII is still within living memory in Saipan and thus this project could conduct oral history interviews with those who lived during the Battle for Saipan. Oral histories provide information that may not be present in historical accounts, assists in the interpretation of sites and artefacts and reveals how people, past and present, created and negotiated meaning with the event and the places associated with it (Jones and Russell 2012:274). First-hand information was collected from four interviewees who were all of Indigenous Chamorro or Carolinian descent. Semi-structured interviews were conducted and guided by the following questions:

1. How old were you during the invasion?
2. Where did you live right before the invasion?
3. Where were you when the invasion began?
4. Did you use caves and tunnels during the invasion?
5. Did someone you know use caves and tunnels during the invasion?
6. Did you move to different caves as the invasion progressed?
7. Do you remember where the different caves were?
8. Can you describe the caves you were in?
9. Did you take anything with you when you went to the caves?
10. Did you leave anything behind in the caves?
11. What did you do inside each cave?
12. Who else was inside the caves with you?
13. How long were you inside the caves?
14. What were the living conditions like inside the caves?
15. Do you remember talking to the Japanese military during the invasion? Do you remember what they told you?
16. Do you recall your first encounter with the U.S. military?
17. Do you know anyone who helped dig or modify caves and tunnels for the Japanese?
18. Do you remember who asked them to assist in preparing caves and tunnels?
19. What tools did they use to prepare the caves and tunnels?
20. What materials did they use to prepare the caves and tunnels?
21. Did they work alongside anyone else?
22. Are caves and tunnels important to you?

23. What is the most significant part of caves?
24. How are the caves and tunnels being treated by people now?
25. What do you think should happen to the caves and tunnels?
26. Do you find caves and tunnels more or less significant than coastal or underwater WWII sites? Why?
27. Do you consider caves part of your heritage?

Two interviews were conducted during the 2013 field season. Since the 2013 field season was directed by McKinnon, the process and requirements for interviewees was different and only verbal consent was required. Interviews were conducted and summarised by McKinnon (McKinnon et al. 2014b). In 2014 the author revisited the interviewees to determine if amendments to the summary were required. A copy of the summary was given to the interviewee to keep.

For the 2014/2015 field season, under the direction of the author, two interviews were conducted and participants were given a letter of introduction and information sheet prior to the interview. Interviewees indicated their willingness to participate by signing a consent form. Given that the Saipan community is small, it is possible that community members could recognise participants, even if they remained anonymous. Therefore, participants were made aware verbally, on the information sheet and through the consent form that their anonymity could not be guaranteed.

To decrease potential discomfort during interviews, interviewees chose the time and location of the interview, which was always at their home. Although some oral history professionals suggest that interviews be conducted between the interviewee and the interviewer only (Yow 2015:105), due to the sensitivity of the topic, the cultural group being interviewed, language barriers and safety concerns, interviews were never conducted one-on-one. To decrease discomfort during the interview, interviewees were encouraged to have family members present. Camacho was present during the interview to decrease any possible discomfort associated with interviewees being questioned by a non-Indigenous outsider (Smith 1999:137–138) and to ensure safety. Questions were asked by the author in English. If clarification was required, Camacho asked the same question in Chamorro. Interviewees responded in English or Chamorro. Interviewees were reminded several times that they could stop the interview at any time and withdraw any information from the project prior to thesis completion and/or publication. Contact details for counselling services were provided in the information sheet.

A COBY CXR190-1G digital voice recorder was used to record the interviews. The data was then directly downloaded onto the author's laptop computer. Both the author and Camacho listened to the interviews. All the English portions of the interview were summarised by the author, while all Chamorro language was translated by Camacho and then added to the summaries (Appendix G–H). Since the interview questions covered more than one topic, the author chose to summarise the interview rather than fully transcribe or log it (Robertson 2000:57–65). Summaries enabled information to be grouped into topics rather than be scattered throughout a transcript. Both interviews were over 1-hour long and included small talk between Camacho, the interviewees and the family member present. A summary was thus faster to produce and the banter could be excluded. Interviewees were visited a second time to monitor well-being and allow interviewees and their family members to make amendments to the summary. One interviewee was given a copy of his summary. The other interviewee was unable to review the summary as she was in the hospital and subsequently passed away two months after the interview was conducted. The author went to the hospital to visit and a copy of the interview was given to the family.

4.7 Archival Research

Primary documents consulted for this study were limited to English archival documents or English translations of Japanese archival documents. Accessing Japanese WWII documents is challenging. Anticipating the war's end and possible accusations of war crimes, the Japanese military and civilian authorities in Japan and in the Pacific were ordered either to destroy all written military and government documents or hide them (Bradsher 2006b:156–157; Chung 1995:11). By the time the Japanese surrendered in September 1945, it is estimated that as much as 70 percent of Japanese army documents had been destroyed (Drea 2006:9; Evans and Peattie 1997:xxii; Harries and Harries 1991:494). Many records were also destroyed in individual air-raids and bombings and from the Hiroshima bomb attack (Bradsher 2006b:157).

Nonetheless, the U.S. managed to capture thousands of papers throughout the Pacific and Asia (Drea 2006:12). After long diplomatic negotiations, many documents were returned to Japan in the 1950s and 60s and distributed to their respective ministries of origin (Bradsher

2006a:169; Drea 2006:12), with most being held at Japan's National Institute for Defence Studies (NIDS). Other surviving records are scattered throughout Asia, Australia, the Pacific and the U.S. (Drea 2006:10).

Prior to returning the documents to Japan, some were copied and microfilmed by various government and private organisations and most are now held at the U.S. National Archives and Records Administration (NARA) (Bradsher 2006a:171–183). These are spread amongst at least twelve different record groups with one finding aid focusing on papers related to Japanese war crimes (Bradsher n.d.; Drea 2006:16–17). The finding aid was consulted and searched using keywords such as "cave," "tunnel," "Saipan," and the names of various islands in the Pacific. Two sources were identified: Report on Japanese Caves on Iwo Jima July 11, 1945, by the U.S. Army Forces and Japanese Cave Warfare July 3, 1945 by the U.S. Amphibious Corps. These are not digitised and can only be accessed at NARA in College Park, Maryland or can be ordered and mailed for a fee.

The author emailed NARA to obtain a copy of a Japanese WWII document translated by the U.S. government entitled CINCPAC Item No. 11,902, A Battle Plan for the Defense of Peleliu Island 1 September 1944, which was referenced in Denfeld (1988). Despite searching a number of record groups and navy, army and Marine Corps records, NARA staff could not locate the document (Tim Nenninger pers. comm. 2015; Nathaniel Patch pers. comm. 2015).

Despite the large proportion of seized documents and translations, none of those held at NARA are digitised, although NARA's current strategic plan is to digitise all of its archives in upcoming years (U.S. NARA 2014:5). At the moment, NARA has digitised some U.S. materials related to the Pacific War and others are published on three different partner sites: familysearch.org, ancestry.com and fold3.com. Familysearch.org is free, while the other two require a subscription. Familysearch.org, ancestry.com and the NARA catalogue were searched for digital archives using keywords such as "cave," "tunnel," "Saipan," and the names of various islands in the Pacific. Ancestry.com was also used to search for information on particular individuals who were in Saipan in the 1940s (see Chapter 5).

In Japan, all Imperial army and navy archives from the Meiji era onwards are held at NIDS and the catalogue for such documents is found on the Japan Centre for Asian Historical Records (JACAR) website. The same keywords mentioned above were used to search for archives, but did not return any results. Also held at NIDS is the *Senshi Sosho*, or *The War*

History Series, which was compiled and published in the 1960s and 70s by the Japanese Military History Department (mostly comprised of army and navy general staff officers) (Evans and Peattie 1997:xxiii–xxiv; NIDS n.d.). The *Senshi Sosho* covers the history of World War II from 1937 to 1945 and is made up of 102 volumes with 34 volumes on the Imperial General Headquarters, 37 volumes on the army, 21 volumes on the navy, nine volumes on aerial warfare and one volume on chronology (Evans and Peattie 1997:xxiii–xxiv; NIDS n.d.). One volume of *Senshi Sosho* entitled *Japanese Army Operations in the South Pacific Area: New Britain and Papua Campaigns*, *1942-43* has been translated into English by the Australia-Japan Research Project (AJRP) and is available online. Other translations of war period interviews and diaries are also available. The Corts Foundation has also translated one volume of the *Senshi Sosho* entitled *The Invasion of the Dutch East Indies*, which is also available online.

A considerable amount of time was spent reading through reports from a variety of environmental and archaeological consulting companies and the U.S. Army Corps of Engineers. These reports were located at the HPO, the Joeten-Kiyu Library and at BECQ, all in Saipan. The Combined Arms Research Library (CARL) digital library was also an excellent source of archival information. CARL provides access to U.S. Army Command and General Staff College documents, including U.S. Army WWII operational documents, which were given to the college.

Other archival repositories were visited, including the CNMI Archives in Saipan, the CNMI Museum of History and Culture and the AMP visitor centre in Saipan. Volunteers also assisted with materials. One volunteer, John Fraser, spent a significant amount of time at the CNMI archives and gave the author several WWII period photographs, aerial photographs and references he thought would be useful for the project. Camacho and Cabrera also conducted archival research in Saipan and referred the author to several magazine articles, newspaper articles and reports.

In summary, a number of different documents were consulted from the above sources. These include: eyewitness accounts; after-action reports; diaries; journal entries; letters; newspapers; League of Nations reports on the Japanese Mandate; contemporary military records such as inventory lists and orders of battles; veteran post-war accounts, including unit histories, campaign histories, battle histories; secondary works; interviews; equipment histories; biographies and autobiographies; personal memoirs; maps including government battle maps, non-battle maps, sketch maps and historic maps; and photographs, including aerial photographs, battle photographs, and equipment photographs.

4.8 Recording Karst Defence Construction

Once the archaeological team arrived at a site, locational data was recorded using a Garmin 12XL handheld GPS. Due to the jungle canopy, sometimes the GPS would not triangulate and a waypoint could not be taken at the site. The GPS was thus taken to the nearest area that would allow for a waypoint to be taken, which was usually not more than 50m away from the site. On one occasion the waypoint was taken approximately 300m from the site. Elevation as identified by the GPS and the site's location on a ridge were also recorded.

Caves and tunnels were given a site number beginning with the prefix "SPS." Sites were then recorded by drawing mud maps of the cave or tunnel, picking points along the perimeter and at notable changes (i.e. where a wall changes direction or abuts a connecting wall) and taking compass bearings and measurements between two points (Figure 4.5). Measurements were recorded using a MASTERCRAFT 057-4585-0 laser distance measuring tool. At +/- 3mm measuring accuracy, a laser was found to be more reliable than a standard tape measure. This also enabled a single person to conduct a survey quickly. The laser also allowed a person to reach inaccessible corners and heights. Volunteers did not assist with measuring sites.

A complete photographic record of each site, including interior, exterior and field views from entrances were taken using a Canon PowerShot A550 digital camera. On one occasion a volunteer took site photographs for the project with his personal single-lens reflex (SLR) camera. A 2m Yamayo Minirod-C range rod with 20cm red and white increments was used as a photographic scale.

Specific dimensions of each site and feature were also recorded. Based on reconnaissance it was determined that four descriptors would be useful for recording the various components of sites: entrances, legs, pockets and shelves. Entrances were defined as the opening of the site to the outside; all entrances were labelled E1, E2, E3 and so forth. Legs were used to describe portions of tunnels. One leg usually constitued a straight portion of a tunnel that was measurable by the laser without any significant turns. Once the wall began to turn the first leg stopped and the next one began. The beginning and ends of legs were noted on the mud map and labelled L1, L2, L3 and so forth. Pockets were used to describe sections of caves, or what speleologists might refer to as chambers. Pockets were labelled P1, P2, and so forth. Pockets were also initially used to describe shallow, excavated portions inside tunnels. What was recorded as a pocket was later determined to be either a “leg” or a “niche” (see Chapter 5 for a description). Shelves were used to describe what appeared to be shelves at the sides of some tunnel walls. Shelves were generally located halfway up the wall and consisted of irregularly shaped, small excavated holes only about 20cm wide and 20cm deep (see Chapter 5). Shelves were also labelled consecutively. Other small “square cut-outs” were found excavated into tunnel walls. These were described when recording the dimensions and attributes of legs or occasionally recorded as a “building material” when the cut-out was deemed significant enough to have its own catalogue number (see Building Material category below).

The materials used in construction, their placement within and immediately surrounding sites and the dimensions of modifications were recorded. Associated surrounding sites, their dimensions, distance away from the site and diagnostic features were also recorded.

Dimensions and characteristics of sites, features and modifications were entered electronically into FileMaker Go recording forms and merged into a FileMaker Pro relational database, post-fieldwork. As a relational database, artefact records (explained below) are linked to site records. The database also allows the user to sort by multiple field values and search throughout the entire database per category. Site, leg, pocket and shelf recording forms are found in Appendix I.

Evidence for post-depositional disturbance, both during the battle and after, was recorded. Battle evidence included charred or ash covered walls, collapsed portions of the site and site damage. More contemporary disturbance included survey markers, piles of gathered artefacts, vandalism and graffiti, refuse dumping, memorialisation, evidence of erosion and weather, evidence of wildlife, livestock grazing and hunting. When considering contemporary disturbance, an integrity scale established by Judge and Smith (1991) was used to measure the current physical condition of each site, as this relates to an archaeologist’s ability to interpret the site. The results of this assessment, which are found in Chapter 5, were considered when interpreting the material remains of sites. Each site received a cumulative maximum of 100 points based on three subcategories:

1. Site Structure (maximum 50 points)
2. Disturbance (maximum 25 points)

3. Clarity (maximum 25 points) (Judge 2008:199; 2012:317; Judge and Smith 1991:21).

Site structure is a measure of the quantity and variety of a site's features and artefacts. If a site had a large quantity and variety of features and artefacts, it was assumed to have greater interpretive value. The subcategory breakdown of site structure was:

Very High: 50–41

High: 40–31

Medium: 30–21

Fair: 20–11

Low: 10–1 (Judge 2008:199; 2012:317; Judge and Smith 1991:21).

Disturbance is a measure of the degree to which post-depositional natural and cultural processes have disarranged the site. The more disturbed, the fewer the points and the point breakdown is as follows:

Very High: 1–5

High: 6–10

Medium: 11–15

Low: 21–25 (Judge 2008:199; 2012:317; Judge and Smith 1991:21).

Finally, clarity is a measure of an archaeologist's ability to read the archaeological components of a site (Judge 2012:317), its distinctiveness or the degree to which archaeological resources may be isolated from their context and therefore the archaeologist's ability to define classes and specialised functions (Glassow 1977:415). Clarity was also measured by the following breakdown:

Very High: 25–21

High: 20–16

Medium: 15–11

Fair: 10–6

Low: 5–1 (Judge 2008:199; 2012:317; Judge and Smith 1991:21).

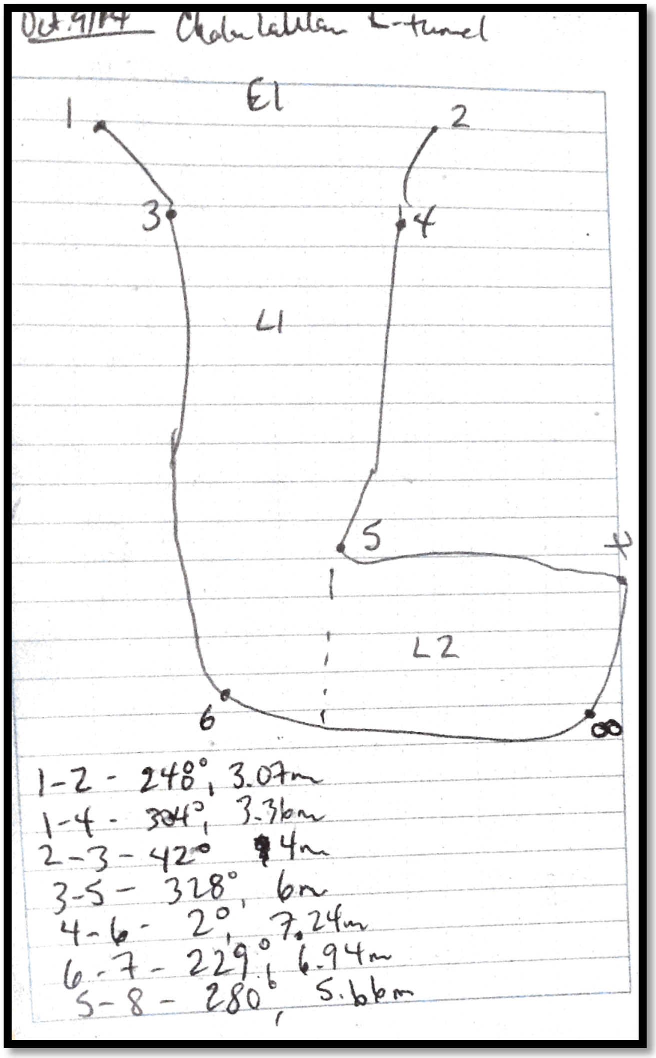

Figure 4.5: Mud map and measurements of SPS10.

4.9 Recording Artefacts

During each site survey, researchers and volunteers marked artefacts with small pieces of fluorescent coloured flagging tape. Baselines using 30m or 50m measuring tapes were laid inside the site and baseline offset measurements were taken to determine a position for all surface artefacts. Once the artefact had a spatial location, its attributes and dimensions were recorded. Artefacts surrounding the site and distance from the site were also recorded. FileMaker Pro and Go were used for artefact recording, which enabled the author to leave all artefacts in situ. Different recording forms were developed for ceramics, glass, faunal remains, human remains, metal, building materials, beads and miscellaneous (Appendix J). Core definitions of categories and artefacts can be found in Appendix K.

Volunteers also recorded artefacts in the field, either electronically or via paper forms for those without electronic devices. Volunteers typically only assisted in artefact recording and more specifically with glass, metal, building materials and miscellaneous artefacts (Figure 4.6). Volunteers did not record human remains. Volunteers were briefed on how to identify glass colour, fragment location, finish type, ammunition parts and so forth and reference books were also brought to the sites. Controls and pre-populated options in FileMaker decreased volunteer error so, for example, volunteers could only select from the glass colours pre-populated into FileMaker recording forms. Volunteers were always within earshot and could ask the author questions as they worked. Nearly 5,000 artefacts were recorded. When a volunteer recorded an artefact, they gave it a catalogue number with his or her initials as a suffix. After the data was sent to the author via email or as paper sheets, the volunteer data was integrated into the main database with a new catalogue number, but keeping the suffix. If photographs were required, volunteers took photographs with their personal cameras and sent them to the author. If an artefact appeared unique or diagnostic to the volunteer, the author took the photograph. Artefact photographs by the author were taken with a Canon PowerShot A550 digital camera on a macro setting with an 8cm photograph scale.

Figure 4.6: Volunteers John Fraser and Kelli Brewer (left) and Susan Marchitti (right).

Despite attempting to limit volunteer errors, sometimes incorrect fields were selected. For example, “yes” was selected on the glass recording form when prompted to answer whether or not the glass vessel had an applied finish. The author changed this field during data processing as no glass vessels had applied finishes within karst defences. Occasionally, locational data of artefacts within the site were missing and could not be spatially related to other artefacts. Only three of the entries could not be used at all due to insufficient details.

4.10 Conclusion

This project used a range of methods, which were established with community archaeology research strategies in mind. High public involvement was a primary goal for this project and influenced the methods from the establishment of co-researchers to the various ways the community was consulted and participated in fieldwork.

Public involvement in this project was not only desired, but also required in order to complete the project and create a broader and more accurate understanding of WWII karst defences. This project exists because locals in Saipan wanted it and the project could not have been accomplished without their direction, cooperation and involvement. As this chapter indicates, not all projects can be community-led, especially on more controversial or sensitive topics, and, when deciding on the level of public involvement, archaeologists need to be mindful of social, cultural and political sensitivities. This chapter presents a specific way of doing this, by merging public involvement options and sensitivities together to develop appropriate collaborative methods at each stage of a research project. The methods always attempted to draw from the "right side," or the community archaeology side, of the spectrum as much as possible. Additionally, providing as many opportunities for local involvement and incorporating innovative ways of conducting research highlights local peoples' roles as owners and custodians of these sites and future monitors of them.

Chapter 5 – Results: Sites

5.1 Introduction

This chapter presents the karst defence sites visited and data collected over the three field seasons in Saipan. The construction of, and modifications to tunnels will be discussed first, followed by caves. Evidence of U.S. occupation reflected in the construction of some tunnels will also be presented. Finally, karst defences on Saipan identified through historical documents and consulting reports will also be discussed as well as the results of the site disturbance evaluation.

5.2 Sites

5.2.1 Tunnels

The 36 WWII-related tunnels (Figure 5.1) recorded in Saipan were constructed by hand and excavated with pick-axes or a combination of rock blasting using explosives and hand-excavation (Table 3). Evidence for these techniques includes pick marks and dynamite holes found on the walls of several tunnels (Figure 5.2).

All tunnels have at least one entrance/exit, and are composed of either a single "leg" or a series of intersecting ones. Legs vary in length and range from 2.2m to 80m. When viewed in a vertical cross-section, the internal shape of legs can be either round or square, and width and height can change between legs or within a single leg. Interior widths range between 95cm and 6.9m, and height from 70cm to 4.7m. Floors can also exhibit slight changes in elevation.

Square-shaped, floor-to-ceiling excavated areas along tunnel walls are referred to by Phelan (1945:4, 9) as "niches" or rooms. Phelan (1945) does not list measurements for niches, but in Saipan they are no more than 2m deep and can range from 1.4m to 3.4m wide (Figure 5.3). Niches are large enough for people to walk in and out of with ease. Other square cut-outs, much smaller than niches, can be excavated anywhere in a tunnel wall and range from 18cm to 95cm wide and 15cm to 71cm high (Figure 5.4). Some square cut-outs were almost perfectly square, while others had only one or two straight walls. More rudimentary holes, or shelves, are also dug into tunnel walls. These holes do not have squared-off edges, are dug about halfway up the wall and are roughly 20cm high, 20cm wide and 20cm deep. While there is no pattern to where niches or square-cut outs are located within a tunnel, shelves are typically found beside each other in sets of three at the ends of tunnel legs or at the back of niches (Figure 5.5).

Figure 5.1: Location of archaeologically recorded WWII-related tunnels in Saipan.

Figure 5.2: Dynamite holes (left) (8cm scale) pick marks (right).

Figure 5.3: Niche in wall of SPS3 (1m scale).


Figure 5.4: Square cut-outs in SPS42 (8cm scale).


Figure 5.5: Rudimentary hole of "shelf" in SPS14 (10cm scale).

Saipan's tunnels have been classified using the same system as Phelan (1945), which divides them into categories based on their overall shape in plan view (see Chapter 2) (Figure 5.6). Tunnels are categorised according to which English letter they most closely resemble, which in Phelan's (1945) study included H, E, I, L, W, U, Y, J, T. Phelan also noted rectangular shapes that did not conform to the shape of any English letter.

The majority of Saipan's tunnels are I-tunnels (n=19). I-tunnels are defined as having only one leg, which can be straight or slightly curved. Most I-tunnels in Saipan range between 2.2m and 18m in length, with 11 of them 5m or less. Two I-tunnels are notably long. SPS8, the longest tunnel recorded for the project, is 80m and SPS29 is 38m. Sixteen of the I-tunnels are constructed in close proximity (less than 210m) to another tunnel. SPS14A, for example, is constructed 3m from SPS14. SPS1 and SPS2 are located along the same cliff line approximately 15m apart and 40m east of SPS3. Similarly, SPS30, 31, 49, 50 and 51 are also all constructed within a 450m stretch of cliff line. SPS46 and SPS46A are two I-tunnels constructed 2.9m apart and SPS43 and SPS44 are constructed 12.6m apart. SPS8 is 60m away from SPS43 and SPS44.

The second most common type was the U-tunnel (n=6). U-tunnels are described as having two parallel legs, each with an entrance and connecting to a perpendicular leg. U-tunnels can be curved (SPS35, SPS39, SPS40, SPS47) or square (SPS5, SPS42) in plan view. Four of these tunnels are constructed in a similar fashion, in that the perpendicular leg is much larger in interior height and width than the parallel legs, resembling a large square room. SPS47 is the only one with the opposite pattern (i.e. the legs are slightly higher and wider than the perpendicular leg).

Distinguishing between an L-tunnel and a J-tunnel is difficult since the primary difference between the two is its curvature. Two tunnels (SPS10 and SPS17) in Saipan are interpreted as L-tunnels because they consist of one leg intersecting at a right angle with a perpendicular leg. While both L- and J-tunnels have one entrance, a J-tunnel would be described as a continuous leg that curves. None of the tunnels in Saipan were interpreted as J-tunnels.

The two W-tunnels in Saipan (SPS11 and SPS20) have three parallel legs, each with an entrance (although two in SPS20 are sealed). The three parallel legs connect to a perpendicular leg. Even though they are both interpreted as W-tunnels, the interiors of the two are quite different. SPS20 is the widest overall of all the tunnels recorded for the project and is also much larger in length and internal dimensions than SPS11. SPS20 also has a number of modifications not seen in SPS11 (see discussion below) and a 1m diameter ceiling hole in one of the parallel legs. Moreover, SPS20 is not constructed near any other tunnels, but SPS11 is constructed along the same cliff line as and in close proximity to SPS10 and SPS9.

SPS4 was the only H-tunnel located and recorded in Saipan. According to Phelan (1945:4–7), H-tunnels can be constructed as a single H or as multiple interconnecting Hs. SPS4 has four entrances all facing in the same direction. The legs then attach to two perpendicular tunnels that are parallel to each other.

Five tunnels recorded for this study do not resemble any of the types listed in Phelan (1945). SPS21 has one entrance and then extends into the shape of an S or zigzag. SPS37, the second widest tunnel overall, resembles two U-tunnels connected by a 3.5m long set of limestone stairs. SPS14 consists of a long leg with two perpendicular tunnels that extend from two different locations in separate directions. The first entrance is located at one end of the long leg and the second at the end of one of the perpendicular legs. SPS3 is a large tunnel that resembles an incomplete H-tunnel. It has two entrances, both at the northern ends of two parallel legs. Lastly, SPS15 resembles three different letter shapes and could be interpreted as a U-, L- or Y-tunnel. The tunnel appears to have once had three entrances that have since been sealed. SPS15 contains unique features and characteristics not seen in other tunnels; these are described below.

5.2.1.1 Entrances

While many tunnels in Saipan had an unmodified entrance, others were more elaborately constructed with several modifications (Table 4). Modifications included the addition of stacked limestone walls (SPS5, SPS11, SPS14, SPS17, SPS21, SPS40), stacked limestone and cement (SPS15) and concrete (SPS3, SPS5, SPS8, SPS15, SPS21). Stacked limestone walls with or without cement can be placed within the entrance or just outside of it to act as a blind, for camouflage (Figure 5.7) or, in the case of SPS21, constructed in the same trajectory as tunnel walls so as to be an extension of them. Concrete is typically used to frame the entrance, the top of which was either square or curved (Figure 5.8). In addition to a concrete-lined entrance, SPS8 has the addition of three short 20cm high concrete walls arranged in a square that extends 3.1m from the entrance. This arrangement means that one would need to stand within the square first in order to enter the tunnel (Figure 5.9). SPS15 has a concrete entrance, but is the only tunnel with an entrance situated in the side of a tunnel leg rather than at the end.

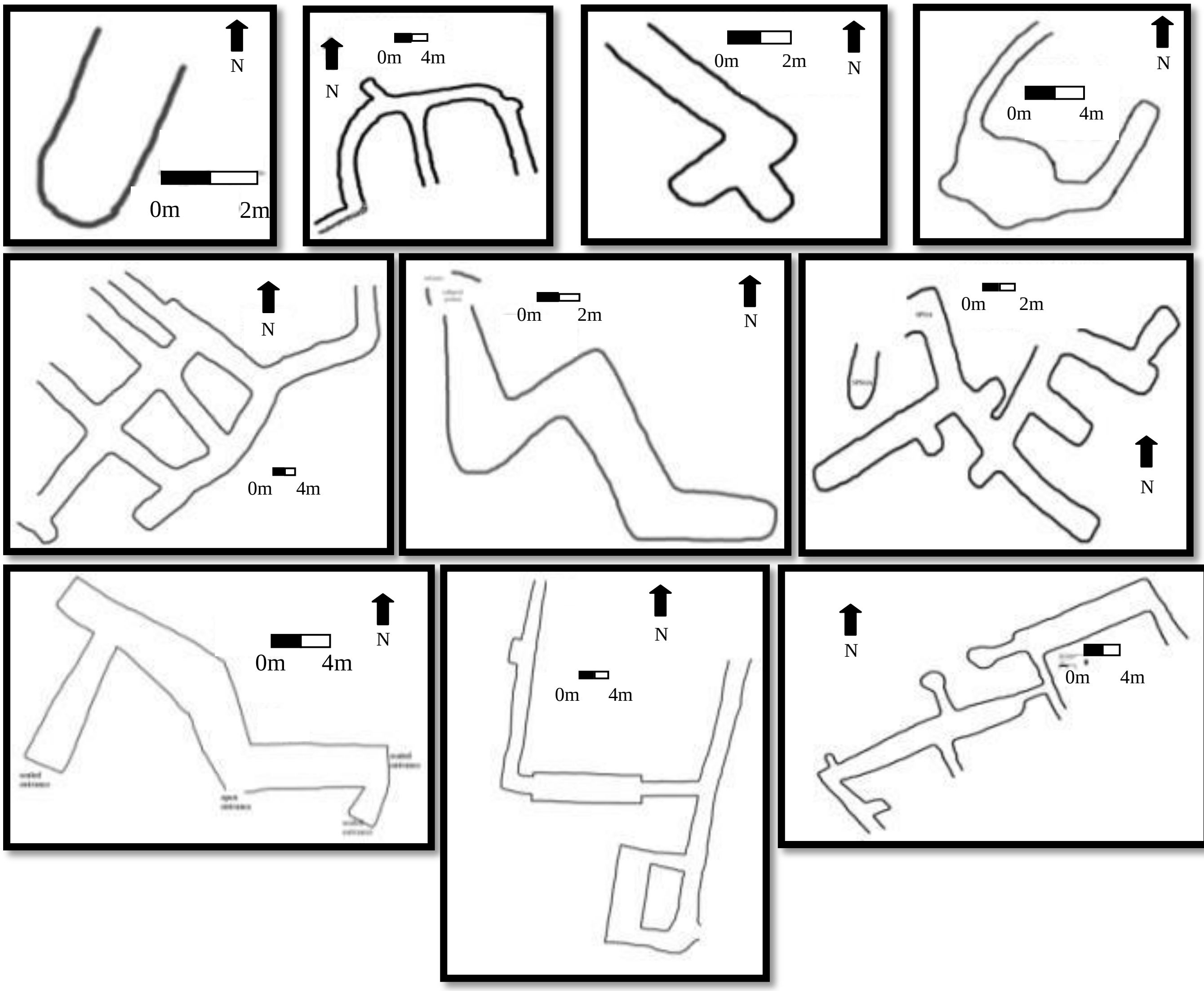

Figure 5.6: Plan views of classificatory tunnel shapes recorded in Saipan (left to right). Top: I-type (SPS2), W-type (SPS11), L-type (SPS17), U-type (SPS35). Middle: H-type (SPS4), S-type (SPS21), unclassified (SPS14). Bottom: unclassified (SPS15, SPS3, SPS37).

Figure 5.7: Stacked limestone entrance at SPS14 (1m scale).

Figure 5.8: Semi-circular arched entrance at SPS21 (left). Square (western) entrance at SPS3 (right) (1m scale).

Figure 5.9: Concrete entrance and walls at SPS8.

Some entrances were also modified with wood. SPS5 has extant wood lintels and uprights at its southern entrance which were once used to hang a door. The same lintels and uprights at its northern entrance have been removed or have rotted away over time. The wood at both entrances was set into the concrete on the entrance exterior. SPS3 also once had wood lintels and uprights at its western entrance that were set into the concrete on the interior side of the entrance. SPS8 once had wood set on the inside wall of its concrete entrance with two rectangular shaped notches in the concrete situated just below where the wood would have been (Figure 5.10). It is likely the wood and notches once hung a door.

Figure 5.10: Extant wood lintels and uprights at SPS5 (left). Wood impressions and notches at SPS8 (right).

The tunnel entrance at SPS21 also once had a door, but this was not hung using wood. An L-shaped threaded rod with nut protrudes out of the eastern, exterior wall of the concrete entrance. According to ServoCity Tech located in Winfield, Kansas, the threaded rod appears to be part of a door hinge (ServoCity pers. comm. 2017). SPS15 has a large extant metal door (Figure 5.11). The door is set on metal hinges that are attached to the concrete frame. The door appears to have been re-purposed as, despite latches being present on all sides of the door, there are no holes in the concrete frame to slide the latches into.

Some tunnel entrances began as an open trench leading up to the entry (SPS3, SPS14, SPS14A, SPS17, SPS20, SPS29). These vary in length from 3m to 23m and are typically dependent upon the slope of the limestone ridge. If the slope is steep the trench will be short, if the slope is gradual the trench will begin at the lowest point and extend to a place high enough to begin excavating the tunnel entrance. Some trenches are slightly curved, which helps conceal the tunnel entrance (Figure 5.12).

Other types of entrances include elevated entrances and combat and escape entrances. An elevated entrance is one where the tunnel has been excavated at a higher point in the limestone and not at ground level (Figure 5.13), requiring one to climb in order to enter it. Three of SPS37’s four entrances were constructed as elevated entrances and were approximately 2.3m above ground level. The combat and escape entrance combination was typically found on U- and Y-tunnels in Peleliu (Phelan 1945:10, 21, 23–24). Combat entrances are larger entrances

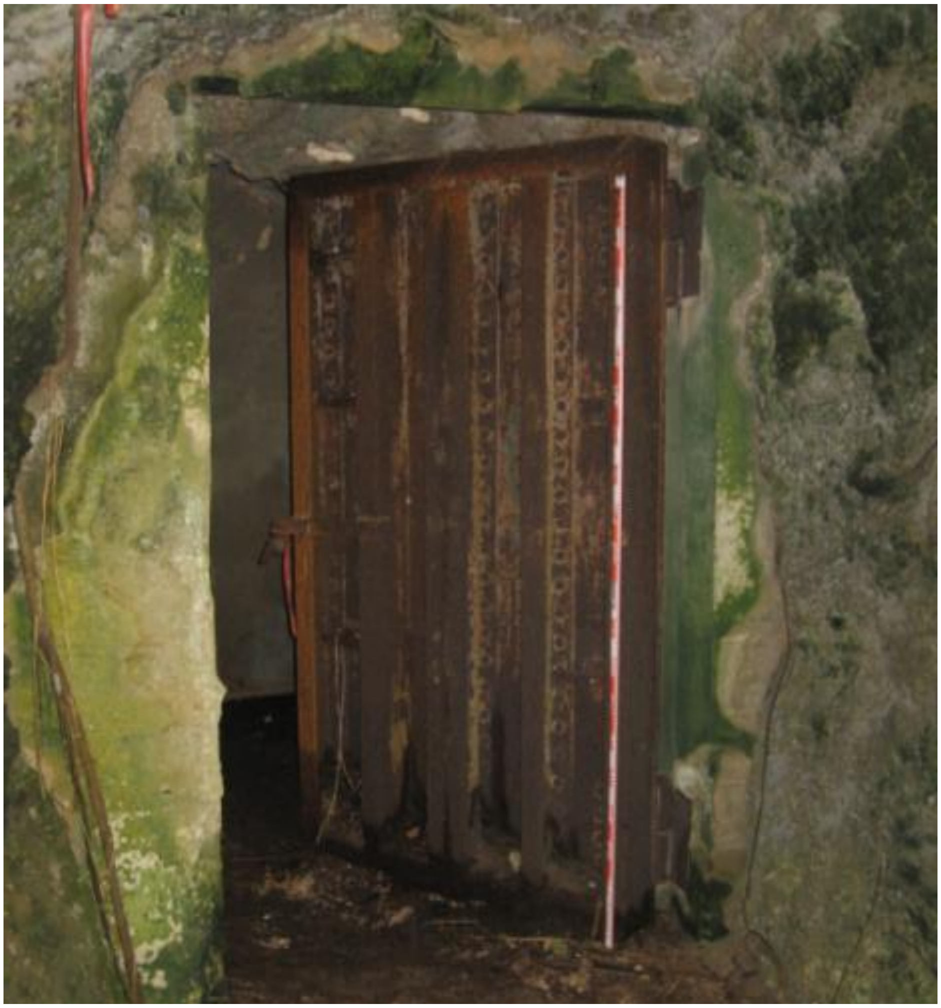
Figure 5.11: Metal door entrance at SPS15 (2m scale).

that could be used as a mortar or gun position and escape entrances are smaller and used for ingress and egress (Phelan 1945:10). Five U-tunnels (SPS5, SPS15, SPS35, SPS39, SPS40) in Saipan have a pattern where the combat entrance’s internal height is markedly greater than the escape entrance, sometimes by as much as 80cm.

In addition, four entrances on tunnels SPS29, SPS38, SPS39 and SPS40 began as a natural cave or shallow opening within the limestone with tunnels dug at the rear of the natural portion (Figure 5.14). The cave entrances on two tunnels (SPS39 and SPS40) also have 1.3m wide footpaths excavated down the centre where the limestone has been removed. Sections in the interior of the natural portion of these two tunnels have also been enlarged, probably in order to store ammunition.


Figure 5.12: Trench at eastern entrance of SPS3.

Some tunnel entrances in Saipan were sealed due to war period explosions (SPS20, SPS35) or tunnel collapse (SPS42). SPS15 also had sealed entrances, but is the only tunnel with entrances that were sealed with concrete. Aside from the entrance with the metal door mentioned above, SPS15 likely had three other entrances that have been sealed with stacked concrete blocks and cement. In the centre of two of these sealed entrances are small openings/windows 50cm wide and 35cm high, with remnants of vertical iron bars (Figure 5.15) resembling windows often constructed in holding cells.


Figure 5.13: Elevated entrance at SPS37.

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Figure 5.14: Natural opening with footpath and tunnel dug at rear at SPS40 (1m scale).


Figure 5.15: Sealed entrance of SPS15.

5.2.1.2 Internal Modifications

Like entrances, tunnel legs also have a number of modifications. Concrete is frequently used to create floors, walls, ceilings, platforms and stairs and can be reinforced with chain link fencing and metal bars. Four tunnels (SPS3, SPS8, SPS15 and SPS20) also have an internal concrete pit (Figure 5.16). These range from 2.9m to 5.1m long and 96cm to 4.1m wide. The depth of the pit in SPS3 is 2m, but only 70cm in SPS15, which also has a set of small concrete steps allowing one to enter. The pits in SPS8 and SPS20 were filled with water and their depth could not be determined. According to historian D. Colt Denfeld, the pit in SPS20 is a water reservoir (D. Colt Denfeld pers. comm. 2016). A ram pump, which is still present within the tunnel, would take water from the reservoir to supply a facility above and outside the tunnel. Beside the reservoir is a 1.8m long and 1.1m wide concrete pad that once supported a generator or other equipment to help facilitate the movement of water via the ram pump (D.Colt Denfeld pers. comm. 2016). The concrete pits within SPS3, SPS8 and SPS20 are all interpreted as reservoirs or cisterns.

Figure 5.16: Concrete reservoir, generator pad and walls in SPS20 (1m scale).

Other modifications include limestone stairs (SPS29, SPS37) (Figure 5.17), interior stacked limestone walls (SPS14) and 60cm gauge tracks (SPS20). In tunnels, sometimes tracks were used for wheeling Type 41 and Type 94-75mm guns in and out (Denfeld 1992:67, 83; 2002:81). The Japanese also used tracks for hand carts to remove mining spoil or to remove the spoil from tunnel excavations (Phelan 1945:5). Both the Type 94 and 41-75mm guns had wheels set 1m apart (United States War Department 1944:45) and the track gauge in SPS20 is 60cm, therefore, these tracks were not used for guns and could be an indication that this tunnel was once a mining adit. According to the property owner, the tunnel was once a manganese mine (Ben Sablan pers. comm. 2014).


Figure 5.17: Stairs in SPS37 (1m scale).

Although there are no extant internal wooden features, the presence of a small amount of wood, various nails and timber dogs in some tunnels suggests that such modifications did exist. Timber dogs are staple-shaped metal pins used to hold together pieces of wood (Law 2010:51). Similar to some tunnels in Peleliu, wood may have been used to construct flooring, supportive wall structures or shelving (Phelan 1945:22). Small 40cm by 20cm notches cut into the walls of SPS4 and SPS20 are evidence of possible supportive wall structures or internal doors (Figure 5.18). Additionally, a number of threaded rods, bolts and flat, metal mounting plates are present at karst defences. Threaded rods in tunnels were used to create concrete forms (Figure 5.19) and as concrete reinforcement (ServoCity pers. comm. 2017). Bolts and mounting plates appear on the internal walls of SPS3. Wires are also attached to the bolts and plates, suggesting that this site had lighting installed throughout the tunnel (Figure 5.20).

Figure 5.18: Notch in wall of SPS4.

SPS3, SPS4 and SPS20 all have ceiling holes or openings to permit airflow. All three tunnels have holes that consist of large circular openings in the limestone ceiling. The rear perpendicular leg of SPS4 extends in a northeast direction and slopes steeply upwards to the ceiling hole. The slope is due to the spoil that is still present within this leg of the tunnel. The floor is steep and the spoil is difficult to climb, thus this opening was not intended to be an escape hole. SPS3 has a ceiling hole at its southernmost end and the concrete portion at the top of the western entrance has a square hole which once held a metal vent that now lies on the tunnel floor.

Figure 5.19: Threaded rods and nuts used for concrete forms in SPS3.

Figure 5.20: Bolt with wire in SPS3 (8cm scale).

Table 3: Saipan Tunnel Data

Site	Overall Length (m)	Overall Width (m)	Internal Max/Min width (m)	Internal Max/Min Height (m)	Number of Entrances (direction it faces)	Entrance Max/Min Width (m)	Entrance Max/Min Height (m)	Niches (Y/N)
L-Types								
SPS10	10.4	7.1	2.9/1.5	1.8	1 (SE)	4	1.3	N
SPS17	6.3	4.5	1.5/1.2	1.8/1.7	1 (NW)	1.6	1.3	Y
I-Types								
SPS1	6.3	1.9	1.9	1.7	1 (N)	1.9	1.7	N
SPS2	7	1.5	1.5	1.7/1.5	1 (NE)	1.5	1.7	N
SPS8	80	5	5/1	4.7/2.8	1 (N)	2.8 (tunnel)/ 1.8 (concrete)	1 (tunnel)/ 1.5 (concrete)	N
SPS9	3.8	2.5	3.2/2.5	0.7	1 (S)	2.5	0.7 (partially caved-in)	N
SPS14 (A)	3.6	1.3	1.3	1.5	1 (NW)	1.8	1.7	N
SPS24	4.4	1.8	1.8	1.7/1.5	1 (NW)	2.3	2.1	N
SPS29	38	6.9	5.1/1.8	3.6/1.3	1 (N)	1.8	2.9	Y
SPS30	3.1	2.5	2.5	1.6	1 (NW)	2.3	2.7	N
SPS31	4.8	2.6	2.6/2.2	3/2.2	1 (NW)	1.9	1.9	Y
SPS38	13.1	1.1	1.1	1.5	2 (W, NE)	1.9/1.4	1.5/1.4	N
SPS43	7.2	1.9	1.9	2.7/1.3	1 (W)	2	1.9	N
SPS44	4.5	2.1	2.1	1.6	1 (W)	2.1	1.1 (partially caved-in)	N
SPS46	3.3	1.8	1.8	1.6	1 (N)	2	1.5	N
SPS46 (A)	7.5	1.6	1.6	1.7	1 (NE)	1.8	1.8	N
SPS48	3.8	2.4	2.4/2	1.6	1 (E)	1.8	1.3	N
SPS49	7.7	2.7	1.3	1.7	1 (NE)	2.5	2.2	Y
SPS50	3.2	1.5	1.5	1.4	1 (N)	1.8	1.7	Y
SPS51	2.2	1.7	1.7/1.2	1.4	1 (NE)	1.2	1.4	N
SPS52	5	too narrow	too narrow	too narrow	1 (SW)	1.4	0.37	N
SPS56	approx. 18	unknown	1.8/1.8	2.4/1	1 (SW)	unknown	unknown	N
W-Type								
SPS11	15.7	22.5	2.1/1.5	2.1/1.8	3 (S, S, SE)	2/1.4	1.7/1.4	Y
SPS20	27	100.6	4.1/2	4.5/2	1 (W)	2.4	2.4	N
U-Type								
SPS39	15.2	13.1	4.1/0.95	4.3/1.7	2 (NE, NE)	1.5/1.3 (natural 1.7)	2.1/1.9 (natural 3.7)	N
SPS40	13.6	9.1	4.2/0.95	3.6/1.7	2 (NE, NE)	2.3/1.8 (natural 1.4)	2/1.7 (natural 2.7)	Y
SPS47	7.9	5.3	1.8/1.3	2.5/0.9	2 (NE, N)	1.8/1.7 (natural 2)	2.5/1.9 (natural 4.8)	N
SPS5	14	22.4	3.4/1.9	2.2/1.7	2 (W, SW)	1.2/1.2	1.7/0.95	N

SPS35	15.1	7.3	5.5/1.1	3.4/1.5	1 (NE)	1.2	0.77	N
SPS42	5	8	1.7/1.3	1.7/1.6	1 (NE)	1.2	1.6	N
H-Type								
SPS4	17	25	2.2/1.7	2.2/1.5	5 (SW, N, NW, NW, N)	2/1.5 (natural 2.4)	1.5/1.1 (natural 2.3)	N
Combination Type/Unknown								
SPS3	42.5	32.2	4/2	3.4/2	3 (N, N, SE)	3/1.6	2.4/1.8	Y
SPS21	17	11.5	2.6/2.2	3/2.2	1 (NW)	1.3	1.7	N
SPS14	17	18.9	1.9/1.5	2/1.6	3 (NW, W, NW)	1.7	1.7	Y
SPS15	12.8	26.7	3.3/1.8	2.5/1.2	4 (S, SW, E, SW)	3.3	3.2	Y
SPS37	14	50	4.1/1.4	2.5/1.5	4 (SE, SE, E, SE)	1.9/1.5	2.5/1.5	Y
Total Sites: 36								

Table 4: Modifications to Tunnels in Saipan

Site	Material	Modification
L-Types		
SPS10	None	Shelving
SPS17	Limestone	Stacked limestone wall at entrance, trench extending from entrance
I-Types		
SPS1	None	None
SPS2	None	None
SPS8	Concrete	Concrete entrance, short concrete walls outside entrance, concrete pit
SPS9	None	None
SPS14(A)	None	Trench extends from entrance
SPS24	None	None
SPS29	None	Trench extending from entrance, entrance begins as natural, excavated stairs, small, square cut-outs
SPS30	None	Shelving near entrance
SPS31	None	None
SPS38	None	None
SPS43	None	None
SPS44	None	None
SPS46	None	None
SPS46(A)	None	None
SPS48	None	None
SPS49	None	None
SPS50	None	None
SPS51	None	None
SPS52	None	None
SPS56	None	None
W-Type		
SPS11	Limestone	Stacked limestone wall leading to entrance
SPS20	Concrete, metal	Trench leading to entrance, concrete pit, concrete walls, floors and ceiling, ventilation (ceiling hole), 60cm gauge track, two sealed entrances
U-Type		
SPS5	Concrete, wood	Concrete and wood entrances, shelving
SPS35	None	One sealed entrance

SPS39	Limestone	One entrance began as natural, stacked limestone at entrance, excavated foot path at entrance
SPS40	Limestone	One entrance began as natural, stacked limestone at entrance, excavated foot path at entrance
SPS42	None	Small square cut-outs, sealed entrance
SPS47	Limestone	Stacked limestone in interior
H-Type		
SPS4	Limestone	Stacked limestone wall at entrance, ventilation (ceiling hole)
Combination Type/Unknown		
SPS3	Concrete, wood	Concrete and wood entrance, trenches leading to two entrances, ventilation (ceiling hole and metal vent at concrete entrance), concrete floors, walls, ceiling, platforms, concrete pit
SPS14	Limestone	Stacked limestone at one entrance and wall in interior, shelving
SPS15	Concrete, limestone	Concrete entrance with metal door, concrete floors and walls, concrete pit, concrete block and cement walls, stacked limestone and cement wall at entrance
SPS21	Concrete, limestone	Concrete entrance, stacked limestone walls extending from entrance
SPS37	Limestone	Limestone stairs
Total Sites: 36		

5.2.1.3 U.S. Occupation

SPS15 is the only tunnel with evidence of construction by U.S. troops. Two inscriptions in smeared cement appear in one leg of SPS15. One reads: “A.H. Liddeke” and the other: “R.S. 19/1/45/” (Figure 5.21). A.H. Liddeke stands for Albert Henry Liddeke who served as a Carpenter’s Mate, First Class, in the U.S. Navy during WWII (Anon. 1984). Born in February 1908 in Oklahoma, he passed away on August 14, 1984 in Enid, Garfield, Oklahoma (Anon. 1984). According to his obituary, he did not have any descendants. R.S. remains unidentified, but was probably Liddeke’s cohort. Both of the inscriptions are in the same leg, appear to be in similarly aged cement and “19/1/45” is probably the date of inscription with “45” referring to the year 1945. The inscriptions and the presence of several ring-pull tab beer cans that date to the 1960s and 70s (see Chapter 6 for a discussion) identify post-war use of SPS15. The unique modifications in SPS15 are also likely to be the result of U.S. post-battle activity.

SPS15 is known to locals as the “wine cellar” or “whiskey cave.” Alcohol was suspected to have been stored in this tunnel in the 1940s, 50s and 60s to supply the Central Intelligence Agency (C.I.A.) and a navy officers’ club/bar called “Tapi Tapi,” which is rumoured to have been built just above where this tunnel is located (David Camacho pers. comm. 2016). From 1949 to 1962 the C.I.A. maintained the Naval Technical Training Unit (NTTU) in Saipan to train Chinese Nationalists for an invasion of China against communism, which never happened (Maga 1990:25–26; Rogers 1995:234).

SPS15 was likely initially constructed by the Japanese for use during the Battle for Saipan. The site was then modified by the U.S. in 1945 and used until at least the mid-1960s. What exactly the U.S. used this site for is unknown as no material or historical evidence exists to support its interpretation as a possible holding cell or location for NTTU training. The abundance of U.S. beer cans may point to its use as an alcohol storage tunnel.

Figure 5.21: Inscription in SPS15 (8cm scale).

5.2.2 Caves

The 37 caves included in this project are divided into three types (Table 5; Figure 5.22):

A. Those having a significant quantity of war period artefacts and/or modifications that indicate clear WWII use.
B. Those having few war period artefacts or modifications, but have attached oral histories indicating WWII use.
C. Those reflecting contemporary use and having significance to the community.

The majority of caves recorded for this project (n=26) fell into Type A and were modified or had enough artefacts (usually numbering in the 100s or more) to enable meaningful conclusions to be drawn about their use and occupation. These caves were particularly useful for answering research questions on defence tactics. Type A caves recorded for the project were modified in similar ways to tunnels. Modifications included stacked limestone walls, earthen stairs and concrete walls, stairs, floors, entrances and ceiling braces. Some concrete walls have windows with an inset stepped design for deflecting incoming fire (Rottman 2003:67) (Figure 5.23). SPS34 showed evidence of stalactite and stalagmite removal and outside of SPS69 were eight rock circles, each 2m to 3m in diameter and piled 25cm to 50cm high (McKinnon et al. 2014b:87).

Three Type A caves (SPS16, SPS26 and SPS32) were constructed with more concrete than others. SPS16, SPS26 and SPS32 were built in a blockhouse or bunker style, in that they are partially reinforced concrete constructions placed between limestone outcrops or were constructed as additions to caves and used both natural boulders and cliff faces to enhance their construction (Military Intelligence Service 1944:157). These are considered "karst defences," as the concrete is placed within a karst landscape and uses the cave or outcrops as part of the structure in contrast to an entirely concrete structure on top of a karst landscape or on a flat coastal plain.

The caves with the most artefacts (SPS18, SPS19 and SPS25) are three of the largest caves in the study. All three are deep and wide, with two (SPS18 and SPS25) having at least two chambers. SPS18, SPS25 and SPS45 are underground caves and required a certain level of agility to enter. SPS19 is within a larger, well-camouflaged sinkhole (McKinnon et al. 2014b:82), but is easily accessible.

One Type A cave, SPS13 (Kalabera Cave), has no war period artefacts or defence modifications. The reason it has been included in the Type A category is because an historical photograph of a group of IJN sailors within SPS13 exists, verifying that it was used during WWII (Figure 5.24). The caption on the right-hand side of the photograph reads "Karabera hora" (カラベラ 鍾乳洞) or Kalabera Cave. Furthermore, the cave was also reported to have been used as a shelter, for combat and as a makeshift hospital (Cabrera 2009).

Six sites for this project are considered Type B caves. The caves included under the Type B category have little archaeological evidence to indicate they were once used for defence. They were not modified and had few artefacts. These sites consist of either alcoves in the limestone or smaller cave sites that are easily accessible. While the scarcity of artefacts could reflect a short occupancy, it could also be as a result of artefact looting or clearing. The property owner of SPS58 was once told that the cave was used as a hospital during the war.

While all of the sites recorded have some level of contemporary significance for the community, six Type C caves were included in this project because they provided answers to research questions about contemporary significance, but did not add to understanding defensive tactics used during the war. SPS13 provided answers to questions both about WWII use and contemporary community significance. Type C sites reflect what people in Saipan currently do with sites and how they interact with them. These include major tourist caves such as SPS13 and Santa Lourdes Cave (SPS27), government impacted sites, such as SPS53 which is used to store UXO (U.S. Army Corps of Engineers 2012), and caves impacted by development, such as SPS6, a collapsed cave. Lastly, Type C caves also include those on private property that have been re-purposed and contain no reliable archaeological evidence of war period use (SPS70). A more in-depth discussion of Type C caves is found in Chapter 10.

Table 5: Saipan Cave Data

Site	Type	Entrance (direction)	Size	Modifications/Artefacts	Associated documents, stories or meanings
SPS6	C	1 (N)	15m wide, 60cm high	None	None
SPS7	B	1 (SE)	2.9m wide, 60cm high	Few artefacts	
SPS12	B	1 (SW)	3.5m wide, 2.3m high, 7.9m deep	Few artefacts	
SPS13	A and C	1 (NE)	16.5m wide, 13.7m high, 9m to 13.7m deep. 24.4m drop to second chamber: 23m long 10m wide	Stacked limestone wall nearby recorded by Cabrera (2009)	Historical photos of use, major tourist attraction
SPS16	A	2 (NE, SW)	10.9m wide, 2.4m high, 11.5m deep	Reinforced concrete	Major tourist attraction
SPS18	A	3 (SE, NE, E)	11.6m wide, 3.6m high, 11.2m deep second chamber 3.9m wide, 1.5m high, 3.3m deep	Stacked limestone wall inside cave, significant number of artefacts	
SPS19	A	1 (N)	18.3m wide, 4.7m high, 20.4m deep	Significant number of artefacts	
SPS22	A	2 (W, NW)	13m wide, 8m high, 10m deep	Earthen stairs leading down to cave, significant number of artefacts	
SPS23	A	2 (NW, N)	3.8m wide (plus a series of pockets), 2.2m high, 6m deep	Stacked limestone and cement, significant number of artefacts	
SPS25	A	1 (SW)	Chamber 1: 3m wide, 2.7m high, 4.9m deep. Chamber 2 (5m drop	Significant number of artefacts	

			from chamber 1): 3.5m wide, 3.7m high, 9.8m deep. Chamber 3 (separated by several boulders, same level as chamber 2): 3.8m wide, 3.4m high, 14.4m deep		
SPS26	A	4 (NE, E, N, S)	2.8m wide, 2.6m high, 10.9m deep	Reinforced concrete bunker-style, significant number of artefacts	
SPS27	C	Several alcoves	Series of alcoves	None	Major tourist attraction
SPS28	A	1 (W)	4.8m wide, 1.4m high, 2.9m deep	Stacked limestone and cement, significant number of artefacts	
SPS32	A	1 (SE)	6m wide, 2.6m high, 4.8m deep	Concrete, stacked limestone, cement, ventilation (ceiling holes in concrete ceiling), significant number of artefacts	
SPS33	A	2 (S, S)	9.7m wide, 3.6m high, 17.6m deep	Significant number of artefacts	
SPS34	A	1 (S)	4m wide, 1.8m high, 10.8m deep	Removal of stalactites and stalagmites, significant number of artefacts	
SPS36	A	1 (N)	6.3m wide, 1.8m high, 4.7m deep	Stacked limestone, cement, reinforced concrete, concrete, significant number of artefacts	
SPS41	A	1 (N)	7.1m wide, 1.1m high, 6m deep	Significant number of artefacts	
SPS45	A	2 (NW, NE)	Chamber 1: 6.5m wide, 3.5m high, 7.8m deep; Chamber 2: 4.1m wide, 2.2m high, 12.6m deep	Significant number of artefacts	Associated oral history of WWII use as a civilian shelter
SPS53	C	1	12.2m wide, 9.1m high, 61m deep	None	Owned by the CNMI Department of Public Lands and used to store UXO.
SPS57	A	2	Approx. 15m wide, 10m deep	Stacked limestone wall inside, significant number of artefacts	
SPS58	A	1	Approx. 10-12m wide, 14-15m deep	Rock and cement wall, concrete	Associated oral history of WWII use as a Japanese hospital
SPS59	A	3	Approx. 20m wide, 15-20m deep	Significant number of artefacts	
SPS60	A	1	4m deep	Significant number of artefacts	
SPS61	A	1	Unknown	Stacked limestone	
SPS62	A	5	Unknown	Significant number of artefacts	
SPS63	A	2	Approx. 2-5m high,	Significant number of artefacts	Associated oral history of WWII use as a civilian shelter

SPS64	B	1	3.5m wide, Approx. 2m high, 4.5m deep	None	Associated oral history of WWII use as a civilian shelter
SPS65	B	1	Unknown	Few artefacts	
SPS66	A	1	Approx. 2-3m wide, 10m deep	Significant number of artefacts	
SPS67	A	1	Unknown	Significant number of artefacts	
SPS68	B	1	Unknown	None	Associated oral history of WWII use as a civilian shelter
SPS69	A	1	Small 50cm square opening, drops to a 5m wide, 4m high, 1.5m deep	Rock circles, stacked limestone	
SPS70	B and C	1	Approx. 50m wide	None	Associated oral history of WWII use as a Japanese shelter, property owner developed as a tourist attraction
SPS71	A	1	Approx. 20m wide	Significant number of artefacts	None
SPS72	B	1	Approx. 3m wide and 3m deep	Few artefacts	None
SPS73	B	1	Approx. 8.5m deep	Few artefacts	None
Total Sites: 37					

Figure 5.22: Location of archaeologically recorded WWII-related caves in Saipan.

Figure 5.23: Concrete walls with inset stepped windows built into the karst at SPS16.

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Figure 5.24: Members of the IJN in SPS13 Kalabera Cave.

5.2.3 Additional Karst Defence Sites

The existence of additional karst defences on Saipan is known from archival sources and contemporary heritage reports. As mentioned previously, however, the language used in archaeological and heritage site reports to describe karst defences is often ambiguous, therefore distinguishing between a cave and tunnel is not always possible from the report alone. Furthermore, descriptions of artefacts are often vague and artefact identification is not always provided. However, some consultants' reports do provide some details of particular tunnels and caves which have been summarised below.

Thirteen additional tunnels were identified from reports: two U-tunnels and two I-tunnels in Laulau Bay (Russell 1987:61–64), seven I-tunnels and one L-tunnel in Kagman (Dilli et al. 1993:68; Mazurek and Kaschko 1991:65, 71; Woodward-Clyde Consultants 1993:2) and one I-tunnel in I Fadang (Swift et al. 1996:60). The L-tunnel is approximately 20m long and the I-tunnels are 10m or less. Five of the I-tunnels in Mazurek and Kaschko (1991:65, 71) are described as "mining shafts." Three sites are vertical shafts and two are described as gradually sloping into the cliffside. Only U.S. post-battle artefacts were found within two of the sites (Mazurek and Kaschko 1991:71). A trench extends from the entrance of the L-tunnel in Kagman and a stacked limestone wall appears in front of the I-tunnel in the I Fadang area (Dilli et al. 1993:68; Swift et al. 1996:60). The more modified tunnels are in the Laulau Bay area and are constructed with gun platforms, concrete basins and reinforced concrete walls (Russell 1987:61–64). Only one I-tunnel in Laulau Bay and one in Kagman contained artefacts. The Laulau I-tunnel has a number of metal drums and the Kagman I-tunnel has 38 metal drums containing diesel fuel and a narrow-gauge track extending along the length of the floor (Russell 1987:61; Woodward-Clyde Consultants 1993:2, 5, 12).

A number of cave modifications have been described in several reports. The most common includes stacked limestone walls in As Mahettok (DeFant et al. 2001b:100), and caves with low rock walls in Talafofo (Swift et al. 1991:31), Capitol Hill (Hunter-Anderson and Kaschko 2002:18) Kagman, As Matuis (Moore et al. 1990:53, 62, 69, 73, 88, 97; Pantaleo et al. 1992:107–109; Russell and Cabrera 2003:34), Laulau Bay (Olmo 1992:17, 35, 44) and Kalabera areas (DeFant and Fulmer 1998:54, 59). One cave in Kagman was reported to have concrete at its entrance (Russell 1987:64). Other notable caves include one filled with UXO in the Kalabera area (DeFant and Fulmer 1998:59) and a U.S. hospital cave in Laulau Bay (Olmo 1992:18).

A compilation of karst defence sites mentioned in *Operation Forger* reports and a map of those sites was completed in 2013 (McKinnon et al. 2014b). A similar list was completed for sites mentioned in Pacific STAR Center for Young Writers (2004) and can be found in McKinnon et al. (2014b), but these sites cannot be mapped as only general locations were given. Figure 5.25 shows the locations of caves and tunnels mentioned in consulting and *Operation Forager* reports.

5.3 Site Disturbance

The 52 sites recorded for this project were assessed to determine the integrity of each site and its material remains (Table 6). The higher the total number was, the better the site's interpretive value. Such an assessment needs to be considered when attempting to analyse and interpret the site. The greatest integrity issue at Saipan's karst defences is context. Visitors, weather and wildlife have moved many artefacts within most of the sites. Artefacts can still be used to interpret the site, but the spatial information within is compromised. Another issue is looting, and the removal of artefacts makes it difficult to draw conclusions about how many people once occupied a site. In general, the integrity of site construction is high, as none appear to have post-battle structural damage (i.e. no walls have been removed or knocked down). Most of the integrity issues related to construction are the removal of doors and the deterioration of wood modifications.

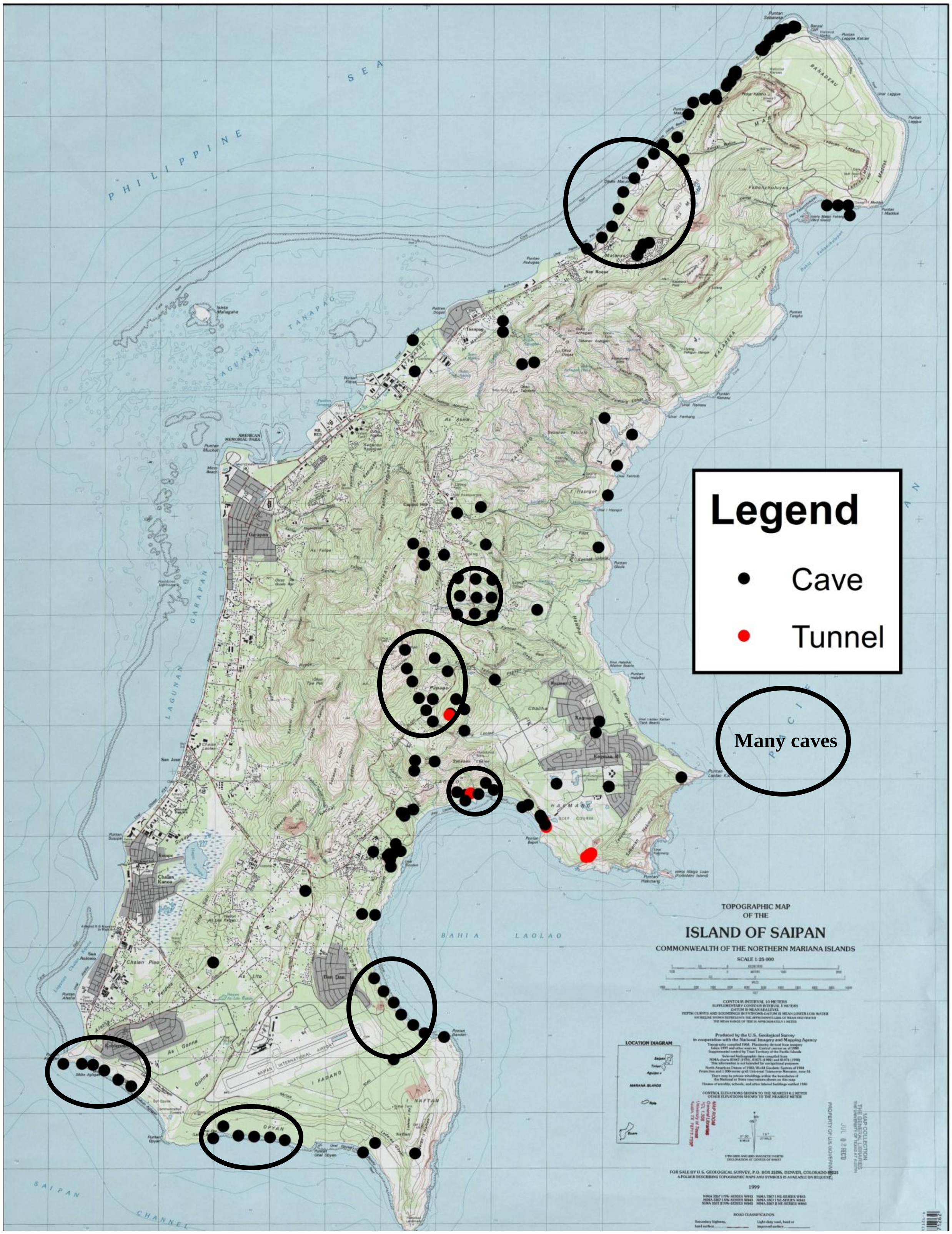

Figure 5.25: Known locations of WWII-related caves and tunnels from consulting and *Operation Forager* reports.

Table 6: Site Integrity Assessment

Site	Site Structure (50)	Disturbance (25)	Clarity (25)	Total (100)	Notes
SPS1	1	1	4	6	Isolated location.
SPS2	1	1	4	6	Isolated location.
SPS3	30	6	10	46	Many artefacts piled outside of this site by visitors. Wood lintels and door removed. Isolated location. Post-battle survey markers. Visitor offerings.
SPS4	35	15	15	65	Isolated location. Post-battle survey marker. Visitors gathering artefacts.
SPS5	10	2	3	15	Disturbance from surface run-off.
SPS6	1	1	1	3	Bulldozed rock at entrance.
SPS7	1	1	2	4	
SPS8	12	4	4	20	Modern debris.
SPS9	1	1	4	6	Isolated location. Wildlife disturbance.
SPS10	22	7	9	38	Isolated location. Modern debris.
SPS11	35	15	18	68	Isolated location.
SPS13	1	1	3	5	
SPS14	36	16	19	71	Wildlife disturbance.
SPS14A	22	7	9	38	
SPS15	23	9	15	47	For interpretation as a U.S. occupied site. Isolated location. Modern debris. Visitor offerings. Modern survey markers.
SPS16	7	3	6	16	Visitor offerings. Modern debris.
SPS17	23	8	10	51	
SPS18	36	16	20	72	Rock and debris bulldozed in covering some artefacts and features. Coconut crab traps.
SPS19	30	12	19	61	Modern debris. Coconut crab traps. Visitors gathered artefacts.
SPS20	37	13	21	71	Modern debris. Grafitti.
SPS21	20	6	8	34	Visitor offering.
SPS22	31	11	18	60	Modern debris.
SPS23	12	5	12	29	Modern debris. Wildlife disturbance.
SPS24	1	1	4	6	Modern debris.
SPS25	40	17	20	77	Isolated location. Coconut crab traps.
SPS26	25	8	16	49	Modern debris. Visitors gathered some artefacts and placed them around site.
SPS28	20	10	14	44	Modern debris.
SPS29	25	6	17	48	Tour guide with tourists observed at site. Modern debris. Visitor offerings.
SPS30	1	1	4	6	Coconut crab traps.
SPS31	1	1	4	6	Coconut crab traps. Modern debris.
SPS32	28	12	15	55	
SPS33	30	12	18	60	
SPS34	19	10	18	47	
SPS35	20	15	15	50	Coconut crab trap. Survey markers.
SPS36	30	16	15	61	Coconut crab trap.

SPS37	35	17	17	69	Used as route for runners. Visitor offerings.
SPS38	11	3	10	24	Isolated location. Modern debris.
SPS39	20	11	14	45	Modern debris.
SPS40	20	9	13	42	Disturbed by cattle farming. Coconut crab trap.
SPS41	40	20	20	80	Isolated location.
SPS42	20	12	15	47	Modern debris.
SPS43	1	2	4	7	Modern debris.
SPS44	1	3	4	8	
SPS45	23	11	18	52	
SPS46	10	2	3	15	Isolated location. Modern survey markers. Coconut crab traps.
SPS46A	10	2	3	15	Isolated location.
SPS47	20	15	15	50	Isolated location. Modern debris.
SPS48	1	1	4	6	
SPS49	1	1	4	6	Modern debris. Coconut crab traps.
SPS50	1	1	4	5	
SPS51	2	1	4	6	
SPS52	1	1	4	6	

5.4 Conclusion

There are a range of tunnel types in Saipan, including I-, L-, T-, U-, W- and H-types, while five do not conform to any letter shape. The overall longest tunnel in the survey was 80m and the overall widest was just over 100m. The shortest tunnel is an I-type approximately 2m long. There are also a range of cave types, including large natural caves with deep chambers, shallow openings in the limestone and concrete bunkers integrated into the walls of natural caves or outcroppings. Both tunnels and caves are modified with similar materials and features, but there are some caves that are completely natural with no modifications at all. Threaded rods, mounting plates and bolts within tunnels suggest that heavier installations were added to tunnels, not caves. Two tunnels have associated oral histories; one indicating that SPS15 was used by U.S. organisations and another suggesting that SPS20 was used as a mine. Six caves are associated with oral histories identifying them as WWII Japanese or civilian shelters. One associated with SPS58 identifies it as a war-time Japanese hospital. None of the tunnels are major tourist attractions today, while four caves are. In terms of site integrity, the majority of sites show evidence of contemporary visitation. Visitors negatively impact the context of the artefacts within a site by moving, removing or damaging them. The integrity of the sites’ construction is high, with few signs of contemporary damage from visitors.

Chapter 6 – Results: Artefacts

6.1 Introduction

The following describes artefacts recorded within and immediately surrounding karst defences and are grouped in this chapter by function. For example, while porcelain electrical insulators are a type of ceramic, they are discussed under the section on electronics and communication devices. Minimum number of vessel (MNV) counts for ceramic tableware and glass containers have been determined differently. Voss and Allen's (2010:1) qualitative methods for MNV counts are used for ceramics because every ceramic sherd located during the project, regardless of size or element, was recorded. Multiple attributes were recorded for ceramics and all were taken into account when grouping sherds. Groupings were conservative in that, if the possibility existed that two sherds could be from the same vessel these were grouped together, even if their attributes were somewhat different (Voss and Allen 2010:2). For glass containers, however, MNVs were determined quantitatively using bases and finishes, although body sherds were counted and grouped by colour (Voss and Allen 2010:1). Quantitative methods were chosen for glass because of the abundance of glass body sherds and the highly standardised vessel attributes (Voss and Allen 2010:1).

6.2 Foodways

6.2.1 Ceramics

A total of 562 ceramic fragments, adding up to 151 vessels, were recorded in 21 karst defence sites in Saipan. One hundred and thirty-eight of those vessels were Japanese porcelain (Table 7). Porcelain is usually identified as having a thin, white, translucent body with little to no porosity (Gorham 1971:19; Ross 2012:14–15). However, not all Japanese porcelain can be characterised in the same way. It can also be thicker and heavier, range in paste colour from white to pale grey and be opaque or translucent (Gorham 1971:19; Ross 2012:15). Some porcelain body sherds in the Saipan assemblage were up to 7mm thick.

While the Japanese began producing earthenware vessels nearly 16,000 years ago (Fujimura 1995:26; Gorham 1971:3; Ishige 2001:10; Stitt 1974:23), Japanese porcelain production began in the 17th century by Korean potters in the Japanese town of Arita (Impey 1996:1–2). Up until the Meiji Restoration in 1868, porcelain vessels were typically hand-thrown on a wheel and hand painted with Chinese motifs in underglaze cobalt blue (a technique referred to as *sometsuke*) (Bibb 2013; Ross 2009b:148, 178). Celadon glaze and red, green and black overglaze enamel colours were also used, but with less frequency (Bibb 2001:5; Ross 2012:15; Ross 2009b:148). Initially, Japanese ceramic production was controlled by the *daimyo* (feudal lords) of various provinces and production focused on artworks for lords and local needs (Bibb 2013). By 1820, porcelain became popular and was used more than earthenware and stoneware (Jahn 2004:186, 301; Ross 2009b:148–149).

With the collapse of the Tokugawa system, ceramic manufacturers began using machinery to prepare the clay and cast the slip, adopted coal-fired kilns and experimented with glazes, pigments and decoration techniques (Jahn 2004:108–114). Most of the changes were geared towards mass-production and supplying the demand for cheap exports and decorative pieces (Jahn 2004:108–114; Ross 2009b:150, 152; White 2003:5–6). During this surge, the egg-shell thin, translucent type of porcelain was made to satisfy overseas preferences for Chinese-style porcelain, while domestic preferences were for thicker and more rugged porcelain wares (Gorham 1971:19). All the Saipan porcelain vessels were manufactured using modern (post-1868) methods, were not hand-made and their dominant design colour was cobalt-blue, although other colours, such as pink, green, brown, red, gold, indigo and grey, were also used.

Table 7: Ware Types in Saipan

	Porcelain		**Stoneware**		**Earthenware**	
	MNV	**Fragments**	**MNV**	**Fragments**	**MNV**	**Fragments**
SPS2	2	2				
SPS12	1	1				
SPS17	1	11	1	7		
SPS18	3	19	1	6	1	10
SPS15	1	1	1	6		
SPS10	1	1				
SPS11*	13	79	1	6		
SPS20	1	2				
SPS19	27	92				
SPS22	1	2				
SPS25	19	42				
SPS21	1	3				
SPS32			1	3		
SPS4	2	2	1	1		
SPS26	11	20	1	2		
SPS45	3	5				
SPS36	1	2				
SPS29	3	9			1	1
SPS33	12	57	1	8		
SPS41	28	110	1	1	1	1
SPS37	7	48				

Total	**138**	**508**	**9**	**40**	**3**	**12**

*One vessel and two fragments are too burnt to determine paste and are not included in the table.

6.2.2 Porcelain Vessels

6.2.2.1 Decorative Techniques

Transfer printing is the most common method of decoration on Saipan porcelain (Table 8). Invented in England in the 18th century, transfer printing is a method of decoration where designs were etched into copper plates, covered with pigment, transferred onto paper and then placed on the vessel (Tarlow 2007:179). Transfer printing (*doban tensha*) was first used on Japanese porcelain in 1888 and by the early 20th century became the dominant method for decorating mass-produced domestic porcelain (Ross 2009b:156). One tunnel, SPS11, contained the thinnest porcelain vessels with the highest-quality transfer printed designs (Figure 6.1).

The second most common method of decoration on Saipan porcelain is stenciling. Stenciling was a decorative technique originally used during the Tokugawa Period up until the 17th century on thick, poorly formed and finished vessels made of inexpensive and unrefined porcelain (Bibb 2001:5; 2013; Ross 2009b:153). The technique was rarely used during the 18th century, but was revived in the 1870s to replace hand painting during the surge in mass production (Ross 2012:7; Ross 2009b:153–154). Stenciling during the Meiji Period was primarily used on domestic wares (Ross 2009b:154).

There were two methods of stenciling: *fukizumi* and *katagami*. *Fukizumi* involves the placement of paper on the vessel to block the application of pigment leaving it sprayed or spattered around the perimeter of the paper (Ross 2012:7). *Katagami* is where paint passes through holes in the paper (Ross 2009b:153) (Figure 6.2). *Katagami* is recognised by patterns of dots, short parallel lines or dashes (Bibb 2001; Ross 2012:7; Ross 2009b:155). Sometimes multiple stencils were used on a single vessel and the overlap is evident in a break in the motif (Bibb 2001:5; Ross 2009b:155). Since stenciling is usually done quickly, there are often visible smudges and smears (Bibb 2001:5). Designs were primarily in cobalt-blue until the 1870s and 80s, when potters developed other colours that could withstand high firing temperatures, such as chrome green and gold-based pink, black, yellow and brown (Jahn 2004:83, 122; Majewski and O'Brien 1987:143; Ross 2012:8). *Katagami* was more common than *fukizumi,* but both types had disappeared from the market by 1920 (Ross 2009b:156). When reviewing Japanese ceramics at North American sites, Ross (2009b:156) found that stenciling was rarely combined with other techniques except for a small amount of hand painting on the rim or solid lines on the interior or exterior. Bibb (2013) suggested that stencilwares could possibly be arranged chronologically based on the quality of the stencil, assuming that the earliest consisted of larger holes and thus simpler designs. None of the stenciled ceramics recorded for this project were decorated with the *fukuzumi* style of stencil.

Figure 6.1: Quality differences between transfer printed designs in the Saipan assemblage.

Eight vessels in the Saipan assemblage are celadon glazed. Celadon is a thick, opaque glaze that comes in various shades of blue or green, although bottle-green, peacock green or grass greens are not within the range of colours of celadon (Gorham 1971:85). Celadon glaze was first used in China during the Sung Period (960–1279) and subsequently in Korea and Japan (Gorham 1971:85–86). Some researchers suggest that there are distinct differences between Chinese, Korean and Japanese celadons, but this is difficult to determine since “no two pieces of celadon are ever of exactly the same shade of green” (Gorham 1971:86). Furthermore, there is no consensus amongst researchers on how to describe celadons and some conclusions are contradictory. The most consistent descriptor of Japanese celadon is that it has a shinier finish than Chinese or Korean types (Bibb 2013; Gorham 1971:85–86; Ross 2009b:189). There was also one crackled celadon teacup in the Saipan assemblage. Crackled celadon was produced by Chinese, Korean and Japanese potters and is caused by the composition of the glaze itself or by taking the vessel from a hot kiln and immersing it in cold water (Stitt 1974:24). Chinese crackled celadon had larger cracks than Japanese celadon and it was a common practice in China to rub colour into the cracks (Gorham 1971:88). Japan has been producing celadon wares since the advent of porcelain and they are therefore difficult to date (Ross 2009b:189), although celadon production reached its peak in the 1920s (Bibb 2013). One celadon teacup in Saipan also has splotches of brown wash on the rim. Non-celadon, single-colour glazing (Figure 6.3), despite its apparent rarity (Gorham 1971:85), was relatively common in the Saipan assemblage, particularly in brown. According to archaeologist Leland Bibb, producing simple vessels in solid colours to sell overseas was a trend in the 1930s (Leland Bibb pers. comm. 2016).

There are a variety of other decorative techniques on porcelain in the Saipan assemblage. Four relief moulded vessels with floral motifs were found. One is single-colour glazed on the exterior and the other three are identical plates with a colour-glazed rim. One brown glazed tea bowl uses a moulding and glaze pooling technique. After being impressed in a mould, the glaze was applied and pooled around the impressions, leaving the outline of the decoration a lighter shade than the rest of the vessel (Leland Bibb pers. comm. 2016). One additional vessel is decorated using rubber stamps. Stamping was used between 1917 and 1940 (Hashimoto 2006; Leland Bibb pers. comm. 2016). Finally, 12 pickle dishes have scalloped rims. These vessels are also combined with transfer printed, stencilled or relief moulded decorations. Additionally, the moulded relief pickle dishes with scalloped rims have a series of concentric circles (*ito giri* lines) on the base with brown wash to resemble a whirlpool design (Gorham 1971:47; Moore et al. 2001:224; Simpson et al. 1979:50).

6.2.2.2 Japanese Dining Practices

Up until the mid-Tokugawa period, a typical urban Japanese meal consisted of rice, a bowl of miso soup and side dishes of pickled or boiled vegetables or fish (Ashkenazi and Jacob 2003:178; Ross 2009b:163; 2011:69; Simpson et al. 2014:88). Rural inhabitants with less access to rice often substituted it with wheat, barley and millet (Ross 2009b:163–164). Rice did not become a staple on the Japanese mainland until after WWII (Ross 2009b:163–164; 2011:69). In Saipan, however, rice was always a staple for the Japanese military and for Chamorro people by 1934 (Hawk 2006:333; Yanaihara 1976:149). The starch and soup during a typical meal were each placed in two identical single-serve bowls (*gohan chawan*) and side dishes were served in large vessels or platters from which diners could help themselves, usually with chopsticks, placing their chosen side dishes onto one or more small, shallow plates (*kozara*) (Ishige 2001:70; Ross 2009b:163; 2011:69; Simpson et al. 2014:88). The dominant seasonings were soy sauce, miso and, to a lesser extent, rice vinegar, which were also served in individual dishes (Ross 2009b:164; 2011:69; Simpson et al. 2014:88).

Table 8: Decoration on Japanese Porcelain from Saipan

Decoration	Vessels	Notes
Transfer print	43	Two also have hand painting and a single colour glaze. Eight have scalloped rims.
Stencil (*katagami*)	27	Two are also hand painted. One has a scalloped rim.
Hand painted	21	Two are also stenciled
Undecorated/clear glaze	15	
Non-celadon, single colour glazed	10	One is embossed, one is porcelain with hand painting, one is impressed/pool glazed
Coloured transfer printed rim-rings	9	
Rubber stamped	1	
Moulded relief	4	One is also single colour glazed on exterior, three have colour-glazed and scalloped rims.
Undecorated celadon	6	
Celadon crackled glaze	1	
Celadon glaze with brown wash	1	
Total	**138**	

Figure 6.2: Decorative techniques in the Saipan assemblage. *Katagami* stenciled vessel (top left), rubber stamped vessel with a Seven Jewels diaper pattern and plant motifs (top right), moulded and pool glazed vessel (bottom left), crackled celadon (bottom right).

Figure 6.3: Single colour glazed ceramic bowl base (8cm scale).

After the Meiji Restoration, Japanese people began consuming more meat and dairy products. Cow's milk became available in most towns by the 1870s and most Japanese were consuming small quantities of dairy by the late 1900s (Ross 2011:70). Despite the availability of imported foods, up until WWII a traditional meal was still important, especially amongst rural and lower-class households and few people prepared Western-style meals at home (Ishige 2001:158; Ross 2009b:166; 2011:70).

The primary beverages consumed prior to the Meiji Period were tea and sake (Ross 2011:70). Sake was consumed during the evening and tea was consumed with meals (Ross 2011:70). Tea was also associated with the tea ceremony amongst the elite (Stitt 1974:14–21). Tea was poured from a pot into cups without handles (*yunomi*) or tea bowls (*matcha jawan*) and sake from cylindrical bottles or flasks (*tokkuri*) into tiny porcelain cups without handles (*guinomi* or *sakazuki*) (Ross 2009b:166; Simpson et al. 2014:92). After the Meiji Restoration, Japanese people continued to consume tea and sake, along with a range of other beverages, including coffee, soft drinks and beer (Ross 2009b:166; 2011:70).

6.2.2.3 Vessel Forms

Ross (2009b:166) points out that vessel nomenclature for 19th and 20th century Japanese ceramics is variable and no standard classification system exists for Japanese tableware. As a result, he built on Bibb's (2013) system which is based on shape, size and function and relied on Japanese terminology for vessels (Ross 2009b:166–172). This thesis uses Ross' (2009b) vessel form and classification system as summarised in Table 9 (Figure 6.4). Only the vessels applicable to this study have been included.

The vast majority of vessel forms in the Saipan assemblage were rice/soup bowls with a hemispherical shape (Table 10). Two variations on the bowls from Ross' (2009b) study exist in the assemblage. The first is a tea bowl less than 10cm in rim diameter with a hemispherical shape and another is a small bowl with a wide, 8cm diameter base (Figure 6.5). The rim of the wide-based bowl is broken and therefore cannot be interpreted as a bowl with complete certainty. The second most common vessel form are small dishes with hemispherical or angled/straight wall body profiles. Only three of the 27 small dishes have the hemispherical profile form. Not recovered in Ross' (2009b) study, but present in Saipan, are large dishes with a rim diameter of more than the 16cm with angled/straight walls. Almost as many pickle dishes as large plates are found in Saipan. All pickle dishes have scalloped rims and one is oval-shaped (Figure 6.6).

Table 9: Summary of Japanese Ceramic Vessel Forms from Ross (2009b)

Vessel	**Size**	**Characteristics**
Rice/Soup bowl (*gohan chawan*)	10–12cm rim diameter 4–5cm base diameter 5cm height	Hemispherical shape with rounded profile or straight walls with shallow well in centre
Rice/Soup bowl lids	9.5–10cm rim diameter 4cm base diameter 3.5cm height	Hemispherical shape with rounded profile
Small dish (*kozara*)	12–16cm rim diameter 8–9.5cm base diameter 2.5–3cm height	Hemispherical shape with rounded profile or straight walls
Pickle dish (*namasu zara*)	12–16cm rim diameter 6.5–7.8cm base diameter 4.5cm height	Deeper than small dish, scalloped rim and sometimes a circular recess on the base known as *janome* (snake-eye or bull's eye).
Tea cup (*yunomi*)	6–9cm rim diameter 3–4cm base diameter 4.5–8cm height	Hemispherical like a rice/soup bowl or tall and cylindrical with straight sides

Sake cup (*sakazuki, guinomi*)	6–8cm rim diameter 2.5–3cm base diameter 3–5cm height	Shallower than a teacup, thinner walls and an everted rim

Tea cups are the third most common vessel form. Two primary styles exist: a tea cup with a hemispherical wall shape like a miniature rice or soup bowl and a tall, cylindrical cup with straight sides. An additional variation in Saipan includes a tea cup with a flat, wide base and no foot ring. The vessel is narrower just above the base and then gradually widens out towards the rim. All tea cups were found without handles, yet one detached porcelain handle was recorded. Based on the absence of an everted rim in all cases, which is a diagnostic feature of sake cups in Ross' (2009b) typology, none of the cups in Saipan were interpreted as sake cups.

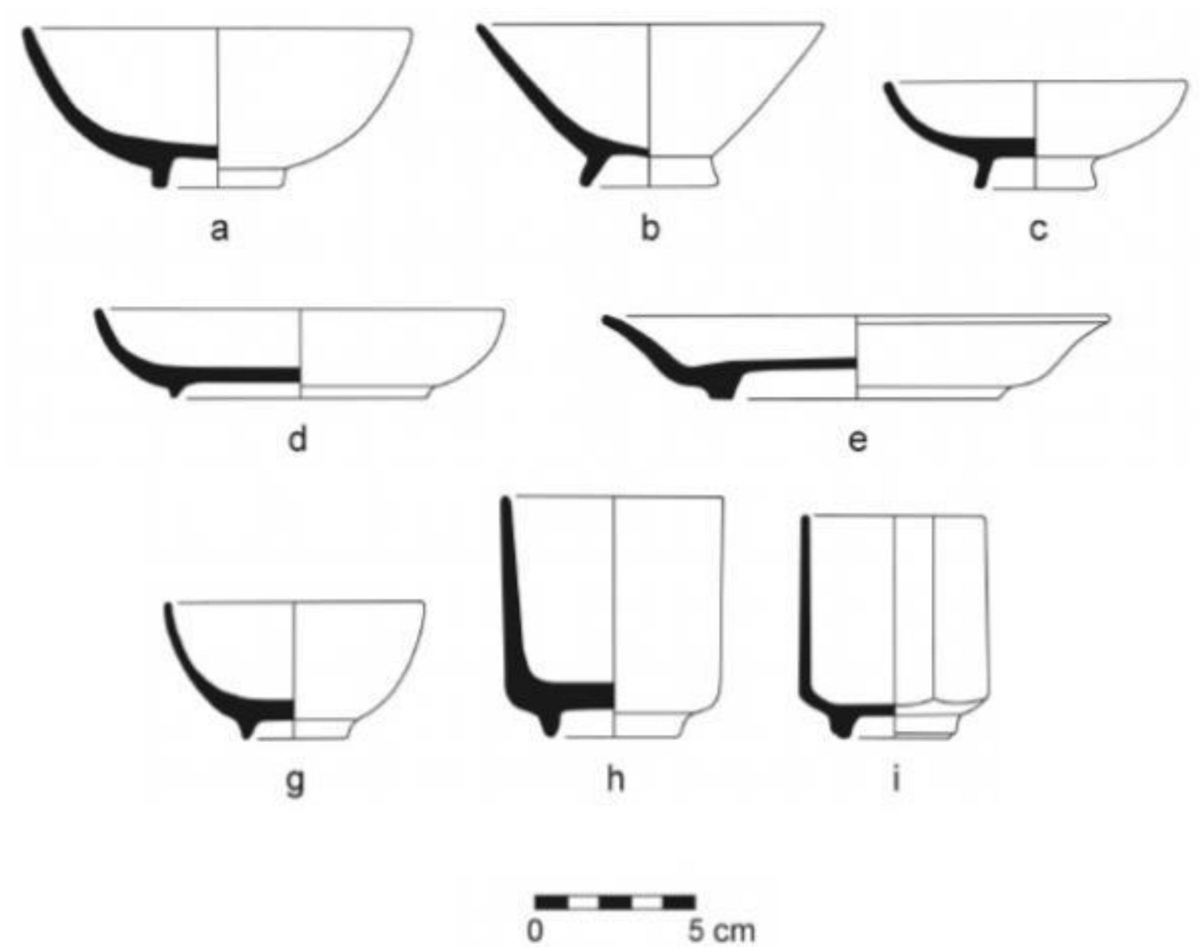

Figure 6.4: Profile drawings of Japanese porcelain vessels from Ross (2009b:169) and present in the Saipan assemblage, left to right. Top: bowl (hemispherical), bowl (straight wall), rice bowl lid. Middle: plate (hemispherical), plate (straight). Bottom: tea cups.

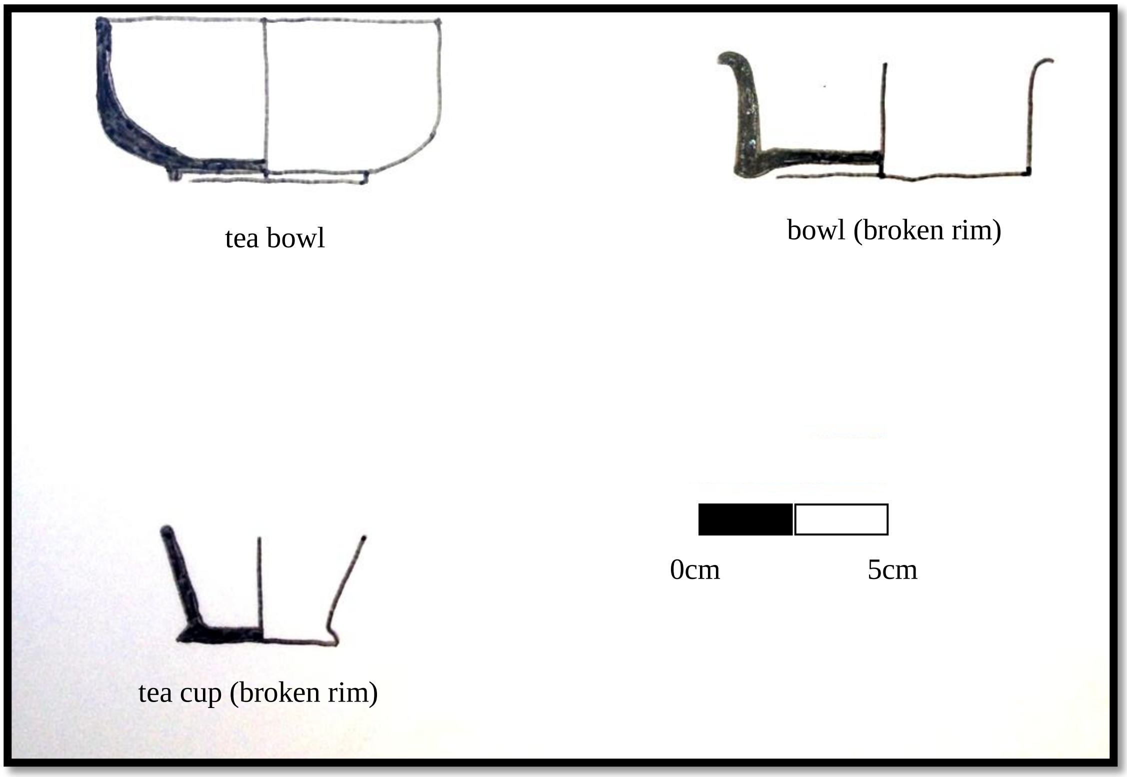

Figure 6.5: Variations on Ross' (2009b) vessel forms found in the Saipan assemblage.

Figure 6.6: Pickle dishes in Saipan from SPS19 (left) and SPS41 (right).

One 7mm thick porcelain vessel with an approximately 12.5cm diameter rim was recorded in SPS17 (Figure 6.7). The vessel has a bulbous shape with a circular opening at the top. The vessel is interpreted as an *hibachi*. An *hibachi* is a short, round vessel filled with ash and hot charcoal to help heat a room or used to heat tea during a tea ceremony (Gorham

1971:192; Simpson et al. 2014:92–93). *Hibachis* are made of glazed porcelain or stoneware with a heavy rolled edge that curves slightly inward and typically ranges in size from 15cm to 60cm in diameter (Gorham 1971:192).

Figure 6.7: *Hibachi* example (left) (Koizumi 1986), *hibachi* from Saipan assemblage rim fragment (middle) and body sherd (right) (8cm scale).

Table 10: Saipan Porcelain Vessel Forms per Site

Site	**Tea cup**	**Rice/ Soup Bowl**	**Rice/ Soup Bowl Lid**	**Tea Bowl**	**Small Dish**	**Large Dish**	**Pickle Dish**	**Tea Pot**	**Unknown**	**Total**
SPS2	2									**2**
SPS4	1				1					**2**
SPS10		1								**1**
SPS11	3	1			7	2				**13**
SPS12		1								**1**
SPS15		1								**1**
SPS17								1		**1**
SPS18	2	1								**3**
SPS19	1	5	1		6	6	8			**27**
SPS20						1				**1**
SPS21	1									**1**
SPS22	1									**1**
SPS25	3	7			4	1			4	**19**
SPS26	1	6			1				3	**11**
SPS29						2			1	**3**
SPS33		8					1		3	**12**
SPS36		1								**1**
SPS37		6							1	**7**
SPS41	5	12			8		3			**28**
SPS45		2		1						**3**
Total	**20**	**52**	**1**	**1**	**27**	**12**	**12**	**1**	**12**	**138**

6.2.2.4 Design Patterns and Motifs

The way that early designs were arranged on Japanese wares was influenced by the Chinese-style five zones of decoration: the centre of the interior, around the centre, around the interior rim, the underside/exterior and the foot ring (Schiffer 2000:18). Ross (2009b:180) found that mass-produced Meiji ceramics in his study also followed this structure. He explains further that the central motifs were of Chinese or Japanese styles with floral motifs around the centre (Ross 2009b:180). Additionally, the interior decorations of several plates were divided vertically into panels (Ross 2009b:181). A *yoraku* pattern (a horizontal border design or "necklace" around the rim) was also found on the interior or exterior of bowls and tea cups (Bibb 2001:6; Ross 2009b:192–193).

The same structural design pattern is found on vessels in the Saipan assemblage. A centre medallion only exists on two vessel types. One is a small plate with a transfer printed, central water lily surrounded by vertical panels with floral and landscape motifs. The second is a bowl with a cobalt blue, hand painted floral motif medallion surrounded by green or blue-green hand painted hatching, a brown rim and a "grass" pattern on the exterior of the bowl in the same green or blue-green colour (Figure 6.8). Additionally, four foot ring patterns and three *yoraku* patterns exist.

Design motifs on Meiji ceramics are almost limitless (Ross 2012:17). Japanese Tokugawa Period potters borrowed Chinese images and illustrations from Indigenous Japanese artists to compile standardised designs and source books (Baird 2001:19–21). At the end of the Tokugawa Period, motifs once associated with elites, such as heraldic crests, were widely used on all consumer goods. Likewise, images associated with lower classes were considered acceptable for elites (Ross 2012:18; Ross 2009b:186). During the Meiji Period, more images associated with Westernisation emerged (Ross 2012:18) such as "the hunter" motif consisting of a Native American man holding a bow with a goose slung over his back (Van Patten 1998:13). Other motifs were inspired by European art (Van Patten 1998:13).

A popular image found on export wares is known as the Phoenix Bird or Flying Turkey. First referenced in North American catalogues in 1914, the design includes a mythological Japanese bird known as the *ho-o* which resembles a phoenix or bird of paradise associated with the imperial family (Baird 2001:116; Gorham 1971:204; Ross 2009b:187; Stitt 1974:134). The motif normally includes the bird, with its head positioned in different ways, and vines and chrysanthemum or paulownia blossoms in blue transfer print (Ross 2009b:187). One body fragment in the Saipan assemblage from a tea cup may have a hand painted version of the Phoenix Bird (Figure 6.9). The fragment shows the bottom half of a bird with its wings spread and long tail feathers, all in cobalt blue. Only the head is missing. Other motifs are apparent to the right of the bird, but are unidentifiable and the bottom of a second bird appears on one corner of the fragment.

Figure 6.8: "Grass" pattern rice bowl with central medallion. Centre interior (left), rim fragment exterior (top right), rim fragment interior (bottom right).

In his study, Ross (2012:16; 2009b:181–182) classified designs thematically based on the dominant motif. Adopting the same themes for this study, motifs have been divided into: plants and animals; geometric patterns; human figures and domestic scenes; military and patriotic symbols; household objects; landscapes; mythology and religion; and abstract decoration (Ross 2009b:182) (Table 11). There are 51 distinct patterns on the transfer printed, stencilled and hand painted vessels, the majority of which have plants or trees as the dominant motif. Two particular designs are common. The most frequent is the “wave pattern” (Schiffer 2000:124), made up of transfer printed cherry blossoms and a shaded blue wave (Figure 6.10). This design is found on bowls, plates and pickle dishes. The second is the grass and cross-hatching pattern mentioned above that was found only on bowls. Overall, the most common motifs are the cherry blossom, a symbol of ephemerality and bamboo, a symbol of strength (Baird 2001:50; Gorham 1971:208). Other notable motifs include: snake skin or fish scale triangles (Baird 2001:140, 300; Gorham 1971:224); the yin and yang symbol borrowed from China; the plum, a symbol of womanhood in Japan; and carp, a symbol for success (Gorham 1971:206, 210, 220). None of Saipan's porcelain vessels had military or patriotic symbols or motifs related to household objects.

Figure 6.9: Transfer printed Phoenix Bird design from Ross (2009b:188) (left), possible hand painted Phoenix Bird design on fragment in Saipan assemblage (right) (8cm scale).

Table 11: Motifs on Saipan Porcelain

Theme	**Bowls**	**Bowl Lids**	**Small Dish**	**Large Dish**	**Pickle Dish**	**Teacups**	**Unknown**
Plants and Animals	18	1	20	10	11	3	3
Geometric patterns	8		2			2	1
Human Figures							1
Landscapes	3		1				1
Mythology and Religion						1	
Abstract	2		2				1
Total	**31**	**1**	**25**	**10**	**11**	**6**	**7**

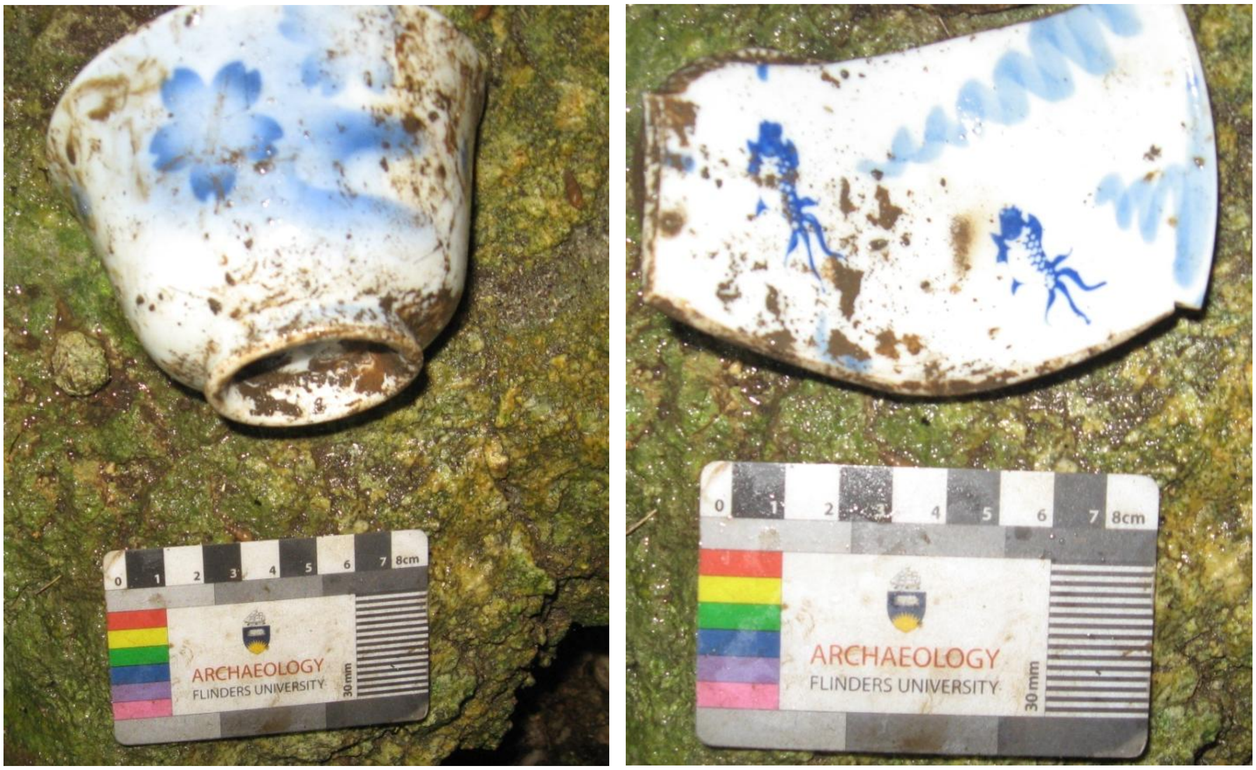

Figure 6.10: Transfer printed wave pattern bowl (left). *Katagami* stenciled carp bowl (right) (8cm scale).

6.2.3 Non-Porcelain Vessels

There are 21 non-porcelain vessels in the Saipan assemblage (Table 12). The two identifiable earthenware vessels (vessels with a porous paste) include one jar and a plant pot fragment. All nine stoneware vessels (vessels that are semi-vitreous and opaque) are tableware, except for one unidentified fragment. Decorative techniques noted on stoneware in the Saipan assemblage included slipping, salt glazing and colour glazing. One tea cup is incised and a bowl is decorated with an sgraffitto technique, where slip is poured over a contrasting-coloured body. When dried, the slip is scraped away in a pattern with a sharp metal tool to reveal the surface beneath (Simpson et al. 2014:62). One notable stoneware tea cup is clear-glazed with a green paste (Figure 6.11). SPS18 has brown plastic bowls of two sizes: a 10cm rim diameter (n=3) and 17.5cm rim diameter (n=2) (Figure 6.12). One 10cm rim diameter bowl is also present within SPS41. Finally, one 9cm diameter metal cup was found in SPS18 and one 16cm diameter metal bowl outside of SPS40.

Figure 6.11: Sgraffitto rice bowl (left), green paste stoneware tea cup (right) (8cm scale).

Table 12: Non-Porcelain Vessels

Site	MNV	Waretype/Material	Vessel Form	Decoration
SPS4	1	Stoneware	Unknown	Slipped and hand painted
SPS11	1	Unknown	Unknown	Burnt
	1	Stoneware	Tea cup	Incising
SPS15	1	Stoneware	Rice Bowl	Slipped
SPS17	1	Stoneware	Unknown	Salt glazed
SPS18	1	Earthenware	Jar	Transfer printed “P”
	1	Stoneware	Rice Bowl	Sgrafitto
	5	Plastic	Bowl	Embossed Star
	1	Metal	Cup	None
SPS26	1	Stoneware	Tea cup	Undecorated/Clear glazed
SPS29	1	Earthenware	Unknown	Transfer printing
SPS32	1	Stoneware	Unknown	Unglazed
SPS33	1	Stoneware	Small plate	Slipped and hand painted
SPS40	1	Metal	Bowl	Enamelled
SPS41	1	Earthenware	Plant pot	Unglazed
	1	Stoneware	Tea cup	Colour glaze
	1	Plastic	Bowl	None
Total	**21**			

Figure 6.12: Non-porcelain vessels in Saipan. Earthenware pot rim (left), metal bowl (middle), plastic bowl (right) (8cm scale).

6.2.4 Marks

Prior to 1891, Japanese exported ceramics did not require any markings and many vessels only had the artists' or their patrons' names in Japanese characters (Gorham 1971:100; White 2003:5). From 1891 to 1921 the U.S. *McKinley Tariff Act* required Japan to print the country of origin on their export wares (Ross 2009b:197). Export wares were thus marked with the word "Nippon," a Romanized version of the word Japan, although wares destined for Canada and Mexico were exempt from the rule (Ross 2012:24; Van Patten 1998:26). After 1921, the U.S. required the word "Japan" or "Made in Japan" in English to be marked on Japanese export wares (Ross 2009b:197–198). From 1945 to 1952 they were stamped "Made in Occupied Japan," then simply "Japan" afterwards (Ifert 1994:5).

The rules in markings, however, were not always adhered to. Some manufacturers marked vessels "Japan" prior to 1921 (White 2003:5) and, although these marks are more common on export wares, they are also found on domestic wares, although seldom on stenciled vessels (Bibb 2001:5). Additionally, some manufacturers would only mark one vessel in a set or have a paper sticker that was easily removed (Alden 1995:7; Van Patten 1998:42; White 2003:5).

Marks on domestic Japanese vessels can be in English, Japanese or Chinese, found on the base or the body, and convey a range of information, including country of origin, name of manufacturer, decorator, retailer, location of manufacture or phrases such as "good luck" (Ross 2012:24; Ross 2009b:196). The oldest mark on domestic wares was a hand painted mark reading "*fuku*," meaning good fortune or happiness in underglazed blue (Gorham 1971:100). Domestic markings on Japanese vessels are not always useful for archaeologists attempting to date ceramics, as the markings are ambiguous (Ross 2009b:196). Marks can provide information on forms or design patterns produced in specific regions or kilns, but "no systematic documentation linking makers and production centres with their marks has been published and so most marks with only partial details are untraceable" (Ross 2012:24; Ross 2009b:196–197).

Fifteen distinct marks are present on 35 of Saipan's vessels, including tea cups, plates, pickle dishes, bowls and one jar (Figure 6.13). Five of the marks are Chinese or Japanese characters related to feng shui practices, including phrases such as "good luck," "good fortune," "happiness" and "longevity" (6.13g-k) (Table 13). Two marks, an embossed star on one of the larger plastic bowls and an anchor and rising sun symbol on the metal bowl, are symbols of the Imperial Japanese Army and the Imperial Japanese Navy, respectively (War Department 1944a:78, 348). Marks identifying particular companies include the logo of the NKK (6.13c), the Fukagawa Seiji Kaisha Company (6.13f) and the Noritake Company (6.13d and e).

An image of Mount Fuji with water is the mark of the Fukagawa Seiji Kaisha Company founded in 1893 (Jahn 2004:216). The mark is generally in underglaze cobalt blue plus the inscription *Fukagawa-sei* and/or the name of the painter (Jahn 2004:216). Only the Mount Fuji mark appears on Saipan's vessels. The Fukagawa Seiji Kaisha Company focused on producing expensive wares for sophisticated tastes, with clients including the Imperial Household Ministry (Jahn 2004:216). The vessels with the Mount Fuji mark in the Saipan assemblage are only decorated with the wave pattern motif described above.

The Noritake Company was founded by the Morimura family in Nagoya in 1904 as Nippon Toki Kaisha Limited (Alden 1995:7, 213; Van Patten 1998:7). They were the largest exporters of Japanese porcelain (Van Patten 1998:10) and produced the world-famous Noritake China (Bibb 2013). Noritake was the only company allowed to continue production of tableware during WWII (Stitt 1974:167). The mark on both 6.13d and 6.13e (陶) is the Japanese character for "pottery." The character was used as early as 1932 up until 1943 on Noritake marks for Nitto dinnerware made for the domestic market (Fisher 2009; Japan Porcelain Society 2008). The letters "RC" on 6.13e stands for "Royal Crockery" and were used as early as 1906 (Alden 1995:10; Van Patten 1998:14), although after WWII RC also stood for "Rose China" (Stitt 1974:167). The RC mark is considered to be an indicator of high quality (Stitt 1974:157; Van

Patten 1998:45). Noritake vessels with the RC mark were only located in SPS11. While the vessel with the RC mark found on 6.13e has no visible decoration, the seven vessels with 6.13d all have the same transfer printed, cobalt-blue rose motif found in Figure 6.1.

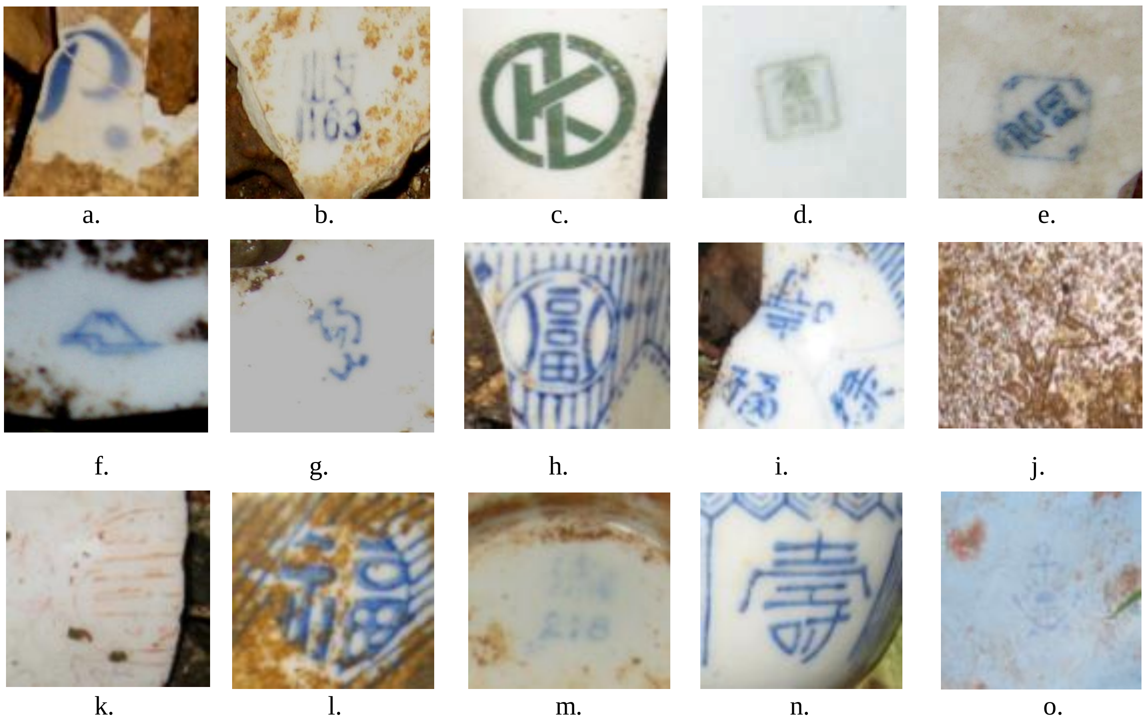

Figure 6.13: Marks on Saipan vessels. See Table 13.

Table 13: Translations of Marks on Japanese Ceramics on Saipan

Figure	**Mark**	**Number of Vessels**	**Translation/Interpretation**	**Site**
6.13a	P	1	The letter “P” in English	SPS18
6.13b	岐 (*toki*) + number	5	Japanese “toki” possibly as in Noritake Toki Kaisha Company or Noritake Company, or possibly “hope” or “opportunity”	SPS18, SPS41
6.13c	NKK	2	Logo for the NKK	SPS19, SPS25
6.13d	陶	7	Japanese for “pottery” used on Noritake Company vessels (Fisher 2009)	SPS11
6.13e	“RC” 陶	1	Noritake Company Royal Crockery	SPS11
6.13f	Mount Fuji with water	7	The mark of the Fukagawa Seiji Kaishi company based in Arita and founded in 1893 (Jahn 2004:216).	SPS19, SPS37
6.13g	*Fuku*	1	“good fortune” (Gorham 1971:100)	SPS19
6.13h	Chinese character	1	Variation of “happiness”	SPS25

6.13i	Japanese characters	1	Chinese for "luck" and "longevity" (Gorham 1971:137; Stitt 1974:12)	SPS26
6.13j	Embossed star	1	Imperial Japanese Army emblem	SPS18
6.13k	Chinese character	1	Chinese for "longevity"	SPS26
6.13l	*Fuku*	1	Chinese for "good fortune"	SPS45
6.13m	Unknown	3	Unknown	SPS41
6.13n	Japanese "*ju*"	3	Japanese for "longevity" Gorham (1971:77)	SPS41
6.13o	Anchor and rising sun	1 (bowl)	Imperial Japanese Navy emblem	SPS40

6.2.5 Glass Food and Beverage Containers

A total of over 4,000 glass fragments, amounting to 760 vessels, are present in the Saipan assemblage. The glass represents a variety of beverage and condiment bottles from both Japan and the U.S., and food jars (Table 14).

Table 14: Glass Beverage and Condiment Vessels in Saipan Assemblage

Japanese Vessels **Beverages** **Beer**	263
Wine	4
Soft Drink/Mineral Water/Cider	63
Sake	95
Soy Sauce	26
Tableware	15
Food Jar	16
U.S. Vessels **Beverages** **Beer**	231
Soft Drink	41
Carboy	4
Food Jar	2
Total	**760**

6.2.5.1 Japanese Beverages and Soy Sauce

Japanese beverage bottles, primarily beer and sake, and soy sauce (*shoyu*) bottles (Fruin 1983:1) are the most common within karst defences (Table 15). Out of the three, sake production has the longest history in Japan and was made shortly after the introduction of wet-rice agriculture in the 3rd century (Alexander 2013:9; Fuess 2006:46; Slaughter 2013:286). The first reference to Japanese soy sauce appears in the mid-1500s and it has been manufactured since the 17th century (Cwiertka 2006:392; Fruin 1983:15; Shurtleff and Aoyagi 2012:6; Yamasa 2016). Although beer was brought to Japan in the 1870s by the Dutch East India Company, it was not readily available or consumed until after the Meiji Restoration (Alexander 2013:8).

Prior to 1868, both sake and soy sauce production was largely controlled by feudal lords in major centres except for rural, small-scale miso paste production (an alternative to soy sauce) and sake brewing for more ceremonial use (Cwiertka 2006:392; Ishige 2001:115; Ross 2009b:303–304; Slaughter 2013:286). After the Meiji Restoration, beer, sake and soy sauce became commercially available (Fuess 2006:45; Ross 2009b:8). In an effort to appear "modern" and "civilised," the Meiji Government encouraged people to consume Western goods such as beer and eliminated licensing restrictions on production (Alexander 2013:17–18; Ishige 2001:142; Ross 2009b:309). As a result, small-scale brewers emerged out of the Yokohama foreign community (Alexander 2013:6; Laker 1975:50; Ross 2010:236). Tens of thousands of sake breweries were also established (Kawabe 1989:36; Ross 2009b:303; Slaughter 2013:286) and in addition to a sake brewery, each locality had a soy sauce brewery (Ishige 2001:115). Many companies made both sake and soy sauce and soy sauce, vinegar and sake were distributed by the same alcohol products guild (Fruin 1983:5, 58). Sake became a daily beverage in the early 20th century (Fuess 2006:45; Ross 2009b:304; 2010:235; Slaughter 2013:286), but only the rich in urban areas could obtain access to, and were able to afford, beer (Alexander 2013:6, 12, 45; Ross 2010:236).

Table 15: Japanese Beverage and Condiment Bottles per Site

Site	Beer Bottles	Sake Bottles	Soft Drink	Soy Sauce	Wine
SPS4	48	25	0	10	2
SPS7	1	0	0	0	0
SPS10	1	1	0	0	0
SPS11	3	5	0	1	0
SPS14	3	3	0	0	0
SPS15	1	0	0	0	0
SPS18	0	6	0	1	1
SPS19	65	3	42	0	0
SPS20	2	2	0	0	0
SPS22	4	2	0	0	0
SPS25	3	7	0	5	0
SPS26	10	3	11	2	0
SPS28	2	0	0	0	0
SPS29	7	2	0	0	0
SPS30	1	0	1	0	0
SPS32	1	1	0	0	0
SPS33	3	8	1	1	0
SPS35	2	0	0	0	0
SPS36	22	6	0	4	0

SPS37	18	11	0	1	0
SPS39	10	5	2	0	0
SPS40	47	1	0	0	1
SPS41	4	1	1	1	0
SPS43	1	0	0	0	0
SPS44	0	1	4	0	0
SPS45	4	2	1	0	0
Total	**263**	**95**	**63**	**26**	**4**

Some of the major beverage and soy sauce companies established themselves in the early 1900s and took measures to dominate the market. The primary beer companies included the Dai Nippon Beer Company (1906), the Kirin Brewery Company (1907) and the Kabuto Beer Company (1908) (Alexander 2013:31, 47). Sake and soy sauce continued to grow in tandem as they used the same culture and sake was often added to soy sauce to improve the flavour (Shurtleff and Aoyagi 2004:5). The Noda Shoyu Company, selling Kikkoman soy sauce, and the Yamasa company dominated production and exports at this time (Shurtleff and Aoyagi 2012:9, 2118).

WWI brought major opportunities for Japanese beer brewers worldwide. When beer exports from European countries ceased the demand for Japanese beer increased both domestically and overseas (Alexander 2013:67–68). Companies also began purchasing formerly owned German breweries in China (Alexander 2013:67). By the late 1920s the leading beer brewers invested in more advertising and bottle manufacturing, and began producing soft drinks, ciders, soda water, vitamin drinks and supplements (Alexander 2013:91; Ross 2009b:310). Dai Nippon introduced a vitamin drink made from beer yeast called “Ebios” in 1930 and Kirin beer sold Yeast Medicine Amitaze (*Kobozai Amitaze*) in tablet and powdered form in 1932 (Alexander 2013:93; Laker 1975:197). Yeast was particularly useful in preventing beriberi—a Vitamin B1/thiamine deficiency (Hawk 2006:337). Demand for soy sauce also increased and several companies sold a non-fermented, chemical soy sauce produced from hydrolysed vegetable protein, which could be made in a day (Cwiertka 2006:393). Sake companies competed with beer and also moved towards more aggressive advertising. Two noteworthy sake companies include the Hakutsuru Sake Brewing Company and the Gekkeikan Company (Kawabe 1989:35).

In the 1930s, beer, sake and soy sauce brewers began opening subsidiary companies overseas in Japanese colonies. Encouraged by military expansion abroad, both Dai Nippon and

Kirin developed branches in Korea, Manchuria, China and the Philippines (Alexander 2013:108, 134; Laker 1975:265; Ross 2013:120). Sake was produced in Hawaii (Slaughter 2013:296) and subsidiaries were developed in Saipan and Rota (Bowers 2001:120; Mohlman 2011:14; Russell 1984:64). Soy sauce companies also opened subsidiary companies (Cwiertka 2006:395).

The Japanese invasion of China in 1937 and increased military spending brought Japan into a period of wartime frugality which affected beer, sake and soy sauce industries differently (Alexander 2013:111). The wartime food shortage decreased the availability of rice (a Grade A foodstuff) for sake brewing. In 1939, government-ordered restrictions came into effect and were soon followed by orders to terminate production and ration the remaining supply (Alexander 2013:111–112; Ishige 2001:161). In 1945, companies were given orders to cease production and switch to distilling fuel alcohol (Alexander 2013:134). In 1937, soy sauce producers moved towards making more chemical soy sauce and were then ordered to produce the synthetic version in 1941 (Cwiertka 2006:393–394). Despite wartime restrictions, beer production and consumption increased as it used barley (a Grade B foodstuff) and was a key source of tax revenue for the government (Alexander 2013:111–112). However, as the war progressed, beer production, prices and consumption became government controlled (Alexander 2013:118–120). Beer was rationed to the public and customers were required to return empty beer bottles and caps in order to buy more beer (Alexander 2013:127). Eventually, the IJA requested that Dai Nippon and Kirin assume control over the beer industry as well as distilleries, soft drink companies and soy sauce firms (Laker 1975:306). Dai Nippon, Kirin and Sakura (although Sakura merged with Dai Nippon in 1943) continued to supply beer from Japan and their subsidiaries to the IJN's major naval bases and the IJA (Alexander 2013:141, 144). Between April 1942 and March 1943, roughly 20 million bottles were delivered to the Japanese military, decreasing to 12.88 million in the following year and 2.17 million between April and August 1945 (Alexander 2013:125, 133, 143).

Beer and sake were both available to Japanese civilians and the Japanese military in Saipan. By 1934, there were 163 bars serving alcohol in Saipan, Tinian and Rota and 71 percent of the volume shipped to the islands was beer (Laker 1975:290, 292). In an interview with U.S. Marine Guy Gabaldon, who fought in Saipan, he described how the Japanese military stored beverages within caves:

> Rock candy, canned crab meat and lemon soda. Man, did the Japs [*sic*] ever like rock candy and lemon soda! It was in every cave and bunker. And many cases of Kirin beer. That was real Kirin Beer, bottled in

> Kirin, Manchuria, not like the Kirin Beer today, made in Tokyo. Those Manchurian troops brought the best with them (The War Times Journal 1999).

The Japanese military was also well-stocked with sake on Saipan (Moore 2013:124). Private Genkichi Ichikawa, fighting in Saipan wrote in his diary that in January 1944 he and other soldiers "…celebrated the New Year of 1944 by having sake at lunch" (Westfall and Kimihira 2014:20). There are several mentions in his diary of the military consuming a refreshing cup of sake, drinking sake to celebrate the emperor's birthday, times when soldiers drank sake from 2pm to 7pm and consuming it before the *gyokusai* attack on July 7, 1944 (Westfall and Kimihira 2014:20, 25, 28, 53, 56, 119). There is also mention of Japanese soldiers transforming sake bottles into home-made hand grenades (Westfall and Kimihira 2014:101).

6.2.5.2 Japanese Beverage and Soy Sauce Bottles

The first glass sake and soy sauce bottles appeared on the market in the mid-1800s to replace wooden casks (Ross 2009b:304, 310; Shurtleff and Aoyagi 2004:5). Standard glass sake bottles were 1.8L volume, usually with lightning-type, ceramic closures (Aso 2004:16; Ross 2009b:304). By the 1940s only about half of the sake produced was sold in glass bottles (Kawabe 1989:36; Ross 2009b:303). A small amount of soy sauce was bottled in the 1910s, and most companies looked to change from kegs and barrels to bottles and cans in the 1920s for easier storage and shipping (Fruin 1983:109, 231–232). The first factory built exclusively for bottling soy sauce opened in 1930 (Fruin 1983:231).

In the beginning, beer companies relied on imports and local glass companies to supply bottles, which had cork and wire closures or stoppered corks with sealing wax (Laker 1975:83). After 1906 companies sought out a low-cost means for mass production and a more efficient closure (Ross 2009b:310). In 1911, Dai Nippon introduced semi-automatic and automatic bottle-making machines from Europe and North America and was the first company to introduce crown finishes on their bottles, which quickly became standard (Alexander 2013:63; Laker 1975:261; Ross 2009b:310).

In 1920, Dai Nippon began using either Graham or Owens bottle machines in all its plants (Laker 1975:125; Ross 2009b:310). Kirin used corks well into the 20th century, including Goldy Corks, an aluminium cork resembling a bottle cap and manufactured in Germany (Alexander 2013:63). Kirin did not use an automatic labeller until 1917 and began using machinery imported from England in 1928 (Alexander 2013:63, 92). Kirin, however, was the first soft-drink maker to use colourless glass bottles (Alexander 2013:92). By the 1930s, prohibition enabled Japan to purchase cheap machinery from the U.S. (Alexander 2013:80). By 1943, beer bottles came in five sizes: a small bottle (360ml), 3.51 *gō* (630ml), 4 *gō* (720ml), 5 *gō* (900ml) and a 2L bottle (Alexander 2013:122, 128; Ross 2009b:310). Dai Nippon's bottles had export style bodies with wider shoulders, while Kirin beer used a bottle with a champagne style body, but by August 1944, both companies used the champagne style body (Alexander 2013:129).

Labels and embossing on Japanese beer bottles changed over time and across companies. In the 1920s most Japanese beer bottles had both English and Japanese marks (Alexander 2013:10). The bottles made by subsidiary companies, however, were marked differently based on their employees. For example, the Kirin subsidiary company in Manchuria printed labels with "Kirin" in katakana script (キリン), since the producers did not know the Japanese word created for beer (Alexander 2013:136). During the war, when the supply of raw materials was low, some bottle-makers ground their competitors' names off the bottle and reused them (Ross 2009b:311). When the government controlled the beer industry in the late 1930s, officially priced products were to be labelled "public" or "government" (公) (Alexander 2013:119–120). In May 1943 all brand labels were replaced by a unified label printed in three colours for the three permitted uses (household, business and special ration price) that featured the word for beer, "*bakushu*" (麦酒), flanked by ears of wheat and the individual brewing company's name in tiny characters (Alexander 2013:129; Kirin Holdings Company Ltd. 2007). In 1944 company names were removed from the label and printed in one colour (Alexander 2013:129).

6.2.5.3 Japanese Beer and Soda Bottles in Saipan

All beer and soda bottles within Saipan's karst defences are machine-made with crown finishes. Of the embossed vessels, the majority of them are brown, olive and emerald Kirin (n=128) and Dai Nippon (n=91) brand bottles. Kirin bottles are embossed with a number and a line underneath it on the base, a KB monogram near the heel of the bottle and Kirin (キリン) written in Japanese katakana script typical of Manchurian-made bottles (Alexander 2013:136; The War Times Journal 1999) (Figure 6.14). Kirin beer bottles come in 630ml or the more common 720ml champagne style bodies. Dai Nippon beer bottles are all 720ml size with export style bodies embossed in English or Japanese with a logo of the sun (a circle with a dot in the centre), a monogram of the letters DNB and the word “TRADEMARK” on the shoulders. A five-pointed star is embossed on the base. According to Ross (2009b:323–324), earlier bottles do not have the DNB monogram or the star. There is also a series of numbers, letters and dots surrounding the star on the base, usually a number to the left, a number to the right and a letter or dot below the star. “Dave,” a collector on Guam using the handle daven2nl on the website antique-bottles.net, theorises that the embossing on the bottom of the Dai Nippon bottle identifies the date of manufacture. According to the Japanese regnal calendar, years are named and numbered according to the emperor and his year of power (Allied Translator and Interpreter Section 1944:16; Nila and Rolfe 2006:4). During WWII, for example, the date “Showa 16,” or just “16,” refers to the 16th year of Emperor Hirohito’s (regnal title Showa) reign which corresponds with the year 1941 in the Gregorian calendar (Allied Translator and Interpreter Section 1944:16; Nila and Rolfe 2006:4). The number to the left of the star on the base would thus be the regnal year of manufacture. The numbers on Dai Nippon bottles in Saipan range between one and 18 which correspond to the years 1926 to 1943.

Thirty colourless, nine aqua and one amber 630ml Kirin bottles were also present in karst defences. Embossing on these vessels includes the KB monogram on the shoulder and “KIRIN BEER CO LTD” in English just above the heel. Three different bases have an embossed T and superimposed C or G and/or a combination of letters and numbers. Kirin used colourless bottles for soft drinks, cider and soda water (Alexander 2013:92; Ross 2009a:10), so these bottles are interpreted as non-beer bottles (Figure 6.15).

Other beverage bottles in the Saipan assemblage include nine Nippon Beer Kosen Company bottles in 900ml amber and olive colours and 720ml colourless glass. Nippon Beer Kosen was in business from 1921 until 1933 when it merged with Dai Nippon (Ross 2009b:309–310). Kosen bottles have export style bodies and are embossed in English or Japanese with a logo of the sun at the heel and a monogram of the letters BNK on the shoulders and just above the heel. One 720ml colourless bottle has no heel markings. Like Kirin, the smaller colourless bottles are interpreted as cider, soft drink or mineral water vessels and the larger amber and olive vessels are considered to have once contained beer.

Seven 900ml amber and olive export style Sakura Beer Company bottles and one 900ml amber export style Kabuto beer bottle are also present. The Sakura Beer Company was in operation between 1929 and 1943 and Kabuto between 1908 and 1921 (Alexander 2013:47). Sakura Beer Company bottles are embossed with English or Japanese with a cherry blossom (*sakura*) on the shoulders and a combination of one letter and a number on the base. The one Kabuto bottle has an embossed K with a circle around it with the word TRADEMARK in English above the heel. Other unknown, unmarked 720ml and 900ml aqua and colourless vessels were also recorded. These are interpreted as cider, soft drink or mineral water bottles.

Figure 6.14: Dai Nippon beer bottle with export style body and crown finish (8cm scale).

6.2.5.4 Sake and Soy Sauce Bottles in Saipan

Archaeologists have located sake bottles on several 19th and 20th century Japanese sites in North America. Three studies discuss sake bottles with embossed company names on the vessels. Slaughter (2013:294) found sake bottles at the Amache Japanese WWII internment camp in Colorado. These were typically large, heavy, one-gallon, colourless or aqua jugs with embossed company names from Hawaiian subsidiary companies (Slaughter 2013:294). Ross (2009b:321, 343) located 11 sake bottles from a 20th century Japanese industrial work camp in British Columbia, Canada. One vessel in his study has an embossed company name (Ross 2009b:343–344). Finally, Bodner (1997:99) recorded a colourless bottle marked “Suishin” located in a cave on Tinian which is probably a sake bottle from the Suishin Yamane Honten Brewery (The Great Sakes of Hiroshima n.d.). Sake bottles without embossed company names are typically described as aqua or sapphire in colour with a champagne style body and come in 720ml or 1.8L sizes with broad collar, club sauce-like or ring type finishes sealed with porcelain stoppers or metal clamps (Bodner 1997; Dixon 2004:290, 292; Eakin et al. 2012:5; King and Parker 1984:175; Ross 2009a:10; 2009b:304, 324, 344).

Figure 6.15: Colourless, 630ml Kirin cider, soft drink or mineral water champagne style bottle (8cm scale).

A total of 122 similar aqua/sapphire (n=119) and amber (n=3) vessels were identified in the Saipan assemblage. These have champagne style bodies with base diameters of 10.7cm to 11cm with an approximate volume of 1.8L (Figure 6.16). One aqua base has a diameter of 8.25cm and is a 720ml bottle. There are three types of finishes related to these bottles. Wide bead finishes with cork closures are the most common (n=31), followed by club sauce (n=3) and one oil finish with indentations for a lightning-type closure (Figure 6.17).

Sixteen of these vessels have embossing on the body, base and finish identifying them as soy sauce bottles. Fourteen are from the Noda Shoyu Company Limited (established in 1917) and two are from the Yamasa Soy Sauce Company (established in 1645) (Fruin 1983:5; Shurtleff and Aoyagi 2012:6, 2118, 2386). Kikkoman soy sauce bottles have the embossed Kikkoman logo and “NODA SHOYU CO LTD TRADEMARK” in English just above the heel. Noda Shoyu Company changed its name to Kikkoman Shoyu Company in 1964 and then Kikkoman Corporation in 1980 (Fruin 1983:243). Two of the bases have two embossed numbers and a stylised arrow. Another has the number 152 in Japanese characters (一五二) with a triangle and another, the number 79 in Japanese characters (七九) and a triangle. One of the finishes also has the same embossed stylised arrow. Similarly, the Yamasa vessel has “YAMASA SHOYU CO LTD TRADEMARK” in English with the Yamasa logo embossed above the heel (Figure 6.18). The one complete Yamasa base recorded is embossed with the number 2. Two of the vessels, one Noda Shoyu and one Yamasa also have wide bead finishes (Lindsey 2016a).

The remaining 106 unidentified aqua/sapphire vessels have a range of embossed marks on the base and are interpreted as sake bottles. However, only four vessels have a marking that may be related to a known sake brewing company. Figure 6.19 shows what is interpreted as a white crane (tsurumaru) with its wings extended—the modern mark of the Hakutsuru Sake Company. According to the company website, however, Hakutsuru did not use the white crane as part of its corporate identity until 1979 (Hakutsuru Sake Brewing Co. Ltd. 2016). While none of the aqua/sapphire bottles in the Saipan assemblage can be positively identified as sake bottles, the likelihood that all 106 vessels contained soy sauce is low given the abundance of alcohol bottles (beer) within karst defences, the mention of sake in military journals, the prevalence of sake bottles in other archaeological studies of Japanese sites and the presence of a sake brewery on Saipan.

6.2.5.5 Wine Bottles in Saipan

Five Akadama Port Wine bottles in aqua and amber were found at three karst defence sites. Although Japan’s environment was not conducive to producing fruit wine (Ishige 2001:32), the Japanese began making wine in 1873 which continued into the 1890s with little local success or demand (Ross 2010:236). Akadama Port Wine is a product of Shinjiro Torii, who began making wines and selling them out of a store in Osaka in 1899 (Alexander 2013:84; Laker 1975:221). The port wine was first launched in 1907 (Suntory Holdings Ltd. n.d.). In 1921, the company was renamed Kotobukiya Limited and expanded to produce first malt whiskey and then beer after the purchase of the Japan-English Brewery Company in 1928 (Alexander 2013:47, 84, 99). The company changed its name to Suntory Limited in 1963 (Suntory Holdings Ltd. n.d.).

Figure 6.16: Typical 1.8L *shoyu* bottle in Saipan with champagne body style (8cm scale).


Figure 6.17: Range of finishes on sake and/or soy sauce bottles in Saipan, wide bead (top), club sauce (bottom left), oil finish (bottom middle), wide bead with embossed stylised arrow (bottom right).

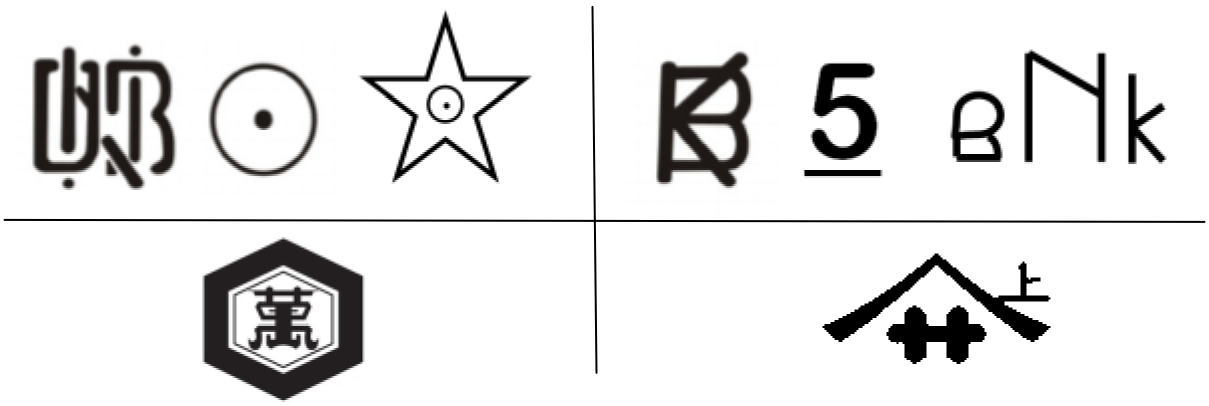

Figure 6.18: Logos on Japanese bottles. Dai Nippon beer (top left), Kirin beer (top right), Noda Shoyu (bottom left), Yamasa Shoyu (bottom right).

Figure 6.19: Possible Hakutsuru Sake Brewing Company logo (courtesy of John Fraser).

Embossed above the heel of the port wine bottles in the Saipan assemblage is "BOTTLED AND GUARANTEED BY KOTOBUKIYA LTD," with "AKADAMA PORT WINE" on the shoulders. The base of the amber vessel has an embossed anchor symbol with a superimposed "c." The bottles are machine-made, cylindrical bottles (Lindsey 2016b) in approximately 720ml size with external screw thread finishes.

6.2.5.6 U.S. Bottles and Post-War Vessels in Saipan

The U.S. bottles located at karst defence sites are predominantly amber beer bottles, but there are also colourless beer bottles and aqua and colourless carboys. All the U.S. amber and colourless beer bottles are crown finished with either the typical two-part or the double-ring crown (Lindsey 2016a).

Most of the U.S. bottles have maker's marks and distinct characteristics making it easy to differentiate between Japanese and U.S. bottles. Other characteristics often found on U.S. bottles in the Saipan assemblage include basal or body stippling (also referred to as baseplate knurling) (Lockhart and Hoenig 2015:3). By the early to mid-1940s, beer bottles were stippled which consisted of tiny dots poked into the base plate of a mould (Lockhart and Hoenig 2015:10; Lockhart et al. 2013:433). A second type of stippling was introduced sometime in the 1970s consisting of small crescents that looked like a single parenthesis encircling the resting point of the base (Lockhart and Hoenig 2015:10). Bottles with this latter type of stippling also exist in the Saipan assemblage and are indicative of post-war visitation of karst defence sites.

Another characteristic of U.S. bottles are embossed phrases such as "NOT TO BE REFILLED NO DEPOSIT NO RETURN" or "NO DEPOSIT NO RETURN NOT TO BE RESOLD." After prohibition was repealed in the U.S. in late 1933, a federal law was passed to prevent the reuse and sale of used liquor bottles, primarily to deter bootleggers and moon shiners (Lindsey 2016b). Between 1935 and 1964, such phrases were required to be embossed on all liquor and beer bottles sold in the U.S. (Lockhart et al. 2013:436).

The most common U.S.-made bottles in Saipan (n=111) are from the Owens-Illinois Glass Company of Toledo, Ohio, established in 1929 (Lockhart et al. 2013:426; Toulouse 1971:46, 170) (Figure 6.20). The Owens-Illinois logo is located on the base of the bottle and includes the embossed factory number code, the Diamond-I logo (an I enclosed by an elongated horizontally orientated diamond with a superimposed O around the I), a date to the right of the symbol and a mould cavity code below the symbol (Lockhart and Hoenig 2015:10). The date code of bottles was represented by a single digit, but to differentiate between decades, the company began adding a dot next to the single digit on beer and soda bottles manufactured in the 1940s (Lockhart and Hoenig 2015:11). This practice was eventually phased out and the company began adding two-digit date codes instead (Lockhart and Hoenig 2015:11). Some Owens-Illinois bottles also included mould prefixes characterised by embossed letters that identified the contents of the bottle (Lockhart and Hoenig 2015:5). The letters “GB” were found on bottles in the Saipan assemblage and refer to “beverage” (Lockhart and Hoenig 2015:5). The word “Duraglas” written in cursive is also present on many of the beer bottles. “Duraglas” was embossed on bottles between 1940 and 1964 and refers to a new formula for bottle making that used less glass (Lockhart and Hoenig 2015:9; Toulouse 1971:170).

The second most common bottle in Saipan was made by the Anchor Hawking Glass Corporation of Lancaster, Ohio, established in 1937 (Lockhart et al. 2013:426; Toulouse 1971:46, 170). The Anchor-H trademark present on the Saipan bottles was first used on June 11, 1938 and continued until 1960 (Lockhart et al. 2013:431, 433; Toulouse 1971:48). It is characterised by an embossed anchor symbol with a superimposed H, a model number above, a plant code number below and a date code number to the right (Lockhart et al. 2013:433). The majority of the Anchor-Hawking bottles are also stippled. Other U.S. maker’s marks include the Diamond Glass Company, the Latchford-Marble Glass Company and Coca-Cola.

The U.S. beer bottles in Saipan date between 1935 and 1945 and their presence are a result of post-battle occupation by U.S. troops, except for the examples found in SPS18. SPS18 contains at least 153 U.S. beer bottles. These bottles are mixed with rock and rubble in the first 2m of the cave and in the berm located just outside the entrance. The U.S. bottles thus do not indicate U.S. occupation of the site. Rather, the bottles were pushed into the cave by a bulldozer or other heavy machinery. There were no U.S. bottles in the rear half of the cave.

A number of more modern bottles are present in the assemblage, which are identified as such by crescent stippling on the base and the presence of dot heel codes. Dot heel codes are embossed dots at the heel of the vessel compatible with the machines that made them (Lockhart and Hoenig 2015:21–22). These were established by the Owens-Illinois company in the early 1990s (Lockhart and Hoenig 2015:21–22). Some of the maker’s marks on modern bottles belong to the San Miguel Corporation of the Philippines and the Nippon Glass Company Ltd. in Tokyo (Toulouse 1971:591).

Figure 6.20: U.S. Owens-Illinois beer bottle dating to 1944 bulldozed into SPS18.

6.2.5.7 Glass Tableware and Food Jars

Fifteen drinking and shot glasses were also recorded within karst defences. Their base sizes range from 3.5cm to 6cm in diameter and all are colourless or aqua glass. Some have embossing on the base, while others are unmarked (Figure 6.21). Three of the drinking glasses have an embossed SGF within an elongated horizontal diamond on the base, two of which also include the phrase “Made in Japan.” Others have “CAN” within a circle on the base, which is a logo used by the Toyo Seikan Co. Ltd. established in 1917 (Toyo Seikan Co. n.d.). The interiors of the colourless glasses have a series of convex vertical panels. Another common glass is aqua with a pattern of vertical engraved marks running up the vessel from the base.

Sixteen jars were located within Saipan’s karst defences. These jars have wide mouths and a range of finish types and are interpreted as once containing food. One notable large, colourless, square-shaped 15cm long jar was found in SPS25. The vessel is pattern moulded with an 11cm wide base and a mouth diameter of 9cm and is interpreted to have once contained dry food or biscuits (Figure 6.22). Other wide mouth glass vessels have markings that identify them as medicial vessels and others are within a site containing an abundance of medicial containers. These other wide mouth vessels are included in the medicine container discussion below.

Figure 6.21: Aqua glass with vertical engraved marks (left), colourless drinking glass with convex vertical panels (right) (8cm scale).

Figure 6.22: Large, square food jar in SPS25 (8cm scale).

6.2.6 Food and Beverage Cans, Cooking Vessels and Utensils

While tinware and metal containers were popular throughout the 1600s and 1700s, the use of tin-plated vessels to preserve food began in the late 1810s as a replacement for expensive glass canning jars (Busch 1981:95–96; Clark 1977:8, 10–11, 13, 19). The sanitary can was invented in 1904 and completely replaced the hole-in-cap can (a three-piece soldered can with packing hole) by the 1920s (Busch 1981:96; Clark 1977:14, 18). The sanitary can was not soldered, but locked or crimped together with the addition of a rubber compound to help seal the seam (Clark 1977:18). Both the side seam on the body and the top of the can were locked and crimped after the can was filled, which allowed for larger pieces of food to be inserted into the can (Busch 1981:97; Clark 1977:18). The can could then be soldered on the outside (Busch 1981:98). In the 1920s enamel linings were added to the interior of the can to prevent bleaching of fruits and vegetables (Busch 1981:98; Clark 1977:32). Over time, the can-making process became much more automated (Clark 1977:18).

The growth of the tinplate industry was heavily tied to 20th century warfare. Food cans and preserved foods played a significant role in feeding military forces around the world and some even financed food preservation experiments (Clark 1977:12; Wedding et al. 2012:80). Preserved foods in cans were a major part of military rations—a commercially-prepared meal designed for use during battle or when hot meals were otherwise unavailable (Busch 1981:95; Wedding et al. 2012:80–81).

During WWII, Japanese army and navy rations were the same and came in standard field and emergency rations (Charlotte's Axis Attic n.d.-d). There were seven different types: two types of field rations (normal and special), a three-day ration (A-ration), a one-day ration (B-ration), and emergency, compressed and high nutrition rations (Charlotte's Axis Attic n.d.-c; U.S. War Department 1942:78–79). In the Pacific, in areas that were safe from air attack, rations were delivered in bulk by merchant vessels (Hawk 2006:336). In areas where enemy air attack was possible, bulk foods, such as rice and vegetables, were poured into 50-gallon drums through a 5cm diameter hole. The drums were then capped and tossed overboard from a passing ship to drift ashore where unit members could retrieve them (Hawk 2006:336). Rations were intended to be supplemented by local foods or vegetables and livestock grown and raised by military units in the combat zone (Danquah 1990:60; Hawk 2006:336; Moore 2013:124).

Japanese military rations used different sizes of cans and tinware. The special field ration contained a 150g can of meat, a 120g can of vegetables and a can of rice beer (Charlotte's Axis Attic n.d.-b; U.S. War Department 1942:78–79). The three-day A-ration contained a 170g can of mixed meat or fish and vegetables. Five-day emergency rations included a can of tea and the entire compressed ration came in a small, square tin (Charlotte's Axis Attic n.d.-d; U.S. War Department 1942:77).

Although not necessarily part of Japanese war rations, sources also mention U.S. troops capturing tinned fruit from the Japanese in Guadalcanal (Moore 2013:123) and karst defences containing canned crab meat (The War Times Journal 1999). These items could have been from stores opened by the Japanese quartermaster corps which supplied beer, sake, hard candy in oval tins, canned fish (tuna, squid, onito or crab) and canned fruit, amongst other non-canned foods, to the military (Charlotte's Axis Attic n.d.-a).

There are a number of Japanese tinwares and cans located within karst defences in Saipan with a range of lengths, diameters and lids (Table 16). Some lids are slightly larger in diameter than the body and are flanged to slide onto the vessel. These are interpreted to have once contained non-perishable food items or items such as lotions, hard candy or other personal items. Other cans have metal lever-lids similar to paint cans that need to be pried off. The most common lever-lid can holds approximately 1521ml (51oz). These would have also contained non-perishable food items, personal items or possibly medications, such as quinine (Hawk n.d.-c:6). The remaining cans were sanitary cans and the most common sizes were 467ml (16oz), 1065ml (36oz) and 306ml (10oz). There were three different methods for opening the sanitary cans in the assemblage: with a sharp object such as a knife, with a can piercer, often referred to as a church key (Memmott 2015), or with a key-winding strip. The pierced cans are interpreted as liquid containers, while all other sanitary cans were interpreted as once containing food or drink. Only one can fragment had a partial undecipherable label still present and one unopened can had an embossed Japanese character on the top (the symbol for prosperity). Embossing has been used to decorate cans since the 19th century (Busch 1981:99; Clark 1977:11) (Figure 6.23). Metal drums were also found in karst defences and, while some may have once contained gasoline, others may have contained water or food.

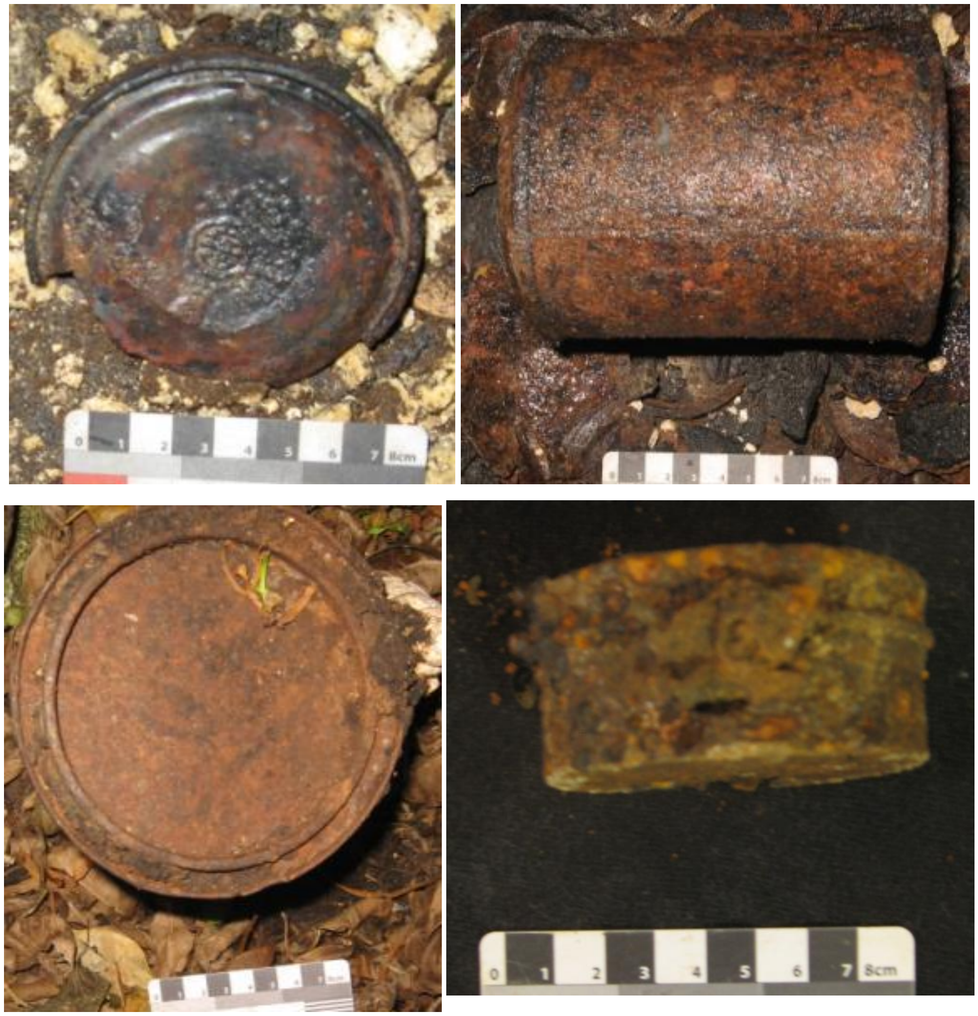

Figure 6.23: Embossed sanitary can (top left), sanitary can (top right), lever-lid (bottom left), can with flanged lid (bottom right) (8cm scale).

Three 460ml (16oz) “low-profile” (short cone) cone-top beer cans with concave bottoms were recorded in SPS18. First made in 1935, low-profile cone-top cans were initially made with flat bottoms (Busch 1981:100), but changed to a concave form in 1937 (Maxwell 1993:101–102). Between 1937 and 1940, another cone-top can was made with a straight, narrow neck called a J-spout (Maxwell 1993:99, 101). Although Schlitz was the first to use the cone-top can, this type was cheaper than the flat-top kind and was therefore initially taken up widely by small brewers. They became increasingly popular in 1939, but had become obsolete by the 1950s (Clark 1977:32; Maxwell 1993:99).

There were also a number of U.S. ring-pull tab beer cans and tabs located within SPS15. Ring-pull tab cans were introduced in 1965 and petered out in the 70s due to the increasing litter problem caused by the throwaway tab (Busch 1981:100–102; Maxwell 1993:107, 109). A total of 23 Budweiser, Schlitz and Miller brand ring-pull tab beer cans (22 in one tunnel and one at a cave site) were recorded. There were also plastic six-pack holders within SPS15 which were first produced by Anheuser-Busch in 1963 (Maxwell 1993:108). Other U.S. items included in the Saipan can count are rectangular SPAM cans and jerry cans. All the jerry cans in Saipan were made in the U.S., as the Japanese only used fuel drums rather than jerry cans (Anonymous n.d.).

Table 16: Cans in Saipan Assemblage

Site	Number of Cans	Can Type/Characteristics	Can Capacity in ml (oz.)	Probable Contents	Notes
SPS3	1	Sanitary Can	143ml (5oz)	Food	One can key
SPS4	1	Sanitary Can	Unknown	Food	In fragements One can key
SPS5	2	Sanitary Can	85mm diameter 152mm diameter	Food Food	 Possibly modern
SPS8	1 1	Sanitary Can Metal Drum	72mm diameter Fragmented drum top	Food Unknown	
SPS10	4	Sanitary Can	385ml (13oz) 80mm diameter x2 85mm diameter Jerry Can	Food Food Food Gasoline/ Water	SPAM can
SPS14	4	Sanitary Can	608ml (20oz) x2 261ml (9oz) 75mm daimeter	Food Food Food	 One can key
SPS15	26	Ring-pull tab Sanitary Can Cone-top	365ml (12oz) x23 104mm diameter Unknown 71mm diameter	Beer Food Food Beer	
SPS17	2	Sanitary Can	80mm diameter	Food	
SPS18	137	Sanitary Can Cone-top Tin ware Sanitary Can	434ml (15oz.) 445ml (15oz) x15 467ml (16oz) x43 69mm diameter x62 70.5mm diameter 447ml (15oz) x6 672ml (23oz) 112mm diameter 533ml (18 oz) 460ml (16oz) x3 743ml (25oz) 116ml (4oz) 385ml (13oz)	Food Food Food Food Food Food Food Food Liquid Beer Personal Personal Food	 Piercer marks SPAM can Two can keys
SPS19	38+	Sanitary Can	559ml (19oz) 699ml (24oz) 1065ml (36oz) x 17+ 105mm diameter x 18	Food Food Food Food	 Charred pile

		Paint Can Metal Drum	170ml (6oz) 222L (59 gallon) x 19	Food Unknown	 Salt?
SPS20	40	Tin ware Sanitary Can	183ml (6oz) 56mm diameter x2 67mm diameter x2 442ml (15oz) 459ml (16oz) 76mm diameter x3 168ml (6oz) 77mm diameter 78mm diameter 483ml (16oz) 436ml (15oz) 515ml (17oz) x2 306ml (10oz) x5 660ml (22oz) 309ml (10oz) x2 690ml (23oz) 89mm diameter x4 336ml (11oz) x2 641ml (22oz) 1045ml (35oz) x6 200mm daimetre 385ml (13oz) 192ml (7oz)	Personal Food Food Food Food Food Food Food Food Food Food Food Liquid Food Liquid Food Food Food Food Food Food Food Liquid	 Can key edge One can key edge Can key edge Piercer marks x3 Piercer marks SPAM can All aluminium
SPS21	3	Sanitary Can	105mm diameter 573ml (19oz) x2	Food Liquid	 Piercer marks Three can keys
SPS22	1	Sanitary Can	473ml (16oz)	Food	
SPS25	1 1	Sanitary Can	107mm diameter Jerry can	Food Gasoline/water	
SPS26	1	Sanitary Can	Unknown	Food	In fragments
SPS29	2 1	Sanitary Can Metal Drum	107mm diameter Unknown 90L (24 gallon)	Food Food Unknown	 In fragments
SPS33	11	Sanitary Can	57.5mm diameter 75mm diameter x 9 Unknown	Food Food Food	 In fragments
SPS34	1	Sanitary Can	Unknown	Food	In fragments
SPS36	17	Sanitary Can Paint Can	97.5mm diameter 1521ml (51oz) x16	Food Food	
SPS37	4	Sanitary Can	58mm diameter 65mm diameter 69mm diameter 77mm diameter	Food Food Food Food	 Can key edge 20 can keys
SPS41	3	Sanitary Can	61mm diameter 77mm diameter 314ml (11oz)	Food Food Food	 Can key edge
SPS42	1	Sanitary Can	78mm diameter x2	Food	
SPS43	1	Sanitary Can	107.5mm diameter	Food	
SPS44	13	Sanitary Can	411m (14oz) 77mm diameter 550ml (19oz)	Food Food Food	

	 1	 Metal Drum	80mm diameter x4 82mm diameter 91.5mm diameter x2 101.5mm diameter 1008ml (34oz) Fragmented drum top	Food Food Food Food Food Unknown	
SPS45	15	Sanitary Can	336ml (11oz) 249ml (8oz) x5 79mm diameter 603ml (20oz) 80mm diameter 992ml (34oz) x3 1053ml (36oz) 385ml (13oz)	Food Food Food Food Food Food Food Food	 SPAM can
SPS47	1	Tin ware	Unknown – rectangular shaped	Personal	
SPS48	1	Metal Drum	Too fragmented	Unknown	
SPS49	1	Sanitary Can	Unknown	Food	Rim fragments
SPS54	38	Metal Drums	55 Gallon	Diesel Fuel	Tested by BECQ
SPS55	16	Metal Drums	55 Gallon	Water mixed with petroleum, lube oil or fuel	
Total	**391**				

Hardtack, a dense cracker or biscuit, was part of several Japanese rations, including the one-day B-ration and five-day emergency ration (Charlotte's Axis Attic n.d.-d; U.S. War Department 1942:77–78). The Japanese had two types of hardtack: a larger, thinner biscuit with several perforations used earlier in the war and a smaller, thicker biscuit with two perforations used later (Charlotte's Axis Attic n.d.-d). Remnants of both types of hardtack were found within karst defences. Three pieces of the smaller hardtack were found within SPS4, five within SPS37 and two fragments of the larger in SPS22 (Figure 6.24).

Other metal food utensils and cooking equipment found within karst defences include forks (n=3), spoons (n=1), tea pots (n=2), pot lids (n=1), a ladle (n=1) and various pots and buckets (n=10). A common metal cooking pot was a large, 18cm diameter pot with a projecting ledge just below the rim that encircled the entire pot (n=5). This ledge (projecting over 3.5cm) allowed the pot to sit within a stove and remain suspended just above an open flame. The IJA soldier's kidney-shaped mess kit could also be used as a rice cooker (*hango*) for the uncooked rice within normal field rations (Hawk 2006:336; U.S. War Department 1942:78–79). Rice would be placed in the aluminium insert and the entire mess kit would be placed over a fire

(Figure 6.25). One lid and five inserts are in the Saipan assemblage. There are other rectangular metal trays (n=6) and bent/melted aluminium fragments (n=10) that may have been used for cooking or preparing food, but could also be medical trays. Lastly, one U.S. military medical department mess tray was present in SPS5.

Figure 6.24: Two types of hard tack in Saipan (left and right) (8cm scale). Japanese hard tack (middle) (Charlotte's Axis Attic n.d.-d).

Figure 6.25: Common cooking pot (left), mess-kit fragment (right) (8cm scale).

6.3 Medicine and Medical Equipment

Modelled after the German army and German system of medicine (Aso 2004:188), the Imperial Japanese Army's medical department was admired for its superiority in the early 20th century (Hawk 2006:334; n.d.-c:1–2). The IJA had their own independent chain of command and officers received command rank and status (Hawk n.d.-c:2). Japan's army was the only one in the world to require that plans for medical support be part of combat operation orders and had the first successful supply system (Hawk n.d.-c:1). In WWII, the Japanese military still had high-quality medical equipment comparable to their Western counterparts (Hawk n.d.-c:2; War Department 1944a:345–346). Most of the medicines were injectable and based on Western-styles licensed from Germany. Therefore, in addition to Japanese labels, medicine could also have English or German labels (Hawk n.d.-c:2, 8). Prior to going overseas, soldiers were inoculated for various diseases, such as cholera, dysentery, typhoid, paratyphoid, plague, smallpox, tetanus, typhus and yellow fever (Hawk n.d.-c:5).

Each IJA soldier carried basic field dressings and a water purification kit consisting of one medicine tin and three glass test tubes: two with Hypochlorite antiseptic and one with sodium thiosulfate for use as an antidote (Hawk n.d.-c:5). Each member of the SNLF, however, was issued a personal first-aid kit (Hawk n.d.-c:2–3; Nila and Rolfe 2006:36). These contained packages wrapped in waxed paper printed with the naval anchor symbol and kanji letters identifying their contents, which included bandages and gauze, an aluminum can of sulfonamide powder, bottles of salt tablets, malaria pills, insect repellant, opiates in powder, pill or syrette form and sometimes condoms and venereal disease ointments (Nila and Rolfe 2006:36–37). As the war progressed, the contents of medical kits varied depending upon the supply of particular medicines (Nila and Rolfe 2006:37).

The chain of care for soldiers unable to treat themselves was to first consult the combat medic assigned to each platoon. Combat medic kits contained a wide variety of ampoules and bottles of various sizes (War Department 1944a:346). The standard drugs included quinine, aspirin, iodine and Vitamins B and C in powders, tablets or solutions (War Department 1944a:346). Quinine came in small tins resembling paint cans and was used as an anti-malarial, as was mosquito repellant, which came in either a green glass bottle, an olive drab-painted tin or a spiral-shaped incense stick (Hawk n.d.-c:6). Although combat medics often carried instruments and blood transfusion kits, they were essentially limited to applying and changing bandages (Aso 2004:22; Hawk n.d.-c:2; War Department 1944a:346).

Next was the Battalion Dressing Station (*sento kyugo han*), which was usually staffed by two or three medical officers and up to ten enlisted men who could administer emergency first aid and care (Hawk n.d.-c:3). Battalion Dressing Stations also administered traditional Japanese medicines, such as aushirin—a charcoal preparation for diarrhea and Kenninjo and Rotoex—expectorants made from snega root and herbs to aid digestion (Hawk n.d.-c:9). In 1943, the Battalion Dressing Station was combined with the front line Field Hospital (Hawk n.d.-c:3).

Field Hospitals were equipped to perform surgery and blood transfusions and could accommodate 500 people on straw bedding (Hawk n.d.-c:4). Surgeons used 5cc ampoules of anesthetic injections such as cocaine, Novocaine and morphine (Hawk n.d.-c:10). Chloroform was also used and came in 50g vials (Hawk n.d.-c:10). Chrome-plated steel surgical instruments were specialised for specific types of care and stamped with a number showing their placement within a kit (Hawk n.d.-c:11, 13). Additionally, at least one dentist was assigned to each Field Hospital to perform extractions, restorations and administer crowns and bridges, but if a soldier required dentures in the Pacific Theatre they were sent home to Japan (Hawk n.d.-b:1; n.d.-c:14). Dentists carried an aluminium pocket kit with approximately 15 chrome-plated instruments, including explorers, a mouth mirror, tooth extraction forceps, tooth elevators, amalgam filling instruments, pluggers, burnishers, foil forceps, a handpiece converter and a dental syringe (Hawk n.d.-b:2; n.d.-c:14).

Line of Communication Hospitals were located approximately 24km to the rear of the Field Hospitals and were better equipped than Field Hospitals to perform operations (Aso 2004:5). They could accommodate 1,000 patients who typically stayed there until they were evacuated to Japan (Hawk n.d.-c:4). Line of Communication Hospitals had 25 medical officers, at least one dental officer and ten nurses (Aso 2004:22; Hawk n.d.-b:1; n.d.-c:4, 14).

Malaria was a major issue during WWII and not only were soldiers given daily quinine pills, but patients were also given a combination of quinine, Plasmoquin and Atabrin (Hawk n.d.-c:6). Plasmoquin and Atabrin came in tablet form in glass bottles (Hawk n.d.-c:6–7). Atabrin also came in powder form and was mixed with distilled water in an injectable ampoule for patients unable to drink water (Hawk n.d.-c:6–7). Another malarial treatment was Bagnon, an intravenous quinine mixed with 2cc of water and 20cc of dextrose (Hawk n.d.-c:7). Doctors were also equipped with lower back needle aspiration equipment to test spinal fluid for cerebral malaria (Hawk n.d.-c:7–8). Malarial treatment and blood transfusions were conducted at Field Hospitals and Line of Communication Hospitals and rather than using a blood banking system, surgeons often performed transfusions directly from one soldier to the other (Hawk n.d.-a:1; n.d.-c:9).

Despite the IJA's sophistication, Hawk (n.d.-c:18) argues that the medical department was effective in Asia, but become disorganised on the Pacific Islands. Evacuation capabilities became limited and the medical staff were unable to adapt to new landscapes and terrain (Hawk n.d.-c:17–18). As the war progressed, the army insisted on minimising logistics to maximise front-line troops, which led to shortages of food, medicines and medics (Hawk 2006:336; n.d.-c:15). Less medicine and fewer medics meant that many soldiers were only minimally cared for or were euthanised (Hawk n.d.-c:15). Furthermore, medical teams often held a superior attitude towards the wounded, who were considered a burden to the emperor and left to die (Hawk n.d.-c:17–18).

In Saipan, a total of 112 glass medicinal vessels were located in 16 karst defence sites. All unmarked bottles that did not fit the descriptions of beverage, soy sauce and sake bottles or jars were interpreted as medicinal. There were a variety of bottle types, colours and finishes, but the most common (n=27) included a 150ml external screw thread finished rectangular bottle in colourless, brown, aqua and aqua tint (Figure 6.26). These often had a black, charcoal-looking substance remaining inside the bottles.

While most glass medicinal containers were unmarked, some (n=11) had company names, drug names, Japanese phrases and graduated measurement lines. A brown, machine-made, single collar finished bottle had the word "Wakamoto" embossed in English across the front with Wakamoto in embossed hiragana characters (わかもと) at the neck. The Wakamoto Company produced a nutritional supplement and digestive aid containing yeast in 1929 (Wakamoto Co. Ltd. n.d.). This particular bottle was manufactured between 1936 and 1955. The word "vitamins" in Japanese katakana (ビタミン) was embossed on the base of an emerald bottle in SPS4. One notable amber vessel base is embossed with the Dai Nippon five-pointed star. This may be an example of the vitamin drink made from beer yeast called "Ebios" that was first produced in 1933 (Alexander 2013:93). Two 1cc ampoules were located within two different tunnels. One is cobalt blue with "BAGNON" stamped in gold. The other is honey coloured with “BISARSEN” stamped in silver. Bagnon, as mentioned above, was a malarial treatment and bisarsen could be the combination of bismuth and arsenic or the German term for arsenic. Both the combination and arsenic alone were used to treat syphilis during WWII (Frith 2012:53–54; Wilcox 1954:579–580).

Other, non-glass medicial containers and equipment were recorded. Two plastic containers of Rohto Eye Lotion were found at two sites. Japan’s Rohto Pharmaceutical Company was founded in 1899 and produced eye drops in 1909. The containers located inside SPS11 and SPS41 in Saipan date to 1931 (Rohto Pharmaceutical Co. Ltd. n.d.) (Figure 6.27). Two syrettes, one in SPS18 and another in SPS10 were recorded. These syrettes are small, flexible metal tubes with black plastic caps. SPS11 contained a number of items, both glass and metal, that were indicative of a Field or Line of Communication Hospital. These included a 2cc syringe, a mouth or laryngeal mirror, a medical spoon, surgical tweezers, microscope ocular lens, a tongue depressor and a speculum fragment (Figure 6.28).

Figure 6.26: 150ml external screw thread finished rectangular bottle, the common type of medicinal bottle in the Saipan assemblage (8cm scale).

Figure 6.27: Japanese medicinal containers with discernible markings. Glass bisarsen ampoule (top left), possible Ebios jar (top right), glass vitamin jar (bottom left), plastic Rohto Eye Lotion container (bottom right) (8cm scale).

Figure 6.28: Medical items within SPS11. Syringe (top left), laryngeal mirror (top right), medical spoon (middle left), speculum fragment (middle right), surgical tweezers (bottom) (8cm scale).

6.4 Human Remains

Ten sites contained disarticulated human remains in unburnt, burnt and calcined forms (Table 17). Three bones exhibited signs of modification. In SPS26, a maxillary lateral incisor appears to have a vertical cut mark to remove the crown from the root of the tooth (Figure 6.29). The cut may be a result of “war trophy” collection. Amongst other war souvenir hunting, U.S. Marines recall the extraction of gold-crowned teeth from wounded or dead Japanese soldiers by slicing the gold portions off with a combat knife (Miller 2008:180; Price et al. 2015:224–226; Sledge 1981:120, 123; Smith 2008:333; Weingartner 1992:56). An unidentified bone in SPS4 also appears to be cleanly cut. In SPS14, one left maxillary central incisor, lateral incisor and canine are connected by a metal bridge, which may be pre-war modification by the soldier himself. In total, 11 individuals are represented within the Saipan assemblage.

Table 17: War Period Human Remains in Saipan

Site	Number of Bones/fragments	Type of bone	Number of Persons Represented	Notes
SPS4	61	Teeth, phalanges, long bones	1	Femur hidden in crevice of tunnel by visitors
SPS14	40	Teeth, carpals, phalanges, maxillary, hyoid	1	
SPS15	1	Occipital fragment	1	Set upon one of the tunnel ledges by visitors
SPS18	1	Distal radius	1	Broken due to visitors or dumping
SPS23	4	2 vertebrae	1	Crushed by visitors
SPS26	63	Almost entire body, one cut tooth, calcined and burnt bone	2	42 bones within the site, 21 bones gathered and hidden just outside site by visitors
SPS34	2	Rib and pelvis fragment	1	Crushed by visitors
SPS36	32	16 calcined frags, 1 burnt frag, 15 bone frags	1	
SPS39	10	Phalanges, carpals, pelvis	1	Seven of the bones have been piled onto a collapsed portion of the wall by visitors
SPS45	2	Unidentified and long bone	1	Could have been dragged in from a dumping area at the end of the cave
Total	**216**		**11**	

Figure 6.29: Modified tooth in SPS26 (8cm scale).

6.5 Faunal Remains

The faunal remains found in 13 sites are a result of post-war visitation by rodents and mammals. None of the faunal remains within or immediately surrounding karst defences can be attributed to war period behaviour. For example, almost an entire canine skeleton is present within SPS9 and a feline skeleton is present in SPS4. Ranching in the vicinity of SPS39 and SPS40 has allowed cows to occupy these sites and some of their skeletal remains were located nearby. Other remains are from contemporary trash and have been found in close proximity to trash bags torn open by animals.

6.6 Clothing and Equipment

6.6.1 Clothing

Military uniforms can be split into two groups: dress and fatigues. Dress is more elaborate and includes a soldier’s insignia and awards, while fatigues are intended to be worn on the job (Adams-Graf 2014:9). The Japanese military had a variety of dress and fatigues and not only did they differ between the IJN and IJA, but also between rankings as well as according to climate and season. For battle in warmer climates, like Saipan, the military developed a tropical uniform in the 1930s (Jowett 2002:24). Tropical fatigues for the IJA consisted of cotton tunics paired with various types of trousers and shorts in khaki-tan, olive drab or jungle green, with wooden or plastic buttons and a lightweight field cap with army star insignia (Jowett 2002:24, 33). Trousers or the breeches of shorts were tucked into knee-high putees or socks (Jowett 2002:33). Army officers' fatigues did not differ significantly from the enlisted men's uniforms, but they more frequently wore white cotton undershirts and the front buttons of their tunics were green or brown plastic or flat brass (Jowett 2002:33, 35; Gary Nila pers. comm. 2015).

Tropical fatigues for naval land troops differed from the IJA in colour. SNLF fatigues were sea-green or navy blue and white, and had the anchor emblem rather than the army star (Jowett 2002:35; Nila and Rolfe 2006:20; War Department 1944a:78). The navy enlisted and petty officer fatigues had flat brass or aluminum buttons while the officers' tunics had domed brass front buttons (Harper et al. 2011:36; Jowett 2002; Nila and Rolfe 2006:22).

Few karst defences contained the remains of uniform fabric. SPS18 contained strips of tan cloth, SPS20 had the remains of olive or tan vinyl and SPS4, SPS28 and SPS34 had tan canvas fabric. A more common item from uniforms in the Saipan assemblage was buttons. The seventy-three buttons located were made of either plastic (n=42) or metal (n=31) and came in a range of sizes and styles. The most common plastic buttons are flat, 11.5mm diameter, 2- or 4-holed sew-through buttons in white (n=7) or green (n=11). The same type also comes in black (n=1). The most common diameter is 11.5mm, but white and green buttons of this type range from 7mm to 16mm in diameter (Figure 6.30). Two larger 18mm diameter sew-through buttons resembling those commonly found on heavier clothing or jackets have flat backs, an indented circle in the centre on the front and two holes. Lastly, there are three plastic, shanked buttons, one is a 19mm diameter, brown button and two are 15mm in diameter; one in black and one in white. According to Gary Nila, white and sea green 2- and 4-hole, sew-through patterned plastic buttons were mostly used on sailors' work clothing, with the sea-green type once forming part of the SNLF uniform. Black, brown or dark green plastic buttons would have been part of the army uniform (Gary Nila pers. comm. 2015). Specifically, the brown, plastic, shanked button appears to be part of an army private's summer uniform (Nakata and Nelson 1987:68).

Metal buttons were part of all types of Japanese uniforms. While there are hundreds of different uniforms, most but not all metal buttons on the summer or tropical versions, belonged to higher-ranking individuals within the officer ranks (Nakata and Nelson 1987:68–69, 71–72, 106, 108, 110, 117, 119–123, 138, 141–142, 145–150). Generally, plain, flat, shanked metal buttons with no logo belonged to the army (Gary Nila pers. comm. 2015), but there are several exceptions, and the only way to identify with certainty which uniform the metal buttons come from is by the logo on them: an anchor and/or cherry blossom (*sakura*) for the navy and a star for the army (Nakanishi 1991:6; Nila and Rolfe 2006:42, 45; War Department 1944a:78, 348). One, 2-piece, crimped metal button (probably shanked, but not present) in SPS36 has a discernable anchor fluke and partial cherry blossom indicating it belonged to the navy. The remaining metal buttons in the Saipan assemblage were too corroded to identify any logos, but they were either domed or flat and shanked, and they ranged in size from 15mm to 26mm in diameter, with most being 20mm. Domed or flat buttons can be part of army or navy uniforms and caps and can belong to various rankings (Nakata and Nelson 1987; Nila and Rolfe 2006:22).

Figure 6.30: Common green plastic, sew-through buttons (left) and domed, metal, shanked button (right) (8cm scale).

6.6.2 Footwear

IJA and SNLF enlisted personnel and petty officer footwear was typically hobnailed, ankle-high, metal-heeled, russet service boots made from pigskin or cowhide (Jowett 2002:33; Nakata and Nelson 1987:167; Nila and Rolfe 2006:33; War Department 1944a:348) (Figure 6.31). IJA officers commonly wore a high, black leather boot (Jowett 2002:33, 36; Nila and Rolfe 2006:34; War Department 1944a:348). The jikatabi (or tabi) shoe, a black or brown canvas, rubber-soled shoe that came up above the ankles and had a rounded toe or separate toe socket, provided better traction and was carried by enlisted personnel and petty officers as a second pair of shoes (Aso

2004:41; Jowett 2002:33; Nila and Rolfe 2006:35; War Department 1944a:348). Tabi shoes, however, have been worn in Japan since the 14th century (Tanaka 2012:90) and were not footwear exclusive to the Japanese military.

There following shoe fragments were in the Saipan assemblage representing at least eight different types of shoes:

1. Entire hobnail boots and metal heel irons. Each shoe consists of a brown leather upper and outsole with a series of round metal cleats at the ball and toe and a curved metal bar that attaches to the heel (heel iron) (SPS10, SPS14, SPS18).
2. Black rubber outsole with a textured tread pattern, a white outline in the interior, an attached rubber heel and a black leather welt (SPS14; SPS20) (Figure 6.32).
3. Black rubber heel with six metal rivets and a diamond tread pattern (SPS14).
4. Split-toe tabi shoe outsole. The sole is made of black rubber with a tire tread pattern at the toe, diamond tread pattern on the heel and a rising sun logo and the katakana characters spelling Asahi (ヒサア) on the arch. Asahi refers to the Asahi Aerial Clothing Manufacturing Company (Nila 2002:6). Imprints of this type of shoe can also be found on the concrete wall of the water reservoir in SPS20 (SPS4, SPS25, SPS36, SPS41, SPS45).
5. Rounded-toe tabi outsole with the same characteristics as the split-toe tabi, but without the separate toe socket (SPS25, SPS45).
6. Rounded-toe outsole made of black rubber with a tire tread pattern on the toe and the heel (SPS36).
7. Brown leather outsole from a child's shoe, 96mm long (SPS45).
8. Black rubber heel fragment with semi-circle and rectangle tread pattern (SPS33, SPS41).
   In addition to the above shoes, two brown leather puttees or leggings were located within SPS18.

Figure 6.31: Hobnailed shoe (left), metal heel for hobnailed shoe (right) (8cm scale).


Figure 6.32: Jikatabi shoe sole (left), black rubber-soled shoe with interior white outline (right) (8cm scale).

6.6.3 ID Tags and Medals

In terms of identification, the IJN was issued with cloth or plastic patches with each soldier's details written on the patch, while the IJA was issued brass military tags intended to be carried at all times (Allied Translator and Interpreter Section 1944:18). The information on these tags could include any of the following: code name of unit, home code number of unit, arm of service, number of regiment or equivalent organisation, number of company, battery or other subordinate unit, personal number and name (Allied Translator and Interpreter Section 1944:18–19). Despite Hawk's (n.d.-c:17–18) assertion that information about blood type was not carried by soldiers, U.S. war period documents suggest that some IJA soldiers did have their blood type engraved into their military tags (Allied Translator and Interpreter Section 1944:19). The numbers on IJA tags do not necessarily represent the unit or division of that same number (i.e. the number 10 on a tag does not refer to unit or division 10), but rather identifies a code number which then corresponds to a unit or division.

Two IJA military tags were located in two separate sites. A tag in SPS18 with a series of numbers that read from top to bottom, left to right: 番， 七血， 一六， 一一九三五， or 74 (soldier number), Company 16, 11935 which is part of the 136th Infantry Unit, of the Nagoya Division, code named Homare (27th Infantry Division 1944:1; Madej 1981a:70). A similar tag from SPS11 reads: 四 0 九五, 0 二五五一 or 4095, 02551. The number 02551 is the code number for the Japanese 47th Independent Mixed Brigade (Madej 1981b:127).

Other tags include a U.S. oval, P1940, two-holed patterned tag worn by someone in the U.S. naval service (marine corps, merchant marines or coast guard) that was located in SPS36 (U.S. Marine Corps World War II Dog Tags 2015). The only information etched into the tag is “41B.” Lastly, a thin, small, metal, banner-shaped pin was located within SPS37. This is embossed with old, stylised kanji characters that read “Dai Nippon TeiKoku KaiGun,” or Imperial Japanese Navy (James Pruitt pers. comm. 2015) (Figure 6.33).

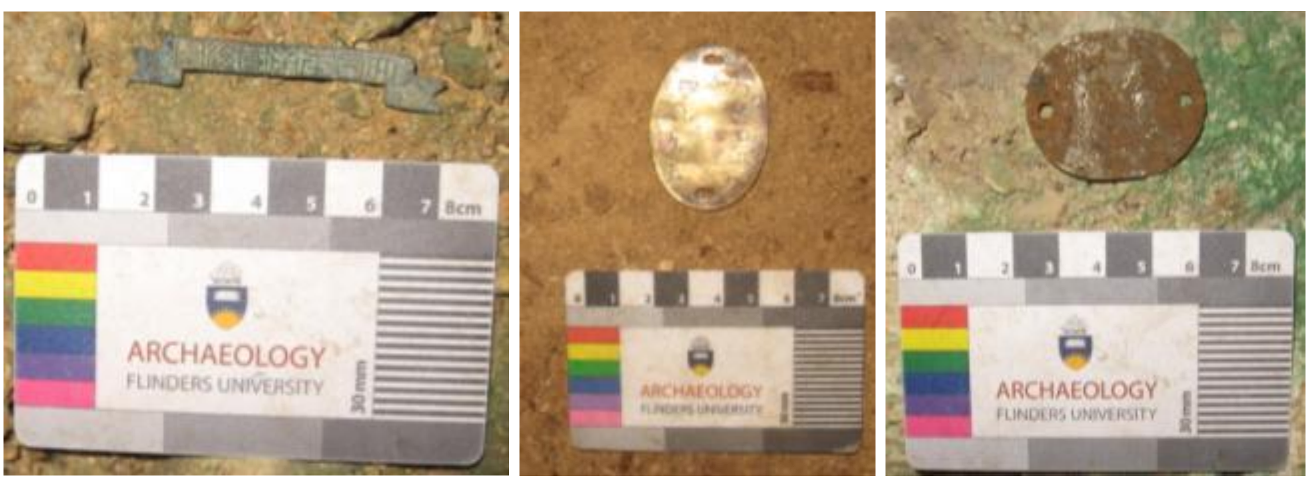

Figure 6.33: IJN pin (left), IJA military tag (middle), U.S. military tag (right) (8cm scale).

Medals are typically not worn during combat (Adams-Graf 2014:9), yet one medal hanger (*kunshou kake*) was located within SPS20 (Figure 6.34). The metal hanger would attach to a garment and medals would be suspended from it. The one in Saipan could fit up to five medals, although wider hangers can hold more than eight medals. The medal hanger could identify someone of a higher rank, who likely had a commanding rather than a combat role. Other items that may be related to high-ranking commanders include an ivory cigarette holder, a clipboard clip and a fountain pen nib (Figure 6.35).

Figure 6.34: Medal hanger (8cm scale).

Figure 6.35: Clipboard clip (left), pen nib (top right), ivory cigarette holder (bottom right) (8cm scale).

6.6.4 Gas Masks

There were distinct gas masks designed for the Japanese navy, army and civilians during WWII, all of which were found in Saipan (Table 18). Navy gas masks were characterised by rounded triangular eye pieces with gray or olive canisters no more than 14cm high (Nakanishi 1991:17, 47; Nila and Rolfe 2006:38; War Department 1944a:261). IJA gas masks had round eye pieces with threaded removable rims and a slightly taller canister and some had fitted rubber nosepieces (War Department 1944a:256). IJA gas masks also came with a thin, black, plastic box of round, plastic anti-fog discs, a container for antifreeze liquid (in a flat square metal flask or black cylindrical syringe), a hinged metal clamp for closing the air hose, a cleaning rag and a can of decontaminant powder (War Department 1944a:261–262). The discs were used to cover the eye pieces when the temperature was below freezing (War Department 1944a:261–262). Civilian gas masks had round eye pieces with fixed rims and a 12.1cm high canister (War Department 1944a:261). The Japanese civilian Air Defence Gas Mask Type 16th Year, Model A had a single plastic eye shield harnessed to the head with wide adjustable fabric straps attached to a small filter cartridge on the front of the face. Thousands of these types of gas masks were issued to civilians in case of chemical warfare or fire (MacDonald 2007) and at least six were found in SPS25 (Figure 6.36).

Table 18: Gas Mask Components in Saipan Assemblage

Site	Type	Number
SPS2	IJN Model 93 Type 3 canister IJN Model 93 gas mask lens	1 1
SPS4	Gas mask eye piece Gas mask clamp	2 1
SPS8	Gas mask canister	2
SPS14	Gas mask clamp Gas mask canister Gas canister cap Anti-fog discs Anti-fog disc holder	1 1 1 3 1.5
SPS15	Gas mask eye clamp IJA	1
SPS18	Canister frag	1
SPS20	Wing nut for gas canisters Canister lids	2 2
SPS25	Japanese Air Defence Gas Mask Type 16th Year, Model A. Fragments of civilian mask	6 1
SPS32	IJA gas mask eye piece	1

SPS36	IJN eye lens	1
SPS37	IJN lens IJA lens	2 1
SPS41	IJA lens	1
Total		**33.5**

Figure 6.36: Japanese civilian air defence gas mask eye piece (left) IJA gas mask eye piece (right) (8cm scale).

6.6.5 Field Equipment and Personal Items

Soldiers carried a range of field equipment. IJA soldiers carried a backpack containing pup tent supplies (tent tarp, poles and pins), a pick-axe or shovel, a towel, soap and toiletries, gun grease, water purification kits, rations, extra socks, a sewing kit, tree climbers (metal spikes attached to shoes) and insect repellant (Jowett 2002:34; War Department 1944a:350–351). The SNLF carried a heavy green canvas knapsack (Nila and Rolfe 2006:38). Both the IJA and SNLF carried haversacks at their waist filled with rations and personal items and distinct canteens that hung from an adjustable shoulder strap (Nila and Rolfe 2006:35–36; War Department 1944a:350).

Various items from the packs themselves and the contents of those packs are present in Saipan's karst defences. There are grommets (n=32), snaps (n=14) and buckles (n=41) from packs and tent tarps (Nakata and Nelson 1987:210). Equipment and personal items include toothbrushes (n=5), toothpaste tube fragments (n=1), toothbrush holders (n=3), plastic soap containers (n=10), combs (n=2), razors (n=1), razor blades (n=2), eye-glass frame fragments (n=3), white Go (a Japanese board game) game pieces (n=3) (Aso 2004:13), black Go game pieces (n=2), leather oil containers (n=2), watch fragments (n=2), military folding knives (n=3), a pick-axe (n=1), shovel (n=1), pliers (n=1), wrench (n=1), a cap and retainer chain from an IJN canteen (n=1) and a Maruman-style cigarette lighter (n=1). Three pairs of scissors were located within SPS41. One is a pair of barber's scissors with finger rest, one a pair of utility scissors and the last is a pair of shears with large handles which allowed for cutting more substantial items (Beaudry 2006:123, 125, 128–129). Additionally, one tent pole within SPS10 and 68 metal cot fragments representing at least two full cots in SPS29 were all U.S. items.

6.6.6 Weapons and Munitions

The SNLF and IJA were issued the same small arms and weapons (Nila and Rolfe 2006:39). Both carried ammunition in pouches on belts made of leather or rubberised canvas; two at the front and one at the rear, with rifle oil strapped next to the rear pouch (Nila and Rolfe 2006:37; War Department 1944a:350–351). The SNLF also wore a brown canvas bandolier (Jowett 2002:36).

Two calibres of Japanese bullets are found within karst defences in Saipan: 6.5mm and 7.7mm (Table 19). The Japanese developed a 6.5mm calibre bullet for the early Type 30, Type 38 and Type 44 Arisaka rifles and all the modified and carbine versions of these types (Ness 2015:28–29; War Department 1944a:189–190). The 6.5mm bullet lost power beyond 200m, which was considered sufficient for battle on the home islands, but the Japanese soon realised its limitations and produced the 7.7mm calibre bullet (Ness 2015:29). The 7.7mm calibre bullets came in a rimless and semi-rimmed form, deemed the Type 99 and Type 92 respectively, and were used in Type 99 rifles and all its variations (Ness 2015:29–32; War Department 1944a:189–190). Both 6.5mm and 7.7mm bullets came in five-round brass clips (Swift et al. 2003:210; War Department 1944a:190, 194).

Other types of Japanese ammunition recorded for this project included 107 fragments of 47mm bullets for a Type 1, anti-tank gun and a shell from a 25mm IJN anti-aircraft bullet (Bishop 2002:186; Ness 2015:177, 181) (Figure 6.37). Artillery rounds include 70mm, 85mm, 135mm and 155mm sizes. According to a 1944 U.S. Army Corps of Engineers report, the Japanese did not equip Saipan with 80mm or 70mm calibre field artillery or specialised guns (Denfeld 2002:27–32). The only artillery and anti-aircraft guns the Japanese had on the island included 75mm, 105mm, 120mm and 150mm guns (Bishop 2002:142, 150; United States War Department 1944:24–25; War Department 1944a:220–270). The U.S. used 60mm, 75mm, 90mm, 105mm and 120mm projectiles during WWII and additionally, a 155mm howitzer projectile (Bishop 2002:139, 156–157, 189, 199–200; U.S. Department of the Army Headquarters 1960:36–174). Therefore, it is likely most of these artillery shells are U.S. in origin. Additionally, there was other U.S. small arms ammunition that was identifiable by the engraving on the rim of the shell.

Figure 6.37: 47mm bullet (8cm scale).

Three anti-aircraft weapons were recorded near SPS4, SPS16 and SPS29. A 75mm Type 88 army anti-aircraft gun was found west and down slope of SPS4, although according to Rottman (2003:44) they were also used by the navy. Two 120mm Type 38 guns were found east of SPS29; one within a 6.75m wide concrete case mate and the other in an open revetment.

According to Rottman (2003:50–51) only the IJN used 120mm guns. The guns recorded at SPS16 include a 140mm coastal defence gun, a 200mm antiboat gun, three Type 10 120mm guns and a 37mm gun, but some of these are from the northern tip of the island which were removed and placed near this site after the war (Denfeld 1997:213–214).

Table 19: Ammunition in Saipan Karst Defences

Site	Ammunition (width x length)	Number	Notes
SPS3	Shell body fragment	1	
SPS4	Arisaka shell 7.7mm projectile 80-85mm x 265mm projectile	7 2 1	Too damaged to determine rim type Artillery projectile
SPS5	15mm diameter shell	1	“SR 4” on base, lodged in wall
SPS10	Arisaka shell 7.7mm projectile 32mm x 53mm shell 9mm projectile	1 1 1 1	Too corroded to determine rim type
SPS11	7.7mm-rimless shell Shell body fragments Clip fragments	3 1 3	
SPS12	10mm full bullet	1	“L 43” (Royal Ordnance Factory - Spennymoor, United Kingdom) on base
SPS14	7.7mm-semi rimmed full bullet 7.7mm semi rimmed shell Arisaka Shells 13mm x 52mm shell 23mm diameter shell base 7.5mm x 33.5mm 7.7mm projectile 18.5mm x 50mm projectile Clip fragments	33 2 1 1 17 1 1 1 7	
SPS15	8.5mm x 63mm shell 20mm x 61mm shell	1 1	 Shot gun shell
SPS18	7.7mm-semi rimmed full bullet 7.7mm projectile Arisaka Shell Clip	24 3 13 1	 10 are frayed
SPS20	7.7mm rimless shell	1	
SPS22	6.5mm full bullet 45mm x 115mm	1 107	 Small fuse tips
SPS23	70mm x 240mm projectile 135mm x 445mm projectile 155mm x 158mm projectile	2 1 1	
SPS25	7mm x 64mm shell 7mm x 32.5mm shell 6mm x 39mm shell	3 1 1	
SPS26	7.7mm rimless shell 7.7mm semi-rimmed shell 7.7mm projectile	13 1 6	

SPS28	Artillery fragment	2	
SPS29	7.7mm projectile Arisaka shell 12.7mm full bullet	1 1 1	 “LC 4” (Lake City Army Ammunition Plant - Independence, Missouri) on base, U.S. machine gun round
SPS31	11mm projectile	1	U.S.
SPS33	Exploded ammunition/schrapnel ranging from 12.4mm to 21mm diameter and 11mm and 23.6mm long	11	
SPS34	7.7mm projectile 7.7mm semi-rimmed shell 7.7mm rimless shell Arisaka shell Shell body fragments 7.7mm projectiles Frayed projectiles	1 70 2 4 20 172 1	
SPS35	6.5mm full bullet	1	
SPS36	7.7mm rimless shell 7.7mm semi-rimmed shell Arisaka shell Frayed projectiles 7.7mm projectiles Clip fragments	7 3 2 3 4 1	
SPS37	7.7mm semi-rimmed shell 7.7mm rimless shell 7.7mm semi rimmed full bullet Arisaka shell Shell body fragments 9mm x 22.5mm shell Clip fragments	38 2 25 51 4 1 31	 U.S.
SPS39	8.5mm x 26mm shell	1	“EC 43” (Evansville-Chrysler Ordnance Plant-Evansville, Indiana) on base
SPS41	8mm x 63.5mm full bullet	1	U.S.
SPS44	25mm x 23cm shell	1	IJN Anti-aircraft shell used in a Type 96 light AA gun
SPS46	7.7mm full bullet 7.7mm projectiles 7.7mm rimless shell 7.7mm semi-rimmed shell Shell body fragments Shells lodged in tunnel wall Projectiles lodged in tunnel wall 8.5mm projectile 6.5mm projectile 7.7mm projectile 6mm projectile 7.5mm projectile 12mm projectile	2 22 4 3 14 3 3 2 9 64 1 1 1	
SPS49	Shell body fragments	1	
Total		**862**	

The Japanese used seven types of hand grenades: Types 89, 91, 97, 99, Type 98 stick grenades, molotov cocktails and pottery hand grenades. The Type 91 was the first produced and had a serrated cast iron body and a threaded recess at the base to accommodate a propellant module or finned extension (Ness 2015:58–60). The body allowed the grenade to fragment, which was considered more of a defensive tactic, and the module or extension enabled it to be thrown by hand or launched from a rifle grenade launcher or grenade discharger (Ness 2015:58–60). The Type 91 was largely replaced by the Type 97 in 1937 (Ness 2015:59). The Type 97 was exactly like the Type 91 (both 50mm diameter and same body type) except it had no recessed base and the Type 97 had a shorter time delay in its fuse (Ness 2015:59, 67; War Department 1944a:209). The Type 97 was replaced by the Type 99 in 1941 which was a smaller grenade (40mm diameter) with a smooth body developed for blast and considered a more offensive grenade (Ness 2015:59–60, 67; War Department 1944a:210–211). Another "grenade" was the Type 89 HE round used in a grenade discharger (Ness 2015:57). The Type 89 HE round was taller than other hand grenades, with a smooth wall and rotating copper band (Ness 2015:54).

A total of nine complete Japanese grenades were present in the Saipan assemblage (three Type 99, five Type 97 and one Type 89 HE round) (Table 20). U.S. Mark II fragmentation hand grenades (Canfield 1994:214–215) and their components were also located in karst defences. Eighty-five small fragments from the bodies of grenades were recorded. Since the bodies of the Japanese Type 91 and 97 grenades and the U.S. MKII were all serrated cast iron, it is impossible to determine whether these fragments are from Japanese or U.S. grenades. However, if there is also evidence of a grenade explosion within a site, it is probable that the pieces are remnants of U.S. grenades that were thrown into the site and exploded during battle. There is also a possibility of an accidental explosion of a Japanese grenade, as their fuses were reported to be unreliable and unsafe (Ness 2015:58).

Three Type 100 or Type 97 81mm infantry mortar rounds, which could be used in both the Type 97 or Type 99 mortars, are located within SPS14 (Ness 2015:84–85). Intended to be fired at close targets, these mortars had a 2,000m to 3,000m range (Ness 2015:78). For extra range, propellant packs or mortar increments were attached to the fins of the round (United States Army Medical Department 1962:22). The fins could hold six increments per round and the packs were made from two pieces of silk stitched together, filled with propellant and covered with a waterproof coating (Inert-Ord.Net 2013). Forty-seven of the propellant packs were located within SPS14. Several Bakelite fuse plugs, a component of both Type 89 and Type 100 HE rounds, were also located.

Table 20: Grenades and Mortars in Saipan

Site	Ammunition	Number
SPS3	Type 97 grenade Type 89 HE round	2 1
SPS4	Grenade fragments Fuse plug	2 4
SPS10	Grenade fragments U.S. fuse sealer Fuse plug U.S. grenade lever	5 2 1 1
SPS14	Type 99 grenade Type 97 grenade U.S. fuse sealer 81mm infantry mortar round Mortar increments	1 2 1 3 47
SPS17	Grenade fragments	11
SPS18	Grenade fragments U.S. fuse sealer	5 4
SPS22	Grenade fragments	1
SPS23	Grenade fragments Fuse plug	1 1
SPS25	U.S. fuse sealer	1
SPS36	U.S. fuse sealer	1
SPS37	Type 99 grenade Type 97 grenade Grenade fragments	1 1 47
SPS41	U.S. MKII grenade U.S. fuse sealer	1 1
SPS46	Grenade fragments	1
SPS48	Type 99 grenade	1
Total		**150**

6.6.7 Electrical and Communication Equipment

There are a range of artefacts related to Japanese electronics and communications equipment (Table 21). One of the most common is vacuum tubes. Vacuum tubes or electron tubes are devices that contain electrodes within an evacuated enclosure (Reich 1941:1). The purpose of a vacuum tube is to pass current (Reich 1941:1). There are hundreds of types of vacuum tubes used for various electronic and communication devices. These are usually composed of a black plastic base with a glass bulb on top. Based on the most complete vacuum tubes found in SPS20, the Japanese used at least two sizes in this tunnel: one with a 29mm diameter base and one with a 35mm diameter base. One of the 29mm vacuum tubes has UX 202A stamped onto the base

(Figure 6.38). This particular tube is a triode oscillator for an army Model 95 Mark 4 transmitter (War Department 1944b:9). A fragment from the base of a white, Western Electric 216A vacuum tube with an embossed "G" and "F" was recorded in SPS29 (Anon. n.d.; Harris 2010). This type of vacuum tube supported up to 6 volts and was manufactured between 1922 and 1944 (Anon. n.d.).

Another common and related object found in Saipan's tunnels is mica (Figure 6.38). Mica is a name given to a group of 37 chemically and physically similar silicate minerals that form in distinct layers (Minerals Education Coalition n.d.; U.S. Geological Survey 2010). The two commercially important micas are muscovite and phlogopite and are used in sheet or ground forms (U.S. Geological Survey 2010). Ground mica was applied to products used in the construction, plastics, rubber and well-drilling industries, while sheet mica's usage is primarily in the electronics and electrical industries as insulators and dielectrics in capacitors (U.S. Geological Survey 2010). Mica was a common insulator and spacer in vacuum tubes and became a large part of the radio industry after WWI (Aragon 1996:49; Chapman 1983:915–929).

Figure 6.38: Vacuum tube without glass bulb component (left), mica (right) (8cm scale).

Fragments found in SPS20 and SPS39 identify five different communication devices. The devices include: a navy aircraft pilot training receiver; a Type 99 MKII radio used on a navy aircraft; a pilot training receiver belonging to naval aircraft; a navy Type 96-1 transmitter and a

Model TM short-wave mobile receiver (Denfeld 1997:21; War Department 1944b:9–10, 57; Yokohama WW2 Japanese Military Radio Museum 2015) (Figure 6.39). Other items from unidentifiable devices include a plate located in SPS20, which reads “Tokyo Electric Company” (東京無線電機株式會社) or today’s Toshiba Company (Toshiba Corporation 2016). The plate was located on the floor of the tunnel underneath the ram pump, but it is unclear whether it was once attached to the pump or another piece of equipment. A fixed condenser for a radio stamped with “MIKADON 10 TKS” in diamond outline was found in SPS3 (Dubilier Condenser and Radio Corporation 1926:76). A fixed condenser would be used to change the tone of a radio receiver and eliminate static (Maxwell 1937:75). Lastly, a small, $32mm^2$ object with a white plastic outer edge and a friable black centre was recorded in SPS41 (Figure 6.40). The object is interpreted as a diaphragm once belonging to a communication device.

Figure 6.39: Coil for Model TM short-wave mobile receiver (8cm scale).

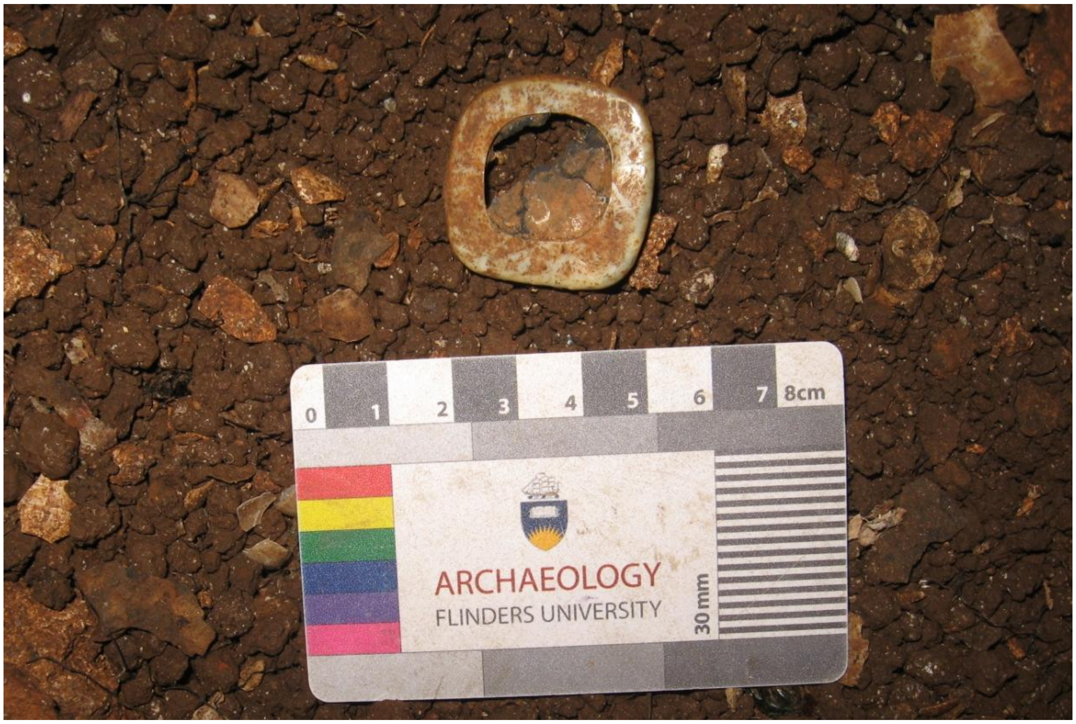

Figure 6.40: Diaphragm recorded in SPS41 (8cm scale).

Another communication and electrical device identified at sites included porcelain insulators. In the successful transmission and distribution of electricity, electrical wires need to be separated from each other and from other conductors, such as metal (Myers 2010:33). The advantage of having a ceramic insulator over older glass types is that it was better at withstanding high temperatures without degradation (Buchanan 2004:1). In Japan, the first insulator, a pin-type, was manufactured in 1871 (Fujimura 1995:26). By the 1920s the Noritake Company, the Dahua Porcelain Company in Manchuria and the Koransha Porcelain Company began manufacturing porcelain insulators (Dalian Insulator Group Co. n.d.; Fujimura 1995:27; Stitt 1974:167).

The fifteen porcelain insulators located in the Saipan assemblage are predominately white or brown, with one black example. All of these were found within or surrounding seven different tunnels and all were used for power rather than communication (Jay Beattie pers. comm. 2016). Types include pin-type, multi-shed post, spool insulators, wire holders and two-piece split-knob insulators.

Pin-type insulators are characterised by a threaded hole in the bottom into which a metal mounting pin would be screwed (Tod 1977:61). The single pin-type insulator found at SPS3 is nicknamed an “SR hat,” which stands for skirt rest (the way it sat in the kiln) and “hat” for its shape and could have supported up to 4,000 volts (Jay Beattie pers. comm. 2016). Post insulators have a coiled appearance and are used to support higher voltages (Fujimura 1995:33). Smaller post insulators without a metal pin were manufactured in the early 1930s in the U.S. and were a stronger and more efficient insulator than the pin-type and free from the thermal problems at the joint of metal and porcelain (Mills 1970:214–215, 217). The multi-shed, indoor post insulators in Saipan were used to support light wires and were suitable for about 5kv (Jay Beattie pers. comm. 2016; Hayato Obara pers. comm. 2016).

Wire holders come in various sizes, but are generally characterised as a large piece of porcelain attached to a lag screw or other metal mounting and used to connect power and communication lines to buildings (Tod 1977:57) (Figure 6.41). Similarly, spool or split-knob insulators have wire grooves on the outside and are usually mounted on racks on the sides of buildings and used for dead-ending communication or power lines (Jay Beattie pers. comm. 2016). The spool insulator at SPS3 is a low-voltage insulator that was used to support 230 volt service wires and was capable of holding a wire tension of 3,000 pounds (J. Beattie pers. comm. 2016). Lastly, there are 14 fragments of porcelain tubes in SPS20. Porcelain tubes were manufactured in the late 1890s until the early 1930s and were primarily used for house wiring and for insulating wires through walls and floors (Myers 2010:38; Tod 1977:7, 9, 15).

Three of Saipan’s insulators have trademarks. Two of the two-piece split knob insulators have embossed letters and numbers: one with “BULL DOG” and the other with “SPN 110.” BULL DOG is a marking found on insulators made by the Illinois Electric Porcelain Company. The company was founded in 1910 in Macomb, Illinois, and began using the BULL DOG trademark in 1918 (Brown 1979:155; Mills 1970:145; Tod 1977:86). Markings on insulators can identify a range of information, including the manufacturers name, factory, product number, rating, date of manufacture, resistance rating and occasionally, the customer’s name or code number (Jay Beattie pers. comm. 2016). SPN 110 could refer to any of the above and SPN may be shorthand for “Saipan.” One of the post insulators has the word “KORAN” stamped into one end—a trademark of the Koransha Company (Figure 6.41).

Figure 6.41: Wire holder (left), post insulator (right) (8cm scale).

Table 21: Electronic Equipment Located in Saipan's Karst Defences

Site	**Item**	**Quantity**	**Details**
SPS3	-Insulator -Wire -Fixed condenser -Vacuum tube Fragments	4 1 1	White pin-type-up to 4000 volts, two white multi-shed indoor post-5kv, one brown spool-230 volts Sheathed wire For a radio with MIKADON 10 TKS in diamond outline
SPS4	-Wire		Sheathed and bare wire
SPS5	-Insulator	1	White two-piece split knob, “BULL DOG” embossed on top
SPS8	-Insulator -Wire	4	Two brown two-piece split knob, one with embossed “SPN 110,” one white wire holder Underground and above ground, twisted pair, sheathed and bare
SPS10	-Wire		Sheathed wire
SPS11	-Wire -Mica fragments		Underground and above ground, sheathed and bare
SPS14	-Wire -Vacuum tube fragments	 1	Sheathed
SPS15	-Insulator -Wire	2	Brown wire holder Bare
SPS18	-Wire -Communication wire spool	 1	Bare
SPS20	-Insulator -Wire -Receiver -Transmitter	2 1 1	White and black multi-shed post, white one has etched “KORAN” in green at one end Underground and above ground, bare and sheathed Model TM Short Wave Mobile Receiver Plug-In Coil Model 95 Mark 4

	-Manufacturers plate -Vacuum tube fragments -Mica -wire tubes -battery box fragments -phone speakers	1 52 17 3	reads 東京無線電機株式會社 or Tokyo Electric Company (today's Toshiba) Equivalent of 52, two sizes: 29mm and 35mm diameter base
SPS21	-Wire		Bare and sheathed
SPS22	-Wire		Sheathed
SPS29	-Vacuum tube base fragment	1	Embossed "G" and "F"
SPS35	-Wire		Underground and above ground, multi-conductor
SPS37	-Insulator -Wire -Vacuum tube fragments -Mica	1 1	Small brown fragment, unknown type Bare
SPS39	-Armature -Wire -Navy aircraft pilot training receiver -Type 99 MKII radio spool -Plate from a Navy Type 96-1 transmitter -Battery Boxes -Vacuum tube fragments -Mica -insulator fragment	2 2 1 1 3 1 1	For motor or generator Bare and multi-conductor Used on IJN aircraft 日本輪業ゴム= "Japan wa-gyo rubber," now Nichirin Co. Entire tube Unknown type
SPS41	-Wire -Diaphragm	 1	Bare
SPS52	-Vacuum tube fragments	1	
Total		**108**	

Other components of electronic and communication equipment are present in karst defences, such as wire, armatures for generators/motors, batteries, dials and speakers for headphones or field phones (Figure 6.42). Some of the dials may also be part of guns and other weaponry, medical equipment or reconnaissance equipment.

6.6.8 Lighting Devices

Glass lighting devices were also present in the Saipan assemblage. Two kerosene lamp bases (Moore et al. 2001:233) were recorded in SPS25 and SPS45. The lamp bases were round, colourless vessels with embossed vertical lines running up the body and a small 17mm diameter opening at the top (Figure 6.43). Light bulb components such as glass fragments, glass mounts, screw thread contacts, electrical foot contacts and attached support wires were also recorded in SPS14, SPS20, SPS25 and SPS37.

Figure 6.42: Headphone or field phone speaker (left) motor or generator armature (right) (8cm scale).

Figure 6.43: Kerosene lamp base (8cm scale).

6.7 Modern Material

Contemporary items found within karst defences include items such as plastic cups; food containers and forks; jars; candle holders and votives; beverage cans and bottles, many with beverages still present; thousand crane wreaths; clothing; survey markers and rope. Many of the karst defence walls also had graffiti. Modern material will be further discussed in relation to contemporary meanings in Chapter 10.

Finally, SPS3 has evidence of post-war surveying on its walls. The tunnel walls have the letters A through V, (no T) with lines separating each letter painted in yellow and set approximately 1m apart (Figure 6.44). The letters are clear with little wear and are thus more likely to be recent.

Figure 6.44: Painted letters on the walls of SPS3.

6.8 Conclusion

There is a vast amount of material within karst defence sites in Saipan. The material remains recorded for this project give indications of the function these sites served (e.g. hospital, command post, combat), who occupied such sites and the behaviour during the Battle for Saipan. Artefacts from post-battle occupation by the U.S. is also present at some sites. The next two chapters will take the data presented in Chapters 5 and 6 and discuss how karst defences functioned during the war and the behaviour surrounding these sites immediately before, during and after the war.

Chapter 7 – Discussion: Karst Defences as Reflecting Distinct Military Cultures

7.1 Introduction

In Chapter 2 it was proposed that the structure and spatial arrangements of military sites can reflect a military's social, political and cultural attitudes and aspirations. This type of analysis can also be applied to karst defences. As discussed in Chapter 3, despite being a part of a single organisation, the IJN and IJA were part of distinct military cultures which operated independently of one another for over 70 years. Phelan (1945) has argued that the differences in operations between the IJN and IJA resulted in the construction of distinct karst defences. The purpose of this chapter is three-fold. First, it will determine the placement and function of karst defences in Saipan. Second, it identifies the specific differences in construction and use between army and navy karst defences. Third, it demonstrates that particular modifications reflect the IJN and IJA attitudes towards each other. To do this, this chapter compares the construction and function of Saipan's karst defences to sites in other areas of the Pacific to determine tunnel and cave standards and variations.

7.2 Comparing Karst Defences in the Pacific

According to Phelan (1945), the friction and division that characterised the IJN and IJA relationship since the late 19th century resulted in the construction of distinct army and navy karst defences in Peleliu. War period documents describe similar distinctions on Truk Lagoon. According to the U.S. Pacific Fleet and Pacific Ocean Areas (1946:22, 82) after the U.S. air-raid on Truk in February 1944, more in-depth defences were built on the inner islands of the lagoon and the army and navy were responsible for constructing their own (U.S. Pacific Fleet and Pacific Ocean Areas 1946:46, 85–86). Supplies and tools were always allotted to the navy first and if requested, the navy could construct fortifications for the army (U.S. Pacific Fleet and Pacific Ocean Areas 1946:46, 85–86).

Other documents on Guam, Iwo Jima and Okinawa also describe separate army and navy caves and tunnels, but such distinctions are made based upon historical knowledge about the locations of command posts. There are tunnels in Okinawa known historically to be IJN headquarters (Dong 2015; Teri 2006), a cave in Iwo Jima known to belong to General Kuribayashi of the IJA (Rosson 2007; Smith 2008) and a cave in Guam belonging to General

Takeshina of the IJA (Taboroši and Jenson 2002:3) (Figure 7.1). Few details of the construction of these sites are provided and exactly how they are identified as army or navy is unclear.

An analysis of the construction of karst defences on these islands (Table 22) shows that karst defences across the Pacific were constructed in similar ways to those in Saipan, using pick-axes and explosives (U.S. Pacific Fleet and Pacific Ocean Areas 1946:52). However, in Truk, the navy command post on Dublon was constructed using a rock drill and the spoil was carried away on small cars on industrial railway tracks (U.S. Pacific Fleet and Pacific Ocean Areas 1946:52). Karst defences were also modified in similar ways throughout the Pacific. Concrete, stacked rock walls and local materials were used on almost all the islands listed in Table 22, both internally and at the entrances (Figures 7.2–7.4).

Figure 7.1: Diagram of General Kuribayashi's tunnel in Iwo Jima (506th Fighter Group n.d.).

Table 22: Data on Comparable Karst Defences

Location (troop size)	**Number of Karst Defences**	**Function/Tunnel Type**	**Tunnel Max/Min length, width, height (m)**	**Modifications (measurements in m)**	**Date of Japanese occupation/Date of U.S. invasion**
Watom Island	"[D]ozens" with eight studied in detail (Petchey 2015:37). Only the northern portion of the	Six gun tunnels (all I-type), one barge tunnel, one E-type tunnel	L: 110/15 (some "short" tunnels) W (internal): 1 H (internal): 1.75 Tunnels have two to four entrances,	Niches typically 2.6 deep, 1.7 high, 1.2 wide (Petchey 2015:37), concrete walls and gun ports, interior	January 1942/never invaded

	island was surveyed (Petchey 2015:30)		some extend right through the hill	wells, local materials (Petchey 2015:35–47)	
Truk	Over 140 karst defences on eight islands, at least 16 tunnels (Denfeld 1981; U.S. Pacific Fleet and Pacific Ocean Areas 1946)	Combat (many gun caves), command post, shelter, torpedo caves, plane caves, radar station cave, storage cave	L: 62/8 W (internal): 4.9/0.9 H (internal): 12.1/1.9 Two plane caves on Moen 30.5 long 7.6 wide 3.7 high	Concrete floors, concrete walls and baseplate for gun, parapet with drums cement and gravel, steel doors, stacked limestone	October 1914/never invaded
Saipan	At least 49 tunnels and at least 34 caves	See Chapter 5	See Chapter 5	See Chapter 5	October 1914/June 1944
Tinian	Four tunnels, 68 caves	Primarily I-types tunnels and caves used for shelter and combat (Putzi et al. 1997:60–63)	L: 5/1 W (internal): 1.5 H (internal): 1.25 (Moore and Hunter-Anderson 1987:28)	Stacked rock walls, concrete platforms, concrete stairs. One 40 deep cave used by Okinawan civilians for shelter that contains 105 features made of rock, including walls, enclosures, overhangs, cupboards, walkways and stairs (OEESC Inc. 2001)	October 1914/July 1944
Rota	At least 70 tunnels and at least 70 caves, most within four complexes	Y, V, C, I, J, T, U, L-types (Moore and Hunter-Anderson 1988:37; Swift et al. 1992) hospital cave (Dixon and Welch 2000:39)	L: 60/1 W (overall): 30/1 W (internal): 5/0.5 H: 3/0.2 (Mohlman 2011; Swift et al. 1992)	Concrete walls, concrete floors, concrete platform, stacked limestone, air vents	October 1914/never invaded
Guam	Hundreds of caves, but 23 WWII-related (four tunnels 19 caves) (Dixon et al. 2012:115; Taboroši and Jenson 2002:2)	Shelter tunnel, two command post tunnels one was the army's, hospital cave and water cave (Taboroši and Jenson 2002:2–3)	H: (entrance): 1	Stacked rock walls at caves, reinforced concrete entrances, concrete walls and ceilings on tunnels and caves, low interior platforms, concrete platforms (Dixon et al. 2012:117; Taboroši and Jenson 2002:3–4)	December 1941/July 1944
Peleliu	At least 500 (200 tunnels and 300 caves) (Phelan	See below	L: 91.4/mere holes in the wall W (overall):	Some five and six storeys deep (Miller 2008:169),	October 1914/September 1944

	1945:2)		61/1.2 W (internal): 4/0.9 (rectangular ones are 10.5) H (internal): 2 rectangular are 11	some with sliding steel doors (Miller 2008:168)	
Iwo Jima	Unknown, but more than 1.6km (16 miles) of passageways (Smith 2008:1). The U.S. was unable to map them because there were so many (CINCPAC-CINCPOA Bulletin No. 136-45 1945:2)	Hospital tunnel (Brooker 2009), storage cave (Rosson 2007), firing positions on Mt. Suribachi, shelters and communication in the south, ammunition storage in the north (CINCPAC-CINCPOA Bulletin No. 136-45 1945:3–4, 5)	L: 731.5 W (overall): 21.3/9.2 W (internal): 3.7/0.9 H (internal): 4.6/1.5 One communication tunnel 731.5 (800 yards) had 14 entrances, General Kuribayashi's cave is 27.9m^2 (300 feet square), with a 2.4 long hall then a large room with other rooms leading off including a bathroom with a tub sunken into the ground, 1.2 wide airshaft running for 2.4, the opening had bars (Rosson 2007; Smith 2008)	Spider hole (vent) in ceiling of hospital tunnel (Brooker 2009), tunnels were constructed downward first then extended into further tunnels, many caves were concrete faced and some on Mt. Suribachi had multiple (up to seven) levels CINCPAC-CINCPOA Bulletin No. 136-45 (1945:3–4, 21–25); (Miller 2008:258)	1600s/February 1945
Okinawa	West of Ukuna are "innumerable caves" (U.S. Tenth Army 1945:21). IJN HQ in Tomishiro City (Dong 2015; Teri 2006), Kakazu Ridge has many caves (Teri 2006)	1,000-man civilian shelter cave near Ie Shima (Dong 2015), ammunition storage and command tunnels (Appleman et al. 1948:169). Right through the hill and mutually supporting (Dissemination Division G-2 Section 1945a:1), some three storeys deep (Appleman et al. 1948:152)	L: 61/4.6 W(internal): 0.9 H (internal): 1.5/1.2 (Appleman et al. 1948:169; U.S. Tenth Army 1945:38). IJN HQ 450 (1500 feet) worth of tunnel to fit 4000 people (Appleman et al. 1948:433–434; Dong 2015; Teri 2006)	IJN HQ constructed with concrete (Dong 2015; Teri 2006), some caves with sliding steel doors, ventilation tunnels, log reinforcement, heavy timber bracing concrete doorways and walls (Appleman et al. 1948:152, 168–169, 250, 433–434)	1879/April 1945

Figure 7.2: Ammunition storage cave in Truk with concrete arched roof (U.S. Pacific Fleet and Pacific Ocean Areas 1946: 50).

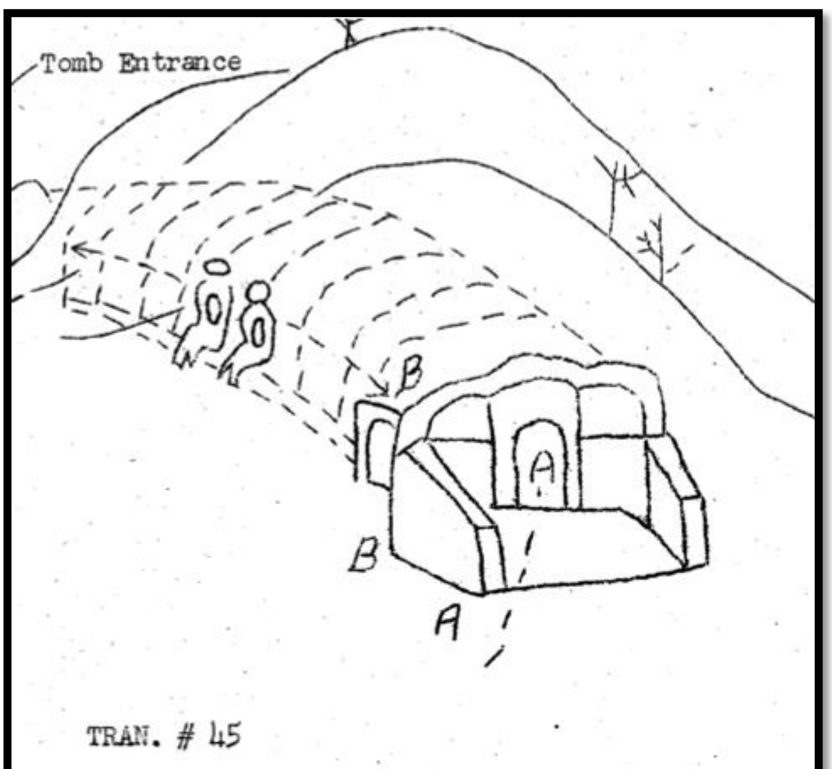

Figure 7.3: Sketch of concrete entrance in Okinawa (Dissemination Divison G-2 Section 1945b:6).


Figure 7.4: Stacked limestone wall at cave in Iwo Jima (CINCPAC-CINCPOA Bulletin No. 136-45 1945:22).

Generally speaking, karst defences also functioned in similar ways throughout the Pacific. Caves and tunnels were used as command posts and hospitals, for storage, shelter and combat, and as gun emplacements. The functions they served depended on the circumstances and the need. For example, in Truk Lagoon, a massive amount of equipment was moved into caves and tunnels after the U.S. air-raid in February 1944 so that nearly every weapon was within karst defence protection (U.S. Pacific Fleet and Pacific Ocean Areas 1946:23–32, 48). Furthermore, more specific equipment used in Truk, such as torpedo boats, listening devices, radars and searchlights, were also protected in this way (Denfeld 1981a:106, 116; U.S. Pacific Fleet and Pacific Ocean Areas 1946:52, 82, 95, 103, 114, 121). Similarly, Rabaul used caves to store barges.

There is no standard overall tunnel length, as the various examples in Table 22 demonstrate. These range from mere holes to massive tunnels over 700m long, including those dug straight through a hill. While there are exceptions to the rule, the majority of internal widths and heights in Table 22 are between 1m and 4m. Some exceptions include an 11m high rectangular navy storage tunnel in Peleliu, two 7.6m wide plane caves on Moen Island in Truk Lagoon and a 12.1m high army command post on Dublon Island, also in Truk.

If the Japanese on Truk, Guam, Peleliu, Iwo Jima and Okinawa constructed distinct army and navy karst defences, and given that karst defences were constructed and functioned in similar ways throughout the Pacific, then it is reasonable to expect that Saipan must also have distinct army and navy karst defences. In order to determine the distinction in Saipan, the data on Saipan's sites presented in Chapter 5 (Table 3) will be compared to the types, measurements and function of those discussed in Phelan (1945) and U.S. Pacific Fleet and Pacific Ocean Areas (1946). Studies on Peleliu and Truk are the most detailed and useful for comparative analysis. Artefacts, reported military activity and proposed Japanese defence sectors will also be used to determine the military affiliation of Saipan's sites.

7.3 Criteria for Analysis

7.3.1 Differences in Army and Navy Karst Defence Construction and Function in Peleliu and Truk

Tables 23 and 24 were compiled to show the measurements and function of army and navy karst defences on Peleliu and Truk. The tables only show tunnels, as no data for cave sizes were reported. A small amount of data from Denfeld's (1988, 2002) and Knecht et al.'s (2012) studies on Peleliu and Denfeld's (1981a) study of Truk were also incorporated into the tables, but only if the data were from sites determined to have military affiliation. For example, Knecht et al. (2012) do not distinguish between navy and army tunnels, but they do list data for H-type tunnels. According to Phelan (1945), only the navy constructed H-types in Peleliu and therefore the data from Knecht et al. (2012) on H-types are incorporated into the Peleliu table below. Data in Knecht et al. (2012) for I-, L- and T-types with no military designation are not used because both the navy and army in Peleliu constructed these types and therefore the measurements and features cannot be used to distinguish between army or navy. Knecht et al. (2012:176, 239) also document two F-type tunnels. No affiliation is given and no diagram is provided for F-types, but the data are included in the table below. A table of army and navy karst defence characteristics generated from the sources above (Table 25) is also used to help guide the analysis.

Table 23: Peleliu Tunnel Data (Denfeld 1988, 2002; Knecht et al. 2012; Phelan 1945)

Purpose	Niches (Y/N)	Max/Min Complete Length (m)	Max/Min Complete Width (m)	Internal max/min width of legs (m)	Internal max/min height of legs (m)	Max/Min Number of Entrances	Max/Min Entrance Width (m)	Max/Min Entrance Height (m)
Navy H-Type								
Communication centers, command post, shelter	Y	91.4/12.2	61/7.6	4/2	2.5/2	9/2	3	2/1
Navy E-Type								
Shelters for enlisted men	Y	12.5/4.6	15.2			4/3	2	1
Army W-Type								
Field hospitals, personnel shelters for reserve troops	N	15.2	22.4/13.7			2	2.2	
Army J-Types								
Shelter against direct fire for personnel at nearby weapons	Y	18.3/9.1			1.9	2/1	2.3	0.95
Navy U-Types								
Combat	Y	20/12	14/7			2	3.1/0.9	
Army U-Types								
Combat	Y	8.5	11/7.6			2		
Navy Y-Types								
Combat	Y	20/12	14/7	2.4/0.9		2	2.5/0.9	
Army Y-Types								
Types 1 and 2: combat; Type 3: protection against small arms, storage, shelter, field hospitals	N	16.8/6				3/1	2.5	
Navy I-Types								
Storage, combat	Y	20/mere holes in the wall	3.1	1.8		1		

Army I-Types								
Storage, combat	N	20/9.1	2.4/1.2			2/1	2	0.9/0.6
Navy L-Types								
Shelters for those at weapons positions	N	20/mere holes in the wall	6.7			1		
Army L-Types								
Shelters for those at weapons positions		20/10						0.9/0.6
Navy T-Types								
Shelters for those at weapons positions, combat	Y	20/mere holes in the wall	9.1			1		
Army T-Types								
Shelters for those at weapons positions, combat		20/10				2	2	0.9/0.6
Navy Rectangular								
Storage		29/1.8	10.5/1.2	10.5	11			
F-Type								
Unknown		4			2/1.8	2/1	2/1.2	1.75/1

Table 24: Truk Tunnel Data (Denfeld 1981a; U.S. Pacific Fleet and Pacific Oceans Areas)

Purpose	Niches (Y/N)	Max/Min Complete Length (m)	Max/Min Complete Width (m)	Internal max/min width of legs (m)	Internal max/min height of legs (m)	Max/Min Number of Entrances	Max/Min Entrance Width (m)	Max/Min Entrance Height (m)
Navy H-Type								
Naval battle command posts, Dublon	Y	156/57				4/3		
Navy E-Type								
15cm gun position in Tol	N	69.6	63.2	Unknown	Unknown	5	Unknown	Unknown
14cm gun on Uman	Y					5		

Army Unknown-Type								
Command post for 52nd division with water trough Dublon	Y	70.9		4.9/0.9	12.1/1.9	3	Unknown	Unknown
Army H-Type								
Command post for 69th regiment Dublon	Y	Unknown	Unknown			3		
Command post for 341st battalion on Fefan	Y	35				3		
H-Type Unknown Affiliation								
Gas proof shelter, Dublon	Y	80				3		

Table 25: Characteristics of Army and Navy Karst Defences in Peleliu and Truk (Denfeld 1981a, 1981b, 1988, 2002; Phelan 1945; U.S. Pacific Fleet and Pacific Ocean Areas 1946)

Peleliu		
Army	**Navy**	**Both**
• The army constructed tunnels in W (hospitals or shelters) and J-shapes (shelter against direct fire or quick shelter spot for personnel situated at guns nearby) • Army U-types were constructed with the same curved legs as the navy U-types, but the army also constructed U-types with squared corners, which caused flashbacks against flamethrowers. • Army U-types had two combat entrances, but sometimes there was a separate combat and escape entrance. When there was an escape entrance, it usually gave access to a	• The majority of tunnels in Peleliu belonged to the navy and were built by the 214th Naval Construction Battalion • Most of the navy tunnels were used as air-raid shelters and often as coastal artillery emplacements • Only the navy constructed tunnels in H- (for communication and command), E- (shelter) and rectangular-shapes (storage) • Navy U- and Y-types had two entrances; one was used as a combat entrance with a ready ammunition chamber and log and stone barricade. The other was a smaller escape tunnel	• The size and purpose of army and navy I-, L- and T-types were the same, but army types had smaller entrances and larger barricades • Both army and navy tunnels had niches, but the navy tunnels had more and at regular intervals. All navy shelter tunnels had niches. The army preferred 'deep niches' to take refuge in for protection against small arms fire (whether the niche itself in army types is deep or the niche is deep within the tunnel is unclear) • The army also used more caves than the navy

protected area not seen from the combat entrance • Army Y-types could have up to three entrances. The Y-types with one entrance were used for storage and shelter while the other Y-types had combat and escape entrances • The entrances of army tunnels were smaller, which assisted in camouflage • The army built tunnels with better camouflage for combat purpose, using materials such as stacked limestone, and to reinforce systems of concrete pillboxes, entrenchments and gun emplacements • The floors in army tunnels often sloped down sharply from the entrance or had quick turns to protect occupants against small-arms fire	• In general, the internal leg dimensions of navy tunnels in Peleliu were larger than army tunnels, measuring approximately 3.1m wide and 1.8m high and most navy tunnels had woodwork and electricity	
Truk		
• The army H-types were shorter in overall length • 84 gun caves/tunnels. Whether these gun defences are caves or tunnels is unclear. Seven were modified with concrete, four with steel and five with palm logs	• Navy E-types had the addition of a gun emplacement giving a combat function to E-types • 21 gun caves/tunnels. Whether these gun defences are caves or tunnels is unclear. Three were modified with stacked rock, 12 with concrete and two with gravel filled drums	• Both the army and navy constructed H-types and used them as command posts

7.3.2 Distinct IJA and IJN Artefacts in Saipan

In addition to the information from Peleliu and Truk, artefacts were also used to help establish the military association of karst defences. Table 26 sets out the diagnostic artefacts located in Saipan's sites. Only those recorded are included in the table, so, although the IJA and IJN had different helmets, no helmets were found in any of the Saipan karst defences and thus are not included in the table.

In times of desperation, both the army and the navy shared sites and combined forces for their last stands (Gary Nila pers. comm. 2015; Phelan 1945:4). Thus, although tunnels were distinct, IJN and IJA artefacts may be found within the same tunnel. Additionally, as the Battle for Saipan progressed, clothing became tattered and torn and there are accounts of Japanese military and civilians wearing the uniforms of fallen soldiers. Therefore, particularly in the northern sites, one cannot identify the presence of military personnel based upon the remains of uniforms alone.

Table 26: Artefact Differences Between the IJN and IJA (Denfeld 1997; Nakata and Nelson 1987; Nila 2002; Nila and Rolfe 2006; U.S. Pacific Fleet and Pacific Ocean Areas 1946; War Department 1944a, 1944b; Yokohama WW2 Japanese Military Radio Museum 2015)

Type	IJN	IJA
Uniform Colour	Blue, white, sea green, khaki-tan	Tan, olive
Buttons	White and sea green	Black, brown or dark green
Leather Footwear Colour	Black	Brown, officers wore black
Identity Tag	General: White cotton label or oval, white, plastic badge Parachute harness metal components: anchor	General: Flat, brass, oval tag with Japanese kanji characters, 4.4cm x 3.2cm Parachute harness metal components: circled star
Canteen	Oval aluminum bottle with aluminum screw cap and retainer chain	Aluminium bottle painted olive with a wood-and-cork stopper
First Aid Kit and Items	Personal first aid kits with aluminium cans of sulfonamide powder, bottles of salt tablets malaria pills, insect repellant and miscellaneous opiates (in powder, pill or syrette forms)	No personal first aid kits issued, dependant on larger field kits containing various anti-malarial medications and vitamins contained in powder, tablet and liquid form (often in ampoules) and a variety of instruments made of nickel-plated carbon steel, nickel-plated copper and aluminium
Gas Masks	Model 93 Type 2: grey face piece with aluminium rimmed, rounded triangular eye piece and gray canister measuring 14cm high x 16.5cm wide x 7.6cm thick. Model 93 Type 3: same as the Type 2, but olive coloured and brown plastic valve housing. The canister measures 11.4cm x 14.6cm x 7.6cm Auxillary canister measures 5.1cm high x 14cm wide x 7.6cm thick	Model 95: khaki-coloured, stockinette face piece with round lenses and threaded removable rims, canister is 15.2cm x 12.7cm x 7cm Model 99: same as 95 but with a fitted rubber nosepiece and a canister only 11.4cm high Civilian Gas Mask Type 1 Model A: tan face piece with round eye piece with fixed rims, canister is 12.1cm x 13.3cm x 7cm
Gas Mask Accessories	An anti-fog compound in a small cylindrical sheet metal container and a cleaning rag	Anti-fog discs in a square, black plastic container, a flat square metal flask for anti-fog liquid, a black cylindrical syringe for anti-fog liquid, a hinged metal clamp for closing the air hose, a cleaning rag

Radio Equipment on the Ground	Model TM Shortwave Mobile (emergency) Radio Set Improvement 2 Type 95 Mark 3 Short-Wave Transmitter (emergency) Type 2 Mark 6 Medium-Wave Transmitter (emergency radio-keyed) Type 92 All-Wave Receiver	Model 92 Mark 3 Improvement 1 Model 95 Model 95 Mark 4 Improvement 1 Model 92 Special Receiver Improvement 4 Type 94
Personal Pack Contents	Unknown	Shelter half with poles and pins, soap, sewing kit, breech clout, rations, mess kit, shovels. Picks, tree climber shoe spikes, phials/measuring spoons/flat tins as part of water purification kits
Mess Kits	Silver coloured, rectangle shaped	Kidney shaped or rectangular, in brown, olive or black on the outside
Insignia	Anchor, sakura (cherry blossom)	Star

7.3.3 Japanese Defence Sectors

Japanese defence sectors and how they relate to karst defences in Saipan are also used in this analysis. Lieutenant General Hideyoshi Obata of the IJA divided Saipan into four sectors: Northern, Navy, Central and Southern (Denfeld 1997:22–23; Hoffman 1950:11). Each sector was defended by a different army regiment, except for the Navy which was primarily defended by navy ground forces from the 1st Yokosuka SNLF and the 55th Naval Guard Force (Crowl 1960:67; Denfeld 1997:22–23; Hoffman 1950:11). The 48 recorded karst defences in Saipan related to the Japanese military (non-civilian) are spread out fairly evenly amongst the four sectors (Northern Sector=18, Navy Sector=15, Central Sector=4, Southern Sector=11). The Central Sector and the southern section of the Southern Defence Sector have few sites (Figure 7.5), but this is a result of geological factors and not because the Japanese paid less attention to these areas. Figure 7.6 shows deposits of Pleistocene and Holocene limesand, beach and wetland in the Central and Southern Defence Sectors. Such areas are not dominated by limestone or other soluble rock and thus are not a karst landscape. No caves or tunnels exist in these deposits.

7.3.4 Reported Army and Navy Activity in Saipan

Lastly, the locations of army and navy activity during the Battle for Saipan and how they related to Saipan's tunnels as discussed in U.S. *Operation Forager* journals and historical accounts of the battle were also used in analysis. Locations of army and navy command posts, POW captures, corpses, troop movements and military artefacts mentioned in the journals are mapped (Figure 7.7). Oral histories collected by the author and others, such as the Pacific STAR Center for Young Writers (2004), Petty (2002) and Poyer et al. (2001) and U.S. official histories were also used to locate areas of military activity and included in Figure 7.7.

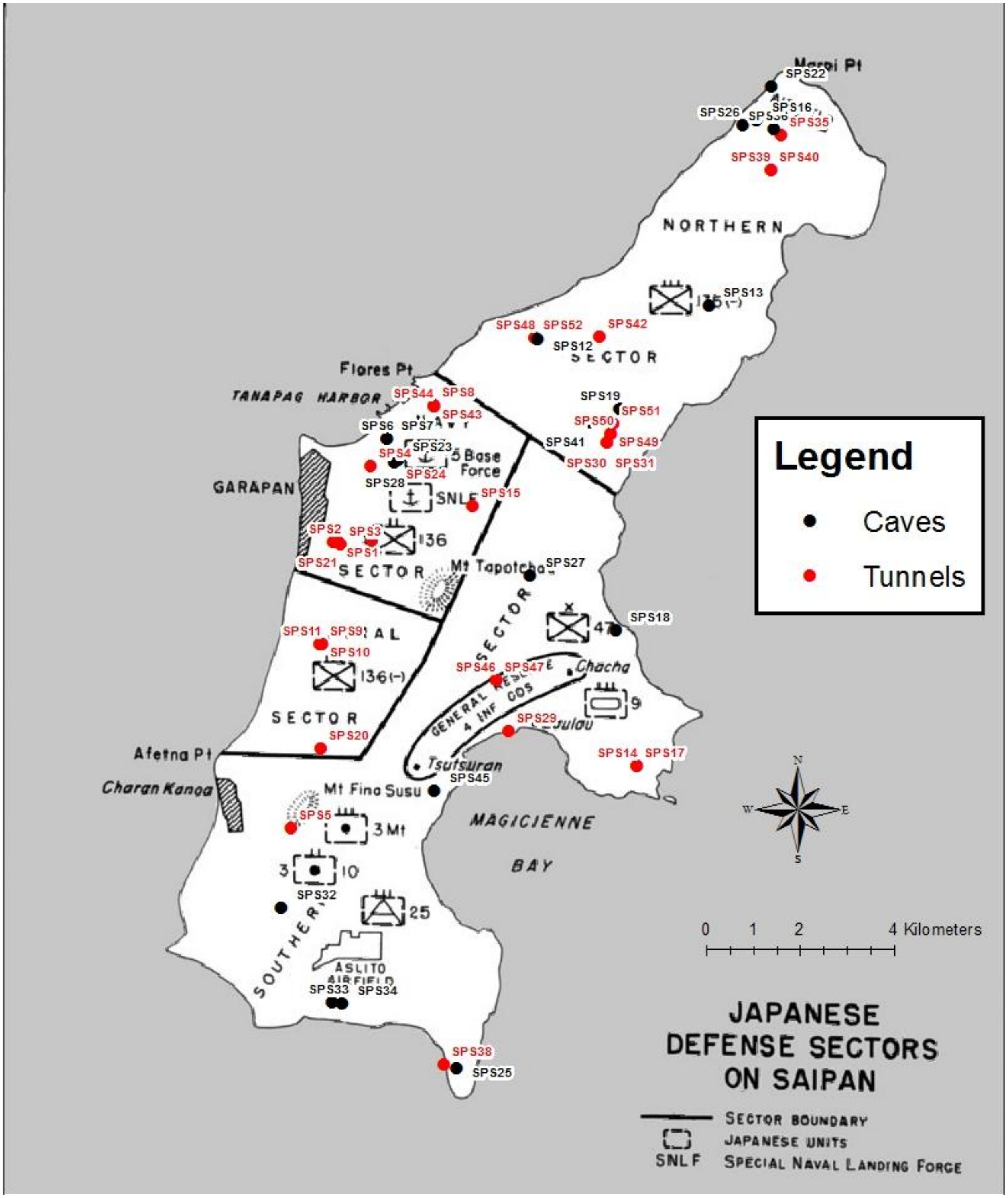

Figure 7.5: Location of Saipan karst defences within Japanese defence sectors (from Denfeld 1997:25).

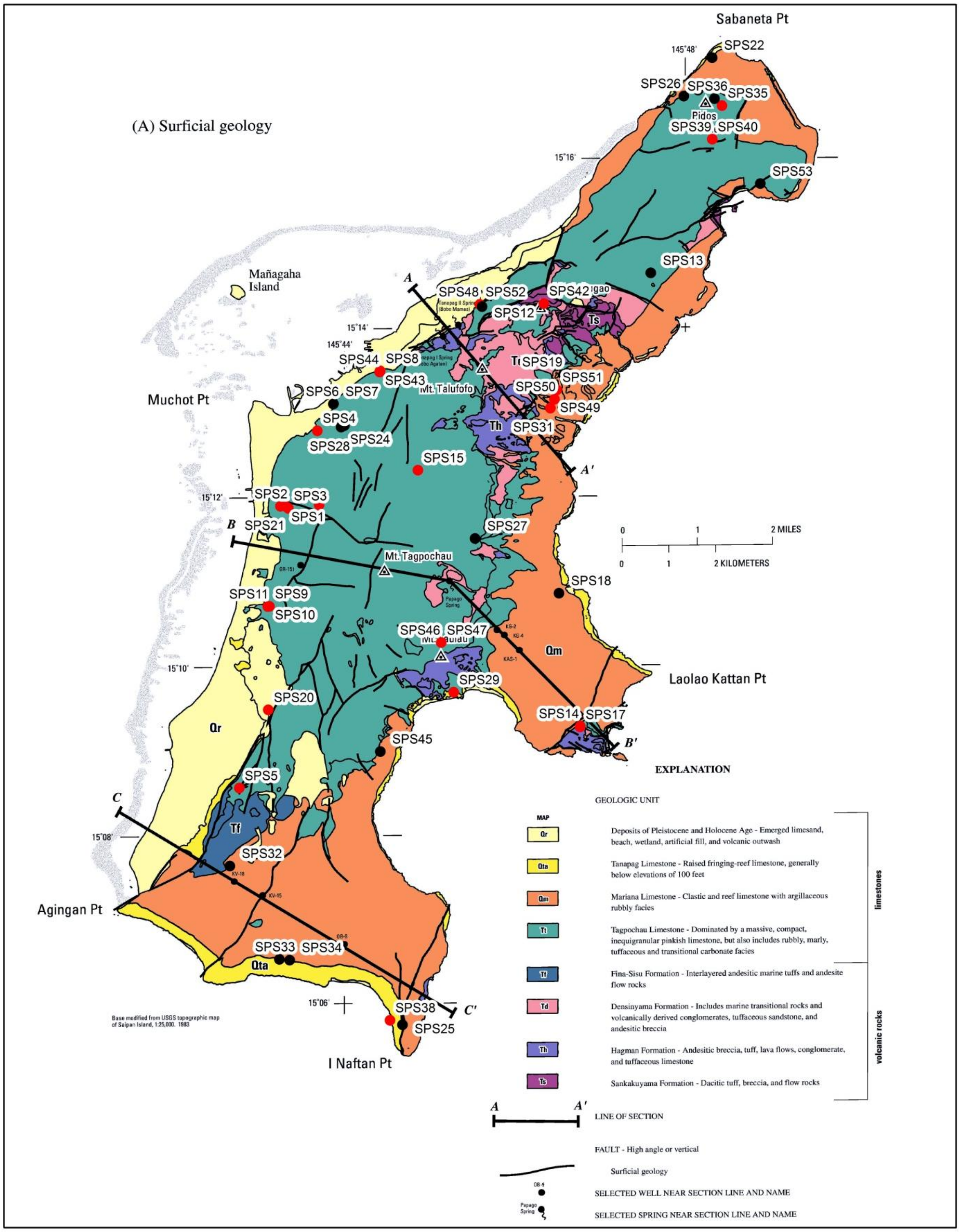

Figure 7.6: Saipan's karst defences and their locations relative to geological units (from Carruth 2003).

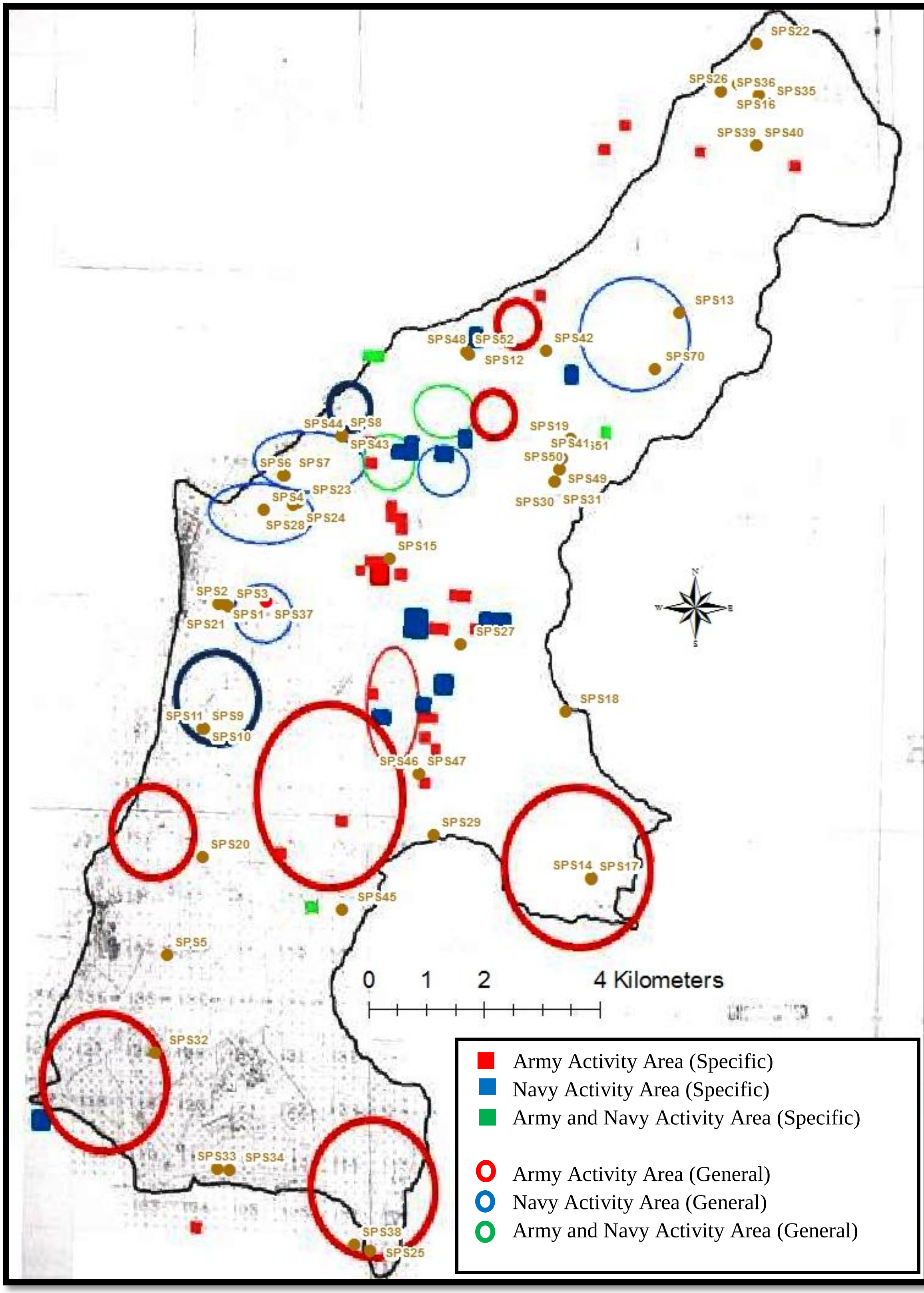

Figure 7.7: Army and navy activity in Saipan.

7.3.5 Determining Karst Defence Function

Karst defences in the above-mentioned sources serve five different primary functions: command, hospital, combat, storage and shelter. To determine function, Saipan's karst defences are compared to those in Peleliu and Truk. Additionally, artefacts and site modifications are also used. Command post artefacts include communications equipment, batteries, wire, lighting, evidence of machinery to generate electricity, plumbing and items likely to come from high-ranking individuals (see Chapter 6). Hospital sites contain a number of medical supplies, including medicine bottles and metal surgical tools. Combat sites contain an abundance of ammunition of different types and sizes. Sites used for storage are identified by caches of cans, bottles and ammunition. Finally, shelter sites contain more personal items, such as razors and soap containers. Shelter sites also contain small stocks of food and ammunition and, according to Phelan (1945:10, 26), could have lights, tin roofs and wooden floors.

Concrete and stacked limestone modifications were also used to help determine function. As discussed in Chapter 2, concrete was used to modify karst defences for two reasons: to make something more structurally sound, as seen in air-raid shelters, and to prevent water from leaking in. If concrete was used for structural integrity, it seems likely that it could be applied either externally or internally. If concrete was used to prevent water from leaking in, it lined the site internally. Thus, the use of internal concrete to protect installations such as wiring and lighting or to protect ammunition from deterioration can be a good indication that a site was used as a command post or for storage. Walls built entirely out of concrete with embrasures suggest the site was likely used for combat.

As determined in Chapter 2, camouflage at karst defences is achieved through stacked limestone walls, local materials and the construction of smaller entrances. Phelan (1945:16) explains that in Peleliu, sites used for combat required the most camouflage. Since the majority of army karst defences in Peleliu were used for combat, these sites have more stacked limestone walls than other types of sites. Thus, the presence of a stacked limestone wall is a strong indication that the site was used for combat. Other modifications used in Peleliu that help to determine function include cut-outs or enlarged portions near entrances which were used to store ammunition at sites used for combat (Phelan 1945:10). A lack of any modifications suggested that a site was likely to have been used for storage (Phelan 1945:26). Gasoline drums and coconut logs were placed outside the entrances of sites used for shelter, and tin roofing and wooden trussing were also used to prevent seepage (Phelan 1945:10, 22), but these modifications were not observed on Saipan.

7.4 Saipan's Army and Navy Karst Defences

Several factors were used to determine the military affiliation of karst defences in Saipan. First, greater reliance was placed on the dimensions, modifications and artefacts when interpreting a site's affiliation than the English letter shape of the tunnel. This is because five tunnels in Saipan do not conform to any of the shapes laid out in Phelan (1945). Additionally, identification of types in Peleliu appears to be subjective and based on observations rather than measurements in the field. While observations can be useful for determining many shapes, sometimes more specific angles are required to differentiate between shapes. For example, a J-type listed in Phelan (1945:23) could easily be interpreted as a slightly curved I-tunnel or an E-type with a slight curve could actually be a W-type, which would be difficult to determine by simple observation alone.

While some tunnels had both IJA and IJN artefacts, it was never in equivalent amounts. Rather, if there were IJA artefacts within a tunnel that was determined to belong to the navy by its construction, it usually consisted of one eye-piece from an army gas mask or one button amongst more IJN artefacts. If only non-diagnostic artefacts were present, these were compared with the non-diagnostic materials found in other previously identified tunnels to help determine affiliation.

Historical affiliations designated to the defence sectors had more bearing on interpretation than military activity because, despite their differences, the IJA and IJN often had no choice but to work together, especially when times were desperate. Evidence from defence sectors and military activity areas were never used to support an interpretation that contradicted what the construction suggested.

7.4.1 Establishing Army and Navy Tunnel Differences in Saipan

Despite the comprehensive data on site construction in Peleliu, many of the differences between army and navy are vague. For example, army tunnels are described as "smaller," "crudely constructed," and with "smaller" entrances. These and other terms needed to be more clearly defined in the Saipan context and SPS11 was the starting point. SPS11, an army W-type, was used as a standard army type because its measurements are almost identical to the army W-type in Peleliu. The Saipan and Peleliu examples differed only by 50cm in overall length (Table 27) and the entrance widths are also nearly equal, differing by 20cm. One major difference between the Saipan and Peleliu W-types was that SPS11 has three entrances instead of two. Moreover, like the Peleliu W-type, SPS11 also functioned as a hospital. A variety of metal instruments typical of IJA hospitals and field kits were recorded within SPS11, along with an IJA military tag. Furthermore, SPS11 is well-camouflaged by a long, stacked limestone wall outside one of the entrances. No internal measurements are given for W-types in Peleliu, but the interior height of SPS11 ranges from 1.8m to 2.1m, which is similar to the height of most navy tunnels according to Phelan (1945:21–22). The interior width ranges from 1.5m to 2.1m, however, which is narrower than the typical navy width of 3.1m in Peleliu.

Although not in a shape described in Phelan (1945), SPS14 is also interpreted as an army tunnel used for combat as it has a number of IJA artefacts, such as hobnailed shoes, gas mask components, mess kits and several types of small and large ammunition and grenades. SPS14 has two large, internal stacked limestone walls for camouflage and is located within an army defence area. Like SPS11, the internal height of the tunnel reached 2m and the internal width varied between 1.5m to 2.1m. The entrance heights and widths of SPS11 and SPS14 are also similar.

Another army tunnel is SPS4 which is identified as an H-type used as a hospital. The tunnel has a large stacked limestone wall outside one entrance and contains a number of artefacts, including IJA first aid items and gas mask components. Similar to SPS11 and SPS14, the internal height ranged from 1.5m to 2.2m and the internal width from 1.7m to 2.2m.

In contrast, SPS37, a combination-type tunnel, is interpreted as a navy shelter. A number of IJN artefacts are present, including an identity tag, gas mask lens and diaphragm, and it has one square niche. The tunnel has no stacked limestone, but there is a set of limestone stairs. Furthermore, SPS37 is also within the Navy Defence Sector and in an area of navy activity. The internal width reached 4.1m, which is 1.2m wider than the widest army tunnel mentioned above, yet the height range is similar: 1.5m to 2.5m.

SPS20 is identified as a navy command post. The tunnel has no stacked limestone, but a considerable amount of concrete, and contains several SNLF buttons, a chain from a navy canteen, wire, ceramic insulators and a number of fragments from receivers and transmitters. The internal widths and heights are large, ranging from 2m to 4m, almost double that of the army types described above. However, as explained in Chapter 5, this site may have been first used as a mine and later modified for war purposes. Ignoring the entrance leg and southern section of the tunnel that includes the mining remains, the remainder of the tunnel closely resembles a Japanese command post in Okinawa (Figure 7.8–7.9). Additionally, the internal height in this area ranges between 2.3m to 4.5m, higher than SPS37, but the width ranges from 2m to 4.1m—measurements similar to SPS37. Thus, the IJN presumably expanded into the mining tunnel portion in preparation for war.

Figure 7.8: Okinawa command post (Totorobaga 2014).

SPS3, a navy command post of unknown shape, also has the same concrete construction found in SPS20 (Figure 7.10). The tunnel is situated within the Navy Defence Sector, in an area of navy activity and the internal and entrance heights and widths are similar to SPS37 and SPS20. Few artefacts identify the tunnel as belonging to the navy aside from an IJN gas mask lens found with ceramic insulators and communications equipment piled outside the site by visitors. Finally, SPS21 is a navy tunnel of unknown function. The tunnel is constructed with a concrete entrance with short stacked limestone walls outside the entrance. The walls are more like small barricades than the large limestone walls found at most army tunnels. The maximum internal widths and heights are consistent with the navy tunnels mentioned above. However, the overall width matches other army types. Artefacts are minimal and only consist of a bisarsen ampoule, normally associated with IJA kits. Other non-diagnostic artefacts found within SPS21 includes 15 timber dogs, some attached to the four logs lying within the site, and a glass support rod from a light bulb. The same timber dogs are found in abundance in SPS20 and SPS29 (see below), both of which are navy types, and the same glass support rod is found in SPS37.

Figure 7.9: Northern (non-mining) section of SPS20 (1m scale).

7.4.2 Saipan U-Types

Saipan's U-types are all combat tunnels and interpreted separately because they have specific construction characteristics. SPS39 and SPS40 are two examples of navy U-types constructed approximately 12m apart with many IJN artefacts, including a bowl, gas mask components and communication equipment. Like U-types in Peleliu, SPS39 and SPS40 have combat entrances with internal cut-outs and enlarged internal portions just beyond the entrances which were used to stack ammunition, while their other entrance is a smaller escape tunnel. The differences in dimensions between the escape and combat entrances are 70cm in height and nearly a metre in width. Although the combat entrance at SPS40 and the escape entrance at SPS39 have stacked limestone, it is not like the limestone walls found at army tunnels, but rather a small barricade to hinder viewing from the outside. The internal widths of the rear legs of both tunnels are just over 4m wide and, like other navy tunnels in Saipan, are 3.6m to 5.7m high, resembling a large square-shaped room. Due to the narrowness of the escape tunnel, the internal width of the legs extending from the entrances can be as little as 95cm.


Figure 7.10: Concrete construction in SPS3.

Similarly, SPS35 has a wide and high rear leg and a combat and escape entrance, although the entrance interpreted as combat is sealed. The sealed entrance appears to be the same dimensions as the leg extending from it, thus the dimensions between it and the escape entrance would differ by 80cm in height and 60cm in width. These measurements are similar to those at SPS39 and SPS40. A combat entrance is more likely to be sealed than an escape entrance, as attacking enemies would concentrate on the place where they could see gunfire.

Although in Peleliu only the army constructed square U-types, SPS5, which is nearly devoid of artefacts, is a square-shaped, navy U-type. The site is wide overall and has a combat and escape entrance (neither of which differ in width, but do differ by 75cm in height) as well as a larger rear leg. Since the tunnel is also modified with concrete and wood, SPS5 is interpreted as a navy tunnel.

SPS47 is an example of an army U-type with two combat entrances. The two entrances begin as high and wide natural openings behind which tunnels have been excavated. The entrance heights differ by 60cm, but since the entire site is only 5m wide, the overall narrowness would make a quick, unaffected exit through an escape entrance impossible. Additionally, the site is well-camouflaged by its surroundings and contains an internal stacked limestone wall at the rear, likely a result of levelling out the ground in order to pile ammunition. Unlike navy U-types, SPS47 does not have a large rear leg and the widths and heights are fairly uniform throughout. SPS42 is also an army U-type with two combat entrances, one of which has collapsed. SPS42 is interpreted as army because it has two combat entrances and the internal widths and heights are uniform.

Table 27: Saipan Tunnel Data

Site	Comparison to Peleliu and Truk data	Number of entrances	Niches (Y/N)	Artefacts with military affiliation and/or modifications	Defensive sector	Navy or army area of activity
			Navy I-Types			
SPS1	Wide and high entrance, 40m from SPS3 (a navy tunnel)	1	N	None	Navy	Navy
SPS2	Wide and high entrance, 40m from SPS3 (a navy tunnel)	1	N	None	Navy	Navy
SPS8	Longest overall tunnel recorded, internal width and height more than typical navy tunnel, wide entrance	1	N	Navy auxiliary gas canister, concrete entrance, short concrete walls outside entrance, concrete pit	Navy	Navy
SPS24	Wide and high entrance, 50m SE of a concrete bunker, in same area as SPS28	1	N	None	Navy	Navy
SPS29	Wider and higher than navy types, wide and high entrance	1	Y	Trench extending from entrance, earthen stairs, cut-outs, two 120mm Type 38 guns used by IJN nearby	Southern	Army
SPS43	Wide and high entrance, 60m from SPS8 (a navy tunnel)	1	N	None	Navy	Navy

SPS44	Wide entrance, 60m from SPS8 (a navy tunnel)	1	N	Shell for a Navy Model 96 AT/AA gun used by the Japanese	Navy	Navy
			Army I-Types			
SPS9	Short entrance and internal height, 16m from SPS10 (an army tunnel)	1	N	None	Central	None
SPS14(A)	Short and narrow typical of army types, 3m from SPS14 (army tunnel)	1	N	30 Arisaka bullet fragments, trench extends from entrance	Northern	None
SPS38	Narrow and short, typical of army types, narrow shaft that gives access to different areas (beach and jungle)	2	N	None	Southern	None
SPS46	Wide yet short entrance, 2.9m from SPS46A (army type)	1	N	Several Arisaka bullets	Southern	Army
SPS46 (A)	Wide and high entrance, 2.9m from SPS46 (army type)	1	N	Several Arisaka bullets	Southern	Army
SPS48	Short entrance, 9.1m from SPS52	1	N	None	Northern	Navy
SPS52	Narrow and short entrance, 9.1m from SPS48	1	N	None	Northern	Navy
			Army L-Type			
SPS10	Short, but wide entrance, downward sloping floor, approx. 16m from SPS11 (an army W-type)	1	N	Grommets belonging to shelter halves and tent poles found in IJA packs, shelving	Central	None
SPS17	Narrow and short entrance, 8.8m northwest of SPS14 (an army tunnel)	1	Y	Internal stacked limestone wall, trench extending from entrance	Southern	None
			Navy W-Type			
SPS20	Widest overall tunnel recorded, internal dimensions are wide and high reaching more than 4m in width and height, wide and high entrance, no prepared defences	1	N	Chain from navy canteen, sea-green SNLF buttons, army and navy radio equipment, trench leading to entrance, concrete pit, concrete walls, floors and ceiling, ceiling hole	Central	Army
			Army W-Type			
SPS11	Overall length and width almost identical to those in Peleliu, entrance width is also the same, 16m from SPS10	3	Y	IJA military tag, trench leading to entrance made of stacked limestone	Central	None

Navy U-Type						
SPS5	Overall length and width more consistent with navy types, square-shape is usually associated with the army, internal width and height similar to navy, combat and escape entrance accessing same area	2	N	Concrete and wood entrances, shelving	Southern	None
SPS35	The open entrance is short, measuring only 77cm high, overall length and width more consistent with navy types	1	N	Metal fragment from a mess kit, although too damaged to be certain	Northern	Army
SPS39	Overall length and width more consistent with navy types, combat and escape entrances, 12.4m from SPS40	2	N	a navy aircraft pilot training receiver, a spool from a Type 99 MKII radio used on a Navy aircraft, a pilot training receiver belonging to naval aircraft and a plate from a Navy Type 96-1 transmitter, a navy model 93 gas canister, an Army Type 99 gas mask eye piece frame, One entrance began as natural, stacked limestone at entrance, excavated foot path at entrance, ammunition chamber	Northern	Army
SPS40	Overall length and width more consistent with navy types, combat and escape entrances, 12.4m from SPS39	2	Y	IJN bowl, one entrance began as natural, stacked limestone at entrance, excavated foot path at entrance, ammunition chamber	Northern	Army
Army U-Type						
SPS47	Two combat entrances, well-camouflaged by surrounding limestone outcrops, overall length and width more consistent with army types	2	N	Stacked limestone in interior	Southern	Army
SPS42	Square-shaped, overall length and width consistent with army types	1	N	Small square cut-outs	Northern	Navy

Army H-Type						
SPS4	In Peleliu only the navy had H-types, but the army in Truk had H-types, similar in overall length and width to navy H-types, but the internal width and height are smaller and some of the entrances are narrow and low	5	N	Medicinal bottles of vitamins and an ampoule characteristic of IJA medical field kits, IJA Type 88-75mm anti-aircraft gun in the area, stacked limestone wall at entrance	Navy	Navy
Navy Combination Type/Unknown						
SPS3	Wide and long overall and internal width reaches 4m and height 3.4m. The current property owner suspects the tunnel is Japanese Admiral Chuichi Nagumo's command post (Yoneko Barcinas pers. comm. 2014)	3	Y	a navy gas mask eye lens located outside the tunnel, concrete and wood entrance, trenches leading to two entrances, concrete floors, walls, ceiling, platforms, concrete pit	Navy	Navy
SPS21	Internal dimensions are more consistent with navy types	1	N	Bisarsen ampoule from IJA, concrete entrance, short, stacked limestone walls extending from entrance	Navy	Navy
SPS37	Internal width reaches 4m, wide overall, entrances are wide and high, two levels	4	Y	One navy gas mask lens and diaphragm, navy metal banner-shaped pin, Type 99 IJA gas mask lens, limestone stairs	Navy	Navy
Army Combination Type/Unknown						
SPS14	The internal dimensions are narrow and short, well camouflaged by surrounding limestone	3	Y	Brown hobnailed IJA shoes, IJA mess kits fragments, 81mm Type 100 HE mortar round and their associated propellant packs, IJA anti-fog discs and anti-fog disc holder, stacked limestone at one entrance and wall in interior, shelving	Southern	None
I-Types with Uncertain Affiliation						
SPS30	Wide and high entrance	1	N	Shelving near entrance, 85m northwest of an excavated trench	Northern	Both
SPS31	Wide and high entrance	1	Y	85m northwest of an excavated trench	Northern	Both
SPS50	Wide and high entrance	1	Y	85m northwest of an	Northern	Both

				excavated trench		
SPS51	Narrow and short entrance	1	N	85m northwest of an excavated trench	Northern	Both
Unknown Type with Uncertain Affiliation						
SPS15	Range of internal dimensions, but narrower than typical navy tunnel, combat and escape entrance, well-camouflaged	4	Y	An army gas mask eye piece ring, Concrete entrance with metal door, concrete floors and walls, concrete pit, concrete block and cement walls, stacked limestone and cement wall at entrance	Navy	Army, this is in the location of one of General Saito's (commander of the IJA 43rd Division) command posts.
Total Sites: 34						

7.4.3 I- and L-Types

Similar to the Peleliu I- and L-types, the majority of I- and L-types in Saipan were used for storage or combat. Some of them are identified as army or navy because of their proximity to tunnels already identified. According to Phelan (1945:4), the only time navy and army tunnels were located in the same area was for liaison purposes between official navy communication tunnels and army command post tunnels. No evidence suggests that these I- and L-types were communication or command post tunnels and, thus, if they are close (less than 60m away and along the same cliff line) to other identified tunnels, they are interpreted to have the same affiliation. For example, the two L-types (SPS10 and SPS17) in Saipan are identified as army. Neither of these have artefacts to support this interpretation, but both are identified as army because of their proximity to SPS11 and SPS14. SPS17 also has a stacked limestone wall. Similarly, SPS1, SPS2, and SPS24 are identified as navy and SPS9, SPS14A, SPS46 and SPS46A are identified as army because they are in close proximity to already identified tunnels.

Two I-types in Saipan were not used for storage or combat. SPS29 is a navy shelter for those controlling the two IJN anti-aircraft weapons nearby. It has internal widths reaching 5.1m, two square niches and limestone stairs. SPS8 is the longest tunnel in the survey with internal widths and heights greater than the typical dimensions for navy tunnels in Peleliu and Saipan. The tunnel contains no diagnostic artefacts, yet it is modified with a concrete entrance, is in a Navy Defence Sector with navy activity and is therefore identified as navy. SPS43 and SPS44 are identified as navy due to their proximity to SPS8 and the presence of an IJN anti-aircraft shell.

Finally, SPS38 is identified as an army I-type used for combat. SPS38 is a small, narrow shaft on Saipan's southern coast that gives access to two different areas—jungle and beach. Army U-types in Peleliu were constructed with the same type of accessibility, yet the navy constructed coastal gun emplacements. Without any artefacts or evidence of guns, SPS38 is interpreted as army in origin because it is narrow and located within an army defended sector.

7.4.4 Uncertain Affiliation

One tunnel of undetermined shape and six I-types have uncertain affiliation. The affiliation of SPS15 is unknown due to the lack of artefactual evidence relating to Japanese occupation (only one IJA gas mask lens was found outside the tunnel) and the modifications of the tunnel could be the result of post-battle occupation by U.S. troops and organisations (see Chapter 5). For example, SPS15 appears to have a combat and escape entrance, but the leg extending from the escape entrance could have been excavated by the U.S. as this is the leg with inscriptions from Albert Henry Liddeke and "R.S." Additionally, the measurements and features of the tunnel are contradictory. For example, like army tunnels, the larger entrance at SPS15 has an external stacked limestone wall, but, like navy tunnels, the internal width of the tunnel can be over 3m. Furthermore, SPS15 is within the Navy Defence Sector, but in an area of army activity. Therefore the military affiliation of SPS15 is unknown.

The remaining five I-types (SPS30, SPS31, SPS49, SPS50 and SPS51) are all less than 8m in overall length and are simple tunnels with almost no modifications and no artefacts. After comparing these I-types to those already identified, no tunnel height pattern could be determined to identify whether they belonged to the navy or army. These could possibly be army in origin because they are located 85m from a large trench. According to Phelan (1945:42), army combat tunnels reinforced systems of concrete pillboxes, entrenchments and gun emplacements. For this reason, these tunnels are probably army I-types.

7.4.5 Caves

Since no cave measurements were reported in Phelan (1945) or in the Truk study, no specific cave dimensions could be compared with the results from this research (Table 28), but the features associated with navy and army tunnels mentioned above were used to identify caves (e.g. large stacked limestone walls at army tunnels).

Table 28: Saipan Cave Data

Site	**Modifications**	**Artefacts**	**Defensive Sector**	**In known Navy or Army area of activity**
Navy Caves				
SPS13	None	None	Northern	Navy
SPS16	Reinforced concrete, entrance resembles SPS21	None	Northern	None
SPS23 (in close proximity to SPS24 a navy I-type tunnel)	Stacked limestone and cement	None	Navy	Navy
SPS26	Reinforced concrete, bunker-style	Ammunition, white IJN uniform button	Northern	None
SPS28 (in close proximity to SPS24, a navy I-type tunnel)	Stacked limestone and cement	None	Navy	Navy
SPS36	Stacked limestone, cement, reinforced concrete, concrete	Two-piece metal button with anchor fluke and partial cherry blossom, IJN gas mask lens	Northern	None
Army Caves				
SPS18	Stacked limestone	IJA military tag, tan uniform fabric, IJA hobnailed shoes, brown buttons from army private summer uniform, embossed star plastic bowl	Southern	None
SPS22	Earthen stairs (modern)	47mm ammunition	Northern	None
SPS32	Concrete, stacked limestone, cement	IJA gas mask eye pieces	Southern	None
SPS34	Clearing of stalactites and stalagmites	Over 200 Arisaka bullet fragments	Southern	None
Civilian Caves				
SPS25	None	Civilian gas mask lens	Southern	None
SPS33	None	Ceramics	Southern	None
SPS45	None	Children's shoe sole	Southern	Both
SPS41	None	IJA gas mask lens and IJN green	Northern	Both

		button		
Unknown Affiliation				
SPS7	None	None	Navy	Navy
SPS12	None	None	Northern	Navy
SPS19	None	None	Northern	Both

The caves in Saipan can be divided into navy (n=6), army (n=4) and civilian (n=4). Most of the navy caves are identified as such because they are modified with concrete and cemented stacked limestone. One exception is SPS13, which has no artefacts or modifications, but is interpreted as navy because it is within an area of navy activity and there is an historical photograph of a group of IJN sailors within the cave. SPS23, SPS26, SPS28 and SPS36 are all modified with concrete and cemented limestone at the entrance. SPS36 is the only cave with diagnostic artefacts. SPS16, although devoid of artefacts, is constructed with large concrete walls and pillars resembling the Japanese navy radio station in Peleliu (Figures 7.11–7.12). Additionally, the entrance of SPS16 is almost identical to the entrance at SPS21, a navy tunnel (Figure 7.13).

The army caves in Saipan have fewer modifications than the navy caves. SPS34 has no additional structural components at all, but is interpreted as army because of the vast amount of spent and heat treated ammunition scattered within and around it which suggests it was used for combat. SPS22 also has no modifications (although it has earthen stairs rumoured to be modern), but a considerable amount of ammunition. SPS18 is undoubtedly an army shelter cave and is the largest and deepest army cave. It contains artefacts such as a military tag, bowls with army symbols and several hobnailed shoes. SPS32 is the only army cave modified with concrete and is constructed with large stacked limestone walls between natural limestone outcroppings. Three caves (SPS7, SPS12 and SPS19) have unknown affiliation due to the lack of diagnostic artefacts and because they have no modifications.

Figure 7.11: Interior of first floor of Peleliu Japanese navy radio station (Knecht et al. 2012:261).

Figure 7.12: Interior of Saipan's last command post.

 

Figure 7.13: SPS21 entrance (left) and SPS16 entrance (right).

SPS25, SPS33, SPS41 and SPS45 are all identified as civilian shelter caves. They are all large and unmodified. SPS25 and SPS45 have particularly narrow entrances, requiring some level of agility to enter, and two chambers. The shape of SPS25, SPS33 and SPS45 does not allow for quick manoeuvring in and out of the cave and anyone within the cave would be difficult to see from the outside (Figure 7.14). SPS41 has an internal height of only 1m and thus adults sheltering within would not have been able to stand up.

Civilian caves are located amongst military karst defences (although away from the western side of the island), but were likely not modified or used by the Japanese military because of their shape. The multiple chambers and small entrances of these caves would have made them difficult to enter and exit quickly or to engage in combat due to a restricted field of fire (Figure7.15). SPS41 is too short to shelter numerous soldiers who would have been forced to squat, sit or lie down when in the cave.

Some of the most diagnostic artefacts in civilian caves include children's shoes, non-military shoe soles and civilian-style gas masks. Other artefacts unique to these caves include kerosene lamp bases, large food jars, cooking pots, metal pots, scissors and serving utensils, such as ladles. Additionally, the only tea bowl recorded and all the undecorated celadon and single-colour glazed ceramics are located within civilian caves. Shrapnel and some ammunition are found within SPS25 and SPS33, but have likely been fired or thrown in and are not the result of military occupation. An IJN button and IJA gas mask lens in SPS41, located in northern Saipan, suggests that the military or perhaps someone wearing a military uniform was taking refuge within the same cave, but its primary use was by civilians.

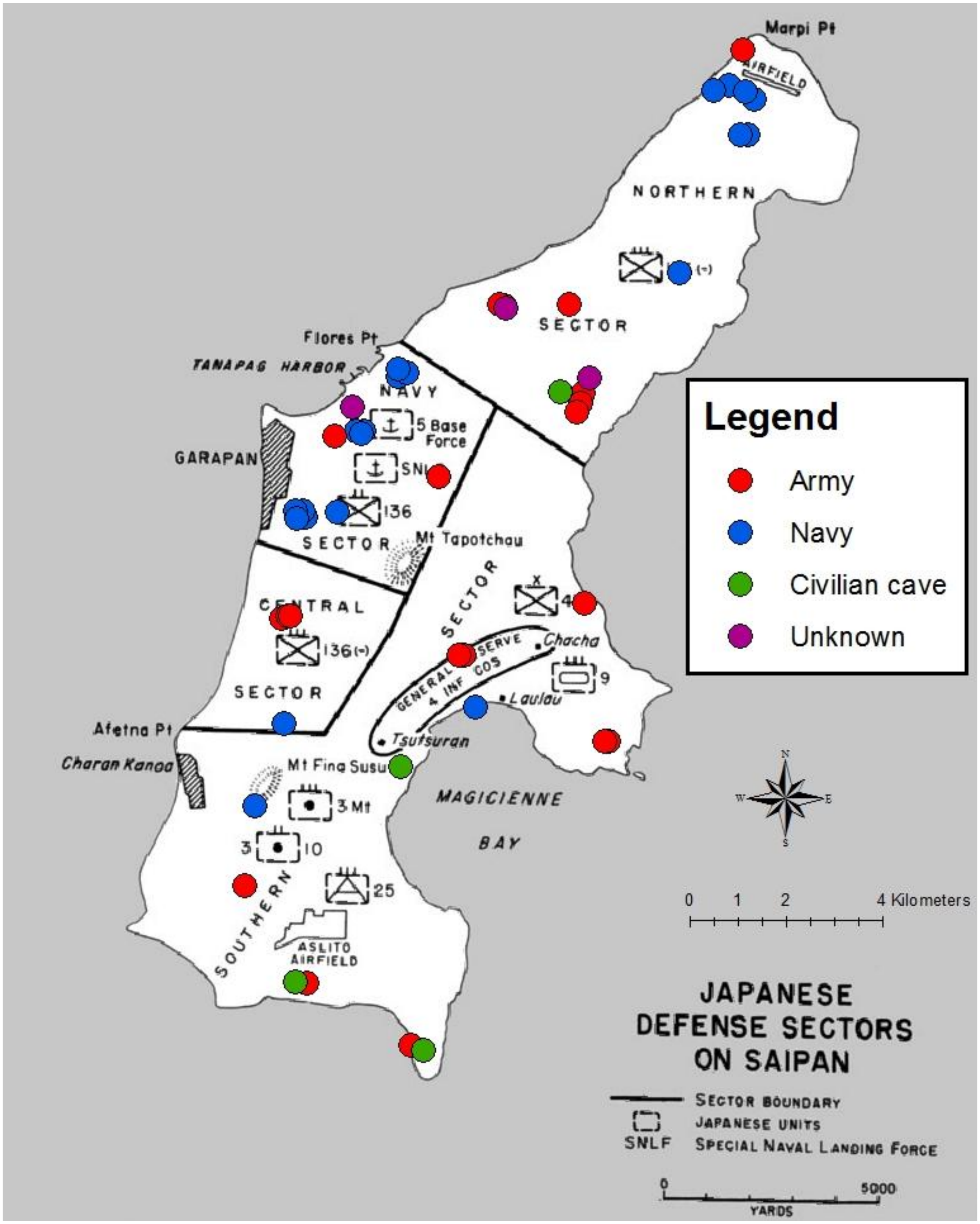

Figure 7.14: Locations of karst defences by affiliation.

Figure 7.15: Volunteer John Fraser preparing to enter SPS25.

7.5 Karst Defence Function

The following section focuses on the function of Saipan's karst defences and their typical features and modifications as they relate to the army and navy (Table 29). The discussion gives new insights into karst defence modifications on Saipan.

7.5.1 Command Posts

There were four command posts recorded in Saipan, three of which belonged to the navy. The navy command posts incorporate concrete both to prevent leakage and to make the walls more structurally sound. SPS3 and SPS20 have the same concrete-lined, domed section with concrete floor. These sections were probably where communications equipment was held and paperwork stored, as they would have been protected from any water damage. Furthermore, metal mounting plates in the domed leg of SPS3 suggest it was well lit. Installations did exist in SPS20 as evidenced by the insulators and wires, but no mounting plates are present. However, the timber dogs could have once supported wooden planks which could have then been used for mounting installations. Both tunnels also have concrete water cisterns.

SPS16 is also constructed with concrete and is a navy communications post. Similar to SPS3 and SPS20, the concrete is used to protect and support the contents of the site. With a bunker-style construction, SPS16 could be assumed to have a combat function similar to army pillboxes. However, the wall features point to the contrary. There are nine square structural holes in the three concrete walls. One served as an entrance in the southern wall, four are situated close to the floor (two in the eastern wall, one in the southern wall, one in the western wall), three close to the ceiling (one in each wall previously mentioned) and one in the centre of the northwestern wall. The holes situated near the ceiling did not serve as gun ports or embrasures, as they were too high (1.73m from the floor) for the average Japanese man. The average height in 1939 was 1.63m (Hatena 2014) and therefore an average soldier would have had to hold the gun over his head in order to aim and shoot. Furthermore, these holes had no field of fire, as they meet a cliff face only a few metres away. Rather, the holes nearest the ceiling were probably used for ventilation and the holes at the floor level likely served some type of plumbing or electrical purpose. The hole in the centre of the northwestern wall could have been used for combat, but the site's primary function was not combat.

SPS32, the one army command post, is the only army site constructed with concrete, which is present on the roof and stairs. There is no evidence of installations, but the site contains a number of battery parts and fine dial adjustments assumed to be from communications equipment. Aside from the concrete roof, the site is constructed of stacked limestone with some type of mortar, likely cement, between the rocks.

Command posts are arguably some of the most important sites during warfare and house important communication devices and personnel. The Saipan examples show that concrete at command posts was not only used because it is a stronger material, but served specific purposes to decrease seepage and support command post needs. If command posts are so important, it is surprising that they have external concrete at all which provides little camouflage. However, the concrete entrances at command posts in Saipan are well-camouflaged by the surrounding limestone. The concrete entrance at SPS3, for example, begins as a 6m long limestone trench (see Chapter 5) with walls approximately 2.7m high. SPS20 is also camouflaged in this way. The northern entrance at SPS16 is short (1.2m) which aids in camouflage, and the concrete walls in the southern section are completely blocked from the front by the natural portion of the cave. SPS32 is camouflaged by its surroundings as it is situated within a sinkhole and built with stacked limestone walls.

All four of the command posts have ceiling holes to permit airflow. These vents were essential, as the lighting, electrical and communication devices would have given off heat which, if trapped within a confined space, would have caused them to malfunction. The vents would also provide necessary ventilation for men situated within the same space over long periods of time.

7.5.2 Hospital

Two army hospital tunnels exist in Saipan (SPS4 and SPS11) as well as one hospital cave (SPS58). SPS4 is interpreted as a Line of Communication Hospital and SPS11 as a Field Hospital. Field Hospitals could only accommodate 500 patients and were meant for shorter stays, while Line of Communication Hospitals held up to 1,000 patients, were better equipped for performing operations and held patients until they could be evacuated to Japan (Hawk n.d.-c:4). While SPS4 and SPS11 are similar sizes, SPS4 has more intersecting legs than SPS11, thus more spaces for accommodating people. The ceiling vent in SPS4 also suggests that it may have contained more people and more equipment and therefore required better airflow. Since a Line of Communication Hospital received arguably the worst cases (i.e. men who were so injured they needed to be evacuated), a vent would also be useful in helping rid the tunnel of the stench of war wounds and infection. SPS58 also has a natural opening at the top of the cave which could have facilitated airflow. SPS11 did not have intersecting legs and probably held less equipment and therefore the airflow afforded by its three entrances was sufficient.

All three of the hospital sites have large, exterior stacked limestone walls. These range between 50cmm and 1.5m in height and have different lengths and widths. These walls were constructed to camouflage the largest entrances to the site, or the only entrance in the case of SPS58. SPS13 was also rumoured to have functioned as a hospital (Cabrera 2009; Chapin 1994:18–19), but no modifications or artefacts were observed to support this.

7.5.3 Shelter

Two army shelter caves (SPS18 and SPS57) are large natural caves situated within sinkholes and have wide, yet short entrances. Both have been modified with internal stacked limestone to serve as an internal platform or elevated floor. SPS18, for example, is an army shelter cave that contains an abundance of personal items, including a complete razor, nine different soap box containers, three toothbrush holders and three toothbrushes. Five plastic army bowls and 130 food cans were also found. This cave has an internal stacked limestone floor under the main entrance which is 60cm high and extends approximately 3m into the cave. This floor likely runs the entire width of the cave, but the rock bulldozed over into the cave, makes its exact width uncertain. A similar limestone floor less than a metre high and running the width of the cave underneath the entrance was also observed at SPS57 in 2013, along with some items such as a tea pot (McKinnon et al. 2014b:75). The exact purpose of these two floors is unknown. They may have served as “false” cave bottoms, making it difficult for those at the entrance to see inside the cave and requiring observers to move closer to the entrance and risk attack.

Navy shelters are not modified with any stacked limestone, but have limestone stairs. Immediately after one enters SPS29, there is a set of limestone stairs descending into a large room with a narrower leg. The site would not have been used for combat activities, as one would need to run up and down the stairs to enter and exit the site. SPS37 contains some personal items such as razor blades and stocks of food. One central leg of SPS37 was used for food storage, as the floor is blanketed with crushed tin can fragments and hard tack. Some artefacts (vacuum tube, light bulbs and wire), although few in number, suggest that SPS37 may have been a command post. The set of limestone stairs in this tunnel separate the site into two almost equal parts. The portion of the site west of the stairs contains the majority of the bottle fragments and the leg used for food storage. Most of the installation materials are located east of the stairs. The site does not have any concrete and therefore its primary function is interpreted as shelter. The western half may have been used for storage and the eastern half as living quarters with light installations.

SPS70 was also reported to be a shelter and was referred to as the “1,000-man cave” by contemporary observers (Lotz 1994:102). This is one of the largest on the island and has no WWII modifications. Unfortunately, artefacts from other parts of the island have been brought to this cave (McKinnon et al. 2014b:101) and therefore, its exact WWII function cannot be determined.

7.5.4 Combat

All army and navy U-types were used for combat. All navy U-types were constructed with both combat and escape entrances, whereas army U-types had only combat entrances. Modifications found at SPS47 include a levelled out limestone floor at the rear in order to pile ammunition. The navy cut out internal portions just beyond the entrance for storing ammunition in SPS39 and SPS40. SPS5 is the only navy U-type with concrete and wood at the entrances in order to hang doors.

The navy also constructed large perpendicular, rear legs in their U-types. These may have served as shelter although no artefactual evidence supports this interpretation. Additionally, the escape leg on navy U-types implies that people anticipated leaving the site quickly and therefore the sites were not meant to be occupied for long durations. It is unlikely the perpendicular legs of navy U-types were used to store anything other than ammunition, as gun fire from the combat entrance would attract the enemy.

SPS14 is also a combat tunnel and has several Arisaka bullets, Type 100 HE mortar rounds and their associated propellant packs. The site has a stacked limestone wall constructed at each of its two entrances. There was also some evidence of lighting and communication devices, including wire, light bulb fragments, vacuum tubes and radio or field phone speakers, but the site's primary function was combat.

The two army combat caves (SPS22 and SPS34) have no stacked limestone or concrete, but contain a large amount of Japanese ammunition of different sizes. The four navy combat caves vary in appearance and all are modified with concrete. One is modified with cement smeared onto the natural limestone (SPS23), two have cemented stacked limestone (SPS28 and SPS36), one has a poured concrete floor and a reinforced concrete entrance (SPS36) and one is constructed as a bunker (SPS26). SPS26 has a good coastal field of fire and contains several Arisaka shells and projectiles.

Although the affiliation of SPS15 is unknown, it was determined to function as a combat tunnel because it has stacked limestone at its entrance. There is a considerable amount of concrete for a combat site but this was due to later U.S. occupation, as no other tunnel is constructed with the same concrete block walls. The concrete flooring at SPS15, a feature in the command post sites, is also constructed differently to that in SPS20 and SPS3. The floors in the two command post tunnels are concrete slabs that do not butt neatly against the tunnel wall, creating a gap of up to 15cm. SPS15 also has a gap between the floor and the walls, but with an additional strip of concrete adjoining the wall to give the pattern of wall, concrete, gap, concrete slab, gap, concrete, wall (Figure 7.16). This difference in construction technique is probably a U.S. feature and not an indication that SPS15 was a command post.

The remaining sites are simple I- and L-types typically used for combat or storage. A large amount of ammunition was found in SPS14A, SPS46 and SPS46A. SPS17 is modified with a short stacked limestone wall at the entrance. SPS38 functioned as a combat tunnel, but more specifically for reconnaissance. The slope of the tunnel is too steep to have been used for storage and there is also no evidence to suggest it was once a place for a coastal gun. Therefore, its specific purpose is interpreted as a coastal look-out and escape tunnel.

7.5.5 Uncertain Function

SPS8 and SPS21 have uncertain functions because they contain few artefacts. SPS8 contains evidence of power and lighting and is the only site with extant pipes for plumbing. The site also has a concrete cistern and entrance. While the installations and concrete somewhat resemble SPS3 and SPS20, there are no indications that the tunnel was once used as a command post. The materials within the tunnel are related to tunnel construction, including leather gloves, a shovel and an axe head. The interior floor and walls undulate as one moves further into the tunnel, suggesting that it may have been unfinished. There are bits of grenade and schrapnel within and a portion of the tunnel appears to have been blown up which suggests that the Japanese military used it during the battle. The function of the three short concrete walls extending from the entrance is also unknown. No mention of such an entrance appears in any documents, but it is hypothesised that the three walls were meant for containment and stabilisation, so were possibly support for a wheeled gun or some type of machinery used for construction or mining.

Figure 7.16: Concrete flooring in SPS15.

SPS21 does not have any internal concrete, but has a concrete entrance almost identical to the one built into the natural portion of SPS16. SPS21 has no materials suggesting that it was a command post; rather the items would point to its use as a shelter, although there are too few items to say this with confidence. The single entrance to SPS21 is also short which would not have allowed any large items to be hauled into the tunnel, nor could it be used for combat. Therefore, SPS21 may have been used as short-term shelter or storage for the navy (Figure 7.17).

Table 29: Karst Defence Function in Saipan

Function	**Artefacts and modifications**	**Sites (IJN)**	**Sites (IJA)**	**Sites (Civilian)**	**Sites (unknown affiliation)**
Command	Communication equipment, plumbing, concrete	Tunnels: SPS3, SPS20 Cave: SPS16	Cave: SPS32		
Hospital	Medical supplies, medicine, stacked		Tunnels: SPS11, SPS4		

	limestone walls at the largest entrances		Cave: SPS58		
Combat	Stacked limestone, ammunition	Tunnels: SPS5, SPS35, SPS39, SPS40 Caves: SPS23, SPS26, SPS28, SPS36	Tunnels: SPS14, SPS15, SPS17, SPS42, SPS47 Caves: SPS22, SPS34		
Storage	Caches of cans, bottles, ammunition				Cave: SPS19
Shelter	Personal items, rooms, small stocks of food and ammunition, few installations	Tunnels: SPS29, SPS37, Cave: SPS13	Cave: SPS18	Caves: SPS25, SPS33, SPS41, SPS45	
Combat/Storage I-tunnel and L-tunnel		Tunnels: SPS1, SPS2, SPS24, SPS43, SPS44	Tunnels: SPS9, SPS10, SPS14A, SPS30, SPS31, SPS38, SPS46, SPS46A, SPS48, SPS49, SPS50, SPS51, SPS52		
Unknown function		Tunnels: SPS8, SPS21			Caves: SPS7, SPS12

7.6 Discussion

The division between the IJN and IJA is reflected in the difference in karst defence construction in Saipan and elsewhere in the Pacific. By comparing Saipan's karst defences to those in Peleliu and Truk, more specific differences in construction and use were identified and associated with each branch of the military. The army in Saipan constructed W- and H-type tunnels for use as hospitals, and types with unclassified shapes for combat. The navy constructed tunnels of various shapes as command posts and as shelters. One navy command post was previously used as a mine and so its W-shape is probably not as a result of a standard navy design. Both the army and navy constructed U-types for combat. The navy constructed U-types in curved and squared U shapes. The rear legs of navy U-types had wide and high internal measurements, resembling large rooms. All navy U-types were constructed with combat and escape entrances that differed by at least 70cm in height. The army constructed U-types with square corners and two combat entrances. The internal width and height of army U-types were smaller than the navy's and stayed relatively uniform throughout. The army constructed I- and L-types for combat. The navy constructed short I-types for combat or storage, but also constructed longer, wider and higher I-types for use as shelters. In Saipan, identifying the military affiliation of short, unmodified I-types is nearly impossible on dimensions alone, as there appears to be no army and navy standard I-types.

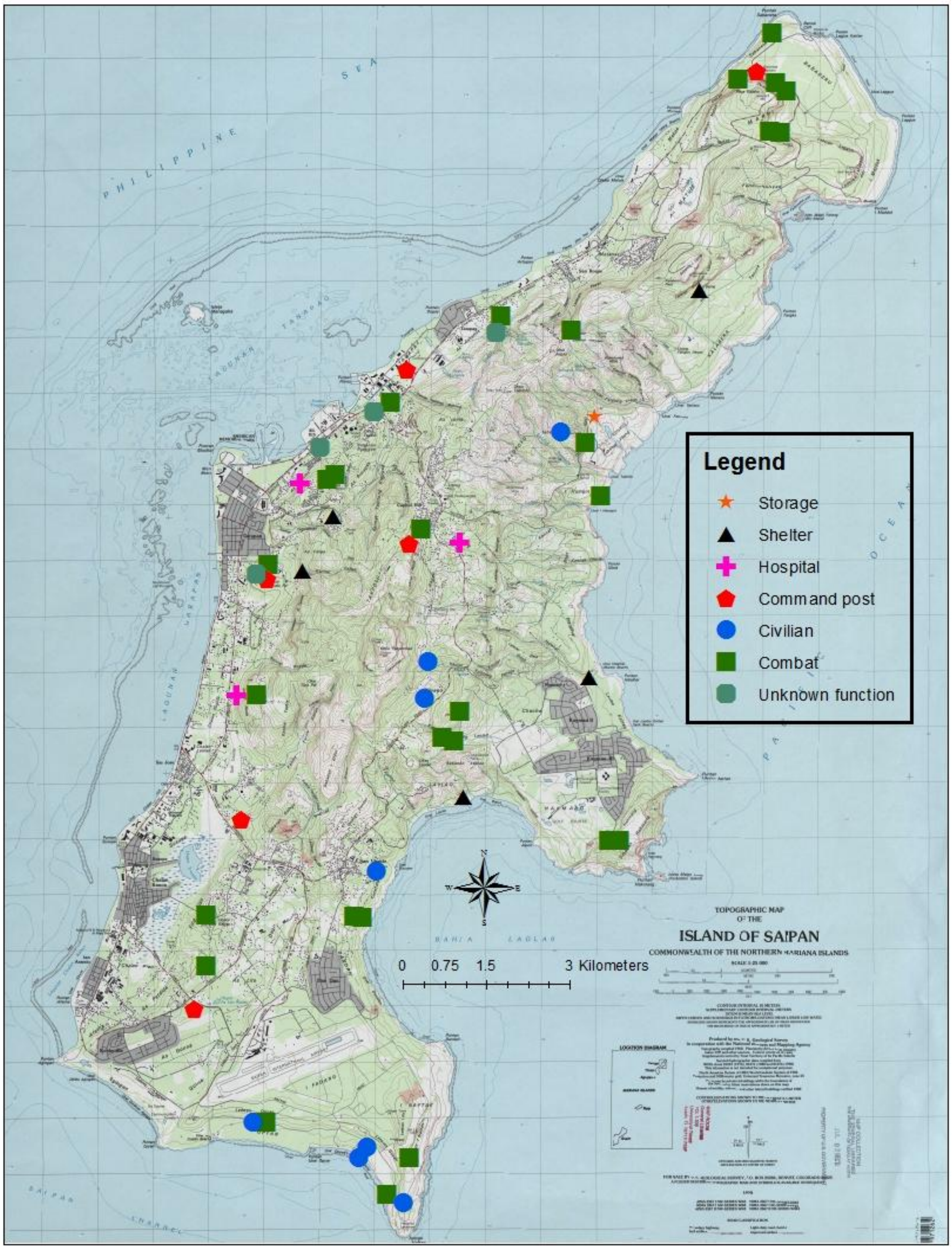

Figure 7.17: Saipan's karst defences by function.

In general, the army in Saipan constructed tunnels with narrower internal widths (2m for army and 4m for navy) and shorter entrances. The army also constructed tunnels that were narrower overall. Niches appear in both army and navy tunnels with the same frequency. Unlike Peleliu, no tunnels with E, T, Y or J shapes were constructed in Saipan. This may be because Phelan (1945) used observation instead of measurements to determine tunnel shape in Peleliu and therefore his imprecise angles may have distorted his classification system.

Both the navy and the army used caves in Saipan. The army used larger, natural caves for shelter and combat, while the navy modified more rock shelters, cliff faces and outcroppings to use as command posts and for combat. The navy modified all of their caves except SPS13. Four had both concrete and stacked limestone and one was modified with just concrete. The army used internal stacked limestone walls to modify shelter caves. Army combat caves have no modifications other than some stalactite or stalagmite clearing. One cave was used as an army command post cave and is the only army cave modified with concrete. Civilians also used caves, but these were large, deep, unmodified and no doubt sometimes uncomfortable caves.

In terms of numbers, in Saipan, the navy modified more caves (n=6) than the army (n=4). In contrast, the army built more tunnels (n=19) than the navy (n=15), but the majority of the army's tunnels are short I-types (n=12) probably used for storage or combat. The more elaborate and larger tunnels on Saipan were built for the navy. This seems surprising, since there were only 6,200 IJN on Saipan versus 25,450 IJA (Denfeld 1997:20–21). This discrepancy is a result of the time available to construct defences. The IJN 5th Special Base Force arrived in the Marianas on December 1940 and continued to arrive up until 1944 (CINCPAC-CINCPOA Bulletin No. 11-45 1945:7; Crowl 1960:55, 61). Army troops did not arrive to the Marianas until January 1944 and continued arriving up until June (Crowl 1960:60; Rottman 2004:18).

In terms of location, civilians used caves all over Saipan, except on the western coast where the Japanese military drove civilians out. Prepared civilian caves are probably located close to the family's home or property, whereas civilian caves with fewer items were probably used opportunistically. For the Japanese military, established defence sectors did not appear to dictate where army and navy tunnels could be built (Table 30). While the majority of the tunnels within the Navy Sector belonged to the navy and most of the tunnels in the remaining army sectors to the army, the navy constructed within army defence sectors and vice versa. This is probably because the navy was on Saipan first. The defence sectors were likely only established by the army when they arrived in 1944, overlaying the earlier presence of navy tunnels that had been constructed before the army arrived.

Table 30: Army and Navy Tunnels per Defence Sector

Sector	**Number of Army**	**Number of Navy**	**Unknown Affiliation**
Navy	2	9	
Southern	6	2	
Northern	8	3	1
Central	3	1	
Total	19	15	1

The function and location of karst defences also reflect the specific defensive roles of the army and navy. Many of the navy karst defences are concentrated in coastal areas and near airfields. This makes sense as naval personnel normally defended airfields and harbour installations and any fixed artillery (Hoffman 1951:14). The army's defences are more centralised. Command posts are spread out across the island, similar to combat sites. Since the two hospital sites are situated near the western coast, it may suggest that the army suspected an invasion was more likely to occur there and required medical services to care for the wounded at the place where the most hostile fighting was anticipated. They were also close to Tanapag Harbour which would have been used as an evacuation route for the seriously wounded.

The similarities between the construction of Saipan's karst defences and Peleliu's, (particularly the almost identical appearance of army hospital W-types) suggest that standards probably existed for karst defence construction throughout the Pacific. This chapter has also determined that concrete and stacked limestone served various purposes within and surrounding karst defences and that their use is not necessarily based on the lack of construction materials as other researchers have suggested (see Chapter 2). This is evident in the army's use of concrete at SPS32 (the army command post) and as mortar for stacked limestone walls, indicating that at least a small amount of concrete was available to the army when they arrived.

The amount of concrete each branch of the military used and where they used it, however, is telling of their interrelationship. Concrete has been determined to serve particular functional purposes in karst defence construction, primarily to strengthen structures and protect contents from water damage. Internal concrete and concrete entrances were never constructed by the army except at SPS32, its only command post. Internal concrete would be particularly useful within hospital tunnels as any operating tools or machinery could have rusted or malfunctioned in a wet environment. Furthermore, a wet environment would not be ideal for someone recovering from injury or illness. There is no evidence of concrete construction at any of the army's hospital sites.

The use of concrete at some navy sites appears to serve no clear battle-related function. For example, the concrete floor at SPS36 (a small combat cave) did not serve to protect any communications equipment within it. Similarly, the navy constructed concrete entrances at SPS5 to hold wooden lintels and hang doors. This is a combat site with combat and escape entrances. If the one entrance was used for a quick escape, why would there be a door which would arguably restrict a quick escape? Additionally, why are the perpendicular legs of navy U-types so much larger than army U-types when they serve the same function? Even if U-types were used for shelter or storage, the army would have benefitted more from an enlarged perpendicular leg as, given that there was four times the number of army soldiers on Saipan, there would have been more soldiers using a site at any given time. The army would have found a larger site with stocks of materials more useful than the navy.

Some of the concrete modifications by the navy and the enlarged U-types are because the navy constructed karst defences before the army arrived and had more time to construct larger and more spacious sites for themselves. Only the navy had the time to ensure their tunnels were properly constructed in order to serve their purpose, as seen in internal concrete used at command posts and only the navy constructed multiple concrete entrances with doors, although it appears to be counterintuitive. The navy also had the time to put concrete floors in their combat caves and excavate larger, more comfortable U-types for far fewer men. The army, although they had access to concrete, could only use it where it was most needed—at their command post, although it would have been useful within other tunnel types, including hospitals.

The above implies that the navy, although assigned to speed up war preparations and in charge of preparing initial defences in the Pacific (Crowl 1960:55), did not construct karst defences for the army in Saipan. Rather, the army was left to construct their own in 1944. The army did have time to construct defences to their standards and were able to modify most of the karst defence sites they used, but time limited their ability to sufficiently modify all of their sites or construct more elaborate tunnels. If the navy did assist in constructing karst defences for the army, it was likely not until the last few months before the battle and with little care for the army's needs.

The identification of distinct civilian caves adds another element to karst defence construction. Civilian caves do not resemble any of the defences constructed by the military. As expected, civilians were probably the last to know of an impending war and were therefore the last to prepare their karst defences. The military did pre-warn some civilians that war was coming (Micronesian Area Research Center 1981a:24; Petty 2002:26, 30, 42; Russell 1984:86) which then prompted civilians to prepare defences, but did not assist civilians in preparing or modifying their shelters.

7.7 Conclusion

The IJN and IJA had functioned autonomously since the Meiji Restoration in 1868. Not only were their military systems and weapons different (the IJN borrowed from the British and the IJA from France and Germany), but their strategic priorities also differed. As this chapter demonstrates, the autonomy of the IJN and IJA can be seen in the defence strategies each branch of the military employed, particularly in karst defence construction. While modifications at karst defences serve particular functions, concrete modifications with no clear function and more spacious navy combat tunnels point to the rift between the IJN and IJA. The IJN had more than three years to construct karst defences and modify them to their needs and preferences while the army had only five months to do the same. Despite being in charge of defence and having construction battalions, the navy did not prepare the island for the incoming army troops. The much smaller group had more spacious and elaborate karst defences and did not assist the army in constructing theirs. Furthermore, neither the army nor the navy assisted in constructing shelters for civilians. However, that is not to say that all sailors and soldiers disregarded the safety of civilians, as will be discussed in the next chapter. The differences between army and navy construction probably exists across the Pacific as, by comparing data from nine different islands, this analysis shows that the Japanese constructed karst defences across the Pacific using similar techniques and modifications.

Chapter 8 – Discussion: Human Behaviour at Karst Defences

8.1 Introduction

In Chapter 2 it was determined that in order to better understand the human experience of war, conflict archaeologists should seek to discuss the range of human behaviours and how they are influenced by a wartime atmosphere. Two ways of doing this are by examining the material remains at karst defences and reconstructing the battlefield. This chapter will do both. First, sites, artefacts and oral histories will be analysed to show their relationships to each other and to the people who used them in order to understand the ways people behaved and the social changes immediately before, during and after the Battle for Saipan. The final section of this chapter presents a battlefield reconstruction with karst defences at the forefront. The reconstruction will identify site specific actions over the battle's 25-day period.

8.2 Human Behaviour of the Warscape Inhabitants

War is a particular social climate defined by heightened uncertainty and intense social change punctuated with violence. Such an atmosphere influences people's choices, which in turn reconfigure social relations. The material culture at conflict sites can reveal the range of behaviours during war which is often omitted from historical retellings that favour one point of view. Behaviour is also often reduced to a basic need to survive which glosses over the complexity of individual reactions and decisions. Human behaviour during the Battle for Saipan differed between the three groups involved: civilians (Japanese, Chamorro and Carolinian), Japanese military and U.S. military. The following describes the different human behaviours at karst defences for each group.

8.2.1 Civilians

For civilians in Saipan, war commenced at different times. For many, it began when they were conscripted for arduous wartime labour beginning in 1943, including children (Micronesian Area Research Center 1981a:9, 23). For others it began when they were forced from their homes in Garapan in 1944 by the Japanese military so that the Japanese could build fortifications in and around potential invasion beaches (Pacific STAR Center for Young Writers 2004:38; Russell 1984:86). At the same time, the access to goods and services that civilians enjoyed under Japanese occupation would have terminated as goods were rationed or completely eliminated in order to provide for the increasing Japanese military presence. Civilian life in many ways was drastically reconfigured. Work was no longer conducted for people's own livelihoods, but for a military power whose goal was to provide for war. Longer hours of work meant a change in family life, and people's relationships with the Japanese occupiers were now dominated by distrust, hatred and fear. Those who needed to move from their homes in Garapan, began daily life on their farms, while others without a farm had to affirm ties with extended family and friends on whom they relied for shelter (Micronesian Area Research Center 1981a:51–52).

Other civilians were conscripted to be part of the Japanese military or to act as interpreters and patrolmen on Guam (Higuchi 2013:51; Micronesian Area Research Center 1981a:31; 1981b:26–28, 45). These men left their families behind to join a new social organisation with close ties to Japanese military men. As collaborators, these Chamorro people were both agents and victims, as most joined against their will (Camacho 2008:210). Unknowingly, those who went to Guam would affect inter-island Chamorro relationships up to the present day. After the war, many on Guam harboured anti-Japanese and anti-Saipanese sentiments as a result of the actions of Japanese military and the Chamorro patrolmen (Camacho 2008:221; Higuchi 2001:26, 29, 34–35). This sentiment is cited by some historians as one of the reasons that Guam voted against reunification of the Mariana Islands after WWII (Higuchi 2001:35).

For those not involved in forced labour, military roles or relocation, the war began in February 1944 when the U.S. commenced bombing to destroy Japanese air power and lines of communication (Farrell 2009:277) and when civilians ran to seek shelter from the bombardment. The preparation of shelters for this event, however, occurred at different times. Some civilians were forewarned by the Japanese about an imminent U.S. invasion and were thus able to prepare some form of shelter in advance (Micronesian Area Research Center 1981a:24; Petty 2002:26, 30, 42; Russell 1984:86). This meant creating their own dugouts or filling a nearby cave with supplies. Civilians took supplies such as canned food, cooking pots, uncooked rice, dry crackers, biscuits, miso (soy bean paste), water, clothes and smaller personal items such as jewellery (Pacific STAR Center for Young Writers 2004:12, 34, 37, 72, 99, 107, 134, 147, 161, 185). Alejandra Cruz' family prepared their own shelter. Before the battle started, they went around the neighbourhood looking for any bottles or water containers. Her father made corks from coconut husks to seal the bottles without caps. Her mother packed up household items such as cups, plates, pillowcases and clothes to take to their shelter cave (Alejandra Cruz pers. comm. 2013).

For others, the initial decision to prepare a shelter would have taken place after the initial U.S. attacks. The second round of bombing occurred on June 13, 1944, and would have prompted more civilians to seek shelter (27th Infantry Division G-2 Section 1944:3). Two days later the U.S. invaded Saipan. Eugenio Borja recalls an air-raid siren sounding for two days before his family took refuge in a cave (Eugenio Borja pers. comm. 2014). Rosa Castro's family sought shelter once the invasion happened. They took minimal supplies with them when they left Tanapag and tied small items such as crackers or biscuits, to themselves and only took cooked food with them. They had no time to prepare and simply wrapped what they had and left. Castro remembers taking a small container of water for herself (Rosa Castro pers. comm. 2014).

The civilians who sought shelter within caves often stayed in the same cave for the entire period of the battle or moved from shelter to shelter either opportunistically or because the Japanese military forced them out. Many shared shelters with the Japanese military or other civilian families (Micronesian Area Research Center 1981a:9; Petty 2002:30). Some stayed within caves even after the U.S. declared victory and finally surrendered to U.S. troops.

For civilians this sequence of events drastically affected their social organisation. As Poyer (2004:152–154) explains, the extended family was no longer part of daily life. Rather, the nuclear family or sometimes the individual became the priority, especially when food and water were scarce. However, oral histories from Saipan indicate that new social bonds were created out of what is often referred to in anthropology as communitas. Communitas, used to describe experiences during the liminal phase of rites of passage (Turner 1996:512; Van Gennep 1960:39), refers to a collective feeling of togetherness and common space in an otherwise anti-structural and uncertain situation (Turner 1969:96). In such a situation, extended families were huddled together in a single cave. Alejandra Cruz remembers hiding in a cave with six or seven families (Alejandra Cruz pers. comm. 2013). Rosa Castro's family partnered with the Amparo Deleon Guererro family to seek out a cave to hide in and Castro had her nephew strapped to her back. There was even a particular etiquette within caves by which the elderly and young were sent into the deepest part for added protection from fire (Rosa Castro pers. comm. 2014). Additionally, civilians and members of the Japanese military also shared caves and sometimes food, water and secrets. Eugenio Borja remembers sharing caves with Japanese soldiers and one told him that the U.S. was going to win the war, but to keep the information secret. Another soldier advised him to crouch down when any flares went up to avoid being shot (Eugenio Borja pers. comm. 2014).

The four civilian caves recorded in Saipan as part of this project were occupied by those who could prepare in advance. Those who could not had few materials and therefore any caves they used are not likely to be represented in the archaeological record. Like Alejandra's mother, the civilians in the four Saipan caves packed a number of household items and tried to recreate a traditional dining experience to some extent. The ceramic tablewares in civilian caves had various designs and motifs and span a range of manufacture dates. The oldest ceramics include the *katagami* stencilled vessels from the 1920s (although six of the 21 vessels are located at two IJN sites) and undecorated, celadon and single colour glazed ceramics from the 1930s. These ceramic types are likely representative of what most households in the Japanese Mandate had at the time. Not surprisingly, civilians brought practical ceramic vessels to the caves, such as tea cups and rice bowls that could be used for both food and drink as well as various sizes of plates and pickle dishes. Considering that a traditional Japanese meal was centered around a personal bowl of miso soup and/or rice with other items served on communal plates, it appears that these civilians tried to hold on to some semblance of home life. If people had time to consider bringing different sizes and types of plates with them, then it is reasonable to assume that they also considered the number of people who would likely live in the cave. Since bowls were not typically shared, it is likely that when preparing for cave living, people would bring one bowl per adult or child. Therefore, rough estimates on the population of adults or young adults within a cave can be made based upon the number of bowls, particularly in SPS25, SPS33 and SPS45, which were determined to have been minimally disturbed and thus have accurate ceramic estimates. The populations of the caves are then at least seven, eight and two, respectively. The number of adults within SPS25 is also affirmed by the number of civilian gas masks present (n=6). Babies and those unable to feed themselves are not included in these estimates, although, based on the presence of an infant shoe sole, at least one small child was present in SPS45. None of the civilian caves contained chopsticks, suggesting that people probably considered such utensils unnecessary or too cumbersome to carry and opted to eat with their hands. Some of the civilians in SPS33, however, brought spoons.

The number of people in SPS41 cannot be estimated in the same way. This cave contains the largest number of ceramics of all the sites recorded for the project and also contains items belonging to the Japanese military. SPS41, although interpreted as a civilian cave, was also used by members of the Japanese military or at least those wearing Japanese military uniforms. SPS41's location in the north and the presence of non-civilian items (a brown plastic army bowl, uniform buttons and a gas mask eye piece) suggests that this cave was probably used opportunistically by members of the military as they moved north towards the end of the battle and could have brought ceramics with them and left them at the cave.

Oral histories suggest that there was some concern, particularly amongst the Japanese military, that the smoke from cooking would give away a person's location to the U.S. military (Pacific STAR Center for Young Writers 2004:24). Borja recalls that if cooking produced smoke and there were Japanese soldiers around, they would shoot the civilians (Eugenio Borja pers. comm. 2015). However, one could cook at night or when the area was already surrounded by bomb smoke (Pacific STAR Center for Young Writers 2004:64). Despite the threat from the military, civilians in SPS41 and SPS25 cooked food. All of the large cooking pots were found within these two caves and the ladle in SPS41 suggests that those within the cave were consuming hot, cooked food out of pots, which required a ladle for serving. Other food items include canned food, along with containers for dry food that did not require cooking, as represented by the large, dry biscuit jar in SPS25. If food ran out, civilians often searched for taro, bananas, sweet potato, breadfruit and sugarcane (Pacific STAR Center for Young Writers 2004:9, 12, 17–21, 67). Some claim that no meat was consumed during the war (Pacific STAR Center for Young Writers 2004:45), while others remember the bombs killing animals which people would then eat, although they would sometimes eat them raw (Pacific STAR Center for Young Writers 2004:63–64, 139, 192).

Civilians anticipated the need for drink during the war. Indeed, there was a constant shortage of water for those who sought shelter in the caves and there are several stories of family members going outside to find water. Some were able to find it nearby, while others had to quench their thirst by drinking coconut water or sucking sugarcane and squeezing banana trunks or pandanus roots (Pacific STAR Center for Young Writers 2004:12, 67, 133, 139, 154, 192). Some had to rely on the rain. Others were so desperate that they had to drink urine and some were told to drink their tears (Pacific STAR Center for Young Writers 2004:38, 140). Civilians in the four surveyed caves brought beer, sake and soft drinks with them, with the large 1.8L sake bottles appearing most frequently. The large bottles were valuable as they held the most liquid and could be reused as water containers. The civilians in SPS25 brought a jerry can which may have served as a water container and must have been stolen from U.S. troops or given to them once the U.S. located the cave. Those in SPS41 brought a tea pot, which may have been from a military occupant, as tea pots were also located at other military sites. Civilians may have also brought condiments to the caves, such as soy sauce. Most Japanese civilian households would have had soy sauce, but whether Indigenous families had the same access to it is unknown. Rice became a staple for Chamorro people in 1934 (Hawk 2006:333; Yanaihara 1976:149), so they probably also had access to soy sauce. Under Japanese control, Carolinian people were considered to be at the bottom of the racial hierarchy (Higuchi 2013:150–151), so their access to goods may have been limited. Given the shortage of water, however, it is unlikely that soy sauce containers were brought containing the original condiment; the more likely reason for bringing both large sake bottles and soy sauce bottles to the caves was to serve as water containers. Eugenio Borja for example, remembers a Japanese civilian on his way to Talofofo, giving him a half-gallon bottle, similar to a Kikkoman soy sauce bottle, filled with water (Eugenio Borja pers. comm. 2014).

The amount of material within civilian caves and the difficulty in entering/exiting, especially at SPS25, SPS33 and SPS45, suggest that the occupants expected to remain at the site for longer than a few days. In order to increase their comfort, civilians prepared their caves with lighting devices, including kerosene lamps, and brought meaningful and valuable items with them, such as jewellery (Eugenio Borja pers. comm. 2014). No jewellery was located within civilian shelter caves during this project, probably because any such items would either have been taken away from the cave if the occupants survived, or been retrieved or looted by others after the danger had passed. Civilians also brought civilian-issue gas masks with them.

Items within civilian caves hint at the employment backgrounds of some of the occupants. A tea cup with the NKK logo in SPS25 likely belonged to an employee at the company or a family member or friend of an employee. A set of barber's scissors within SPS41 suggests that people within this cave had ties to the barbershop located in Garapan (Russell 1984:64). There are three additional sets of utility scissors within SPS41. These would have had multiple uses, from harvesting vegetables or plants when foraging for food or to use as a weapon.

The NKK cup and barber scissors may also reflect the types of individuals who were pre-warned about the battle. Those working in primary industries in Saipan and in prominent shops located in Garapan were probably privy to information or gossip about the imminent battle. Such groups had an advantage and would have been able to prepare for the battle in advance.

Some of the civilians in SPS33 likely engaged in shrapnel/ammunition collecting in order to cope with the battle. Moshenska (2008c) describes shrapnel collecting amongst children in Britain during WWII as a way of engaging with, making sense of, and coping with, war. He suggests that through shrapnel collecting, children could participate in the war. Engaging in play allowed children to forget the devastating consequences of war and gain some form of control of it (Moshenska 2008c:121). While three of the civilian caves in Saipan contain ammunition, there is only one complete bullet in SPS41 and four shells in SPS25. In SPS33 there are at least 11 different pieces of shrapnel and ammunition ranging from 12.4mm to 21mm diameter, all concentrated in the deepest and most protected portion of the cave. Additionally, there are no other military-related items within the cave. Borja has described his own collecting behaviour as a child during the war, although it was not shrapnel. He remembers always running in and out of the cave and climbing trees to see the action and describes encountering the bodies of fallen Japanese soldiers lined up at a water source near Santa Lourdes cave (SPS27). Borja collected the watches from the soldiers' bodies. He had about seven watches on his arm and his mother scolded him. One day Borja was without his mother and he was grazed by a bullet or shrapnel on his left shoulder. The two Japanese soldiers he was with at the time were killed. Eugenio attributed him being hit by shrapnel to the bad luck he had received from taking the watches. After he got hit he went back to the cave, took off the watches he had and threw them away (Eugenio Borja pers. comm. 2014).

During the battle, particularly towards the end, civilians had two choices: they could continue to hide until the fighting stopped, or they could take their own lives. Propaganda influenced such decisions and civilians were routinely told that the U.S. would torture and mutilate women and children (North 2004:352). Oral histories connected to SPS64 illustrate the desperate situation families were in and the choices they made. A Japanese man who visits SPS64 nearly every year explained that, as a young boy, he and his family took refuge in this cave. During the battle his father killed his mother and brother, and attempted to kill him, and finally committed suicide (Herman Tudela pers. comm. 2013). Mothers with uncontrollably crying babies were given an ultimatum by Japanese soldiers: kill them or the soldiers would do it for them (Cook and Cook 1992:289). Towards the end of the battle, some civilians decided to take their own lives by jumping from the cliffs in northern Saipan (Denfeld 1997:92, 96, 127; Spoehr 2000:60; Taboroši and Jenson 2002:3–4). Some of these civilians may have consumed alcohol prior to jumping or taking the lives of their loved ones. There is no evidence that civilians overdosed on drugs before taking their own lives, but there are oral histories indicating that some took cyanide (Cook and Cook 1992:290).

Amongst those civilians who survived the war, some surrendered to the U.S., while others, particularly babies who were left in many karst defences, were rescued by the U.S. (Juan Camacho pers. comm. 2013). The decision to surrender created a new life for those who were interned at Camp Susupe in Chalan Kanoa. Segregated into groups, new identities were asserted based on race (Trefalt 2009:345). The U.S. distrusted both Japanese civilians and military and subjected them to harsher and more restrictive regulations and requirements (Trefalt 2009:348). Local Indigenous people were recruited by the U.S. to become Marine Scouts. These individuals were hired to guard the camp, ensure rules were followed, destroy Japanese hideouts in the jungle and capture Japanese stragglers (Wright and Knight 2000:6–8). Families were further impacted as many who had survived the battle passed away at the camp from injury and disease (Petty 2002:21). Some stayed in the camp for nearly two years until reintegrated with a new, post-war identity in their home countries or in Saipan, while civilian patrolmen were sent to Guam to be tried for war crimes (Higuchi 2013:88).

8.2.2 The Japanese Military

For some in the Japanese military, war began when they were conscripted into the Russo-Japanese war. One such individual was Isoroku Yamamoto. Yamamoto spent the majority of his adult life as a warscape inhabitant. Entering the naval academy at 20 years of age, Yamamoto took part in the Russo-Japanese war of 1905, participated in negotiations during the London Naval Conference in the 1930s, helped plan the attack on Pearl Harbour and Midway, and eventually died in 1943 (Harries and Harries 1991:296). Similarly, members of the Kwantung Army were stationed in Manchuria shortly after the Russo-Japanese war, involved in the Manchurian Incident of 1931 and then sent to defend various Pacific islands in the 1940s (Gordon 2003:187; Harries and Harries 1991:152; Hasegawa 2005:10). Military trainees were likely taken from their families while in their early 20s or as teenagers (Cook and Cook 1992:122), placed in intensive military preparatory school and indoctrinated into military beliefs. Such indoctrination decreased the amount of agency individuals in the military had. As Nohara Teishin, once a member of the IJA stationed in China, explains,

> Nobody fights a war because they like it. “Nation’s orders,” “Emperor’s orders”- that’s what they said. What could you do but go? If an order was issued and you didn’t go, you were a traitor. There’s not one soldier who ever died saying “Tenno Heika Banzai!” [Long Live the Emperor!] I was with hundreds of men when they died. They lay dead with grimaces on their faces (Cook and Cook 1992:35).

For many others, the war began once they were sent to construct defences on various Pacific islands in the 1930s which then accelerated after Pearl Harbour in 1941. In Saipan, the Japanese began constructing air bases and setting up defences along potential landing beaches (Denfeld 1997:12). They expected the U.S. to invade in June or July (Westfall and Kimihira 2014:59) and, although they did not know exactly where the U.S. would land, they correctly anticipated that it would likely take place along the western coast of Saipan, where the U.S. initiated the invasion. They also prepared to defend several other locations. Based on the locations of combat karst defences and their fields of fire, several specific defensive locations appear to have been chosen, such as Laulau Bay, Marpi Airfield, Aslito Airfield, Flores Point/Tanapag Harbour and Obyan (Figure 8.1). Denfeld (1997:22–29) also identified these areas as important for Japanese defence based on the locations of artillery.

As discussed in the previous chapter, the navy built defences before the army arrived and karst defence site construction differed based on military affiliation and function. Amongst the sites recorded for this project there is no noticeable change in construction techniques or materials as the battle moved from west to east, then south to north. However, by incorporating the sites from northwestern Saipan documented in Eakin et al. (2012), there is a change in how stacked limestone walls are constructed. Of the 26 cave sites recorded by Eakin et al. (2012:131), eleven of them had stacked limestone and one was modified with concrete. The stacked limestone walls appear to be small, hastily-built structures with no mortar and large gaps between the rocks (except at one site) (Figure 8.2). These are noticeably different to many of the stacked rock walls at the karst defences recorded for this project (SPS14, SPS32) which show evidence of mortar (either cement or mud) and are much more substantial (Figure 8.3). The walls in the north, however, resemble the walls at SPS40 and SPS39, both of which are also located in the north (Figure 8.4). In Peleliu, navy U-types were sometimes constructed with a small blind at

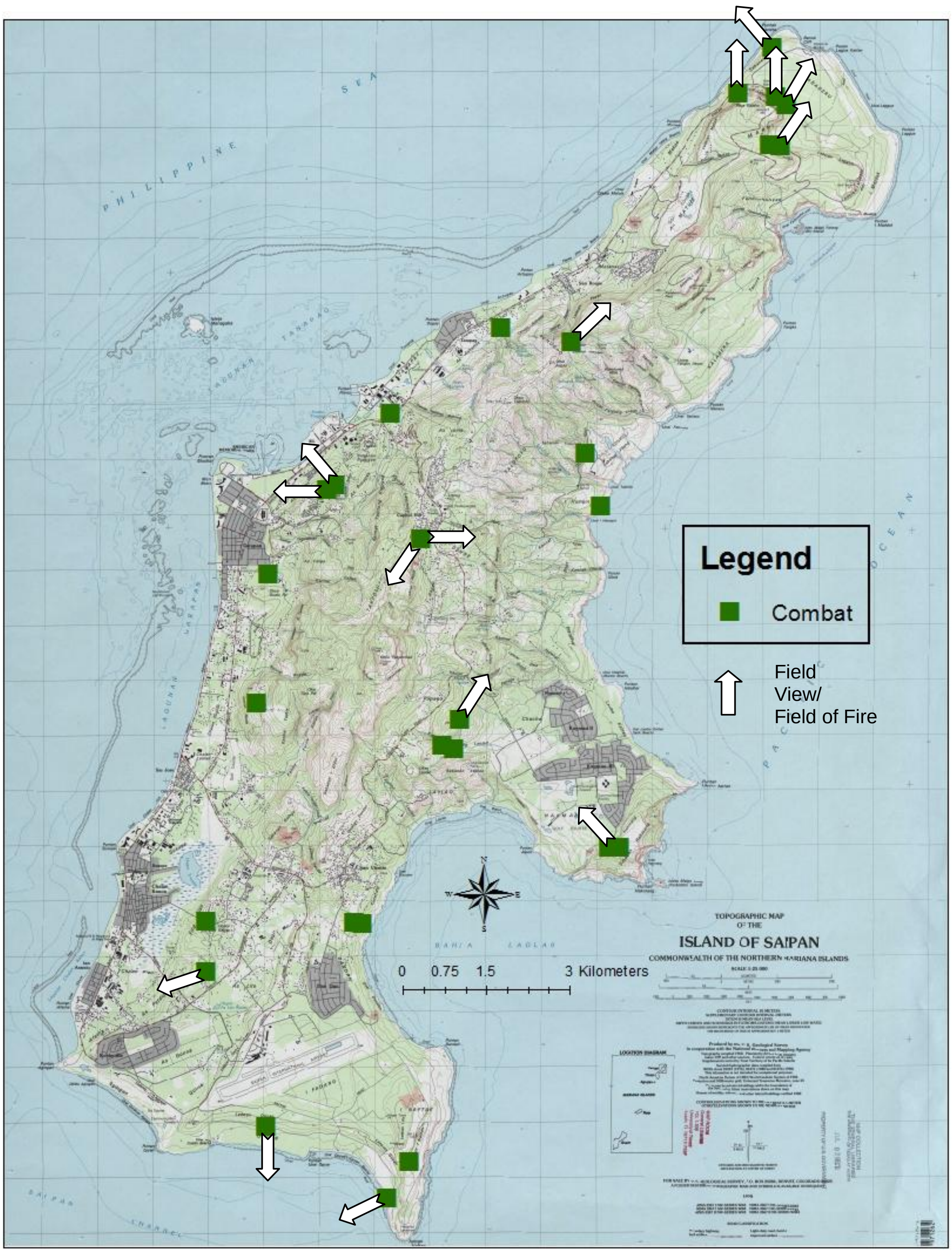

Figure 8.1: Saipan's combat karst defences and known fields of fire.

the combat entrance. The stacked limestone wall at SPS40 is built at the combat entrance and the one at SPS39 is built in front of the smaller escape entrance, suggesting that by the time the military reached SPS39 the escape entrance was no longer used for that purpose, but rather was occupied, causing the military to set up stacked limestone for camouflage. No mortar was used in these walls. The walls at SPS14 and SPS32 were built with precision and were an intentional part of site construction, while the walls at the northern sites were built quickly, with no supporting mortar and likely towards the end of the battle. Although small stacked limestone walls without mortar exist in other parts of the island, they appear more frequently in the north. Moreover, when hastily stacked limestone walls are present at unmodified caves, as in some of the sites recorded by Eakin et al. (2012), it is a strong indication that they were built by people retreating to the north with few materials and desperate to shelter and camouflage themselves with whatever was available during the last days of the battle.

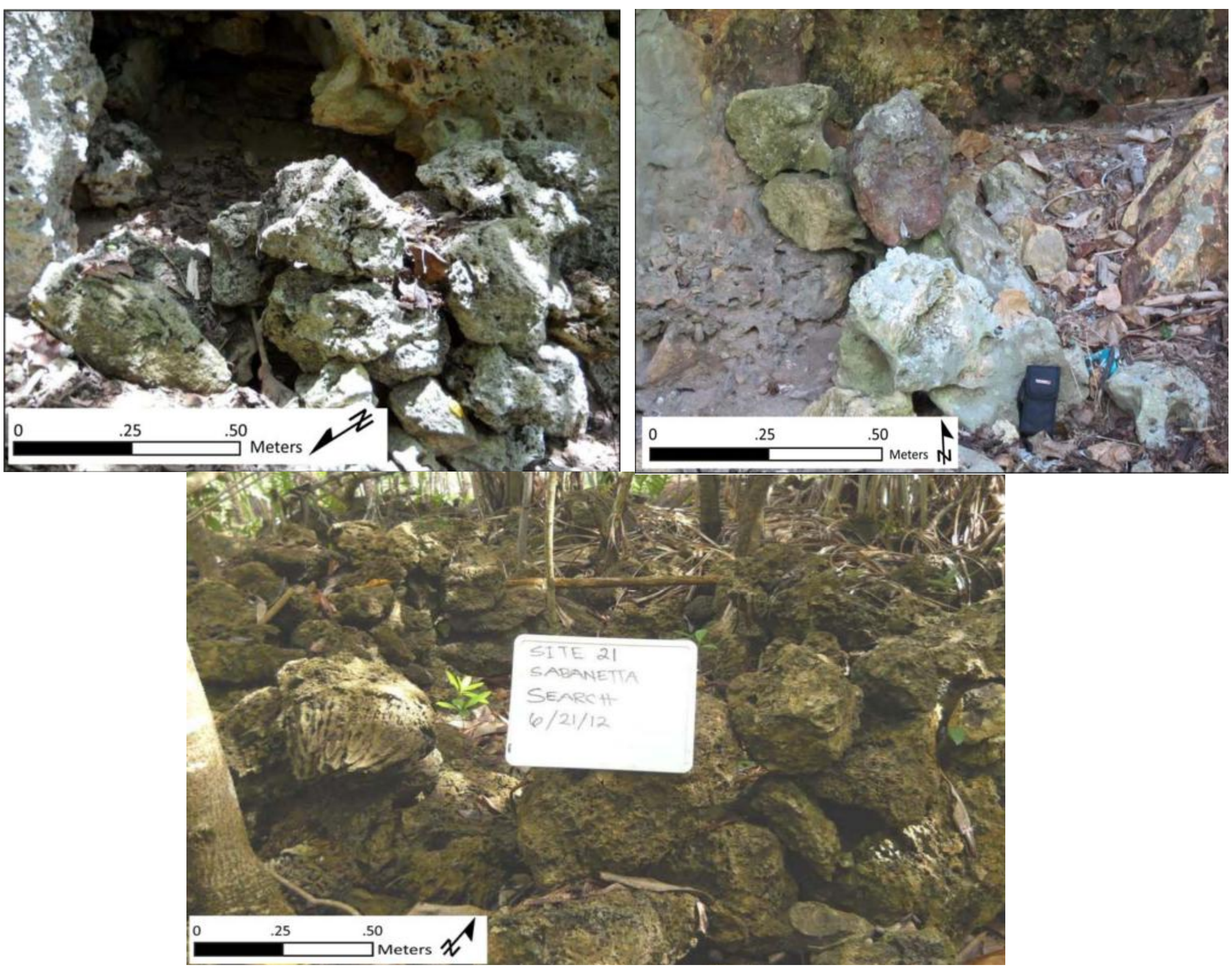

Figure 8.2: Hastily-built stacked limestone walls in the north (Eakin et al. 2012:40, 47, 91).


Figure 8.3: Stacked limestone walls at SPS32 (left) and SPS14 (right).

Figure 8.4: Hastily-built limestone wall at SPS40.

While some of the northern sites may have been used opportunistically by retreating Japanese military and civilians, others were meant to have military personnel stationed for a longer period of time. One of these sites is SPS36. A navy combat cave, SPS36 was well-constructed with cemented stacked limestone, a reinforced concrete entrance and a concrete floor. Apart from ammunition, the site contained three Go game pieces. Like the piano and the gardening pots at a WWI gun emplacement in Sydney (see Chapter 2), the Go game pieces suggest a period of time when there was no immediate threat to the men within SPS36. Go game pieces were also located in SPS4. Perhaps Go was even played here by some of the medical staff, although such efforts to pass the time would have been short-lived, as a Line of Communication Hospital located near the front lines of battle could not have been idle for long.

Both the army and navy used lighting devices as evidenced by wires and bulb fragments. Command posts were better equipped with lighting than other sites. Many combat and shelter sites had only rudimentary holes dug in the backs of tunnel niches or at the ends of tunnel legs wherein candles were likely placed. The hospital tunnels in particular appear to have been poorly lit.

Food was in short supply throughout the entire Pacific War. Some Japanese soldiers describe eating bats, rats, lizards and snails (Masao 2000:99). Some were so desperate that they resorted to eating each other (Harries and Harries 1991:426). However, this does not seem to be the case in Saipan. The military on Saipan were well-stocked with food and rations and fared better than the military on other islands and compared to civilians. Some 2,500 tons of Japanese food, primarily stored within karst defences, including soy sauce and miso, were used to feed the internees at Camp Susupe after the battle was over (Meller 1999:52, 55; Pacific STAR Center for Young Writers 2004:71). War period diaries describe some members of the Japanese military consuming traditional meals, such as miso broth and pickled radish for breakfast and rice mixed with wheat for lunch, all eaten out of rice/soup bowls (Aso 2004:12). At karst defences in Saipan the Japanese military also consumed their meals from various porcelain vessels, but the IJN had more elaborate dining experiences and used more tablewares than the IJA. Army sites contain fewer total ceramic tableware vessels and fewer types than IJN sites, except for SPS11, the army Field Hospital. Figures 8.5 and 8.6 illustrate the differences between IJA and IJN dining experiences. The IJA is shown consuming food from rice/soup bowls and mess kits, even sipping liquid from the lids or inserts of the mess kit. The IJN is shown to have a wider range of tableware. These photographs also show the IJA using spoons and possibly forks, while the IJN is using chopsticks. No chopsticks were found in Saipan's military sites, but four forks and one spoon were recorded, all within three army sites (two hospital tunnels, SPS4 and SPS11, and one shelter cave, SPS18). The army in Saipan also consumed food out of brown plastic military bowls and the navy out of blue enamelled metal military bowls. Both used drinking glasses for beverages.

The Japanese military stocked karst defences with specifically designated military supplies sent from the Japanese mainland and not with items that were already being sold in Saipan. The ceramics located at karst defence sites belonging to the military are both newer types and of higher quality than those found in civilian sites. While a clear date for ceramics cannot be ascertained, from a comparison of designs and techniques the ceramics at military sites were found to be made later than those at civilian sites, perhaps post-1930 (the date of the single-coloured undecorated and NKK ceramics found at civilian sites). The maker's marks on some of the vessels identify specific companies which may have been selected to supply ceramics to the IJN and IJA. Three marks linked to specific companies are shown in Table 13 in Chapter 6 and belong to the Noritake Company and the Fukagawa Seiji Kaishi Company. Ceramics with the Noritake Company mark are only found in army sites, while the Fukagawa Mount Fuji mark appears on ceramics found in SPS37 and SPS19. SPS37 is a navy site, but SPS19 was identified as of unknown affiliation in Chapter 7. Given that the IJN used more ceramics and a wider variety of types than the IJA the high vessel count and the presence of Fukagawa ceramics at SPS19 suggest that it was most likely a navy site. More research is required to determine whether these ceramic manufacturers were securely and consistently linked to these branches of the military and whether vessels with such maker's marks can help identify distinct army and navy karst defences at other sites in the Pacific.

Unlike civilians, the military in Saipan did not appear to use pots to cook their food. Rather, the IJA used their mess kits as rice cookers over open fires (Figure 8.7). Rising smoke would be targeted for bombardment by the U.S., so cooking for breakfast and lunch had to be finished by early morning (Chôko 2000:73). The IJN's short, shallow, rectangular mess kits would not have been conducive to cooking food. One possibility is that the IJN only consumed canned goods and rations that did not require cooking. Another is that the IJN used concrete stoves constructed near caves (such as the one near SPS26) or within caves as mentioned in the

Figure 8.5: IJA soldiers at meal time during WWII in the Pacific. Country unknown (Zingzing 2012b).

Figure 8.6: Members of the IJN at meal time in Saipan (The Australian War Memorial).

Operation Forager reports (27th Infantry Division G-2 Section 1944:178). The navy used more concrete than the army in their construction and concrete stoves could have been part of the infrastructure. Concrete stoves are likely part of navy sites because they had more time to construct such features.

Both the IJN and IJA coped with war by consuming alcohol and kept caches of beer and sake (in bottles and cans) within karst defences. Bergen-Cico (2012:6) has explained that war and substance abuse have been closely associated for centuries. Soldiers often consume drugs and alcohol to increase aggression, to cope with traumatic events and inhibit fears and reluctance (Bergen-Cico 2012:6–8). During WWII, Japanese troops were given stimulants to stay alert and energised and Kamikaze pilots were given amphetamines (Bergen-Cico 2012:38–39). With the presence of a variety of alcohol bottles in nearly every site, there is no doubt that the Japanese military consumed drugs and alcohol in order to cope with battle. The military also became inebriated to enable them to face the many devastating events during the Battle for Saipan. Such events include the *gyokusai* attack of July 7 (Westfall and Kimihira 2014:119), the ceremonial suicide or *seppuku* committed by Japanese officers and the suicides from Saipan's northern cliffs. Sake, in particular, was used for these "ceremonial" events and sacrifices, and sake was also reported to help soldiers sleep during battle (Westfall and Kimihira 2014:52–53).

Figure 8.7: IJA soldiers cooking with mess kits (Zingzing 2012a).

Like ceramics, there appears to be more alcohol and soft drink bottles in navy sites than army ones, except for SPS4. SPS4 has a high quantity of beverage bottles (n=85) and thus the tunnel either performed a second function as storage, or alcohol was used in the provision of first aid. The sites in the northern portion of the island (SPS26, SPS36, SPS39 and SPS40) all have high concentrations of alcohol bottles. Other sites in the north that were not recorded in detail for this project due to time constraints also contain a substantial amount of bottles. For example, a cave known to locals as Beehive Cave, according to Fred Camacho, contains "more bottles than I have seen in one cave" (Fred Camacho pers. comm. 2017). Considering the lack of water during the battle, bottles would have been carried by both retreating military and civilians. Even empty bottles may have been kept as refillable water containers. In Peleliu, the Japanese military would tie a string to a stalactite in the cave and set a bottle at the end of it. As the natural water from the stalactite moved down the string, it would drip into the bottle (Phelan 1945:28).

The rift between the IJN and IJA appears to go beyond influencing how sites were constructed and also influenced site features and the level of overall comfort. The IJN built themselves concrete stoves for cooking and were able to equip their sites with lighting. The IJN also had much larger stocks of food, drink and supplies. The IJA sites appear to have been only lit with candles, as evidenced by the small candles shelves at the rear of many army tunnel legs. Overall, the IJA also had less food and drink, except for the hospitals which were the best stocked IJA sites.

The end of the battle was characterised by desperation. Members of the Japanese military had two choices: surrender to the U.S. or commit suicide. Suicide was chosen by soldiers and sailors for different reasons. As part of the Bushido Code and a form of blind loyalty to the emperor, many soldiers believed that becoming a prisoner of war was a national embarrassment and chose to sacrifice themselves for their country (Cook and Cook 1992:288–289). This pressure was increased for higher-ranking individuals, who either felt shame for losing the battle or did not want to confront the atrocities they committed (Maga 2001:46–47). In order to take their own lives, the military likely consumed alcohol before they killed themselves, both to decrease inhibitions and as a ceremonial sacrifice. There are few medicinal vessels (n=6) within the northern sites, suggesting that the military probably chose to consume alcohol rather than overdosing on medication. Some soldiers, however, knew they were going to surrender shortly after the battle began (Cook and Cook 1992:285). The choice to surrender was a difficult one and a soldier or sailor had to keep the idea to himself for fear of being shot in the back by other military or Japanese civilians (Cook and Cook 1992:290).

Another group of artefacts that illustrate the desperate times in the last few days of the battle are communication devices and related materials. Within and immediately outside of SPS39 and SPS40 are a number of communication device parts, including batteries, insulators, transmitters and vacuum tubes. Navy U-types were never used as command posts in Peleliu and no structural evidence suggests they were used as command posts in Saipan. The alcohol bottles, the hastily-built rock walls and the communication equipment found at SPS39 and SPS40 support the interpretation that a desperate group of retreating Japanese military occupied these sites in the last few days of battle. Prior to making one of the two decisions mentioned above, the men at these sites possibly lugged communication equipment with them in a final effort to organise a counter-attack.

Like civilians, surrendered or captured Japanese military spent the next couple of years within Camp Susupe. For those who were once at the top of the social hierarchy in Saipan, they were now at the bottom and received the least food and the worst housing, and were forced to labour (Meller 1999:34; Trefalt 2009:346–347). These individuals were held until their repatriation or trial on Guam (Higuchi 2013:88; Maga 2009). Other military men held out in Saipan's jungle for nearly five months after the island was declared secure. Captain Sakae Oba and 50 men surrendered on December 1, 1945 (Denfeld 1997:97) and were repatriated to Japan in 1952 (Trefalt 2003:63).

8.2.3 The U.S. Military

The Japanese attack on Pearl Harbour was the moment the U.S. military entered the war (Goldberg 2007:10). The early 1940s changed the lives of many who decided to enter the U.S. military service to fight for their country. From May to June 1944, the U.S. military organised and assembled to undertake one of the most crucial battles in the Pacific (Goldberg 2007:49–50, 52).

According to official U.S. histories, the U.S. did not encounter karst defences in Saipan until June 17, 1944 (27th Infantry Division G-2 Section 1944:10; Crowl 1960:145), but the U.S. actually encountered SPS32 on June 16, 1944 (see battlefield reconstruction below). Karst defences posed a major problem for the U.S. and were difficult and time-consuming to clear (Harries and Harries 1991:391). The U.S. immediately attempted to coax those hiding within karst defences to surrender (Goldberg 2007:125). The first stages of the battle were effectively a learning exercise for U.S. troops as they encountered various Japanese tactics to lure them within a cave's field of fire. Sometimes the Japanese would send children out to ask for help and U.S. soldiers would be told that a wounded civilian was inside the cave ready to surrender. When the U.S. approached, the Japanese military and sometimes civilians would attack (Goldberg 2007:125). As a result, early in the battle, the U.S. developed a tactic to attack karst defences by direct gun fire, grenades or flamethrowers if those inside would not surrender. Some sites, especially those suspected to contain Japanese military, were sealed shut (106th Infantry 1944:11, 24). There is clear archaeological evidence of karst defence destruction by U.S. troops.

8.3 Site Specific Actions

8.3.1 Reconstructing Violence

Reconstructing the Battle for Saipan through a discussion of site specific actions at karst defences highlights specific war period behaviours, particularly the violence that punctuated the war. The discourse contains grim details and involves a discussion and interpretation of violent acts. Proof of death and details of how people died are described using artefactual evidence, including human remains. As discussed in Chapter 2 conflict archaeologists need to consider the effects of their methods and interpretations so, before continuing, a discussion on the ethics surrounding the reconstruction is necessary.

While reconstructing the Battle for Saipan may be confronting to the reader, it is useful and necessary for several reasons. Re-creating the events at karst defences helps to interpret this poorly understood aspect of WWII. The fear of death, actual death and sacrifice was a real part of war experiences at these sites and such suffering should not be overlooked in an examination of the war. Reconstruction also conveys some of the extreme behaviours that occur in a wartime atmosphere and how war influenced the choices people made. In turn, these sites become a more important part of fully understanding the human experiences of war in the Pacific.

The remains of WWII in the Pacific lie in a liminal time, in that they are too recent to be considered by many as archaeological evidence, yet too old to be studied for human rights or criminal purposes (González-Ruibal et al. 2015:116). There is little argument that the U.S. and Japanese military killed each other during the Battle for Saipan and civilians were caught in the middle. Even though the reconstruction is detailed and includes how people died during the war, it does not disclose new information about how war was conducted in other contexts that has not already been told in historical accounts. There is no foreseeable use of the interpretation in any impending legal battle or for nationalistic or propaganda purposes. What may result, however, is a move to collect the remains by Japanese bone collecting missions. To help facilitate the proper identification and repatriation of these human remains, all of them were left in situ and a list of human remains and their GPS locations were given to the HPO as per the CNMI's 1999 Standards for the Treatment of Human Remains (see Chapter 4). If anyone wishes to recover the remains from karst defences they will need to obtain a permit from the HPO (James Pruitt pers. comm. 2017). The following reconstruction sometimes identifies the specific regiment a fallen soldier may have belonged to. By honing in on the identity of the solider, the human remains are no longer an artefact or the remains of an unknown soldier, but are given an identity (Moshenska 2008b:169) and refer to an individual who, regardless of nationality, has a story to tell through their life and death.

Since there is no code of ethics for conflict archaeology, each archaeologist needs to weigh the risks of their interpretations. The following interpretation will certainly make some people uncomfortable and may conjure up anger and sadness. However, the reconstruction is deemed to be worthwhile. Neglecting the human remains within karst defences and the conclusions we can draw would be disrespectful to those individuals who died in the battle as well as irresponsible archaeological practice. Confronting and processing past trauma and abuse (however that is facilitated) can also contribute to conflict resolution, understanding and healing and this is the case for individuals and nations, victims and perpetrators (Banks and Pollard 2011:132; Kritz 1996:127; Perring and Linde 2009:211). So while the reconstruction of death at karst defences may be unpleasant, understanding and accurately portraying the devastation at such sites is of value to victims, perpetrators, nations, to history, to the individuals who died as well as to the discipline (Blau and Skinner 2005:458).

8.3.2 Identifying Battle Activity

The following section reconstructs the battlefield, but focuses on karst defences and the archaeological remains associated with those sites. Battlefield reconstruction occurs at different scales and with different levels of detail depending upon the nature of the site(s) and artefacts. The reconstruction of the Custer segment of the Battle of Little Bighorn, for example, could track ammunition to identify lines of battle and individual guns based on firing pin and land and groove signatures (Fox 1993:54; Fox and Scott 1991:95). The reconstruction of the Battle for Saipan cannot be tracked in the same way because firearm signature comparisons were not conducted on the ammunition cartridges located in karst defences. The microscopy required to conduct such analysis was beyond the scope of this project. Moreover, reconstructing battle lines for the Battle for Saipan was not a worthwhile endeavour, as they can be largely determined from WWII situation maps. Rather, this project aimed to investigate the role of karst defences during the battle as well as identify individual and group behaviours at sites. U.S. troop movement during the Battle for Saipan is well-documented in official histories and the *Operation Forager* reports, but the information about karst defences and what happened at these sites is poorly understood; this is where the value in reconstructing the battle lies.

Borrowing from Fox and Scott (1991), the following reconstruction uses both gross and dynamic patterning. Gross patterning is static and integrates archaeologically identified positions with information from the historical record (Fox and Scott 1991:94). Dynamic patterning is the movement of battle and incorporates a chronology of events and artefacts representing individual behaviours (Fox and Scott 1991:94). Gross patterning is easily achieved through GIS, whereby the GPS coordinates from the 2014/2015 field season were plotted onto Saipan maps. Dynamic patterning which portrays the chronology of events was achieved by plotting the sites onto U.S. WWII situation maps (Figures 8.10–8.13). By georectifying the situation maps in ArcGIS and plotting karst defence sites, a detailed story of the battle as it occurred at a particular site and the branch of the U.S. military that was involved can be constructed. Sites were then related to the U.S. official history of the Battle for Saipan, the *Operation Forager* reports, oral histories and the analysis conducted in the previous chapter in order to identify Japanese military involvement.

Artefacts are also used here to identify battle activity and add detail to the dynamic patterning. Battle activity is determined by artefacts, burnt or broken walls and sealed entrances. Artefacts that indicate an attack include melted metal and glass, heat-expanded cans and drums, ceramics with burned paste, human remains, including burned and calcined bones, frayed bullet shells, shrapnel and grenades. Artefacts indicating battle activity are usually coupled with charred walls, blast holes or wall spalling (Tables 31 and 32).

The level of attack and the weapon type can also be identified based on artefacts. The U.S. used a variety of weapons on karst defences in Saipan, including the M1A1 flamethrower (McKinney 1949:150) and flamethrowers integrated into U.S. Sherman tanks to increase distance and duration (Bishop 2002:269; Hanks 2015:75). They used a number of hand grenades, including the MKII, white phosphorus, and smoke grenades (Rottman 2013b:42). They also used dynamite (Goldberg 2007:126). Often the U.S. troops used combinations of weapons and a typical operation would include throwing a smoke grenade at the karst defence entrance to create a smoke screen behind which a team of flamethrowers would then attack (McNab 2015:31).

Of the physical remains that indicate battle activity, one of the most susceptible to blast or fire are human bodies. According to a study on the effects of fire on a human body, when it is exposed to 800 degree Celsius heat, the phalanges begin to calcinate after 20 minutes, although femur bones can take up to 50 to 60 minutes (Bohnert et al. 1998:13–16; Walker et al. 2008:130). While calcination can occur based on a multitude of factors, such as placement within a fire or whether a bone is protected by layers of muscle and tissue, calcination is the final stage of cremation when there is a complete loss of organic material (Mayne Correia 1997:276). This suggests a body would need to be exposed to a fire for minutes or hours in order for its skeletal remains to become calcined.

The melting points of various materials can also give an indication of the type of battle activity. The melting point of glass, which depends on the amount of silica and other elements present, typically melts between 725 and 1,700 degrees Celsius (Cronyn 1990:128–129). The silver and alloy melting point is 960.5 degrees Celsius, copper is 1,084 degrees Celsius, lead is 327 degrees Celsius and iron is 1,500 degrees Celsius (Coningham and Young 2015:318; Cronyn 1990:202, 213, 230). Thus, items such as melted metal and glass would also be an indication of prolonged direct heat.

Finally, bullets and cans can also point to battle activity. A number of frayed bullet shells are present within karst defences. Such a reaction occurs when a bullet is exposed to heat. Contrary to popular belief, a bullet in a fire will not shoot straight, but will explode, causing the shell to burst and the neck to fray (Rottman 2013a). Similarly, food cans exposed to prolonged heat will typically explode (Zimmerman 2013:343). Some of the karst defences have exploded or expanded cans and drums, which gives an indication of the amount of time they were exposed to heat.

Determining whether or not a site was affected by a flamethrower or an explosive is dependent upon the condition of the rest of the site. SPS4 is an example of a site that was attacked by a flamethrower and suffered a resulting fire. Major charring on the walls occurs at E2 and throughout L1 (Figure 8.8). The walls of all the remaining legs are ashy. There are no melted artefacts or calcined remains in the first 4m of L1 where the majority of the charring occurs, but they are present just beyond the charring and throughout the rest of the tunnel. It is thus inferred that on July 3 or 4, 1944, the U.S. 6th Marine Regiment blasted the tunnel at E2 with a flamethrower which came through L1, charred the walls and ignited a fire that swept through the remainder of the tunnel.

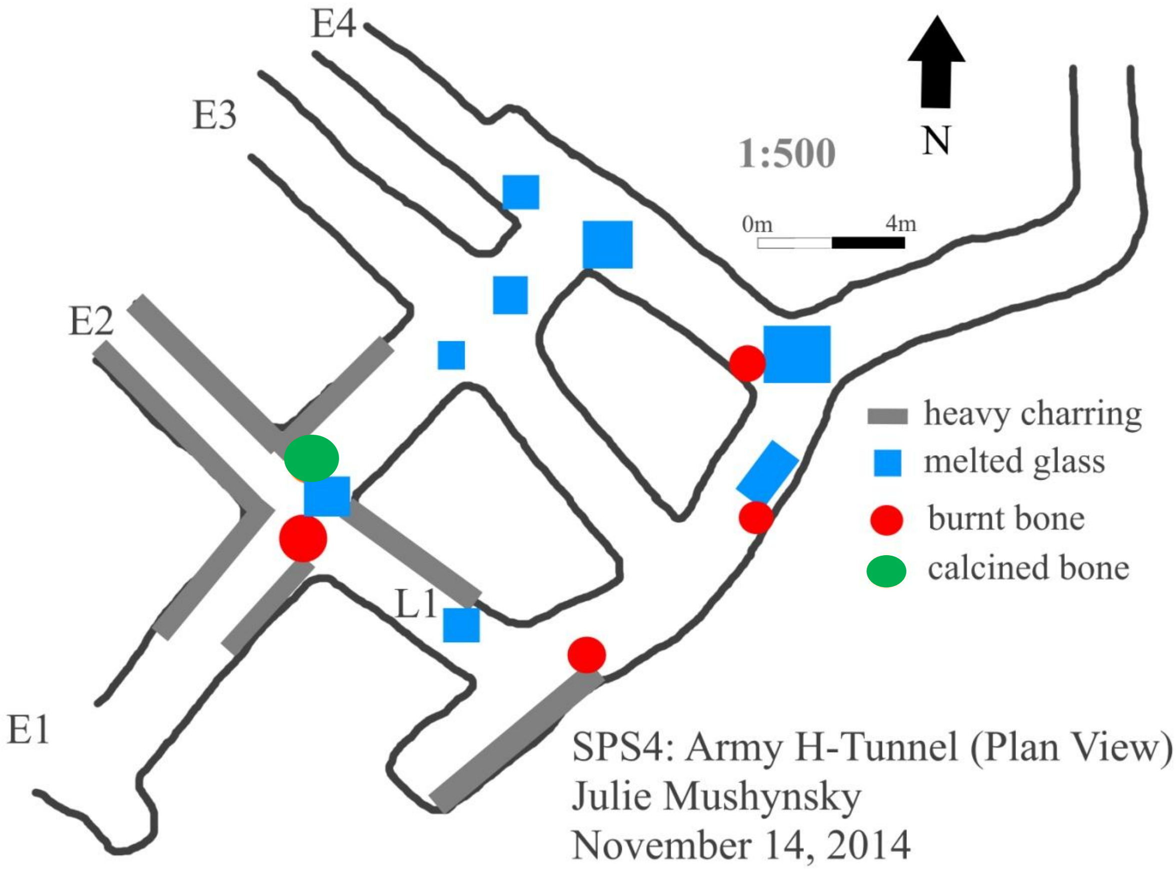

Figure 8.8: SPS4 and patterns of battle activity throughout the site.

SPS19 is an example of a karst defence site attacked by a flamethrower with no resulting fire. The U.S. 23rd Marine Regiment attacked SPS19 between July 2 and 4, 1944, resulting in expanded metal drums, a large cache of expanded cans with charred insides and roof spalling. Interestingly, only one glass vessel of the 111 located within this cave is partially melted. The patterns of heat-impacted remains, including wall charring, suggest that the marines approached the cave from the northeast and blasted here where most of the large spalling occurred, walked towards the cave and turned to blast the western portion of the cave, where more ash and less overt black charring appears. The bottles under the spalled roof at the rear of the western portion of the cave were not impacted by the flamethrower, as they were protected by the roof spall

(Figure 8.9). While some of the cans within SPS19 have exploded, the majority have only expanded; another indication that the site was exposed to heat from a flamethrower rather than a prolonged heat from a fire.

SPS26, on the other hand, contains burned and calcined bone fragments, but little evidence of flamethrowers. The burned and calcined bones consist of small fragments along the west wall and some complete phalanges showing evidence of fracture lines (Bohnert et al. 1998:14; Dirkmaat et al. 2012:128). Other phalanges within the site are unburnt. Twenty-one bones have been hidden near this site and are assumed to have been from this defensive position. None of the hidden bones have evidence of burning. Some slight charring occurs on the walls near the calcined bones and the southern portion of the site has collapsed. This damage is interpreted to be from a grenade or explosive which was thrown by the U.S. 24th Marine Regiment on July 8 or 9, 1944, causing structural damage to the site and a small fire. The resulting fire was small enough to burn portions of the wall and some of the bodies inside, but not large enough to consume the fallen soldiers completely.

One issue when determining battle activity caused by grenade or explosives is whether or not the damage and remains are a result of U.S. grenades being thrown by U.S. military or Japanese grenades used by the Japanese military to take their own lives. As early into the battle as June 26, 1944, Japanese soldiers were ordered to commit suicide if they could not participate in combat (Crowl 1960:159). If fragments of MKII grenades are present it is assumed that the site was attacked by the U.S., although it is possible that Japanese military and civilians used abandoned U.S. grenades to kill themselves.

Table 31: Saipan Site Specific Actions at Tunnels

Site	Function	Day Encountered (1944)	Military Involved	Battle Activity
		Navy I-Types		
SPS1	Storage or combat	June 25 to 30	6th Marine Regiment	None
SPS2	Storage or combat	June 25 to 30	6th Marine Regiment	None
SPS8	Command post	Between July 3 and July 4	8th Marine Regiment	Charred wood and schrapnel
SPS24	Storage or combat	July 3 to 4	6th Marine Regiment	None
SPS29	Shelter	June 22	24th Marine Regiment	U.S. cot fragments
SPS43	Storage or combat	Between July 3 and July 4	8th Marine Regiment	None
SPS44	Storage or combat	Between July 3 and July 4	8th Marine Regiment	None
		Army I-Types		
SPS9	Storage or combat	Between June 16 and June 17	2nd Marine Regiment	None

SPS14 (A)	Storage and combat	June 25	24th Marine Regiment	None
SPS38	Combat and escape or reconnaissance and escape	After June 25	105th Regiment	None
SPS46	Combat	Between June 23 and June 25	27th Infantry	Charred walls on outside, frayed and melted ammunition
SPS46 (A)	Storage and combat	Between June 23 and June 25	27th Infantry	Charred on outside, frayed and melted ammunition
SPS48	Storage or combat	July 4 and July 7	24th Marine Regiment	None
SPS49	Storage or combat	July 2 to 3	23rd Marine Regiment	None
SPS52	Storage or combat	July 4 and July 7	24th Marine Regiment	None
Army L-Type				
SPS10	Storage or combat	Between June 16 and June 17	2nd Marine Regiment	U.S. MKII grenade fuse sealer and lever, charred walls
SPS17	Combat	June 25	24th Marine Regiment	None
Navy W-Type				
SPS20	Communication and command post	Between June 16 and June 17	8th Marine Regiment	Sealed entrance
Army W-Type				
SPS11	Hospital	Between June 16 and June 17	2nd Marine Regiment	Melted glass, charred items, charred walls
Navy U-Type				
SPS5	Combat	June 16	23rd and/or 24th Marine Regiment	None
SPS35	Combat	Between July 8 and July 9	24th Marine Regiment	Sealed entrance and charring
SPS39	Combat then repurposed as command and communication post	Between July 8 and July 9	24th Marine Regiment	Human remains (unburnt), melted glass
SPS40	Combat	Between July 8 and July 9	24th Marine Regiment	None
Army U-Type				
SPS47	Combat	Between June 23 and June 25	27th Infantry	Heavy charring and ash outside
SPS42	Combat	July 4	23rd Marine Regiment	None
Army H-Type				
SPS4	Hospital	July 3 to 4	6th Marine Regiment	Charred wood, melted glass, burnt walls, human remains (unburnt, burnt and calcined)
Navy Combination Type/Unknown				
SPS3	Command post	June 25 to30	6th Marine Regiment	None
SPS21	Communications	June 25 to 30	6th Marine Regiment	None

SPS37	Shelter	June 30 and July 2	6th Marine Regiment	Grenade fragments
Army Combination Type/Unknown				
SPS14	Combat	June 25	24th Marine Regiment	Grenade blast, U.S. MKII grenade fuse sealer, human remains
I-Types with Uncertain Affiliation				
SPS30	Storage or combat	July 2 to 3	23rd Marine Regiment	None
SPS31	Storage or combat	July 2 to 3	23rd Marine Regiment	None
SPS50	Storage or combat	July 2 to 3	23rd Marine Regiment	None
SPS51	Storage or combat	July 2 to 3	23rd Marine Regiment	None
Unknown Type with Unknown Affiliation				
SPS15	Combat	June 30 to July 2	27th Division	Army, this is in the location of one of General Saito's (commander of the IJA 43rd Division) command posts

Figure 8.9: Underside of roof spall in SPS19. Note severe charring and broken, unmelted glass (30cm scale).

Table 32: Saipan Site Specific Actions at Caves

Site	Function	Date Encountered (1944)	Military Involved	Battle Activity
Navy Caves				
SPS13	Shelter	Between July 5 and July 7		None
SPS16	Combat or communication	Between July 8 and July 9	24th Marine Regiment	Blasted walls
SPS23 (in close proximity to SPS24 a navy I-type tunnel)	Combat	Between July 3 and July 4	6th Marine Regiment	Human remains (unburnt)
SPS26	Combat	Between July 8 and July 9	24th Marine Regiment	Human remains (unburnt, burnt and calcined), charred on west wall and ceiling and slight charring on east wall
SPS28 (in close proximity to SPS24, a navy I-type tunnel)	Combat	Between July 3 and July 4	6th Marine Regiment	None
SPS36	Combat	Between July 8 and July 9	24th Marine Regiment	U.S. MKII fuse sealer, human remains (unburnt, burnt and calcined)
Army Caves				
SPS18	Shelter	Between June 23 and June 25	23rd Marine Regiment	U.S. MKII fuse sealer, human remains (unburnt)
SPS22	Combat	Between July 8 and July 9	24th Marine Regiment	None
SPS32	Command post	June 15 to 16th	U.S. 25th Marine Regiment	Melted metal, charred walls
SPS34	Combat	Between June 18 and June 20	105th Regiment	Charring on west side and ceiling, human remains (unburnt)
Civilian Caves				
SPS25	Shelter	After June 25	105th Regiment	U.S. MKII grenade fuse sealer, non-Japanese bullet shells
SPS33	Shelter	Between June 18 and June 20	105th Regiment	None
SPS45	Shelter	Between June 18 and June 20	24th Marine Regiment	None
SPS41	Shelter	July 2 to 3	23rd Marine Regiment	Melted glass, charred ashy walls, grenades, spalled walls, U.S. MKII fuse sealer
Unknown Affiliation				
SPS7	Unknown	Between July 3 and July 4	6th Marine Regiment	None

SPS12	Unknown	July 4 to 7	24th Marine Regiment	None
SPS19	Storage	July 2 to 3	23rd Marine Regiment	Expanded cans and drums, charred walls, no melted glass, spalling on walls

8.3.3 Reconstructing the Battlefield with Karst Defences

Historical accounts and war period documents of the Battle for Saipan are generally told with few mentions of caves or tunnels. Caves only make a significant appearance in historical accounts during the period of June 22 to July 2, 1944, when some of the most intense fighting occurred. Situated in Purple Heart Ridge within Death Valley in the northern Laulau Bay area, the 165th Infantry of the U.S. army fought with the 136th and 118th Infantry of the IJA (Crowl 1960:168; Denfeld 1997:73). SPS46, SPS46A and SPS47 were amongst the IJA combat tunnels that were encountered by the U.S. between June 23 and June 25 and were attacked with flamethrowers. For the remainder of the battle, mentions of caves appear to be concentrated in two other areas: Naftan Point in southeastern Saipan and in “Marpi” which is often used, both during the battle and even today, to refer to any place north of Paradise Valley or Matansa. Caves are also explained as used primarily for combat and chosen opportunistically, except for those identified as command posts in historical accounts. The caves in Marpi are described as shelters for people in the last few days of the battle.

However, as Chapter 7 demonstrates, karst defences are more numerous, spread out and more organised than historical accounts suggest. They appear in all areas of Saipan with a limestone topography and the U.S. encountered them on more occasions that what is recorded in accounts of the battle. The first karst defence encountered by the U.S. was an army command post (SPS32) on June 16, 1944. Once the marines established their beachhead on the western coast of Saipan, a main priority was to strengthen the beachhead and capture the Aslito Airfield, the largest Japanese airfield on the island (Denfeld 1997:59; Hoffman 1951:52). As the U.S. 25th Marine Regiment of the 4th Marine Division pushed east they ran into heavy opposition from Japanese machine guns, mountain guns and anti-aircraft weapons guarding the western side of the Aslito Airfield (Crowl 1960:97). SPS32 was likely part of these initial attacks to defend the airfield. The site was subsequently attacked by the 25th Marine Regiment with a flamethrower, resulting in a fire as indicated by the melted metal and charred walls.

On the same day, the U.S. 23rd and 24th Marine Regiments to the north of the 25th Regiment would have encountered SPS5, but not the IJN personnel inside it (Crowl 1960:97).

The IJA 3rd Mountain Artillery Regiment had important artillery positions at Mount Fina Sisu (Denfeld 1997:53), at the base of which SPS5 is constructed. SPS5 does not display any evidence of battle and so the Japanese likely retreated east or north before the U.S. arrived.

On the night of June 16 the U.S. 6th Marine Regiment were along the beaches just south of Garapan and thwarted three counterattacks from a group of Japanese made-up of members of the IJA and IJN attempting to push them back into the ocean (Crowl 1960:95–98; Denfeld 1997:53). The final attack at 0330 was composed of approximately 1,000 Japanese equipped with 37 tanks, rifles and machine guns who were approaching through a west-running ravine (Crowl 1960:98). It is possible the counterattack began in the ravine running northeast and in front of SPS9, SPS10 and SPS11. The counterattack was met by a barrage of fire from the marines and they defeated the Japanese within one hour (Crowl 1960:98). In the process, the U.S. also attacked SPS10 with explosives and SPS11, the army hospital, with flamethrowers down its easternmost leg.

The Japanese could not compete with U.S. naval and air superiority (Denfeld 1997:49, 106) and could not push the marines back from the invasion beaches along the island's southwestern shoreline. Most of the Japanese men on the front line had been killed (Cook and Cook 1992:284). The U.S. established a beachhead within the first few days of battle (Denfeld 1997:59; Hoffman 1951:52), but they endured a number of night-time counterattacks and bombardment from heavy coastal defences (Denfeld 1997:54–55, 58).

The capture of the Aslito Airfield on June 18th by the U.S. was cause for concern from Imperial Headquarters which demanded that the Japanese hold Saipan as "…the fate of the Japanese Empire depend[ed] on the result of [the] operation…" (Campbell 2012:216–217; Denfeld 1997:59, 61). Two days after the U.S. took the Aslito Airfield, many Japanese leaders knew they were in trouble. Army Commander, General Saito ordered all secret documents destroyed. Tank crewman, Matsuya Tokuzo, questioned in his diary "what will happen to Japan after we die?" (Denfeld 1997:60, 62).

The loss of the Aslito Airfield was detrimental to the Japanese navy mobile fleet en route to the Marianas. U.S. carriers met the Japanese fleet in the Philippine Sea, west of Saipan, on June 18 (Denfeld 1997:65; Rottman 2004:61). Known as the Battle of the Marianas to the Japanese and the Great Marianas Turkey Shoot to the U.S., Japan lost 3 carriers, 31 float planes, 476 aircraft and 445 aviators (Denfeld 1997:67; Rottman 2004:62). No Japanese aircraft was able to support the mobile fleet from the Aslito Airfield and the resulting defeat of the fleet left the army and navy fighting on the island without any reinforcements (Denfeld 1997:67).

Moving east, abreast of the 4th Marine Division in the south, the U.S. 8th Marine Regiment was delayed by the swampy areas surrounding Lake Susupe (Crowl 1960:109). After sloshing through these areas, the 8th Marine Regiment reached the first IJN command post, SPS20, sometime between June 16th and June 17th (Crowl 1960:109) and met with little resistance. They sealed the northern and southernmost entrances with explosives.

By June 18th, the U.S. 4th Marine Division had crossed the entire island and began pivoting north, essentially cutting the island in two (Crowl 1960:114). General Saito knew he had lost the beach defences and drew up a new defensive line which ran from just below Garapan to Laulau Bay with the Yokosuka 1st SNLF on the western edge, 135th Infantry in the centre and 118th Infantry to the east (Denfeld 1997:60-61, 69). The 9th Tank Regiment was in reserve to guard against a possible landing at Laulau Bay (Denfeld 1997:61). The 47th Independent Mixed Brigade was stationed at Kagman (Denfeld 1997:61), and officers and other individuals responsible for communication took equipment to SPS14 in order to keep informed about the changing defensive lines.

Before the Aslito Airfield could be secured, the U.S. 105th Regiment of 27th Infantry Division had the difficult task of capturing Naftan Point (Crowl 1960:105, 137; Denfeld 1997:61). Naftan Point was an important defensive position for the Japanese, and particularly for the Japanese 47th Independent Mixed Brigade, which had been situated in caves at Naftan Point since the invasion. Well defended and making good use of the terrain, the Japanese used caves and gun emplacements to defend the region (Denfeld 1997:61). The southern stretch from Agingan Point to Naftan Point also had many caves, which were used by both the military and civilians (27th Infantry Division G-2 Section 1944:20). As the U.S. worked to secure the southern portion of Saipan they battled a number of enemy positions on June 19th, including SPS34 (Crowl 1960:141), where at least one member of the Japanese army was killed, probably by gun-fire. SPS34 has no major modifications, so it was likely used opportunistically by members of the 47th Independent Mixed Brigade who were retreating eastward from their stations at Agingan Point. Unfortunately, on the same day, about 20 to 30 civilians ran into the U.S. 105th Infantry and were killed (Crowl 1960:141). It is possible that some of them had been hiding in SPS33. After about a week of battle the 105th Infantry encountered SPS25 on June 25th , shot at it, threw in an explosive and took approximately 89 civilian POWs from the area, some likely from this cave (27th Infantry Division G-2 Section 1944:49). Naftan Point was finally secured on June 28, 1944 (Crowl 1960:160).

SPS29 was part of a heavily defended cliff line at Laulau Bay, a place where, as of June 18th, the IJA still anticipated a U.S. invasion (Denfeld 1997:61). During reconnaissance, the U.S. learned of heavy Japanese defences at Laulau Bay and avoided the area (Denfeld 30–31, 116–117, 123; Hoffman 1951:62; Rottman 2004:73, 76). However, as the U.S. 24th Marine Regiment pushed north on June 22, they were met with little resistance (Crowl 1960:169). They likely encountered SPS29 and began using it as a U.S. hospital. On June 22, regiments of the U.S. 27th Infantry Division who had left Naftan Point joined the marines in the push north (Crowl 1960:168).

While the U.S. army fought the Japanese 136th and the 118th Infantry in Death Valley, the U.S. 24th Marines had captured Kagman Peninsula by June 25, 1944 with few casualties (Crowl 1960:187, 209; Denfeld 1997:76). Although members of the Japanese army were stationed at SPS17 and SPS14, the majority probably left to join the eastern flank of General Saito's new line of defence. The Japanese 136th Regiment would have needed reinforcement, as they suffered heavy losses on the front lines during the initial invasion and what was once a force of 3,500 at this point now numbered only 400 men (Cook and Cook 1992:286; Denfeld 1997:61). Nevertheless, on June 25th the U.S. 24th Marine Regiment encountered the easternmost entrance of SPS14 and attacked the tunnel with at least one grenade, killing one member of the IJA.

The U.S. 6th Marine Regiment fighting on the western side of the island on the southern end of Garapan pushed north on June 25th, also with little resistance (Crowl 1960:229–232). The IJN command post SPS3 and nearby tunnels (SPS1, SPS2 and SPS21) were likely abandoned and left unscathed. The Japanese were situated at the southeastern edge of Garapan and attacked the U.S. near SPS37 (Denfeld 1997:75). SPS37 may have been encountered by the U.S. 6th Marine Regiment sometime between June 25 and July 2. The tunnel contains a number of grenade fragments, but they could be Japanese or U.S. and result from battle or Japanese suicide.

Between July 2 and July 3 the U.S. 23rd Marine Regiment advanced north past Talafofo (Crowl 1960:238). On the way, they attacked SPS19. Two intact, live U.S. grenades are present within SPS41 so either the marines also attempted to attack SPS41 with these weapons or those hiding within brought them to the cave. No human remains were located.

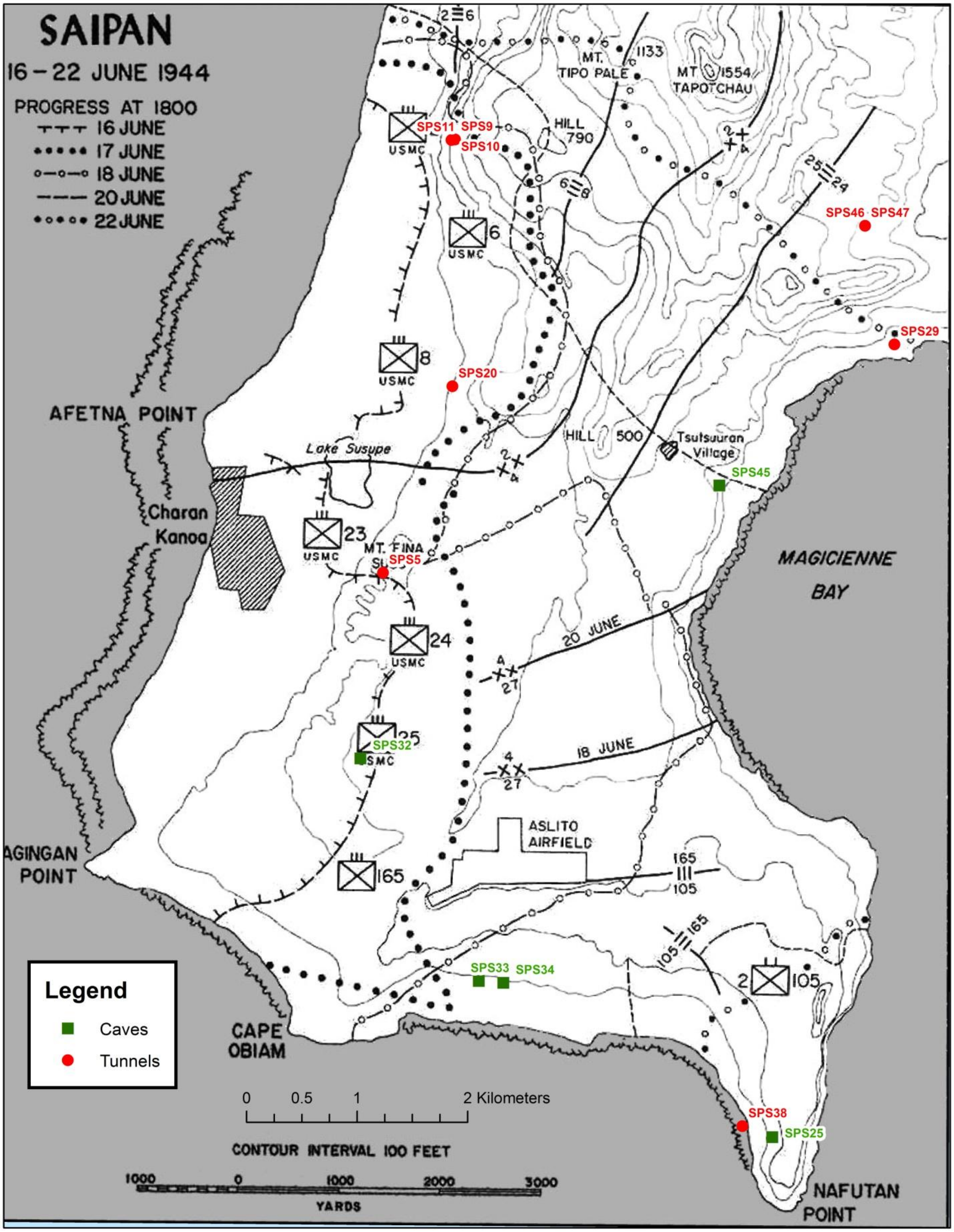

Figure 8.10: Situation map for the Battle for Saipan with karst defences from June 16 to June 22, 1944.

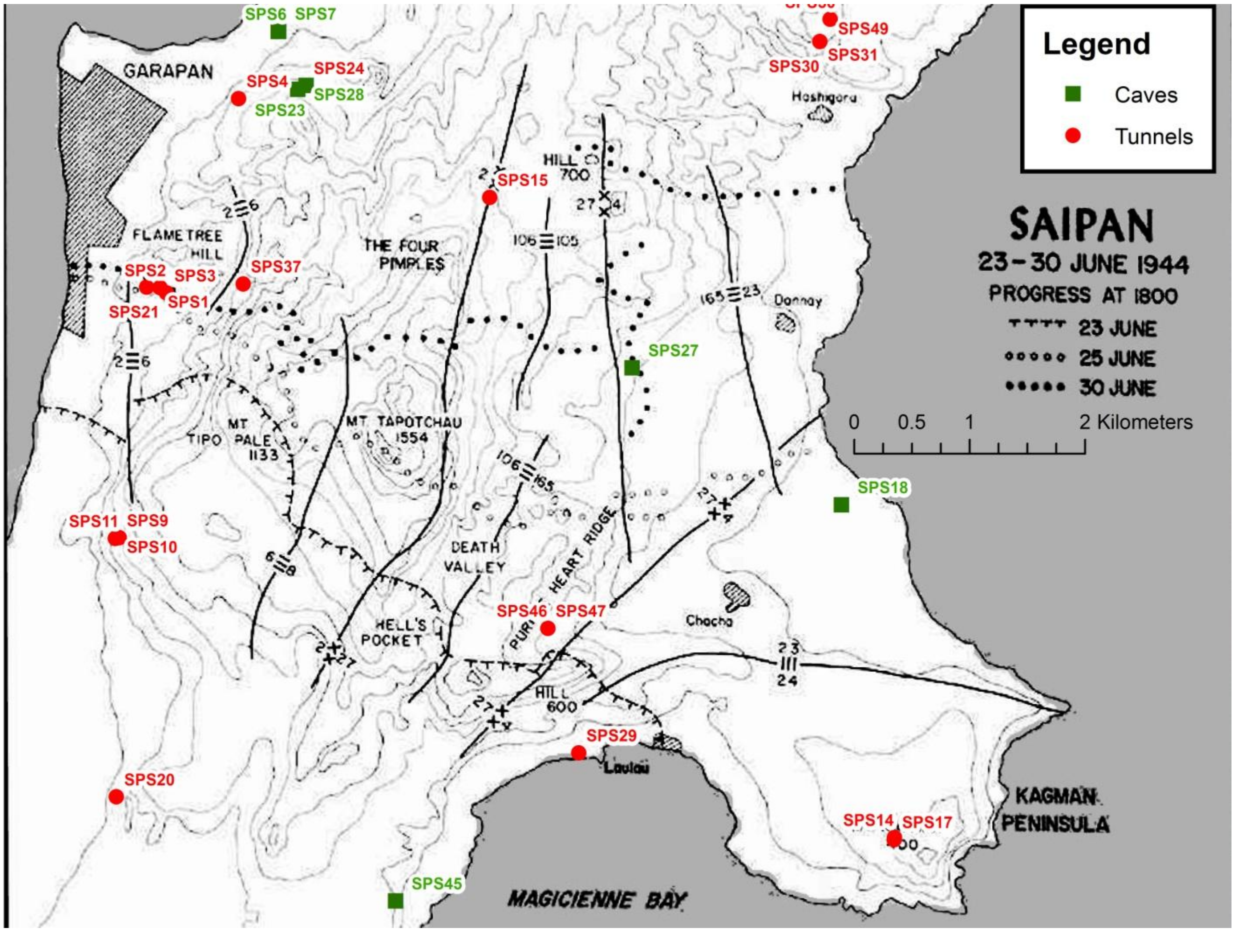

Figure 8.11: Situation map for the Battle for Saipan with karst defences from June 23 to 30, 1944.

As the U.S. moved towards Tanapag the 6th Marine Regiment was held up on July 3, 1944 (Crowl 1960:242–243; Denfeld 1997:84) by the Japanese in the area surrounding SPS4, SPS23, SPS24 and SPS28. Members of the IJA and medical staff were attacked within SPS4 by the marines with flamethrowers. The abundance of medicinal bottles within the tunnel would have exacerbated the fire and in the process killed at least one person within the tunnel. On July 4, the U.S. 23rd Marines quickly captured Hill 767 (Crowl 1960:241) and SPS42.

Sometime between July 3 and 4, the Japanese military may have used SPS8, SPS43 and SPS44 to attack the U.S. 8th Marines and 106th Infantry on the division border. Both the 2nd Marine Division and the 27th Infantry fired upon this area, hitting a portion of SPS8 and causing it to collapse. By 1420 on July 4, the U.S. marines and infantry met up at Flores Point to begin mopping up operations (Crowl 1960:241–242).

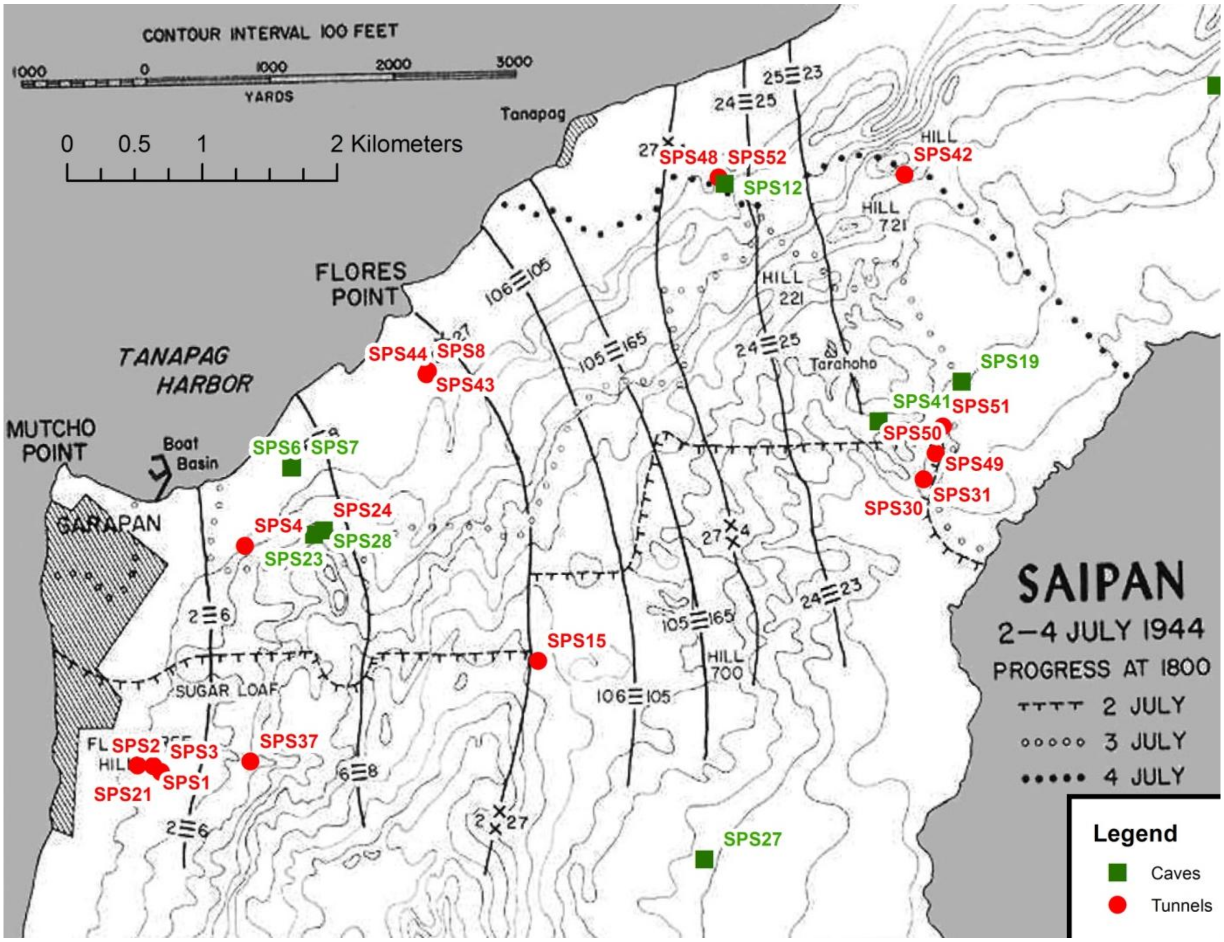

Figure 8.12: Situation map for the Battle for Saipan with karst defences from July 2 to 4, 1944.

The July 7th *gyokusai* attack in Paradise Valley sparked the beginning of the end. The *gyokusai*, or the "glorious death" of a soldier serving the emperor (Bullard 2007:v; Denfeld 1997:83), was made up of men from various units equipped with spears, bayonets tied to poles or sticks (Denfeld 1997:84, 90). The group attacked U.S. marines in the Tanapag area and approximately 2,500 to 3,000 Japanese died during the suicide attack (Denfeld 1997:92; Harries and Harries 1991:432–433). General Saito, Admiral Nagumo, Admiral Hideo Yano and General Iketa all committed suicide within their command posts by ceremonially cutting their stomachs (*seppuku*) and having aides subsequently shoot them (Denfeld 1997:87, 89; Harries and Harries 1991:432).

In the final days of the battle, Japanese military and civilians hid in the caves of northern Saipan (Denfeld 1997:92, 127). Leaflets were dropped and a loudspeaker called to any survivors to surrender. The U.S. 8th Marine Regiment attacked the caves in the northern part of Saipan where Japanese military and civilians were hiding (Crowl 1960:264). Few karst defences were left untouched. Both SPS26 and SPS36 were blasted with explosives at the entrance, causing both to partially collapse. A U.S. grenade killed at least one member of the IJN in SPS36. In SPS26 at least one member of the IJN was killed, either from U.S. attack or suicide. One entrance to SPS35 was sealed and SPS16 was also hit, leaving gaping holes in its concrete walls. The 24th Marine Regiment did not attack SPS40, but blasted SPS39 with a flamethrower on July 8th or 9th, killing at least one soldier inside. As the sites of potentially the last attempt to communicate with Japanese troops, which inevitably failed, some of the members of the Japanese military in SPS39 took part in consuming the alcohol stockpiled at this site prior to making the choice to surrender or perish.

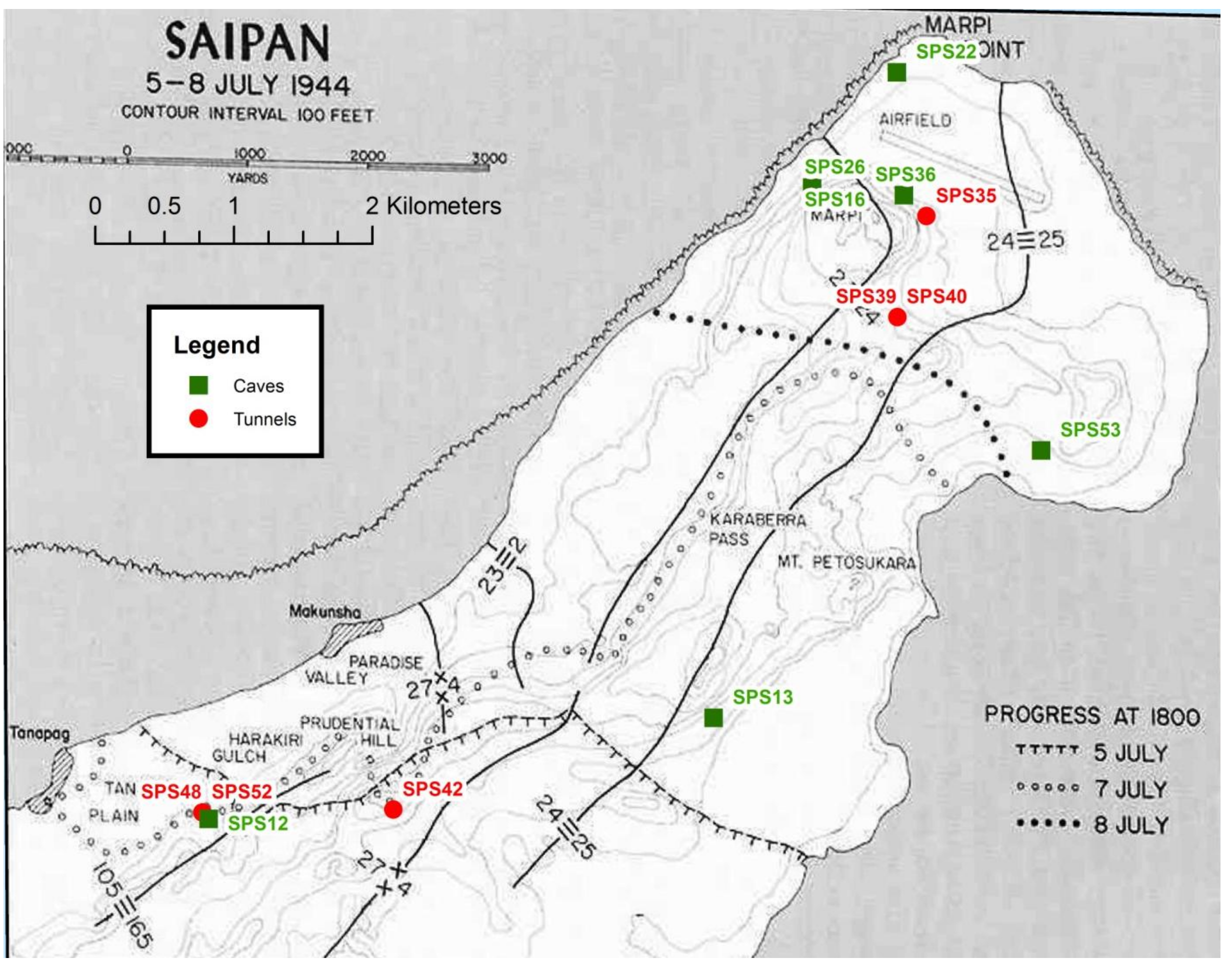

Figure 8.13: Situation map for the Battle for Saipan with karst defences from July 5 to 8, 1944.

8.4 Conclusion

As the material culture of karst defences suggests, war is not an event that suspends social processes, rather it changes them and sometimes at a rapid pace. The types of behaviours war can ilicit are varied and can be understood as more than just acts of survival and violence. A discussion of karst defences and their related artefacts and the people who occupied them, gives a broader interpretation of the battle and war in general that incorporates events before, during and after.

The artefacts at karst defences help demonstrate the diversity of war experiences. They also highlight the difficulty in pinpointing a particular emotion from material remains. There were a range of emotions during the Battle for Saipan: fear, anxiety, desperation, anger, sadness, greed, hatred, relief, awe, camaraderie and more. This chapter demonstrates how the war creates a climate with a range of emotions and how it influences behaviours.

The chapter also addressed archaeology's unique ability to reconstruct periods of micro-change during the battle for Saipan. By replaying the battle with karst defences at the forefront, we gain a better understanding of not only what happened at these sites, but a better understanding of battle behaviour on a micro and macro scale. Karst defences were a bigger part in the overall battle and affected the way the Japanese, U.S. military and civilians operated and acted. Death and how people died was a grim part of the battle. People suffered and died at karst defences and that reality is acknowledged here. The goal was to discuss the many experiences of war at karst defences, even of those who were not alive after the battle to tell it themselves.

Chapter 9 – Discussion: Japanese Defence Strategy in WWII

9.1 Introduction

In this chapter, the data on karst defences is placed within a historical discussion of the Japanese defence strategy in the Pacific during WWII. This chapter will elaborate on and clarify some of the popular historical understandings of defence in the Pacific that were introduced in Chapters 2 and 3.

9.2 Archaeology and History

Archaeological studies can contribute new knowledge to well-known histories, such as WWII. "Archaeology deals with structures and objects 'on the ground' and their spatial, chorological and chronological relationships" (Spennemann 1992:282), something historical and architectural historical studies alone do not do. The evidence on the ground can question what is taken for granted, challenge it, strengthen it, weaken it or put new twists on it altogether (Holtorf 2009:66; Spennemann 1992:282). Archaeology can thus clarify popular understandings of war or introduce elements not considered in historical accounts (Banks and Pollard 2011:131; Pollard 2014:196). This, in turn, conveys the diversity of war experiences and helps establish a multi-vocal and more inclusive history (Harrison and Schofield 2010:13–14).

According to Spennemann (1992:283) the WWII story in the Pacific needs to be more balanced. Official war histories are broad and general, while unit histories are particularistic and anecdotal. In between are the biographies and autobiographies of combatants and victims (Spennemann 1992:283). Historical accounts of the Battle for Saipan are also biased. Although there are Islander and Japanese accounts of the war, the story is primarily and repeatedly told from a U.S. point-of-view. Bulgrin (2005:14) explains that Japanese defence in Saipan in particular is only partially understood

By taking a closer look at caves and tunnels in Saipan, this project helps fill the Japanese WWII defence knowledge gap and furthers the understanding of how both the Japanese military and civilians approached the issue of defence in the Pacific. As a result, this research contributes to developing a more comprehensive WWII story in the Pacific.

9.3 The Switch from Offence to Defence

A chain of events, including the first U.S. defensive move against Japan during the Doolittle Raid in April 1942, the Battle of the Coral Sea in May 1942 and the Battle of Midway in June 1942, contributed to a change in Japanese strategy from offence to defence. In September 1943 the Japanese high command initiated the Absolute National Defence Sphere policy which placed defence at the forefront. Japanese strategy changed a second time after the fall of Saipan in July 1944. Some scholars suggest that July 1944 marks the beginning of extensive karst defence construction which became part of a new Japanese defence manual dated September 1944 (Denfeld 1988:9), but which had been employed independently on other islands prior to September.

Karst defences, however, should not be thought of in relation to the changing Japanese strategy or as a type of construction that only existed after a certain period of time, but rather as something that became more important, and more intensively constructed, as the war progressed. Other sources of information, including archaeological studies, war period documents, travel guides, newspapers, personal blogs and YouTube channels, show that karst defences were more ubiquitous than what has been reported in historical accounts. Karst defences are found in various regions of the Pacific including Papua New Guinea, within the South China Karst and on both atoll and high islands (Table 33). Karst defence construction is present in at least 27 different areas in the Pacific. Furthermore, the U.S. encountered karst defences in at least 13 locations in the Pacific before the U.S. invaded Saipan.

As demonstrated in Table 33, the number of karst defences in a particular place is not dictated by the size of an area, but rather surface area. In other words, if a karst landscape exists, then karst defences can be built, regardless of land size. Peleliu, for example, known to have some of the most extensive karst defences, is only 13km^2. U.S. veteran O.P. Smith describes karst defences in Peleliu:

> There were actually two Peleliús after the first two weeks of the battle. One Peleliu was the flat ground we had captured on the southern third of the island. There we went about the job, all but unmolested, we'd been sent to do-seize the airstrip, and bring in our men and planes so that the Japanese couldn't use the island to interfere with Macarthur's operations in the Philippines. The other Peleliu began at Bloody Nose Ridge…. This was a brutally different extra-inning ball game, one where the score was kept in the number of ridges taken and how many Marines were killed or wounded in the seemingly endless process (Wright 2002:290).

Similarly, Dublon Island on Truk Lagoon has over 20 gun caves and is only 8.8km^2. The reason that high islands have more karst defences than atolls is due to their greater surface area and more rugged terrain. Karst defences can be present at different levels and throughout the rough peaks and valleys of high islands, enabling mutually supporting defences. Low-lying atolls do not have the same terrain to enable the same extensive karst defence construction.

Table 33: Known Locations and Characteristics of Karst Defences in the Pacific in Order of Allied Invasion

Location	Type of Land Mass	Size	Date of Japanese Occupation/Date of U.S. Invasion	Characteristics of Karst Defences
Tulagi, Solomon Islands	High Island	5.5km^2	May 1942/August 1942	Hastily prepared, but numerous (Miller 2008:50, 63, 65; Miller 1949:62–63, 65; Petchey 2015:33; Rottman 2003:7).
Gavutu, Solomon Islands	High Island	0.09km^2	May 1942/August 1942	Hastily prepared, but numerous (Miller 2008:50, 63, 65; Miller 1949:62–63, 65; Petchey 2015:33; Rottman 2003:7).
Buna, New Guinea	Continental Papua New Guinea	462,840km^2	July 1942/November 1942	A maze of Japanese tunnel positions at Buna (Military Intelligence Division 1944:40; Milner 1989:193).
Salamaua, New Guinea	Continental Papua New Guinea	462,840km^2	March 1942/April 1943	Salamaua airfield had tunnels (Miller 1959:201).
New Georgia, Solomon Islands	High Island	2,037km^2	January 1942/June 1943	Caves at Kokengolo Hill were stocked with rice, bales of clothing, blankets and occupation currency (Miller 1959:164–165).
Rabaul, Solomon Islands	High Island	36,520km^2	January 1942/never invaded	A total of 563km (350 miles) of tunnels and caves (Miller 1959:312). "Countless" Japanese tunnels on the road from Kokopo to Rabaul including Karavia Bay tunnels used as hospitals and modified with cut-out stairs (McKinnon et al. 2008:218; Watkins 2012). Barge tunnels present (McKinnon et al. 2008:218; Petchey 2015:44) and modified with concrete floors and walls (Watkins 2012).
Watom Island, Solomon Islands	High Island	12.6km^2	January 1942/never invaded	Dozens of karst defence sites, primarily gun positions, but crudely constructed (Petchey 2015; Peter Petchey pers. comm. 2017).
Betio Island, Tarawa Atoll, Gilbert Islands	Atoll	1.5km^2	December 1941/November 1943	Tarawa had a system of ditches and tunnels (Morton 1962:573).
Makin Atoll (Butaritari), Gilbert Islands	Atoll	13.49km^2	December 1941/November 1943	A tunnel at kings wharf connected a reinforced pit to a pillbox with a gun at one end (Crowl and Love 1955:99–100).

Roi-Namur, Kwajalein Atoll, Marshall Islands	Atoll	2.5km^2	September 1914/February 1944	Karst defences present (Crowl and Love 1955:320).
Eniwetok Atoll (including Parry Island), Marshall Islands	Atoll	5.85km^2	September 1914/February 1944	Karst defences present (Crowl and Love 1955:341, 348). Parry Island was honey-combed with tunnels (Rottman 2003:89).
Biak Island, Papua	High Island	2,455km^2	April 1942/May 1944	Karst defences present (Data and Kovitz 2012). Small caves riddled along ridges and some begin as sinkholes (Rottman 2003:71, 77).
Wakde Island, Papua	High Island	3km^2	April 1942/May 1944	Widespread use of caves (Rottman 2003:86).
Yunnan Province, China	Mainland China	550,000km^2	May 1942/May 1944	Caves at Mount Laifeng in Tengchong within the South China Karst (Na 2015; Winston 2015).
Truk (Moen, Dublon, Eten, Fefan, Uman, Eot, Udot, Param and Tol)	High Islands	Moen: 18.7km^2, Dublon: 8.8km^2, Eten: 0.5km^2, Fefan: 13.2km^2, Uman: 4.7km^2 , Eot: 0.49km^2, Udot: 4.93km^2, Tol: 34.2km^2	October 1914/never invaded	Extensive karst defence construction with various modifications (U.S. Pacific Fleet and Pacific Ocean Areas 1946).
Saipan	High Island	115km^2	October 1914/June 1944	See Chapter 5.
Guam	High Island	550km^2	December 1941/July 1944	Hundreds of caves with only a few tunnels primarily for command and communication and some modified with concrete (Taboroši and Jenson 2002).
Tinian	High Island	102km^2	October 1914/July 1944	Many caves, few tunnels (Moore and Hunter-Anderson 1987; OEESC Inc. 2001; Putzi et al. 1997).
Rota	High Island	85.38km^2	October 1914/never invaded	Numerous karst defences including four tunnel complexes with various modifications (Mohlman 2011; Moore and Hunter-Anderson 1988).
Pagan	High Island	47.23km^2	October 1914/never invaded	One tunnel that held around 200 drum of gasoline (Shin'ichi 2000:88).
Peleliu	High Island	13km^2	October 1914/September	Considered to have the most extensive karst defences in the Pacific (Gayle 1996:10).

			1944	
Angaur	High Island	$8km^2$	October 1914/September 1944	Widespread use of caves (Rottman 2003:86).
Philippines (including surrounding islands)	High Islands	$300,000km^2$	December 1941/October 1944	Many karst defence in Bataan (Fabian 2014), Leyte, Valencia, honey-combed on Lone Tree Hill in present-day La Union (some 15m long and 12m wide), Manila, Visayas, Visayan Island, Caballo Island, Baguio and Pangasinan (Cannon 1954:104–353; Smith 1953:265–607). Note, the U.S. encountered karst defences in the Philippines in 1942 during the Japanese invasion of the Philippines (Morton 1953:311, 339).
Taiwan	High Island	$36,193km^2$	April 1895/never invaded	Karst defences present (Fukudome 1986:350; Keeling 2011:351).
Hong Kong	High Island	$1,104km^2$	December 1941/never invaded	Karst defences present (Anonymous 2014; David 2008).
Iwo Jima	High Island	$23.73km^2$	1600s/February 1945	More than 1.6km (16 miles) of passageways and some tunnels were three stories underground (Smith 2008:1).
Okinawa	High Island	$1,207km^2$	1879/April 1945	"[I]nnumerable caves" (U.S. Tenth Army 1945:21).

Table 33 also reveals that karst defence construction had occurred throughout the Pacific, but accelerated after the fall of Saipan. The earliest U.S. encounter with karst defences was in the Philippines in January 1942. The number of karst defences in the Philippines and how they were constructed, however, is unknown, since no archaeological work has been conducted. The U.S. continued to combat fortified caves and tunnels, but they appear to be more abundant later in the war. Locations with major karst defence construction were first encountered by the U.S. in February 1944 in the Marshall Islands and construction occurred more intensely and extensively on islands after the fall of Saipan, particularly on Peleliu, Iwo Jima and Okinawa. Compared to Saipan, these islands have more tunnels, longer tunnels and tunnels with more legs. According to U.S. Intelligence Staff, karst defences on Iwo Jima were so numerous that it was impossible for them to plot all of the sites on a 1:10,000 scale map (CINCPAC-CINCPOA Bulletin No. 136-45 1945:2). One particular communication and command post in Iwo Jima had 14 entrances and was 730m long (CINCPAC-CINCPOA Bulletin No. 136-45 1945:4, 25). Other tunnels had multiple storeys and were sunk deep underground (Figure 9.1). Karst defences in Okinawa were often excavated straight through hills, were almost always mutually supporting and were constructed at the bottom, middle and summit of the same hill (Dissemination Division G-2 Section 1945a:1; U.S. Tenth Army 1945:21, 38). Peleliu had hundreds of karst defences. Some tunnels were over 90m long (Phelan 1945:2, 7) and others were five and six storeys deep (Miller 2008:169). None of the tunnels surveyed in Saipan were over 80m in length, extended straight through a hill or were constructed several storeys deep.

Figure 9.1: Two-storey tunnel in Iwo Jima (CINCPAC-CINCPOA Bulletin No. 136-45 1945:25).

Rota, however, is the exception in terms of the discussion above. Despite having a small military garrison estimated to be between 3,000 and 4,000 men (Mohlman 2011:27), compared to Saipan, Tinian and Guam, Rota has an abundance of karst defences. Rota's sites are divided into four complexes that include a number of WWII features, including large numbers of caves and tunnels in close proximity. The four complexes are Chudang Palii, Ginalangan, Sayan

Gigani and the southeastern portion of Rota (Figure 9.2). Amongst the trenches, rock walls and terraces of the Chudang Palii complex there are 34 tunnels and 14 caves within a 32-hectare area (Mohlman 2011:2, 47; Swift et al. 1992:62). The Ginalangan complex contains 36 tunnels and a number of overhangs and enclosures adding up to 400 linear metres of karst defences stretching across a 1.5km area (Moore and Hunter-Anderson 1988:33, 36, 124). A survey of the Sayan Gigani complex identified 42 tunnel openings (whether these openings are connected is not known) and various fortified cave complexes (Craib 1989:40–41). Finally, the southeastern complex consists of 24 caves, a number of them modified (Butler 1997:184–234). Rota has roughly the same number of karst defences as Truk, but Truk was a major naval base with 24,061 IJN and 14,299 IJA personnel (U.S. Pacific Fleet and Pacific Ocean Areas 1946:6).

The reason why Rota has so many tunnels is because it was never invaded. After the U.S. invaded Saipan, Tinian and Guam, the Japanese on Rota likely anticipated an invasion. If karst defence construction accelerated after the fall of Saipan, the troops on Rota were presumably following orders to continue constructing karst defences.

This information suggests that karst defences were a part of the Japanese strategy as early as January 1942 in the Philippines and larger and more complicated karst defences were constructed after the Marianas Campaign which began in June 1944 and ended two months later. After the fall of Saipan, the Japanese were running short on men and supplies, but knew, from battles on other islands and in Saipan's Hell's Pocket, that tunnel warfare wreaked havoc on the U.S. troops who found it difficult to find and destroy karst defences. Construction was likely accelerated after the Battle for Saipan as the Japanese found they could inflict more damage to the U.S. troops from these positions and possibly force a war of attrition.

If karst defences were part of a Japanese defence manual, it either existed prior to the construction of defences on Saipan or Saipan's karst defences were the prototypes. The almost exact size and function of SPS11 in Saipan and army W-tunnels in Peleliu, and the similarities in other types suggests either that Peleliu's tunnels were based on Saipan's designs. Both may be based on another island with karst defences constructed earlier. While the archaeological study of Truk Lagoon's karst defences is comprehensive, not enough construction details have been published to determine the similarities between those on Truk and those on Saipan. More research comparing Saipan's karst defences and those on other islands where battle occurred before June 1944 would present a better timeline of when any Japanese karst defence manual may have existed.

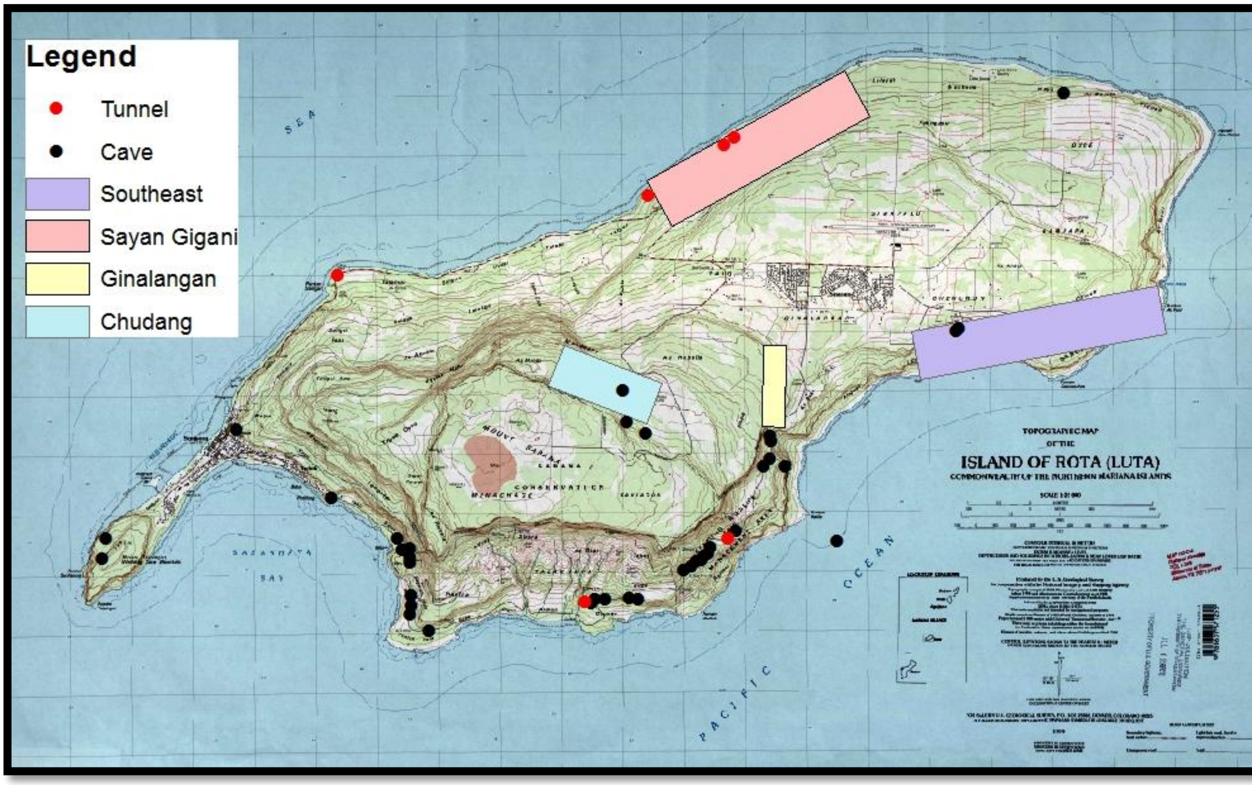

Figure 9.2: Rota's karst defences and karst defence complexes.

9.4 Beaches First Strategy

In September 1944, the U.S. reported on the Japanese tactics for defending islands. Described as the "beaches first strategy" (War Department 1944a:128), Japanese efforts would focus on constructing heavy coastal defences to stop the U.S. before they could establish a beachhead and move inland. Once the U.S. moved inland, they would be confronted with in-depth defences such as karst defences, which would be defended to the death (Denfeld 1988:9).

Research on karst defences suggests that a beaches first strategy was not employed uniformly across all of the Japanese islands and that inland defences remained important throughout the Pacific War. As described in Chapter 2, several U.S. official histories refer to inland defences featuring more prominently than coastal ones on other islands in the Pacific including Tulagi, Guadalcanal and Makin. The ease with which the U.S. took islands changed at Tarawa in November 1943, around the time the Japanese called for the Absolute National

Defence Sphere. The Japanese bombarded the U.S. heavily as they approached the landing beaches and Tarawa was allegedly the first well-fortified shoreline (Crowl and Love 1955:132, 158).

The beaches first strategy was not used substantially prior to 1943. Like karst defences, coastal defences begin to appear more prominently as the war moved closer to the Japanese mainland. After several defeats in 1942, Japan lost the ability to force a decisive naval battle and needed to move towards defending individual islands. The increase in coastal defences is a result of the new focus on defence as advocated for in the Absolute National Defence Sphere policy. As the U.S. continued to invade islands despite coastal defences, the Japanese increased karst defence construction. Increasing karst defences can thus be understood as a result of failing initial defence efforts on individual islands and more desperate attempts to weaken the U.S. and delay a Japanese surrender. The acceleration of all types of defences reflects the Japanese crisis level during the Pacific War.

9.5 Hasty Defences

Another popular understanding of Japanese strategy and preparation in the Pacific, particularly in the Marianas, is that the Japanese suffered from a lack of supplies and were rushed in constructing fortifications. This is attributed to the destruction of Japanese supply ships by U.S. submarines between March and June 1944. Archaeologists have further perpetuated this belief by attributing the use of stacked limestone to limited supplies and arguing that concrete is evidence of construction before Japanese supply ships were destroyed (Eakin et al. 2012:131–132; Mohlman 2011:165–167).

Historians, however, have addressed the overall struggle to defend and prepare the entire Pacific after heavy losses in 1942. Denfeld (1981b:5) explains that the entire Pacific suffered from inadequate defences. Unfinished defences have been described in many places, including Tulagi and Gavutu in the Solomon Islands (Petchey 2015:33), Kwajalein (Denfeld 1981b:5), Watom Island (Petchey 2015:47) and Iwo Jima (CINCPAC-CINCPOA Bulletin No. 136-45 1945:2). There were also unfinished defences in Peleliu. For example, in one of the tunnels in Peleliu, Phelan (1945:38) found an incomplete octagonal gun support framework. While the presence of displaced guns and unfinished airfields in Saipan do attest to an inability to construct defences on time, unfinished or hasty defences should be considered a problem that plagued the Japanese throughout the Pacific and not one that only affected those in the Marianas.

In terms of lack of supplies in the Marianas, the research carried out for this thesis, indicates that, when taking karst defences into consideration, both concrete and local materials were important and served specific purposes based on how the site was to function and military preference. The use of concrete and local materials should also be considered within the context of the IJN and IJA relationship, as demonstrated in Saipan's and Peleliu's karst defences. Similar defence scenarios existed on both Saipan and Peleliu. Peleliu's navy tunnels were larger, had more legs and were constructed with more concrete than the IJA's even though the IJA garrison was larger (4,000 IJA to 6,900 IJN) (Price and Knecht 2012:7). Also, like Saipan, the IJN arrived to Peleliu much earlier than the IJA. In Peleliu, the IJN's 4th Fleet gathered in Palau in 1940 (Higuchi 2013:43), but the IJA did not arrive until April 1944 (Price and Knecht 2012:7). Even though Peleliu had more karst defences, both Saipan and Peleliu had similar karst defence types and modifications and both had unfinished defences, but Peleliu never suffered the loss of merchant ships.

Perhaps the issue of material shortages in the Marianas has been slightly overstated in historical accounts. While the Marianas certainly were hindered in some way by the loss of merchant ships in 1944, concrete does not appear to be part of that loss as both the IJN and IJA had access to it in Saipan. Furthermore, Rota, which would have suffered the same losses as Saipan, seemed to have sufficient supplies, as the Japanese continued fortifying the island after Saipan fell. However, while there are many karst defences in Rota, exactly how they are modified and how closely they resemble those in Saipan is unknown. Saipan also appears to have been better defended than other islands that did not suffer any losses (e.g. Watom Island), but more archaeological studies of karst defences and modifications on other areas of the Pacific would give a better understanding of exactly how the loss of supply ships affected Saipan and the Japanese strategy overall.

9.6 Violating Article 4 of the Japanese Mandate

The karst defences recorded for this project cannot be dated to a time earlier than 1935, and therefore cannot help to determine whether the Japanese ignored their non-fortification clause while still under the Japanese Mandate. With enough supplies and labour, karst defence construction would have been relatively rapid. For example, according to aerial photography, the vast amount of karst defences on Iwo Jima was constructed within the three months between June and September 1944 (CINCPAC-CINCPOA Bulletin No. 136-45 1945:2). Antonio Borja, a native Tinian merchant marine, was conscripted into the Japanese army at Rota and forced to dig tunnels for cannons. Borja remembers the work schedule was from seven in the morning until midnight, six days a week for 18 months (Petty 2002:62–63). The karst defences in the Philippines only took one month to construct (Morton 1953:311, 339). While obviously a greater number of karst defences would take longer to construct, if the sites on Iwo Jima only took three months, then all karst defences in the Pacific could have been built after the bombing of Pearl Harbour in 1941 and so cannot be used to suggest that the Japanese disobeyed the non-fortification clause of the Class C mandate.

The present research also indicates that some of Saipan's tunnels may have originally been mining tunnels (Denfeld 1988:37). The Japanese increased mining production throughout the Pacific in the mid- to late-1930s for various materials, including mica in Sulawesi in the Dutch East Indies (Aragon 1996), manganese, bauxite and phosphate in Saipan (Bowers 2001:214–215; Cloud Jr. et al. 1956:119, 122) and phosphate in Peleliu (Knecht et al. 2012:134) and Rota (Bowers 2001:212). Such materials, however, were mined in different ways. Mining tunnels or adits are associated with manganese and mica mining, while phosphate is mined in open pits (Cloud Jr. et al. 1956:120). Therefore, the tunnels in Peleliu were likely not mining tunnels. According to archaeologists Rick Knecht and Neil Price, while some of the tunnels in Peleliu may have been linked to phosphate mining at some point during the pre-war period, there is no evidence that the Peleliu tunnels were mines in their own right (Rick Knecht and Neil Price pers. comm. 2017).

In Saipan, mining took place in 1939 (Cloud Jr. et al. 1956:119). So even if some of the tunnels were originally manganese mining adits, they would have been constructed no earlier than 1939, after the Japanese left the League of Nations.

9.7 Civilian Defence and Varied Experiences

While the war was not theirs, "Micronesians must be seen as active participants in the Pacific conflict" (Poyer et al. 2001:8). Indeed, civilians from many ethnic backgrounds participated in the Pacific War, including Chamorro, Carolinian, Korean, Japanese and Okinawan people

(McKinnon 2015c:2; Price and Knecht 2013:193). Even though some scholars and those on Saipan believe that WWII is not their heritage, this research shows that civilians played a major role during the war. Civilians in Saipan participated in the Pacific War in a variety of ways, as labourers, soldiers, military police and interpreters and were not passive bystanders.

Research into WWII cave life demonstrates another way Micronesian and Asian civilians participated in WWII and the varied civilian experiences of war across the Pacific. Civilians made concerted efforts to defend themselves during the war. The preparation of caves for protection appears to have occurred on many islands across the Pacific, but not all. Civilians on Saipan would have experienced cave life differently to those on other islands. Civilians on Truk Lagoon, for example, would have experienced cave life for a much longer duration. On bypassed islands like Truk, people did not get the relief from war granted by U.S. invasion and occupation (Poyer 2004:141–142). Rather, the struggle to protect oneself against U.S. bombing, while supplies dwindled, continued until the Japanese surrendered in 1945. Others, such as those on Peleliu had no cave life as they were evacuated to Babelthuap, another island in Palau, before the battle broke out (Poyer et al. 2001:369). Civilians on Iwo Jima were also evacuated in 1944 (Smith 2008:xviii).

9.8 Conclusion

Archaeology's connections to and ability to add details to history are valuable. Historical in nature, this chapter takes data gathered at Saipan's karst defences and other sites across the Pacific to analyse popular narratives of Japanese defence during WWII in the Pacific. By taking more than coastal defences and airfields into account when determining the preparation of Japanese troops, this chapter gives a more comprehensive version of Japanese and civilian war preparation, by introducing a timeline for karst defence construction and discussing the influences on karst defence design.

Chapter 10 – Contemporary Meanings

10.1 Introduction

Karst defences have many stakeholders, including both local groups and those living overseas. The various ways different groups of people relate to karst defence sites emerged during participant interviews, fieldwork observations and conversations with property owners, volunteers and locals. This chapter discusses the contemporary significance of karst defences to various communities and its many nuances.

10.2 Dark Heritage in the Pacific

Heritage places define our lives, provide emotional anchors and present people with certainties and familiarities, which in turn provide assurances and reassurances (Schofield 2015:208; Spennemann 1999:746). Modern conflict is particularly significant to many people. WWII was a total war that involved entire populations (Schofield 2004:2). Few were unaffected by WWII and it has shaped the modern world (Denfeld 2011:319; Schofield 2004:2). As archaeologists, we help create the heritage that people consume by uncovering the material traces of the past and constructing narratives around them (Schofield 2015:208; Turnbridge and Ashworth 1996:8).

Not everyone consumes heritage as their own. Heritage associated with atrocity is especially sensitive and can cause dissonance or be rejected outright. Karst defences as heritage places have been rejected by some during the course of this research. In an interview with the late Rosa Castro, she explained that the war was traumatising for her and although she did not lose any family members, at the time she and her family believed that they were going to die (Rosa Castro pers. comm. 2014). To Castro, the study of WWII karst defences is a sad study. Castro told the author that she felt sorry for her, because the author came a long way to study and learn something that is bad (Rosa Castro pers. comm. 2014). During the interview Castro was indifferent to the significance of karst defences. She had no opinion on whether the sites should be preserved or whether the study had any value. A way of distancing herself from memories of WWII, she told the author that whenever she hears or talks about WWII caves, she will remember the author's face.

Even though karst defences are associated with death and tragedy, which is still within living memory, it does not mean archaeologists should avoid interpreting the sites for fear of evoking dissonance or adverse reactions. Rather, archaeologists need to be aware of the social, political and economic issues that may arise when presenting and representing dark heritage places.

10.3 Indigenous Community

As mentioned previously, several researchers have found that Pacific Islanders do not consider WWII heritage as “their heritage” (Jeffery 2006:153; King 2006:508; McKinnon 2014:180; Sayers and Spennemann 2006:397; Spennemann 2006a:16). Studies and questionnaires administered to locals and Micronesian decision-makers also suggest that WWII heritage is not important in terms of Micronesian identity (Sayers and Spennemann 2006:396–397; Spennemann et al. 2001:16–18). However, the above, as others have pointed out, focuses on the tangible heritage of WWII which is mostly related to the U.S. or Japanese military, rather than the intangible elements of heritage valued by Micronesians (Jeffery 2006:153; King 2006:511; King 2008:33–34; McKinnon 2015c:4–6).

In actuality, karst defences as a form of tangible heritage do matter to Indigenous groups in Saipan because they represent what Indigenous people had to endure during the battle. Jeffery (2007:252) also found this when comparing underwater and terrestrial WWII sites in Chuuk (Truk Lagoon). In the words of Eugenio Borja, karst defences are “souvenirs” for the locals and should be preserved (Eugenio Borja pers. comm. 2014). To many, karst defences were a place for survival because they offered protection during the war. Caves in Saipan are significant to Juan Camacho, as in order to protect him from gun fire and bombing, he was left in a cave as a baby and U.S. troops needed to go in and retrieve him after the battle (Juan Camacho pers. comm. 2014). Many descendants of people who hid inside caves have a deep connection to karst defences as they represent the courage of their family members and the sacrifices they made to survive. The interpretive centre at AMP recognises the importance of caves for civilian survival and has a cave exhibit with oral histories and audio of people whispering within a cave to depict civilian battle experiences (Figure 10.1).

Some people in Saipan practice a form of cognitive ownership (Boyd et al. 1996) of the tangible heritage of WWII karst defences, especially of personal artefacts like identity tags or the human remains found inside them. During fieldwork, several people showed or told the author about artefacts they had in their possession. In general, they justify taking the artefacts because if they do not take them “someone else will.” When taking identity tags, one particular person felt like he or she was "taking the soldiers around with them." The act of piling and hiding human remains is also an example of this type of ownership. Four sites recorded during this project had human remains gathered and placed in a protected space, like a crevice in the wall or on an elevated portion of the floor out of the way of foot traffic. In essence, most local people believed they were better guardians of these types of remains than those legally mandated to do it.

Figure 10.1: AMP exhibit on civilian cave use in Saipan during WWII.

Indigenous groups want to preserve WWII history and "correct the imbalance that makes islands nearly invisible" in accounts of the Pacific War (Poyer et al. 2001:337). Some believe that research on caves and tunnels is an important part of understanding WWII, and a study of WWII is valuable as many older people are passing away and their knowledge will be lost (Joe Wabol pers. comm. 2014). Elders think that such research is worthwhile and what is often expressed over and over by local Indigenous people is that most research is important as long as it is available for the next generation to read about (Jesus Sablan pers. comm. 2014). No doubt for some the WWII aspect of caves and tunnels are a part of "a heritage that hurts" (Little and

Shackel 2014:43). The war was an unspeakable horror for many Micronesians and approximately one-fifth of the Indigenous population was killed in an unwanted fight between two groups of outsiders on their land (Cabrera 2005:3; Spoehr 2000:60). Like Castro, many local Indigenous people involved in WWII would prefer to forget about it (Micronesian Area Research Center 1981a:42).

What matters to Indigenous groups in Saipan with respect to caves is multi-layered and relates to cave use over time. Indigenous groups also have a connection to caves because they exhibit prehistoric use. A number of caves contain rock art and other artefacts related to occupation and ritual, including bone tools, pottery sherds, shell adzes, sling stones and grinding stones (Cabrera and Tudela 2006). Often Japanese troops would clear out caves prior to use, and as a result many prehistoric artefacts are regularly found along the perimeter or outside of caves (McKinnon et al. 2014b:58).

Related to prehistoric use and a belief which has been maintained to the present day, many Indigenous people relate caves to the lives of *taotaomo'na*. *Taotaomo'na* are ancestral spirits, or the people of before, who inhabit the Earth along with the living (Cunningham 1992:104–105; Guampedia 2014). Spirits provide both daily protection and assistance with tasks, but some are also malicious and create dangers and problems, especially if one behaves disrespectfully (Cunningham 1992:104–105). Spirits can appear as animals or headless humans and evil spirits are said to inhabit the jungle and caves (Cunningham 1992:104–106). Malevolent spirits can cause sickness or even death (Cunningham 1992:105; Flood 2001:170; Guampedia 2014). Three different people warned the author about encountering *taotaomo'na* in the jungle during fieldwork and one described the death of two researchers after studying caves in Saipan. Often people would ask, "aren't you afraid?" and "aren't you afraid of getting sick?" According to one story, a researcher from the U.S. mainland relieved him or herself in the jungle while studying within SPS13, Kalabera Cave. Once the researcher went home, he or she fell ill and died. The reason was because of *taotaomo'na,* possibly because they did not conduct themselves properly or because they did not ask permission to relieve themselves in the jungle (Juan Reyes pers. comm. 2014). A way of showing respect to the ancestors is to request permission to enter *taotaomo'na* land or to relieve oneself by reciting the following (Cunningham 1992:106; Fred Camacho pers. comm. 2014):

> *Guela yan Guelu, sedi yu' ya bai hu faloffan guini gi lugåt miyu ya dispensa yu' kumu man'estototba yu'. Esgaihun yu' gi hinanauhu yan na' libri yu' gjnin håfa na dåñu hu fakcha'i mo'na. Si Yu'us Ma'åsi'!*
>
> (Ancestral Grandmother and Grandfather, permit me to pass through your lands and waters and pardon my transgressions. Guide me on my journey and shield me from any harm that may come upon me. In humble gratitude I ask this of you) (Genevieve Cabrera pers. comm. 2017).

Not everyone believes in the continued presence of spirits. Eugenio Borja explained that during the war the spirits left the caves so now they are no longer there (Eugenio Borja pers. comm. 2014).

Today, caves are also local hunting grounds for coconut crabs. Sometimes weighing over 2kg, coconut crabs are large hermit crabs that exist across the western Pacific (Amesbury 1980:1; Buden 2012:314). They burrow into the porous limestone substrate within caves and feed on coconut, decaying wood, snails and the exoskeletons of insects and anthropods (Amesbury 1980:1, 16). Coconut crabs are a highly sought after food item and are trapped or lured into caves at night. Coconut crab traps consist of an unhusked coconut with a rectangular cut in its side that exposes the flesh. Sometimes other food items are placed within the opening to attract crabs. The coconut is tied to a tree or other stable feature so the crab cannot carry the coconut away. At night, trappers return to collect the crabs feeding on the trap. At least ten sites recorded for this project had coconut crab traps inside. Other wild animals and livestock also regularly use caves and tunnels to rest or shelter in.

10.4 Non-Indigenous Groups

10.4.1 Asian Non-Residents

What typically most concerns Japanese and other Asian non-residents about WWII in the Pacific is the loss of lives and that the remains are scattered throughout the Asia-Pacific (Trefalt 2017:147). Asian non-residents access karst defences and other WWII heritage in Saipan in order to memorialise and commemorate those who passed. This is evident in the objects that visitors leave behind. Within karst defences Asian tourists often erect small monuments, including stupas and statues, hang paper crane wreaths, burn incense and candles and leave beverage offerings to those who have passed (McKinnon 2015b:148–151) (Figure 10.2). One such cave is SPS64, a small 2m high cave at the Lao Lao Bay golf course (discussed in Chapter 8) (Figure 10.3). At the entrance are Japanese offerings and flowers and a grave stone with the inscription "Suzuki" in order to commemorate the family who died in the cave (McKinnon et al. 2014b:98). Such commemoration also exists in underwater environments (McKinnon 2015a). Interestingly, while caves, tunnels and sites in the lagoon where people lost their lives are frequently visited, McKinnon (2015b:152) points out that in underwater contexts, some Japanese tourists refuse to dive on sites near the cliffs in northern Saipan because of the "souls" left behind in the water.

Visitation and commemoration by Asian non-residents has also occurred on a larger scale. Since the 1970s, the Japanese government has arranged pilgrimages to Saipan and other former battlefields and provided memorial services for war-bereaved survivors (Akira 2013:45; McKinnon et al. 2014b:69). Additionally, the Japanese government and NGOs have erected a number of monuments at past battlefields as part of the Erection of Monuments to the War Dead mission (Akira 2013:44; McKinnon et al. 2014b:69; Trefalt 2017:150). Other private and religious groups have arranged the same (Akira 2013:45).

The Japanese focus on commemoration is largely due to the way Japan understands their role in WWII. Many argue that Japan has never come to terms with this or taken responsibility for its transgressions and continues to portray itself as the victim of the atom bomb (Buruma 1995:201; Chang 2011; Chung 1995:11; Hasegawa 2005:302). Some of the Japanese wrongdoings during the war include the treatment of Chinese people in Nanking, the induction and coercion of comfort women and the deadly human experimentation conducted by the IJA's Unit 731 (Aso 2004:6, 173; Chang 2011:4–6, 164; Drea 2009:197; Hickey et al. 2016:1–2; Segel 1998). Additionally, the treatment of POWs and use of slave labour have reflected poorly on the Japanese (Harries and Harries 1991:315; Miller 2008:25; Peck 1988:6; Seldan 2004:28). Many high-ranking, Japanese wartime officials were never brought to trial for misdeeds and lived long and successful lives (Chang 2011:176, 182). The historical evidence of aggression and atrocity has been downplayed or eliminated from Japanese schools and textbooks (Chang 2011:205–207; Chirot et al. 2014:8) and some ultra-conservative Japanese commentators and politicians outright deny war crimes or insist stories were exaggerated to embarrass the Japanese people (Chang 2011:200–201; Drea 2006:5). The heedlessness towards Japan's wrongdoings is reflected in the lack of WWII public presence. Film, art and literature produced during the war period are not publicised and there is no public effort to preserve, accumulate or reconstruct the war from an historical perspective (Cook and Cook 1992:10–11). Furthermore, there are no national war museums, rather "peace museums" and small shrines, such as the Yasukuni Shrine which holds memorabilia and the ashes of war leaders, with a focus on retaining peace (Chang 2011:203; Cook and Cook 1992:11; Harries and Harries 1991:486). In light of this, the reverence towards Japanese soldiers may be the reason why Japanese tourists are open to visiting sites in Saipan once occupied by soldiers, such as karst defences and the lagoon, but reluctant to visit sites of mass civilian suicide, such as the waters below Saipan's northern cliffs.

Figure 10.2: Flowers and water offering within SPS29 (1m scale) (courtesy of John Fraser).

Another form of large scale honouring of the dead by Japan includes bone collecting missions and repatriation. In an effort to finalise the war (Jeffery 2007:251) the Japanese government initiated the collection of Japanese soldiers' remains on former battlefields following the San Francisco Peace Treaty in 1951 (Akira 2013:44; McKinnon et al. 2014b:69;

Trefalt 2017:149). In the 1960s and 1970s, activities shifted to the Japan War-Bereaved Association (JWBA) and to organisations such as Kuentai, which is non-government and non-profit (Akira 2013:45; Price et al. 2015:229; Trefalt 2017:148–149). Kuentai has operated a Japanese division since 2006. In 2014 the organisation established a U.S. division in order to recover the remains of U.S. military (Historynet 2014; Kuentai-USA.com 2014b).

Figure 10.3: Commemoration at SPS64.

The collection of human remains by bone collecting missions has been a cause for concern for some archaeologists, the HPO and CNMI locals. This is due to conflicting codes of behaviour around “orphan” heritage, or sites in which ownership and location are separated (Price 2005:181). A population’s own heritage, located inside its own current territory are subject to codes of behaviour, policy structures and legislation determined by the local perception of heritage value (Price 2005:181). However, when heritage attracts interest from outside its own territory, the behaviour from those groups may clash with local standards and rules (Price 2005:181). For example, in 1992 a project by consulting archaeologists worked to identify a mass grave in Achugao, Saipan. Volunteers from a Japanese government bone collecting mission also participated under the guidance of the archaeologists. The archaeologists’ research objectives ran counter to that of the bone collection mission volunteers, however, which was to collect as many human remains as possible in order to cremate them and return the ashes to Japan (Adams et al. 1996:5). Due to the large number of mission volunteers vis-à-vis archaeologists and the language barrier, mission volunteers undertook unauthorised bone-collecting and souvenir-hunting and, in turn, violated Saipan’s heritage legislation (Adams et al. 1996:4, 6, 28). This prevented the archaeologists from conducting a controlled excavation and properly recording all materials (Adams et al. 1996:28). In 1985 a bone collecting mission unlawfully bulldozed a well-known prehistoric site on Tinian in order to gather the bones of fallen Japanese soldiers (Ward and Pickering 1986:117). Additionally, in 2008/2009 Kuentai was tasked by the Japanese government with collecting the remains of Japan’s war dead in the Philippines. Kuentai was found allegedly paying locals to bring them skeletons, which Kuentai would then send to Japan without knowing for certain whether they were the remains of Japanese soldiers (Parry 2011; Trefalt 2017:153). Despite concerns, some locals support the goals of Kuentai and agree to take them to sites with human remains (James Pruitt pers. comm. 2017).

Recently, bone collection missions have complied with local heritage legislation. In 2014, for example, during fieldwork for this project, Kuentai applied for a permit from the HPO for the recovery of remains (Japanese and U.S.) in the mass grave located in Achugao, Saipan. When Kuentai located possible U.S. remains, they contacted the U.S. Defense POW/MIA Accounting Agency (DPAA) which is tasked with recovering and identifying the remains of fallen WWII U.S. service members (Defense POW/MIA Accounting Agency n.d.). The DPAA requested that Kuentai hire an archaeologist to recover the remains using DPAA methods and if American soldiers were retrieved, to have someone monitor the site to ensure its security. Any recovered remains were to be held at the HPO for safekeeping and left for DPAA to do the forensic analysis (Bagnol 2014b). According to Kuentai's fieldwork log, as of 2015, they hired archaeologists from the U.S. mainland to monitor their excavations at Achugao. All U.S. remains were left on Saipan, but Kuentai explains that if they had had enough funds, they would have sent the human remains to the U.S. government for analysis (Kuentai-USA.com 2014a).

10.4.2 U.S. Non-Residents

Comparatively speaking, U.S. non-residents have less of a connection with karst defences than other groups. Except for SPS29 and SPS15, the U.S. did not spend a considerable amount of time constructing or occupying karst defences during the war. Rather, they destroyed them. In general, Americans view the Pacific War as an achievement and a victory (Spennemann 1992:281–282; Yaguchi 2007:241). The "good war" narrative is perpetuated by the military, media, Hollywood and historians (Casaregola 2009:8; Ma 2007:185). Therefore, except, possibly, for U.S. soldiers or marines who had to face death at karst defences, the demolition of them during the battle is viewed as part of an honourable and courageous fight (Casaregola 2009; Spennemann 1992:281).

U.S. visitors do visit Pacific battlefields, but mainly WWII sites in Hawaii because of their proximity (Spennemann 1992:281). Similar to the Japanese, pilgrimages to other Pacific battlefields, including Saipan, have been organised by U.S. survivors and relatives, and some have been arranged in partnership with former U.S. marines and Japanese soldiers (Akira 2013:49–50; Bagnol 2014c). Whether they visit karst defences is unknown.

U.S. locals in Saipan are interested in WWII heritage and have organised ways to explore karst defences. The Saipan Hash House Harriers are a group of locals (although not all from the U.S. originally) who organise a group run through the jungles of Saipan on Saturdays. The exploration of karst defences are a regular part of their runs.

Most Western countries have repatriation programs, which receive a great deal of public support. So, like the Japanese bone collectors, the U.S. also seeks to return the remains of fallen soldiers (Hawley 2005). Also similar to the Japanese collectors, issues with the recovery of human remains by the POW/MIA have emerged. In January 2015, the POW/MIA commission was shut down after allegations of fraud, mishandling of bodies, and the planting of skeletons and subsequently "finding" them in order to claim success in recovery (Trefalt 2017:154).

10.5 Political and Economic Context

10.5.1 Heritage Law in the CNMI and Karst Defence Protection

Heritage law to protect historical and archaeological heritage in the CNMI emerged in the 1980s and borrowed from U.S. heritage law (Carson 2012:314, 326). At the time, heritage in the U.S. was (and is) governed by the *National Historic Preservation Act* (NHPA) of 1966. Section 106 of the Act requires federal and private agencies to take into account the effects of their actions on historic properties (Anyon et al. 2003:122; Barras 2010:5; King 2006:505; MacManamon 2003:47). The NHPA protects and manages sites that are eligible for the National Register of Historic Places (NRHP) maintained by the National Park Service (NPS) (Anyon et al. 2003:122; King 2006:505; MacManamon 2003:47, 49). The NHPA established State Historic Preservation Offices (SHPO), which were required to have a state-employed, professionally qualified archaeologist on staff to monitor NHPA compliance and allowed the NPS to give matching grants to states to support preservation activities (Anyon et al. 2003:122; MacManamon 2003:47, 49).

In 1974 the CNMI (then a trust territory) was included as a "state" for heritage law purposes and was thus able to receive preservation grants from the NPS as long as it established a SHPO to enforce the NHPA and matched the funds or provided equal in-kind services (King 2006:505–506). The CNMI SHPO was established by the passage of the *Commonwealth Historic Preservation Act of 1982* or Public Law 3-39 (Department of Community and Cultural Affairs n.d.). According to the *Commonwealth Historic Preservation Act*, unless permitted under Section 5 of the Act, it is unlawful for anyone to wilfully remove or take any artefact or knowingly destroy, remove, disturb, displace, or disfigure any cultural or historic property that is of historic or cultural significance to the people of the CNMI. Any violation of the Act can incur a fine of less than 1,000 dollars and/or imprisonment for no more than three months.

In Saipan the HPO has the overall legislative responsibility for the protection and preservation of archaeological sites (McKinnon 2015a:15), although from its inception the enforcement of government regulations was a challenge and remains so today. Government funds and resources to the HPO were always limited, which not only hindered the ability to complete their primary duties, but also prevented them from enforcing heritage laws and investigating infractions (McKinnon et al. 2014b:128). The HPO relies upon police to conduct investigations and make arrests, but there has been a lack of support for allowing the HPO to follow through with this (McKinnon et al. 2014b:128).

Retaining staff at the HPO has also been difficult and has influenced public opinion of the office. Since the beginning, the HPO has had to rely on non-locals to fill archaeologist and historian positions, primarily because no formal education or training for such positions exists in the CNMI (Carson 2012:327; King 2006:506). As a result, since the 1970s, the HPO's heritage programs have been criticised for being structured without reflecting or relating to Micronesian cultural values (King 2006). Recently, the Saipan HPO was without an archaeologist from 2011 to 2014, which put a major strain on the office, particularly at a time when an archaeologist was needed to consult with the U.S. military who proposed to turn Pagan into a live-fire training ground in 2013 (Eugenio 2013). From 2014 to 2015, two archaeologists and one historian resigned from the HPO and a new archaeologist was hired in May 2016. The high turn-over rate and lack of resources and staff has decreased local confidence in the office's ability to do its job and assist with requests (McKinnon et al. 2014b:116).

Karst defences in Saipan receive little protection as sites of cultural heritage, which could be due to the lack of HPO resources or the absence of public demand. No database on karst defence sites exists and as a result developers and contractors unknowingly negatively impact sites. For example, on Rota in 2016, a Japanese tunnel was accidentally found by a contractor of the CNMI utility company when he was working on the company's power plant (Villanueva-Dizon 2016). The utility company's transformer and oil storage facility are allegedly right above portions of the tunnel and the tunnel ceiling caved in (Villanueva-Dizon 2016).

Two karst defence sites, SPS13 and *Unai Laggua,* a Japanese Defence "Pillbox," are listed under the NRHP, and are thus federally protected. Most protection for karst defences, however, is not due to the cultural heritage value of the sites, but rather is a collateral outcome of natural heritage protection, particularly of the endangered Mariana Swiftlet (Reichel et al. 2007:686). As a result, FWS and DFW erected signs outside locations known to have Mariana Swiftlets (Figure 10.4) warning visitors not to disturb the birds.

Figure 10.4: U.S. Fish and Wildlife sign.

To some extent, the Department of Public Lands (DPL) and BECQ protect karst defence sites under the FUDS program, which the U.S. Army Corps of Engineers (USACE) executes on behalf of the U.S. Army and Department of Defence (DOD) (U.S. Army Corps of Engineers n.d.-a). This aims to clean up abandoned hazardous waste on sites used by the DOD prior to 1986 (U.S. Environmental Protection Agency 2016). Part of the program includes placing posters around the island to warn people of harmful FUDS sites and UXO (Figure 10.5). Karst defences that are considered FUDS sites include Kagman Caves (SPS54 and SPS55) and SPS53, known to locals as "Boom Cave" (U.S. Army Corps of Engineers n.d.-b). Contaminants in the soil and UXO at SPS53 pose an unacceptable ecological and human health risk (U.S. Army Corps of Engineers 2012). Therefore, it is generally understood that visitors need to request permission to access SPS53 from DPL or BECQ, although some locals access this site regularly without authorisation.

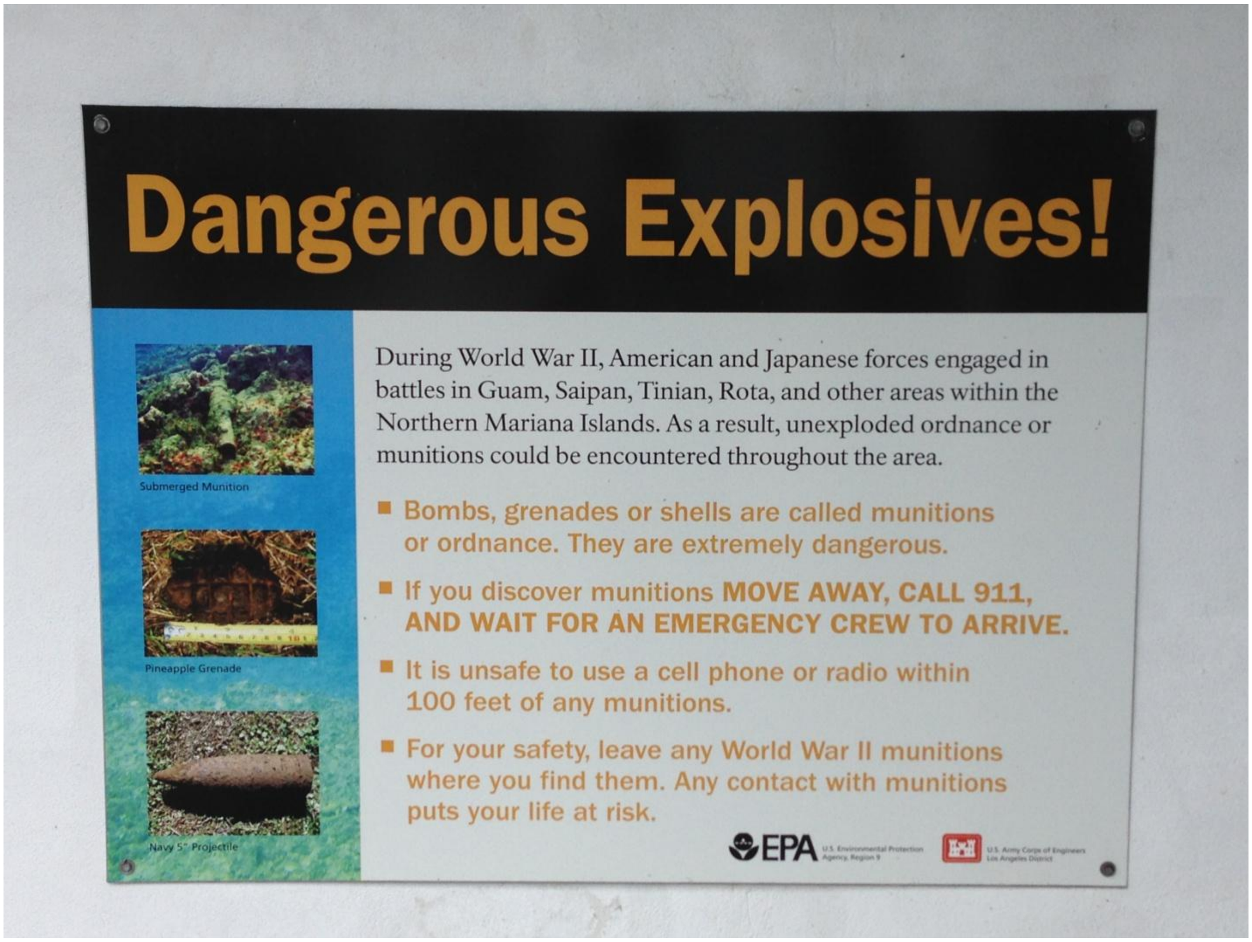

Figure 10.5: UXO warning poster.

Since many karst defence sites are on private property, this provides a certain level of protection depending on the level of accessibility and the attitude of the property owner. The CNMI's system of land ownership prevents foreign investors from owning land, which can also help protect karst defences from development (McKinnon et al. 2014b:123).

The minimal amount of protection afforded to karst defences has been acknowledged by McKinnon et al. (2014b). In response to this and the desire to protect these sites by some locals, a series of Public Service Announcements were produced to convey the stories associated with karst defences and advocate for the need to protect them (McKinnon et al. 2014b:121–122). Additionally, McKinnon et al. (2014b:129–132) urged the Saipan community to organise a non-profit group to help preserve sites.

10.6 Karst Defences and Dark Tourism

Since the 1990s, tourism has been a primary industry for Saipan, but after the garment industry collapsed in 2009 tourism became the CNMI's most vital industry (Commonwealth Economic Development Strategic Planning Commission 2009:10; McKinnon 2015a:14). Thus, there are three karst defences in Saipan dedicated to attracting tourists. Santa Lourdes, SPS27, is one of them (Figure 10.6). Santa Lourdes cave is a series of small limestone openings in the As Teo area of Saipan near a natural spring. The cave's significance is based on Catholicism and named after the Marian apparitions in Lourdes, France. In 1950 a statue in Saipan that once stood at a church during the Japanese period was brought to the cave on the recommendation of nuns because the cave was near a natural spring and grotto. Every year since 1951 the Santa Lourdes fiesta is celebrated here and a souvenir booth is set up for tourists all year round. Another major tourist attraction is SPS16, the Last Command Post (Figure 10.7). SPS16 is a cave in the Marpi area surrounded by large guns and tanks taken from other parts of the island and easily accessible to the public (Denfeld 1997:213–214). Finally, SPS13, Kalabera Cave, is the most frequently visited cave on the island. Despite having prehistoric and historic significance, the primary attraction of the cave is its size and the abundance of rock art (Cabrera 2009:18–19; Chapin 1994). To garner more tourism and visitation to Kalabera Cave, in 2014 contractors began constructing a viewing deck inside the cave, along with a prayer or offering area, rock art interpretive panels, a nature trail and landscaping (Eugenio 2014).

Some individual property owners have found ways to develop their own caves into a tourist attraction. The property owner of SPS70, *Liyang I Falingun Hanum* (cave of disappearing water), erected a concrete mermaid statue at the entrance and also created a legend for the site about a mermaid. He also built a large platform/walkway into his cave and "salted" the site with artefacts he found elsewhere on his property (McKinnon et al. 2014b:101). Other property owners have opened their caves to tourists, and some even charge an entrance fee (Fred Camacho pers. comm. 2014). Karst defences are also a major component of tourist company itineraries.

Figure 10.6: SPS27, Santa Lourdes cave.

Tourism is an important part of the Saipan economy, but unfortunately it is also a threat to karst defence sites. Increased visitation to sites can lead to vandalism and looting (Figure 10.8). Employees at AMP regularly have visitors bring them artefacts taken from karst defences. AMP is not a repository, and so they do not accept items. Tourists cannot take artefacts home with them, so they often end up being discarded. Furthermore, some locals are concerned that some tourists are trespassing on private property to gain access to cave sites (McKinnon et al. 2014b:117–121).

Figure 10.7: SPS16, Last Command Post.

A questionnaire distributed in 2013 revealed that 63 percent of respondents were in favour of opening caves to tourists (McKinnon et al. 2014b:117–121). During public meetings and conversations with property owners and participants, the majority of people supported visitation to karst defence sites. The ethical concerns regarding how the archaeology of recent conflict is conducted also applies to how recent conflict can be used for tourism. There is some uncertainty regarding whether sites related to death and suffering should be made a spectacle and whether people should profit from such dark tourism (Baldwin and Sharpley 2009:188).

Figure 10.8: Graffiti on wall of SPS3.

10.7 Sites of Conflict

Battlefield tourism and the protection of karst defences is complex and there are a range of stakeholders with various motivations for visiting these sites. The HPO holds legislative power and are able to halt development or excavation under section 106 of the NHPA. However, in terms of monitoring and preventing heritage infractions, unless the site is listed under the NRHP, the HPO holds little power or influence. Furthermore, placing restrictions on large portions of land by the government in the name of heritage protection is more difficult in Micronesia.

Government control of already scarce land would not go unnoticed in Saipan. Also, as Jeffery (2007:260) points out, restricting Micronesians from their land under U.S. policies is a form of neo-colonialism.

Moving towards more karst defence protection and promotion will need to be initiated by locals. Saipan's residents are keenly aware of heritage issues on the island and are admirably adept at mobilising for urgent matters they are passionate about. In some cases where heritage is too significant for the population to hand over control to "experts," locals have taken on the role of heritage protector. One notable way they have done this is through the Pagan Island U.S. military take-over dispute. After the U.S. military proposed to turn Pagan into a live-fire training ground in 2013, local, grassroots organisations emerged such as the Alternative Zero Coalition, the Guardians of Gani and PaganWatch. These groups actively participate in the public hearings conducted by the U.S. Department of Navy and the CNMI government on the Environmental Impact Statement for the planned military training on Tinian and Pagan. Recently, these groups along with the Tinian Women's Association and Center for Biological Diversity filed a complaint in federal court against the U.S. Navy (Perez n.d.).

How to deal with human remains at karst defence sites is an ongoing issue in the CNMI. Having the remains from at least three different ethnic groups on the islands, they are dealt with in different ways based on a set of standards and guidelines. Identifying the ancestry of human remains is the first step, but is also a problem. With no osteologist or physical anthropologist in Saipan, identifying the remains is not always possible and even then, if the remains are minimal, ancestral identification is impossible without expensive DNA analysis. What typically happens to all human remains when they are recovered is that they get stored at the HPO until they are buried or handed over to the appropriate government, which for some locals is considered inappropriate practice, especially for ancestral remains (Villahermosa 2016).

The HPO currently has good working relationships with the Japanese government and the newly formed Japan Association for Recovery and Repatriation of War Casualties who conducts bone collecting projects (James Pruitt pers. comm. 2017) and the repatriation of human remains appears to be a welcomed practice supported by all parties. Kuentai however is repeatedly in conflict with the HPO due to unprofessional conduct and the use of locals and tour guides to circumvent the permitting process. The unauthorised removal and potential for returning non-Japanese remains to Japan is a highly unethical practice and, as Trefalt (2017:152) argues, highlights old tensions and creates new ones. To mitigate this, the HPO could recover the human remains at all sites once they were notified of their existence, but again the HPO does not have the resources to do this. Unless they are able to hire more people to take on the work, the HPO permits for collectors should continue to demand proper supervision for the removal of human remains. If remains are to be taken off-island, the onus should be on the collector to have someone qualified to properly identify the remains first and ensure there would be a place to hold them, as would be expected of any archaeologist proposing a project. As for unauthorised clandestine acts, locals have the power to prevent it.

Economic factors and the financial value of sites have a large amount of influence in heritage decisions. Both salvage archaeology and site modification has been approved in order to attract more tourists to the islands. Karst defences are a particularly good source of financial value because they are "off the beaten path" and something different from the sites frequently visited in the lagoon (Yoneko Barcinas pers. comm. 2014).

Of the 458,225 tourists visiting the CNMI in 2016, 94 percent were Asian (Marianas Visitors Authority 2016). In a study conducted in 2001 on Japanese tourists' attitudes towards cultural heritage attractions in Saipan, WWII relics in both terrestrial and underwater environments were identified as the most highly valued heritage and most important sites in the CNMI (Sayers and Spennemann 2006:390, 393). While many would be inclined to cater tourism at karst defences to the nationality of the primary visitor, this does not appear to be what Japanese tourists want or what should be proposed from a political standpoint. Despite being more interested in WWII heritage, Japanese tourists are also interested in learning about local Indigenous history and culture (Sayers and Spennemann 2006:389). A study on Japanese visitors to the Arizona Memorial on Oahu in Hawaii, found that Japanese tourists are interested in a non-Japanese experience. The focus on American victory at the memorial left the Japanese visitors feeling a sense of "otherness" which in contrast to the rest of the island, was somewhat welcomed since many felt that "Hawaii is pretty much the same as Japan" (Yaguchi 2007:249).

Japan's ability to reconcile their misconduct during WWII is still politically charged and controversial (Chirot 2014:23). Despite official apologies by Japanese government officials between 1984 to 2010, the problem still remains as there are many Japanese individuals in power that still deny any misdeeds (Shin 2014:158–160, 163). Not accepting responsibility has strained Asian relationships and has resulted in the construction of museums in China with the primary purpose to expose Japanese brutality (Ma 2007:159). Author Iris Chang has also referred to the Japanese denial of events at Nanking as a “second rape” of the people (Ma 2007:179).

While the HPO has a certain level of political and legislative power, the local Saipan community would have the most influence in protecting and/or promoting karst defences. If Saipan’s community was to make a serious effort at karst defence tourism, the types of stories they would want to convey should be multi-vocal (Jeffery and Palmer 2017:164; Scott-Ireton and McKinnon 2016:164–165). Seaton (2009:75) and Sharpley (2009a:161–163) argue that in order to eliminate dissonance, dark tourism site narratives and management must be inclusive, incorporating the interests of those who are the subject(s) of the narrative, the property owners and the visitor groups.

One-sided interpretations of historical sites in the Marianas by foreigners would not only fuel current political conflict but also perpetuate colonial ideals and alienation of Indigenous groups from their land and cultural practices (Jeffery and Palmer 2017:164). Holistic stories not only contribute to inclusivity, but are also ways of acknowledging the various stakeholders of sites and can in turn increase their protection. They could look to other researchers who have successfully interpreted WWII sites in the Pacific with little or no backlash by highlighting many WWII experiences (Jeffery and Palmer 2017; McKinnon and Carrell 2011).

Sharing information with visitors, in turn, has benefits. Anthropologist Joy Sather-Wagstaff (2011:22) explains that tourists are a major part of how tragic events are comprehended and commemorated. Tourists not only provide economic support for commemorative sites, they are also “the population that geographically disperses knowledge of these sites through the narrative, performative, and visual culture of travel once off-site, post-visit” (Sather-Wagstaff 2011:22). When locals share information with tourists, the knowledge can be further disseminated.

10.8 Conclusion

WWII heritage in Saipan matters to many people on the island and abroad. At this point in time karst defences receive little protection in terms of CHM and any form of preservation may need to be initiated by local community organisations from the grassroots level. While some locals have expressed interest in promoting karst defences for tourism, locals may have to consider how karst defences are portrayed, given the politics and pain attached to them and the types of tangible heritage still remaining within these sites. It is hoped that this thesis will assist in understanding the diversity of war experiences and the many ways people today relate to karst defences and assist the community in making informed decisions on preservation and battlefield tourism.

Chapter 11 – Conclusion

11.1: War is a Human Activity

War is a specific human activity, with strategy, decision-making and subsequent violence all influenced by history and cultural and social systems (Frésard 2004:9; Riches 1986:24; Schröder and Schmidt 2001:3, 5, 8). Insights into human behaviour during conflict, amid WWII in the Pacific Theatre can be found at karst defences. Karst defences are unique sites, as they were occupied and used by three types of war participants: civilians with various backgrounds, the Japanese military and U.S. military. Thus, analysing the material remains of such sites can contribute to a greater understanding of a wide range of human activity during the Pacific War from different perspectives.

11.2: Revisiting the Research Questions

In Chapter 1, the following research questions about karst defences were proposed:

- What were the defence and survival strategies and tactics employed by people in Saipan at karst defences and what influenced these choices?
- How did karst defences change as the war progressed in Saipan?
- How do karst defences in Saipan relate to the wider Japanese defence strategy in the Pacific?

In order to answer these questions, a number of aims were achieved. The first sought to establish basic archaeological facts, or building blocks, for broader archaeological enquiry (Smith 1994:16–17). For this thesis, basic facts included where karst defences were located in the Pacific and exactly where they were located in Saipan. It also included establishing the construction and design of karst defences in Saipan and the materials associated with them. Comparative analysis was then conducted between Saipan's karst defences and those in Peleliu and Truk to determine the function and military and civilian affiliations of Saipan's caves and tunnels. Another aim was to understand the human behaviour at Saipan's karst defences, including individual and group responses as the Battle for Saipan progressed. Such responses were determined by analysing artefacts and modifications at karst defences as well as oral histories. The final aim was to identify the contemporary significance of caves and tunnels to the Saipan community. This was achieved through the documentation of karst defence use today and through interviews and conversations with locals about karst defence significance.

Much can be gleaned about the defence strategies and tactics people employed at karst defences during the Battle for Saipan. The strategies and tactics used by the Japanese military differed between the IJN and IJA, which was influenced by a long history of Japanese military culture. The IJN and IJA constructed distinct defences because they had operated independently of one another for over 70 years. While the general functions were similar in that both the IJN and IJA constructed sites for use as command posts, shelter and for storage and combat, they chose to construct and modify their sites in different ways, which reflected both military preference and their respective defensive roles. IJN sites were more coastal and located along harbours and near airfields, whereas the IJA sites were more central and better suited to inland combat. The IJA's combat duty influenced their decision to modify sites with stacked limestone and to select natural caves for their better camouflage. Additionally, the IJA's combat role also influenced the construction of hospital sites, as more hand-to-hand combat by the army resulted in more casualties and an increased need for medical intervention on the ground. In contrast, the navy would have used hospital ships (Evans and Peattie 1997:29).

The rift between the IJN and IJA contributed more broadly to Japanese military defence problems in Saipan. Despite the navy's presence on Saipan years before the army arrived, and the navy's responsibility to fortify the island, they did not construct defences for the army in advance. The extended period of time the navy was on the island allowed them to prepare more elaborate and comfortable defences for themselves, even though there was a much smaller navy garrison compared to the army. This resulted in smaller places for the army to retreat to, fight from and hide within. The disunity between the two branches of the military expanded into how each prepared for daily life within karst defences. Compared to the navy, army sites were poorly stocked and therefore the army likely suffered more from shortages of food and water during the battle. There was insufficient effort by the navy at building defences for the army and stocking them in order to increase the chances of an IJA victory against the U.S. if U.S. troops pushed inland. A lack of cooperation thus contributed to Japan's inability to hold Saipan.

The inability of the IJN and IJA to coordinate efforts may have also contributed to Japan's loss of WWII. Peleliu also suffered from a lack of coordination between the navy and army at karst defences, as navy personnel did not fully contribute to tunnel warfare and used their sites to shelter in rather than fight from, particularly near the end of the battle (Phelan 1945:3–4). Guam, Tinian, Peleliu, Iwo Jima and Okinawa all had similar defence scenarios in terms of the ratio of naval to army personnel and that the navy was present on each island before the army. Thus, all these islands likely suffered from the same IJN and IJA division. Despite having caused an extraordinary number of U.S. casualties from more numerous karst defences on Peleliu, Iwo Jima and Okinawa, it was not enough to defeat the U.S. troops. Lack of coordination between the IJA and IJN likely contributed to these losses in addition to the cumulative effects of defeat. No additional supplies or men were sent out to these locations, as they were needed for protecting the homeland. Perhaps if the IJN and IJA could have combined forces, especially earlier in the war, they would have had a better chance of winning it.

Civilians were left to develop their own defence strategies and tactics. Such strategies included preparing caves on their property to shelter in. The ability to prepare a cave in advance depended on civilians' employment and ethnicity. Some civilians with close ties to the Japanese occupiers and military were pre-warned about the battle, particularly Asian and Indigenous labourers and officers. Additionally, those who worked in Garapan, the commercial centre of Saipan, would also have been exposed to public chatter and gossip about the war. Access to certain goods was determined by a social hierarchy which placed Asians at the top and Indigenous civilians at the bottom. Chamorro civilians would have had access to fewer supplies than Asian civilians and Carolinian people had access to even fewer. This would have dictated the types and amounts of food and drink civilians could take into their cave. Insider information regarding the incoming battle may have also been influenced by the established social hierarchy, as the military would have likely warned Japanese civilians before Indigenous ones.

Despite the assumption that warfare causes people to focus on the survival of the nuclear family or the individal, this was not always the case in Saipan. Oral histories indicate that more than one family often sought shelter within a single cave and non-relatives came together to help each other survive the war. Oral histories and one cave site in Saipan also indicate that there was some comraderie between Japanese military and Japanese and Indigneous civilians. In order to assist civilians, sometimes the Japanese military shared shelter, food and insider information. The opposite also occurred and the Japanese military ran civilians out of caves and told them that the U.S. would torture or kill them. Interactions with Japanese military influenced whether civilians surrendered or committed suicide.

Insight into the daily life of both the Japanese military and civilians at karst defences and how they prepared for war, as discussed above, is a unique contribution archaeology can make to this study. While food and drink storage by the Japanese military is historically documented, the consumption patterns, the level of preparation for life within caves and tunnels and the people who shared supplies is not. Archaeology thus offers a more profound analysis of not only the daily life at karst defences, but also the social organisation of war.

Military culture and particular war circumstances forced more sinister U.S and Japanese defence strategies and tactics. The impact of battle and military doctrine placed U.S. and Japanese soldiers into a mind-set which focused on eliminating each other, with less concern for civilian lives. The U.S. had encountered karst defences on other islands and developed efficient ways of dealing with them. The U.S. painstakingly eliminated caves and tunnels with flamethowers and grenades and entombed people, including civilians, alive within caves and tunnels. Similarly, the Japanese military used civilians as lures and decoys in order to save themselves.

The second research question was formulated through a review of archaeological literature of human behaviour during conflict. This question was proposed to understand how the stress and tension of battle impacted human behaviour and how they influenced the Battle for Saipan as it proceeded.

First, the battle began poorly for the Japanese military. The U.S. established a beachhead in three days and captured the Aslito Airfield quickly. The Japanese lost many men in the first few days. The military immediately began retreating east then north, as evidenced in the karst defences that were abandoned. The U.S. military encountered karst defences in Saipan as early as June 16, 1944 and U.S. troops used a variety of tactics to eliminate them, including explosives and flamethrowers. For civilians, the war initiated the beginning of cave life and, while some could hide out for the entire battle, others were caught in the cross-fire.

Second, Japanese military troop movement and reorganisation is reflected in the changing function of karst defences. Tunnels once used for combat or shelter were repurposed as communications and command posts, particularly at SPS14, SPS37, SPS39 and SPS40. The karst defences in the north reflect more desperate times for the military and civilians in the latter stages of the battle. As both began retreating north, caves and tunnels were used as immediate and opportune protection. As the battle came to an end and there was nowhere else to retreat, people began constructing hasty limestone rock walls in front of karst defences in order to avoid detection. Nearly any cave or opening could become a shelter in the last days of the battle and in the case of Captain Sakae Oba and his men, they functioned as shelters for up to five months after the battle was over.

The second research question can be taken further than Saipan to touch on how karst defences changed as the entire Pacific War progressed. In terms of tunnel construction, it changed over time from single-levelled, shorter types, as seen in Saipan, to more numerous, longer, multi-levelled and elaborate types constructed after the Marianas Campaign. This reflects the Japanese drive towards forcing a war of attrition and their refusal to surrender, an attitude that had been indoctrinated into the military since the Meiji Restoration.

The third research question was formulated from a review of historical and archaeological reports and sought to broaden the historical narrative of Japanese defence strategy in the Pacific. This research demostrates that, despite the Japanese disinclination for defence, especially early in the war, karst defences were actually an integral part of the overall Japanese strategy across the Pacific Theatre. Karst defences were likely not constructed before the Japanese left the League of Nations in 1935, but were constructed as early as 1942. As the Japanese moved from offence to defence, more coastal fortifications were constructed. As the Japanese became more desperate, the construction of karst defences, which were already a part of Japanese tactics and known to cause the U.S. military much hardship, was increased as a way to inflict even more damage to U.S. troops and attempt to force a cease-fire.

Karst defences are also more prominent in Saipan than historical accounts declare. Although most literature focuses on describing caves in three areas of Saipan (Naftan Point, Hells Pocket and Marpi), the U.S. fought karst defences throughout the battle and across the island. A comparison of Saipan's karst defences to those in other areas of the Pacific suggests that the Japanese in Saipan were probably better prepared than originally thought (Denfeld 1988; Peattie 1988; Rottman 2004). The similarities between Saipan's and Peleliu's tunnels suggest that Peleliu's were based on Saipan's designs and standard design plans likely existed and were dispersed amongst troops as guidelines for karst defence construction. Saipan may even have been the island where the first standard types were constructed. More comprehensive archaeological studies on other islands with defences known to have been constructed earlier are required to determine whether this is true.

Despite what has been previously assumed by historians and archaeologists (Eakin et al. 2012; Mohlman 2011), the use of limestone does not necessarily mean that the military in Saipan was short on resources or rushed in constructing defences. Also, the use of concrete does not reflect the opposite. The Japanese military struggled to adequately fortify the entire Pacific and any study of karst defence modification needs to consider how the site functioned and how the relationship between the IJN and IJA influenced that construction.

The Japanese defence strategy and how it related to civilians differed from island to island. On some islands the Japanese recruited civilians as labourers, policemen and soliders. On other islands, like Peleliu and Iwo Jima, civilians were evacuated before battle broke out. On islands like Saipan, civilians were caught in the throes of war and needed to plan for their own defence and survival. Civilians on Truk were not caught in a particular battle, but endured periodic Allied bombings for over a year. Truk's civilians had to live in desperate times until the end of the war, when the U.S. finally arrived to relieve them.

Identifying how people relate to karst defences today and how a study of WWII affects different groups of people was a requirement for this project. Such an enquiry is an ethical way of conducting research and constructing narratives on a topic that could be disturbing to some. In order to reduce the potential adverse affects, this project identified the stakeholders and attempted to collaborate as much as possible with those who were interested in participating in the project. As a result, a more nuanced understanding of how people assign meaning to karst defences emerged. These differ from group to group, have historical, political, cultural and economic influences and occasionally conflict with one another.

Karst defences are important to Indigneous groups on Saipan as they reflect their own struggles and the sacrifices of family members during the war. Caves, in particular, are important to local Indigenous groups because their significance is not temporally bound. They are associated with prehistoric use and occupation and spiritual traditions and beliefs held by many people today. Caves are a part of local Indigneous identity and are more than just war period sites. They are places which Indigenous groups have both prehistoric and historic connections to. Some, however, relate karst defences to a painful period of their past, which they prefer to forget.

Asian groups, particularly Japanese, have attachments to karst defences that primarily relate to the loss of life. Japanese visitors to karst defences and other WWII sites commemorate and memorialise those who died. Government and NGOs also take part in bone collecting. Such behaviour is a result of long held beliefs in Japan that there are only victims of war, which distances them from being the perpetrators of any wrongdoings. This is still a contentious subject today amongst Asian nations. To Japanese people, commemoration and the repatriation of remains is a way of honouring victims and finishing the war. U.S. organisations have also sought to repatriate the remains of fallen U.S. soldiers. Repatriation has a great deal of public support, but unfortunately has also disturbed karst defence sites and has resulted in allegations that repatriated remains were recovered unethically and misidentified.

If karst defences are to be protected, locals possess a great deal of power in intitating efforts as locals know where these sites are, especially those located on private property. At this point, the HPO has little time and few resources to dedicate to any efforts to document, monitor or follow through with infractions, although this may change in the future. The present economic climate in the Marianas which relies heavily on tourism means that locals see the economic value of karst defences. In order to avoid further political tensions and refrain from eliminating the local story of WWII, efforts towards promoting sites for tourism should convey the varied experiences at karst defences.

11.3 Future Research

Other fruitful avenues remain for research on karst defences in order to better understand the Pacific War and the people who lived through it. More comprehensive surveys in other areas of the Pacific are required to understand how people defended themselves on other islands. More studies can determine whether similar pressures existed as battles progressed and add information on what war was like for those on islands that were never invaded or attacked.

Comparative analysis is an avenue of investigation that would give greater insight into the overall Japanese and civilian defence strategies across the Pacific during WWII. The construction of sites and the material remains on other islands can now be compared to the data from Saipan and Peleliu. More comparative studies can contribute to a number of historical questions identified in Chapter 9, including how karst defence construction changed over the entire Pacific War, when standard designs were developed by the Japanese and how the loss of supply ships affected the military in Saipan. Moreover, such analysis can also contribute to understanding the varied experiences of civilians.

More studies on identifying distinct army, navy and civilian karst defences are required on other islands. Such studies can give greater insights into Japanese military culture and the army and navy division during the Pacific War. Studies can also identify artefacts specific to each group and can give a more detailed story on how each prepared for war.

More oral history collection is required to identify people who assisted in constructing karst defences. Recording oral histories is an urgent matter, as those with first-hand memories are quickly passing away and this source of information will soon be lost. A more thorough investigation of archival materials related to this topic is also required. Documents at the NARA, the Library of Congress and NIDS have not been sufficiently explored.

Since civilian experiences of the Pacific War are varied, the significance of karst defence sites in other parts of the Pacific will be equally as diverse. How communities relate to such defences is a useful area of research in order to fully understand WWII heritage in the Pacific. Exploring contemporary meanings on Okinawa, where civilians were caught in the middle of the battle, would be a unique contribution to understanding WWII heritage. Okinawa is an island detached from mainland Japan and was a separate nation until 1879 (Allen 2002:79). Whether locals identify themselves as Japanese or prefer to consider themselves Pacific Islanders would influence how they relate to karst defence sites and WWII in general.

11.4 Conclusions

Archaeological studies on topics of the recent past can make the familiar unfamiliar (Graves-Brown 2000:1). As a study of WWII, this thesis demonstrates that we do not entirely understand all conflict human behaviour or aspects of WWII, despite it being so well-documented. This thesis is about taking what is hidden, literally by the jungle and figuratively by history, and bringing those elements into a discussion about the human experiences of WWII in the Pacific. For Saipan and those who visit, while karst defences may be hidden, the topic of WWII is not. Remnants of WWII are all around and people confront them on a daily basis. This thesis is thus also about turning a constant reminder of a painful past—a heritage that hurts—into a heritage that heals (Little and Shackel 2014:40). By using karst defences to convey the diversity of war experiences in Saipan it is possible to understand more fully the legacies of WWII rather than the just the violence that punctuated that past, and remind people of the generation whose experiences and behaviours shaped the world we now know today.

References

27th Infantry Division 1944 POW Interrogation Report of FURUTA, Kohei.

27th Infantry Division G-2 Section 1944 Journal Forager Operation, United States Army.

106th Infantry 1944 Forager Narrative Report 15 April–5 August 1944. 'Forager' Operations Report. United States Army.

506th Fighter Group n.d. *506th Fighter Group-Battle of Iwo Jima*. Retrieved February 26 2017 from <http://506thfightergroup.org/battleofiwo.asp>.

Adams-Graf, J. 2014 *Warman's World War II Collectibles*. Iola, Wisconsin: Krause Publications.

Adams, J., D.C. Denfeld and M.J. Tomonari-Tuggle 1996 Test Excavation of a WWII Japanese Mass Grave at Achugao, Saipan, Commonwealth of the Northern Mariana Islands. Unpublished report prepared for the Division of Historic Preservation, Commonwealth of the Northern Mariana Islands and the Division of Health and Welfare Japanese Government.

Akira, N. 2013 The engagment of religious groups in postwar battlefield pilgrimages. *Nanzan Institute for Religion and Culture Bulletin* 37:42–51.

Alden, A.N. 1995 *Collector's Encyclopedia of Early Noritake*. Paducah: Collector Books.

Alexander, J.W. 2013 *Brewed in Japan: The Evolution of the Japanese Beer Industry*. Vancouver: UBC Press.

Allen, M. 2002 *Identity and Resistance in Okinawa*. Lanham: Rowman and Littlefield Publishers.

Allied Translator and Interpreter Section 1944 Exploitation of Japanese Documents. U.S. Army South West Pacific Area.

Amesbury, S.S. 1980 *Biological Studies on the Coconut Crab (Birgus Latro) in the Mariana Islands. Agriculture Experiment Station*. College of Agriculture and Life Sciences. University of Guam. Technical Report No. 17. University of Guam Marine Laboratory.

Anderton, M.J. 2002 Social space and social control: Analysing movement and management on modern military sites. In J. Schofield, W.G. Johnson and C.M. Beck (eds), *Matériel Culture: The Archaeology of Twentieth Century Conflict*, pp.189–198. London: Routledge.

Anon. 1984 *Albert H. Liddeke*. Retrieved July 23 2017 from <http://newsok.com/article/2078164>.

Anon. n.d. *WE 216-A*. Retrieved June 1 2017 from <http://www.bill01a.com/articles/we-216-a.htm>.

Anonymous 2014 *Japanese Tunnels on Jardine's Lookout*. Retrieved January 14 2017 from <http://www.strippedpixel.com/japanese-tunnels-jardines-lookout/>.

Anonymous n.d. *Q and As About Imperial Japanese Army*. Retrieved August 2 2016 from <http://www3.plala.or.jp/takihome/fqa.htm#fuel>.

Anyon, R., T.J. Ferguson and J.R. Welch 2003 Heritage management by American Indian tribes in the Southwestern United States. In A. Hatton and F.P. MacManamon (eds), *Cultural Resource Management in Contemporary Society Perspectives on Managing and Presenting the Past*, pp.120–141. Hoboken: Taylor and Francis.

Aragon, L.V. 1996 "Japanese time" and the mica mine: Occupation experiences in the Central Sulawesi Highlands. *Journal of Southeast Asian Studies* 27(1):49–63.

Arnold, B. 2002 Justifying genocide: Archaeology and the construction of difference. In A.L. Hinton (ed.), *Annihilating Difference: The Anthropology of Genocide*, pp.96–116. Berkeley: University of California Press.

Ashkenazi, M. and J. Jacob 2003 *Food Culture in Japan*. Westport: Greenwood Press.
Aso, T. 2004 *From Shanghai to Shanghai: The War Diary of an Imperial Japanese Army Medical Officer, 1937–1941*. Norwalk, CT: EastBridge.
Bagnol, R.C. 2014a *Captains, Crew of Five Prepositioning Ships Donate Toys for Kids*. Retrieved July 23 2017 from <http://www.mvariety.com/cnmi/cnmi-news/local/72365-captains-crew-of-five-prepositioning-ships-donate-toys-for-kids>.
Bagnol, R.C. 2014b *Remains of One Possible American Soldier Recovered, Kuentai-USA Digs for More*. Retrieved July 23 2017 from <www.mvariety.com/cnmi/cnmi-news/local/68779-remains-of-one-possible-american-soldier-recovered-kuentai-usa-digs-for-more>.
Bagnol, R.C. 2014c *Two World War II Veterans Revisit Saipan Today*. Retrieved July 23 2017 from <http://www.mvariety.com/cnmi/cnmi-news/local/62546-two-world-war-ii-veterans-revisit-saipan-today>.
Baird, M. 2001 *Symbols of Japan: Thematic Motifs in Art and Design*. New York: Rizzoli International Publications, Inc.
Baldwin, F. and R. Sharpley 2009 Battlefield tourism: Bringing organised violence back to life. In R. Sharpley and P. Stone (eds), *The Darker Side of Travel: The Theory and Practice of Dark Tourism*, pp.186–206. Bristol: Channel View Publications.
Banks, I. and T. Pollard 2011 Protecting a bloodstained history: Battlefield conservation in Scotland. *Journal of Conflict Archaeology* 6(2):124–145.
Barker, B. 2007 Massacre, frontier conflict and Australian archaeology. *Australian Archaeology* 64(1):9–14.
Barras, L.E. 2010 Section 106 of the National Historic Preservation Act: Back to Basics. National Trust for Historic Preservation, Washington, DC.
Barratt, G. 2003 *The Chamorros of the Mariana Islands: Early European Records, 1521-1721*. Saipan: CNMI Division of Historic Preservation.
Beaudry, M.C. 2006 *Findings: The Material Culture of Needlework And Sewing*. New Haven: Yale University Press.
Beazley, O. 2007 A paradox of peace: The Hiroshima Peace Memorial (Genbaku Dome) as world heritage. In J. Schofield and W. Cocroft (eds), *A Fearsome Heritage*, pp.33–50. Walnut Creek: Left Coast Press, Inc.
Beck, C.M., J. Schofield and H. Drollinger 2011 Archaeologists, activists, and a contemporary peace camp. In C. Holtorf and A. Piccini (eds), *Contemporary Archaeologies: Excavating Now*, pp.95–112. Frankfurt: Peter Lang.
BECQ n.d. *Home*. Retrieved February 8 2016 from <http://www.deq.gov.mp/sec.asp?secID=18>.
Beevor, A. 2012 *The Second World War*. New York: Little, Brown and Company.
Bellah, R.N. 2008 *Tokugawa Religion*. New York: The Free Press.
Bergen-Cico, D.K. 2012 *War and Drugs: The Role of Military Conflict in the Development of Substance Abuse*. New York: Taylor & Francis.
Bibb, L.E. 2001 Japanese stencilwares of the Meiji and Taisho eras. *Asian American Comparative Collection Newsletter* 18(1):5–6.
Bibb, L.E. 2013 Japanese Ceramics from the Home Avenue Dump, San Diego, California., Unpublished report in possession of author.
Bishop, C. 2002 *The Encyclopedia of Weapons of World War II*. New York: MetroBooks.

Blau, S. and M. Skinner 2005 The use of forensic archaeology in the investigation of human rights abuse: Unearthing the past in East Timor. *The International Journal of Human Rights* 9(4):449–463.

Bodley, R.V.C. 1934 *The Drama of the Pacific*. Tokyo: Hokuseido Press.

Bodner, C.C. 1997 Reconnaissance Archaeological Site Survey of the MPLC Agricultural Homesteads and Carolinas Heights Homestead Subdivision Marpo and North Carolinas Areas Tinian, Commonwealth of the Northern Mariana Islands. Unpublished report prepared for the Marianas Public Land Corporation by International Archaeological Research Institute, Honolulu.

Bohnert, M., T. Rost and S. Pollak 1998 The degree of destruction of human bodies in relation to the duration of the fire. *Forensic Science International* 95(1):11–21.

Bowers, N.M. 2001 *Problems of Resettlement on Saipan, Tinian, and Rota Mariana Islands*. Ann Arbor: University of Michigan.

Boyd, W., E., M. Cotter, W. O'Connor and D. Sattler 1996 Cognitive ownership of heritage places: Social construction and cultural heritage management. *Tempus* 6:123–140.

Bradsher, G. 2006a A "constantly recurring irritant": Returning captured and seized Japanese records, 1946–1961. In E. Drea, G. Bradsher, R. Hanyok, J. Lide, M. Petersen and D. Yang (eds), *Researching Japanese War Crimes: Introductory Essays*, pp.169–196. Washington, D.C.: National Archives and Records Administration for the Nazi War Crimes and Japanese Imperial Government Records Interagency Working Group.

Bradsher, G. 2006b The exploitation of captured and seized Japanese records relating to war crimes, 1942-1945. In E. Drea, G. Bradsher, R. Hanyok, J. Lide, M. Petersen and D. Yang (eds), *Researching Japanese War Crimes Records: Introductory Essays*, pp.151–168. Washington, D.C.: National Archives and Records Administration for the Nazi War Crimes and Japanese Imperial Government Records Interagency Working Group.

Bradsher, G. n.d. *Japanese War Crimes and Related Topics: A Guide to Records at the National Archives*. College Park, Maryland.

Branton, N.L. 2000 Rice Bowls and Resistance: Cultural Persistence at the Manzanar War Relocation Center, California, 1942–1945. Unpublished M.A. thesis, Department of Anthropology, University of Arizona, Tucson.

Branton, N.L. 2004 Drawing the Line: Places of Power in the Japanese-American Internment Eventscape. Unpublished PhD thesis, Department of Anthropology, University of Arizona, Tuscon.

Brown, G. 1979 *Collectible Porcelain Insulators: A Reference Book for Insulators Collectors*. Colorado Springs: R and R Printing and Bookbinding Co.

Buchanan, R.C. 2004 Ceramic insulators. In R.C. Buchanan (ed.), *Ceramic Materials for Electronics*, pp.1–86. New York: Marcel Dekker, Inc.

Buchli, V. and G. Lucas 2001a The absent present: Archaeologies of the contemporary past. In V. Buchli and G. Lucas (eds), *Archaeologies of the Contemporary Past*, pp.3–18. London: Routledge.

Buchli, V. and G. Lucas (eds) 2001b *Archaeologies of the Contemporary Past*. London: Routledge.

Buden, D.W. 2012 Coconut crabs, Birgus latro (Anomura: Coenobitidae), of Sorol Atoll, Yap, with remarks on the status of B. latro in the Federated States of Micronesia. *Pacific Science* 66(4):509–522.

Bulgrin, L. 2005 The Tudela Site: Fire and steel over Saipan, 15 June 1944. *Journal of Conflict Archaeology* 1:1–17.
Bullard, S. 2007 Japanese army operations in the South Pacific area: New Britain and Papua campaigns, 1942–43. In B.B.K. Senshishitsu (ed.), *Senshi Sosho: Minami Taiheiyo Rikugun Sakusen Volumes 1 and 2*. Canberra: Australian War Memorial.
Burke, H.D., A. Gorman, K. Mayes and D. Renshaw 2011 The heritage uncertainty principle: Excavating air raid shelters from the Second World War. In K. Okamura and A. Matsuda (eds), *New Perspectives in Global Public Archaeology*, pp.139–154. New York: Springer.
Buruma, I. 1995 *The Wages of Guilt: Memories of War in Germany and Japan*. New York: The New York Review of Books.
Busch, J. 1981 An introduction to the tin can. *Historical Archaeology* 15(1):95–104.
Butler, B.M. 1997 An Archaeological Survey of the East and Southeast Coast of Rota, Mariana Islands. Unpublished report prepared for the Division of Historic Preservation Department of Community and Cultural Affairs, Saipan, CNMI by the Center for Archaeological Investigations Southern Illinois University at Carbondale.
Butler, B.M. and D.G. DeFant 1991 *Archaeological Survey on the Leeward Coast of Saipan: Garapan to Oleai*. Micronesian Archaeological Survey Report Number 27, Saipan: Division of Historic Preservation.
Cabrera, G. 2015a A historical overview of the Battle for Saipan. In J.F. McKinnon and T.L. Carrell (eds), *Underwater Archaeology of a Pacific Battlefield*, pp.15–26. New York: Springer Briefs in Archaeology.
Cabrera, G. 2015b A historical overview of the Battle of Saipan. In J.F. McKinnon and T.L. Carrell (eds), *Underwater Archaeology of a Pacific Battlefield: The WWII Battle of Saipan*, pp.15–26. New York: Springer.
Cabrera, G. and H. Tudela 2006 Conversations with *I Man-Aniti*: Interpretation of discoveries of the rock art in the Northern Mariana Islands. *Micronesian Journal of the Humanities and Social Sciences* 5(1/2):42–52.
Cabrera, G.S. 2005 *Historic and Cultural Sites of the CNMI: The National Register Sites*. Saipan: The Division of Historic Preservation.
Cabrera, G.S. 2009 A Cultural Resource Survey of Liyang Kalabera, Marpi, Saipan. Unpublished report prepared for Herman B. Cabrera and Associates.
Camacho, K.L. 2008 The politics of Indigenous collaboration: The role of Chamorro interpreters in Japan’s Pacific Empire, 1914–45. *The Journal of Pacific History* 43(2):207–222.
Campbell, J. 2012 *The Color of War: How One Battle Broke Japan and Another Changed America*. New York: Crown Publishers.
Canfield, B.N. 1994 *U.S. Infantry Weapons of World War II*. Lincoln: Andrew Mowbray Publishers.
Cannon, M.H. 1954 *The War in the Pacific: Leyte: The Return to the Philippines*. Washington, D.C.: U.S. Government Printing Office.
Carman, J. 2002 *Archaeology and Heritage: An Introduction*. London: Continuum.
Carman, J. 2013 *Archaeologies of Conflict*. London: Bloomsbury Publishing.
Carr, G. 2011 Engraving and embroidering emotions upon the material culture of internment. In A. Myers and G. Moshenska (eds), *Archaeologies of Internment*, pp.129–146. New York: Springer Science+Business Media, LLC.

Carruth, R.L. 2003 Ground-Water Resources of Saipan, Commonwealth of the Northern Mariana Islands, U.S. Geological Survey Water–Resources Investigations Report 03–4178.

Carson, M.T. 2012 History of archaeological study in the Mariana Islands. *Micronesica* 42(1/2):312–371.

Casaregola, V. 2009 *Theaters of War: America's Perceptions of World War II*. New York: Palgrave MacMillan.

Casella, E.C. 2007 *The Archaeology of Institutional Confinement*. Gainesville: University Press of Florida.

Casella, E.C. 2011 Lockdown: On the materiality of confinement. In A. Myers and G. Moshenska (eds), *Archaeologies of Internment*, pp.285–296. New York: Springer Science+Business Media, LLC.

Chang, I. 2011 *The Rape of Nanking: The Forgotten Holocaust of World War II*. New York: Basic Books.

Chapin, J. 1994 *Breaching the Marianas: Battle for Saipan*. Washington D.C.: Marins Corps Historical Center.

Chapman, G.P. 1983 Mica. In S.J. LeFond (ed.), *Industrial Minerals and Rocks*, pp.915–929. New York: AIME.

Charlotte's Axis Attic n.d.-a *Japan's PX-The Soldier's Store*. Retrieved June 28 2016 from <http://17thdivision.tripod.com/charlottesaxisattic/id24.html>.

Charlotte's Axis Attic n.d.-b *Japanese Armed Forces Preserved Rations*. Retrieved June 28 2016 from <http://17thdivision.tripod.com/charlottesaxisattic/id23.html>.

Charlotte's Axis Attic n.d.-c *Japanese Armed Forces Standard Rations*. Retrieved June 28 2016 from <http://17thdivision.tripod.com/charlottesaxisattic/id22.html>.

Charlotte's Axis Attic n.d.-d *Japanese Rations*. Retrieved June 28 2016 from <http://17thdivision.tripod.com/charlottesaxisattic/id20.html>.

Chirot, D. 2014 Admitting guilt is neither common nor easy: Comparing WWII memories in Europe and East Asia. In D. Chirot, G.-W. Shin and D. Sneider (eds), *Confronting Memories of World War II European and Asian Legacies*, pp.13–44. Seattle: University of Washington Press.

Chirot, D., G.-W. Shin and D. Sneider 2014 Introduction. In D. Chirot, G.-W. Shin and D. Sneider (eds), *Confronting Memories of World War II European and Asian Legacies*, pp.3–12. Seattle: University of Washington Press.

Chôko, Y. 2000 Memories from Emigration to repatriation. In O. Mariko (ed.), *Pagan Island in the Distance*, pp.70–77. Tokyo: Pagan Island HP Management Committee.

Christiansen, H. 2002 Forgotten and refound military structures in the Central Pacific: Examples from the Marshall Islands. In J. Schofield, W.G. Johnson and C.M. Beck (eds), *Matériel Culture: The Archaeology of Twentieth Century Conflict*, pp.58–64. London: Routledge.

Chung, C.S. 1995 Korean women drafted for military sexual slavery by Japan. In K. Howard (ed.), *True Stories of the Korean Comfort Women*, pp.11–31. London: Cassell.

CINCPAC-CINCPOA Bulletin No. 11-45 1945 Know Your Enemy! Japanese Naval Ground Forces.

CINCPAC-CINCPOA Bulletin No. 136-45 1945 Defense Installations on Iwo Jima.

Clark, H.M. 1977 *The Tin Can Book*. New York: New American Library.

Clarke, A. 2002 The ideal and the real: Cultural and personal transformations of archaeological research on Groote Eylandt, Northern Australia. *World Archaeology* 34(2):249–264.

Cleary, T. 1999 *Code of the Samurai: A Modern Translation of the Bushido Shoshinshu of Taira Shigesuke*. North Clarendon: Tuttle Publishing.
Cloud Jr., P.E., R.G. Schmidt and H.W. Burke 1956 Geology of Saipan Mariana Islands. Part 1, General Geology. Geological Survey Professional Paper 280-A. U.S. Department of the Interior, Washington, D.C.
CNMI Department of Community and Cultural Affairs 2014 *Home*. Retrieved February 11 2016 from <http://www.dcca.gov.mp/>.
Cocroft, W. 2007 Defining the national archaeological character of Cold War remains. In J. Schofield and W. Cocroft (eds), *A Fearsome Heritage: Diverse Legacies of the Cold War*, pp.107–127. Walnut Creek: Left Coast Press, Inc.
Cohen, J. and N. Swindler 2000 Painting a "new" face on CRM: Integrating traditional culture and archaeology. In K.E. Dongoske, M. Aldenderfer and K. Doehner (eds), *Working Together: Native Americans and Archaeologists*, pp.37–43. Washington, D.C.: The Society for American Archaeology.
Colwell-Chanthaphohn, C. and T.J. Ferguson 2008 Introduction: The collaborative continuum. In C. Colwell-Chanthaphonh and T.J. Ferguson (eds), *Collaboration in Archaeological Practice: Engaging Descendant Communities*, pp.1–32. Lanham: AltaMira Press.
Commonwealth Economic Development Strategic Planning Commission 2009 CNMI Comprehensive Economic Development Strategic Plan (2009–2014). Department of Commerce, Saipan.
Coningham, R. and R. Young 2015 *The Archaeology of South Asia: From the Indus to Asoka, c.6500 BCE–200 CE*. New York: Cambridge University Press.
Cook, H.T. and T.F. Cook 1992 *Japan at War an Oral History*. New York: The New Press.
Coomans, P. 2000 *History of the Mission in the Mariana Islands: 1667–1673*. Saipan: N.M.I. Division of Historic Preservation.
Crader, D.C. 1990 Slave diet at Monticello. *American Antiquity* 55(4):690–717.
Cronyn, J.M. 1990 *Elements of Archaeological Conservation*. London: Routledge.
Crosby, A. 2002 Archaeology and vanua development in Fiji. *World Archaeology* 34(2):363-378.
Crowl, P.A. 1960 *The War in the Pacific: Campaign in the Marianas*. Washington, D.C.: U.S. Government Printing Office.
Crowl, P.A. and E.G. Love 1955 *The War in the Pacific: Seizure of the Gilberts and Marshalls*. Washington, D.C.: U.S. Government Printing Office.
Cunningham, L.J. 1992 *Ancient Chamorro Society*. Honolulu: Bess Press.
Cwiertka, K.J. 2006 The soy sauce industry in Korea: Scrutinising the legacy of Japanese colonialism. *Asian Studies Review* 30(4):389–410.
D'Arcy, P. 2006 *The People of the Sea: Environment, Identity and History in Oceania*. Honolulu: University of Hawai'i Press.
Dalian Insulator Group Co., L. n.d. *Memory of Dalian Insulator*. Retrieved July 23 2017 from <http://www.insulators.cn/en/daciyinxiang/dacijiyi/index.html>.
Danquah, F.K. 1990 Japan's food farming policies in wartime Southeast Asia: The Philippine example, 1942–1944. *Agricultural History* 64(3):60–80.
Data, P. and J. Kovitz 2012 *Bushido and the Butchers of Biak*. Retrieved January 14 2017 from <http://wwiiscrapbook.com/book/bushido-and-the-butchers-of-biak/>.
David 2008 *Japanese Wartime Tunnels*. *Gwulo: Old Hong Kong*. Retrieved January 14 2017 from <http://gwulo.com/japanese-wartime-tunnels-hong-kong>.

David, N. and C. Kramer 2001 *Ethnoarchaeology in Action*. Cambridge: Cambridge University Press.
DeFant, D.G. and J. Fulmer 1998 Archaeological Inventory Survey Bird Island Golf Course and Resort Development Project. Unpublished report prepared for Pete A. Tenorio and Associates by Paul H. Rosendahl Inc., Guam.
DeFant, D.G., J. Smith and L.L. Guerrero 2001a Archaeological Survey, Tanapag Heights Homestead Subdivision. Unpublished report prepared for CNMI Division of Land Management by Paul H. Rosendahl, Inc., Guam.
DeFant, D.G., J. Smith and L.L. Guerrero 2001b Final Report: Archaeological Survey of Proposed Tanapag Heights Homestead Subdivision: As Mahettok, Island of Saipan Commonwealth of the Northern Mariana Islands. Unpublished report prepared for Efrain F. Camacho Engineers and Architects, Saipan by Paul H. Rosendahl, Inc., Guam.
Defense POW/MIA Accounting Agency n.d. *WWII Accounting*. Retrieved October 4 2016 from <http://www.dpaa.mil/Our-Missing/World-War-II/>.
Denfeld, D.C. 1981a *Field Survey of Truk: World War II Features*. Saipan: Historic Preservation Office.
Denfeld, D.C. 1981b *Japanese Fortifications and Other Military Structures in the Central Pacific*. Saipan: Historic Preservation Office.
Denfeld, D.C. 1988 *Peleliu Revisited: An Historical and Archaeological Survey of World War II Sites on Peleliu Island*. Saipan: Commonwealth of the Northern Marianas Division of Historic Preservation.
Denfeld, D.C. 1992 *Japanese World War II Fortifications and Other Military Structures in the Central Pacific*. Saipan: Division of Historic Preservation.
Denfeld, D.C. 1997 *Hold the Marianas: The Japanese Defense of the Mariana Islands*. Shippensburg: White Mane Publishing.
Denfeld, D.C. 2002 *Japanese WWII Fortifications and Other Military Structures in the Central Pacific*. Saipan: CNMI Division of Historic Preservation.
Denfeld, D.C. 2011 Managing our military heritage. In, *A Companion to Cultural Resource Management*, pp.319–336. Malden: Blackwell Publishing Ltd.
Denfeld, D.C. and S. Russell 1984 *Home of the Superfort: An Historical and Archaeological Survey of Isely Field*. Saipan: Historic Preservation Office.
DeRosa, C.S. 2006 *Political Indoctrination in the U.S. Army from World War II to the Vietnam War*. Lincoln: University of Nebraska Press.
DezhamKhooy, M. and L. Papoli Yazdi 2010 The archaeology of last night…what happened in Bam (Iran) on 25–6 December 2003. *World Archaeology* 42(3):341–354.
Dezhamkhooy, M., L.P. Yazdi and O. Garazhian 2015 All our findings are under their boots! The monologue of violence in Iranian archaeology. In A. González-Ruibal and G. Moshenska (eds), *Ethics and the Archaeology of Violence*, pp.51–70. New York: Springer.
Dilli, B.J., J.D. Henry, A.E. Haun and M.K. Swift 1993 Archaeological Inventory Survey Phase II Data Collection Shimizu Golf Course Development. Unpublished report prepared for S.C. Properties Saipan, Inc. by Paul H. Rosendahl Inc., Guam.
Dirkmaat, D.C., G.O. Olson, A.R. Klales and S. Getz 2012 The role of forensic anthropology in the recovery and interpretation of the fatal-fire victim. In D.C. Dirkmaat (ed.), *Companion to Forensic Anthropology*, pp.113–135. Malden: Blackwell Publishing Ltd.

Dissemination Division G-2 Section 1945a Information on Japanese Defensive Installations and Tactics 1569-45. Inclusion 8: Items for the Attention of Unit Commanders. United States Army.
Dissemination Division G-2 Section 1945b Information on Japanese Defensive Installations and Tactics 1569-45. Inclusion 9: Guide to Battle Tactics using Cave-Type Strong Points. United States Army.
Dissemination Division G-2 Section 1945c Information on Japanese Defensive Installations and Tactics 1569-45. Inclusion 13: Advantages and Disadvantages of Cave Positions. United States Army.
Dixon, B. 2004 The archaeology of rural settlement and class in a pre-WWII Japanese plantation on Tinian, Commonwealth of the Northern Mariana Islands. *International Journal of Historical Archaeology* 8(4):281–299.
Dixon, B., L. Gilda and L. Bulgrin 2012 The archaeology of WWII Japanese stragglers on the island of Guam and the Bushido Code. *Asian Perspectives* 51(1):110–127.
Dixon, B. and R. Schaefer 2014 Archaeological investigations of caves and rock shelters on Guam and Tinian: A synthesis of their use through time. *Journal of Pacific Archaeology* 5(1):52–74.
Dong, C. 2015 *Battlefields and Bunkers: Exploring Okinawa's WWII History*. Retrieved January 2 2017 from <http://www.cnn.com/2015/03/12/travel/okinawa-world-war-ii-travel/>.
Dongguan MingXing Hardware Products Factory 2016 *Black Coating Machine Thread Truss Screw*. Retrieved June 13 2017 from <http://www.mx-fastener.com/black-coating-machine-thread-truss-screw.html>.
Drea, E. 2006 Introduction. In National Archives and Records Administration (ed.), *Researching Japanese War Crimes: Introductory Essays*, pp.3–20. Washington, D.C.: National Archives and Records Administration for the Nazi War Crimes and Japanese Imperial Government Records Interagency Working Group.
Drea, E.J. 2009 *Japan's Imperial Army: Its Rise and Fall, 1853–1945*. Lawrence: University Press of Kansas.
Dubilier Condenser and Radio Corporation 1926 Every One a Micadon. *Popular Science Monthly*:76.
Dutton, D.G. 2007 *The Psychology of Genocide, Massacres, and Extreme Violence: Why "Normal" People Come to Commit Atrocities*. Westport: Praeger Security International.
Eakin, J., K. Higelmire, E. Salo and D. DeFant 2012 Final Report: Intensive Archaeological Survey of Sabanettan I Toru, Saipan, CNMI. Unpublished report prepared for the Commonwealth of the Northern Mariana Islands Department of Community and Cultural Affairs Division of Historic Preservation by Southeastern Archaeological Research, Inc., Honolulu.
Eugenio, H.V. 2013 *US Military Eyes Leasing Pagan*. Retrieved April 15 2013 from <http://www.saipantribune.com/newsstory.aspx?cat=1&newsID=126677>.
Eugenio, H.V. 2014 *Kalabera Cave Development Begins*. Retrieved July 23 2017 from <http://www.saipantribune.com/index.php/kalabera-cave-development-begins/>.
Evans, D. and M. Peattie 1997 *Kaigun: Strategy, Tactics, and Technology in the Imperial Japanese Navy, 1887–1941*. Annapolis: Naval Institute Press.
Fabian, G. 2014 *Inside the Dipnaysupuan Japanese Secret Tunnels*. Retrieved January 14 2017 from <http://intrepidwanderer.com/2014/03/inside-the-dipnaysupuan-japanese-secret-tunnels/#.WHrue_krLIV>.

Farrell, D. 2009 Operation tearaway and tattersalls. In T. Carrell (ed.), *Maritime History and Archaeology of the Commonwealth of the Northern Mariana Islands*, pp.269–343. Texas: Ships of Exploration and Discovery Research, Inc.
Farrell, N. 2011 Historic battlefields: Studying and managing fields of conflict. In T.F. King (ed.), *A Companion to Cultural Resource Management*, pp.298–318. Malden: Wiley-Blackwell.
Fellers, B.F. 1935 *Psychology of the Japanese Soldier*. Fort Leavenworth, KS: The Command and General Staff School.
Ferguson, N. 2013 An Assessment of the Positive Contribution and Negative Impact of Hobbyist Metal Detecting to Sites of Conflict in the UK. Unpublished PhD thesis, School of Humanities, College of Arts, University of Glasgow, Glasgow.
Festinger, L., A. Pepitone and T. Newcomb 1952 Some consequences of deindividuation in a group. *Journal of Abnormal and Social Psychology* 47(2):382–389.
Fisher, K. 2009 *Noritake Collectors Guild Backmarks*. Retrieved July 20 2016 from <http://www.noritakecollectorsguild.info/bstamps/index.html>.
Flood, B. 2001 *Marianas Island Legends Myth and Magic*. Honolulu: The Bess Press, Inc.
Foster, R. 2009 'Don't mention the war': Frontier violence and the language of concealment. *History Australia* 6:68.1–68.15.
Fowler, M. 2015 'Now, Are You Going to Believe This or Not?' Addressing Neglected Narratives Through the Maritime Cultural Landscape of Point Pearce Aboriginal Mission/Burgiyana, South Australia. Unpublished PhD thesis, Flinders University, Department of Archaeology, Adelaide.
Fox, R.A. 1993 *Archaeology, History and Custer's Last Battle*. Norman: University of Oklahoma Press.
Fox, R.A. and D.D. Scott 1991 The post-Civil War battlefield pattern: An example from the Custer Battlefield. *Historical Archaeology* 25(2):92–103.
Frésard, J.-J. 2004 *The Roots of Behaviour in War: A Survey of the Literature*. Geneva: International Committee of the Red Cross.
Frith, J. 2012 Syphilis: Its early history and treatment until penicillin, and the debate on its origins. *Journal of Military and Veterans Health* 20(4):49–58.
Fritz, G. 2001 *The Chamorro: A History and Ethnography of the Mariana Islands*. Saipan: NMI Division of Historic Preservation.
Fruin, W.M. 1983 *Kikkoman: Company, Clan and Community*. London: Harvard University Press.
Fuess, H. 2006 Investment, importation and innovation: Genesis and growth of beer corporations in pre-war Japan. In J. Hunter and C. Storz (eds), *Institutional and Technological Change in Japan's Economy: Past and Present*, pp.43–59. Abingdon: Routledge.
Fujimura, T. 1995 The evolution of porcelain insulator technology in Japan. *IEEE Electrical Insulation Magazine* 11(3):26–36.
Fukudome, S. 1986 The air battle off Taiwan. In D.C. Evans (ed.), *The Japanese Navy in World War II: In the Words of Former Japanese Naval Officers*, pp.334–354. Annapolis: Naval Institute Press.
Gayle, G.D. 1996 *Bloody Beaches: The Marines at Peleliu.* Washington D.C.: Marine Corps Historical Center.

General Headquarters Southwest Pacific Area Military Intelligence Section 1944 I-III: Daily summary of enemy intelligence. IV: G-2 estimate of the enemy situation. V: Miscellaneous information, 30/31 May 1944.

Giblin, J. 2015 Archaeological ethics and violence in post-genocide Rwanda. In G. Moshenska and A. González-Ruibal (eds), *Ethics and the Archaeology of Violence*, pp.33–50. New York: Springer.

Gilchrist, R. 2003 Introduction: Towards a social archaeology of warfare. *World Archaeology* 35(1):1–6.

Gilmore, A.B. 2000 *You Can't Fight Tanks With Bayonets: Psychological Warfare Against the Japanese Army in the Southwest Pacific*. Lincoln: University of Nebraska Press.

Glassow, M.A. 1977 Issues in evaluating the significance of archaeological resources. *American Antiquity* 42(3):413–420.

Gojak, D. 2002 'So suspicious of enemies': Australia's late nineteenth- and twentieth-century coastal defences, their archaeology and interpretation. In J. Schofield, W.G. Johnson and C.M. Beck (eds), *Matériel Culture: The Archaeology of Twentieth Century Conflict*, pp.159–171. London: Routledge.

Gokee, C. and J.D. León 2014 Sites of contention: Archaeological classification and political discourse in the US-Mexico borderlands. *Journal of Contemporary Archaeology* 1(1):133–163.

Goldberg, H.J. 2007 *D-Day in the Pacific: The Battle of Saipan*. Bloomington: Indiana University Press.

González-Ruibal, A., X.A. Vila and R. Caesar 2015 Ethics, archaeology, and civil conflict: The case of Spain. In A. González-Ruibal and G. Moshenska (eds), *Ethics and the Archaeology of Violence*, pp.113–136. New York: Springer.

Gordon, A. 2003 *A Modern History of Japan: From Tokugawa Times to the Present*. New York: Oxford University Press, Inc.

Gorham, H.H. 1971 *Japanese and Oriental Ceramics*. Rutland: Charles E. Tuttle Co., Inc.

Graves-Brown, P. 2000 Introduction. In P. Graves-Brown (ed.), *Matter, Materiality and Modern Culture*, pp.1–9. London: Routledge.

Greenwood, A. 2014 Saipan Is The Most Beautiful Place In America You've Never Heard Of. *Huffington Post*.

Grguric, N.K. 2008 Fortified homesteads: The architecture of fear in frontier South Australia and the Northern Territory, ca. 1847–1885. *Journal of Conflict Archaeology* 4(1-2):59–86.

Guampedia 2014 *Taotaomo'na*. Retrieved October 5 2016 from <http://www.guampedia.com/taotaomona-taotaomona/>.

Hakutsuru Sake Brewing Co. Ltd. 2016 *About Hakutsuru*. Retrieved June 13 2016 from <http://www.hakutsuru.co.jp/english/company/brand.html>.

Hamilakis, Y. 2003 Iraq, stewardship and "the record": An ethical crisis for archaeology. *Public Archaeology* 3(2):104–118.

Hanks, M. 2015 Landing at Saipan: The three M4 Sherman tanks that never reached the beach. In J.F. McKinnon and T.L. Carrell (eds), *Underwater Archaeology of a Pacific Battlefield*, pp.73–84. New York: Springer Briefs in Archaeology.

Hardesty, D.L. 2010 *Mining Archaeology in the American West: A View from the Silver State*. Lincoln: University of Nebraska Press.

Harper, R.A., M.K. Swift and M.A. Fleming 2011 Data Recovery: Saipan Airport Runway Area Safety Improvement Project. Swift and Harper Resource Consulting, Saipan.

Harries, M. and S. Harries 1991 *Soldiers of the Sun: The Rise and Fall of the Imperial Japanese Army*. New York: Random House Inc.
Harris, F.W. 2010 Crystal Sets to Sideband: A Guide to Building an Amateur Radio Station. Unpublished report.
Harris, O.J.T. and T.F. Sørensen 2010 Rethinking emotion and material culture. *Archaeological Dialogues* 17(2):145–163.
Harrison, R. 2004 *Shared Landscapes: Archaeologies of Attachment and the Pastoral Industry in New South Wales*. Sydney: University of New South Wales Press Ltd.
Harrison, R. and J. Schofield 2010 *After Modernity: Archaeological Approaches to the Contemporary Past*. Oxford: Oxford University Press.
Hasegawa, T. 2005 *Racing the Enemy: Stalin, Truman, and the Surrender of Japan*. Cambridge: The Belnap Press of Harvard University Press.
Hashimoto, T. 2006 *Modern Printed Porcelain: Designs and Historical Context*. Osaka, Japan: Kenkyusha.
Hatena 2014 *Trend of the Average Height of Japanese Men*. Retrieved March 30 2017 from <http://nbakki.hatenablog.com/entry/2014/05/30/173407>.
Hawk, A. 2006 The great disease enemy: Kak'ke (beriberi) and the Imperial Japanese Army. *Military Medicine* 171(4):333–339.
Hawk, A. n.d.-a Blood Transfusions in the Imperial Japanese Army. Unpublished draft paper.
Hawk, A. n.d.-b Dentistry in the Imperial Japanese Army. Unpublished draft paper.
Hawk, A. n.d.-c The Paradox of the Imperial Japanese Army Medical Department. Unpublished draft paper.
Hawley, T.M. 2005 *The Remains of War: Bodies, Politics, and the Search for American Soldiers Unaccounted For in Southeast Asia*. Durham: Duke University Press.
Hickey, D., S.S. Li, C. Morrison, R. Schulz, M. Thiry and K. Sorensen 2016 Unit 731 and moral repair. *Journal of Medical Ethics*:1–7.
Higuchi, W. 2001 The Japanisation policy for the Chamorros of Guam, 1941–1944. *The Journal of Pacific History* 36(1):19–35.
Higuchi, W. 2013 *The Japanese Administration of Guam, 1941-1944: A Study of Occupation and Integration Policies, with Japanese Oral Histories*. Jefferson: McFarland Incorporated Publishers.
Hiroyuki, S. 2001 Japanese air operations over New Guinea during the Second World War. *Journal of the Australian War Memorial* 34:1–49.
Historynet 2014 *Japanese Search Team Repatriates American War Dead*. Retrieved July 23 2017 from <http://www.historynet.com/japanese-search-team-repatriates-american-war-dead.htm#prettyPhoto>.
Hoffman, C.W. 1950 *Saipan: The Beginning of the End.* Historical Division Headquarters. U.S. Marine Corps.
Hoffman, C.W. 1951 *The Seizure of Tinian.* Historical Division Headquarters. U.S. Marine Corps.
Holtorf, C. 2009 Commentary: Visions of the twentieth century. In J. Schofield (ed.), *Defining Moments: Dramatic Archaeologies of the Twentieth Century*, pp.65–82. Oxford: Archaeopress.
Holtorf, C. and A. Piccini 2011 Introduction: Fragments from a conversation and contemporary archaeologies. In C. Holtorf and A. Piccini (eds), *Contemporary Archaeologies: Excavating Now*, pp.9–30. Frankfurt: Peter Lang.

Hung, H., M.T. Carson, P. Bellwood, F.Z. Campos, P.J. Piper, E. Dizon, M.J.L.A. Bolunia, M. Oxenham and Z. Chi 2011 The first settlement of Remote Oceania: The Philippines to the Marianas. *Antiquity* 85(329):909–926.

Hunter-Anderson, R.L. and M.W. Kaschko 2002 Final Report: Archaeological Survey of the Proposed Capitol Hill Subdivision, Saipan Commonwealth of the Northern Mariana Islands. Unpublished report prepared for E.M. Chen and Associates, Inc. by Micronesian Archaeological Research Services, Guam.

Ifert, B. 1994 *Made in Japan Ceramics 1921–1941: With Price Guide*. Atglen, PA: Schiffer Publishing, Ltd.

Impey, O. 1996 *The Early Porcelain Kilns of Japan: Arita in the First Half of the Seventeenth Century*. Oxford: Clarendon Press.

Inert-Ord.Net 2013 *Japanese Ordnance of WWII: 81mm Type 100 HE Mortar Round*. Retrieved September 15 2016 from <http://www.inert-ord.net/jap02h/t100mort/index.html>.

Isherwood, R. 2011 Community archaeology: Conceptual and political issues. In G. Moshenska and S. Dhanjal (eds), *Community Archaeology: Themes, Methods and Practices*. Oxford: Oxbow Books.

Ishige, N. 2001 *The History and Culture of Japanese Food*. London: Kegan Paul.

Jahn, G. 2004 *Meiji Ceramics: The Art of Japanese Export Porcelain and Satsuma Ware 1868–1912*. Stuttgart: Arnoldsche.

Jansen, M.B. 2000 *The Making of Modern Japan*. Cambridge: The Belknap Press of Harvard University Press.

Japan Porcelain Society 2008 *Techniques and Backstamps*. Retrieved March 24 2016 from <http://japan-porcelain.com/backstamps.htm>.

Jarvis, H. 2002 Mapping Cambodia's 'killing fields'. In J. Schofield, W.G. Johnson and C.M. Beck (eds), *Matériel Culture: The Archaeology of Twentieth Century Conflict*, pp.91–102. London: Routledge.

Jeffery, B. and K.A. Palmer 2017 The need for a multivocal approach to researching and managing Guam's World War II underwater cultural heritage. *International Journal of Nautical Archaeology* 46(1):164–178.

Jeffery, W. 2006 A CRM approach in investigating the submerged World War II sites in Chuuk Lagoon. *Micronesian Journal of the Humanities and Social Sciences* 5(1/2):137–155.

Jeffery, W. 2007 War Graves, Munition Dumps and Pleasure Grounds: A Post-Colonial Perspective of Chuuk Lagoon's Submerged World War II Sites. Unpublished PhD thesis, School of Arts, Education and Social Sciences, James Cook University, Townsville.

Johnson, M. 2010 *Archaeological Theory: An Introduction*. Malden: Wiley-Blackwell.

Johnson, W.G. 2002 Archaeological examination of Cold War architecture: A reactionary cultural response to the threat of nuclear war. In J. Schofield, W.G. Johnson and C.M. Beck (eds), *Matériel Culture: The Archaeology of Twentieth Century Conflict*, pp.227–235. London: Routledge.

Johnstone, W.C. 1937 *The Shanghai Problem*. Stanford University, California: Stanford University Press.

Jones, S.M. and L. Russell 2012 Archaeology, memory and oral tradition: An introduction. *International Journal of Historical Archaeology* 16:267–283.

Jowett, P. 2002 *The Japanese Army 1931–1945*. Oxford: Osprey Publishing Ltd.

Judge, C. 2008 The South Carolina Heritage Trust program: Fifteen years of site acquisition and management. In F.P. McManamon, A. Stout and J.A. Barnes (eds), *Managing*

Archaeological Resources: Global Context, National Programs, Local Actions, pp.195–204. Walnut Creek: Left Coast Press.
Judge, C. 2012 The South Carolina Heritage Trust Program: Fifteen Years of Archaeological Site Acquisition and Management. In S. Sullivan and R. Mackay (eds), *Archaeological Sites: Conservation and Management*. Los Angeles: The Getty Conservation Institute.
Judge, C. and S.D. Smith 1991 Acquiring the Past for the Future: The South Carolina Heritage Trust Statewide Assessment of Cultural Sites. Research Manuscript Series Book 230, The South Carolina Institute of Archaeology and Anthropology, University of South Carolina, Columbia.
Kador, T. 2014 Public and community archaeology: An Irish perspective. In S. Thomas and J. Lea (eds), *Public Participation in Archaeology*, pp.35–48. Woodbridge: The Boydell Press.
Kauppi, U.-R. 2002 The Salpa Line: A monument of the future and the traces of war in the Finnish cultural landscape. In J. Schofield, W.G. Johnson and C.M. Beck (eds), *Matériel Culture: The Archaeology of Twentieth Century Conflict*, pp.49–57. London: Routledge.
Kawabe, N. 1989 The development of distribution systems in Japan before World War II. *Business and Economic History* 18:33–44.
Keeling, S. 2011 *The Rough Guide to Taiwan*. London: Penguin Books.
King, T. 2006 How Micronesia changed the U.S. historic preservation program and the importance of keeping it from changing back. *Micronesian Journal of the Humanities and Social Sciences* 5(1/2):505–516.
King, T.F. 2008 *Cultural Resource Laws and Practice*. Lanham: AltaMira Press.
King, T.F. and P.L. Parker 1984 *Pisekin Nóómw Nóón Tonaachaw: Archaeology in the Tonaachaw Historic District, Moen Island.* Center for Archaeological Investigations, Southern Illinois University, Occasional Paper No. 3, Carbondal.
Kirin Holdings Company Ltd. 2007 *The History of Kirin*. Retrieved May 9 2016 from <http://www.kirinholdings.co.jp/english/company/history/group/04.html>.
Knecht, R., N. Price and G. Lindsay 2012 WWII Battlefield Survey of Peleliu Island Peleliu State, Republic of Palau. Unpublished report prepared for the Peleliu War Historical Society.
Kritz, N.J. 1996 Coming to terms with atrocities: A review of accountability mechanisms for mass violations of human rights. *Law and Contemporary Problems* 59(4):127–152.
Kuentai-USA.com 2014a *Field Blog*. Retrieved June 8 2017 from <http://kuentai-usa.com/update20151106.html>.
Kuentai-USA.com 2014b *History*. Retrieved June 8 2017 from <http://kuentai-usa.com/>.
Laffin, J. 1987 *Battlefield Archaeology*. New York: Hippocrene Books.
Laker, J.A. 1975 Entrepreneurship and the Development of the Japanese Beer Industry, 1872-1937. Unpublished PhD thesis, Indiana University, Bloomington.
Lansford, T. 2017 *Political Handbook of the World 2016-2017*. Thousand Oaks: SAGE Publications.
Law, B. 2010 *Roundwood Timber Framing: Building Naturally Using Local Resources*. East Meon: Permanent Publications.
Law, G. 1999 *Administrative Subdivisions of Countries: A Comprehensive World Reference, 1900 Through 1998*. Jefferson: McFarland and Company, Inc.
Lea, J. and S. Thomas 2014 Introduction. In S. Thomas and J. Lea (eds), *Public Participation in Archaeology*, pp.1–7. Woodbridge: The Boydell Press.

Lees, W.B. 1994 When the shooting stopped, the war began. In C.R. Geier and S.E. Winter (eds), *Look to the Earth: Historical Archaeology and the American Civil War*, pp.39–59. Knoxville: The University of Tennessee Press.

Lennon, J. and M. Foley 2000 *Dark Tourism: The Attraction of Death and Disaster*. London: Continuum.

Lindsey, B. 2016a *Bottle Finishes and Closures: Part II Types or Styles of Finishes. Types Link Bar*. Retrieved July 21 2016 from <https://sha.org/bottle/finishstyles.htm#Finish>.

Lindsey, B. 2016b *Bottle Typing/Diagnostic Shapes: Liquor/Spirits Bottles. Spirits Cylinder Bottles*. Retrieved July 21 2016 from <https://sha.org/bottle/liquor.htm#Squat>.

Litster, M. and L.A. Wallis 2011 Looking for the proverbial needle? The archaeology of Australian colonial frontier massacres. *Archaeology in Oceania* 46:105–117.

Little, B.J. and P.A. Shackel 2014 *Archaeology, Heritage, and Civic Engagement: Working Toward the Public Good*. Walnut Creek: Left Coast Press.

Lockhart, B. and R. Hoenig 2015 The Bewildering Array of Owens-Illinois Glass Co. Logos and Codes. Society for Historical Archaeology.

Lockhart, B., B. Shreiver, B. Lindsey and C. Serr 2013 Anchor Hawking Glass Corp. Society for Historical Archaeology.

Long, S. and P. Memmott 1998 The significance of indigenous place knowledge to Australian cultural heritage. *Indigenous Law Bulletin* 4(16):9–13.

Lotz, D. 1994 *World War II Remnants: Guam, Northern Mariana Islands: A Guide and History*. Honolulu: Arizona Memorial Museum Association.

Lotz, D. 1998 *World War II Remnants–Guam, Northern Mariana Islands: A Guide and History*. 2nd Edition ed. Honolulu: Arizona Memorial Museum Association.

Lubkemann, S.C. 2008 *Culture in Chaos: An Anthropology of the Social Condition in War*. Chicago: University of Chicago Press.

Ma, X. 2007 Constructing a national memory of war: War museums in China, Japan, and the United States. In M. Gallicchio (ed.), *The Unpredictability of the Past: Memories of the Asia-Pacific War in U.S.–East Asian Relations*, pp.155–200. Durham: Duke University Press.

MacDonald, J. 2007 *Japanese Air Defence Gas Mask Type 16th Year, Model A*. Retrieved June 21 2016 from <http://worldwar2database.com/gallery/wwii1191>.

MacManamon, F.P. 2003 The protection of archaeological resources in the United States: Reconciling preservation with contemporary society. In A. Hatton and F.P. MacManamon (eds), *Cultural Resource Management in Contemporary Society Perspectives on Managing and Presenting the Past*, pp.40–54. Hoboken: Taylor and Francis.

Madej, W.V. 1981a *Japanese Armed Forces Order of Battle 1937–1945, Volume 1*. Allentown: Game Marketing Company.

Madej, W.V. 1981b *Japanese Armed Forces Order of Battle 1937–1945, Volume 2*. Allentown: Game Marketing Company.

Maga, T. 2001 ‘Away From Tokyo’: The Pacific Islands war crimes trials, 1945-1949. *The Journal of Pacific History* 36(1):37–50.

Maga, T.P. 1990 *John F. Kennedy and the New Pacific Community, 1961–63*. Houndmills: The Macmillan Press Ltd.

Maio, C.V., D.E. Tenenbaum, C.J. Brown, V.T. Mastone and A.M. Gontz 2013 Application of geographic information technologies to historical landscape reconstruction and military terrain analysis of an American Revolution battlefield: Preservation potential of historic lands in urbanized settings, Boston, Massachusetts, USA. *Journal of Cultural Heritage* 14(4):317–331.

Majewski, T. and M.J. O'Brien 1987 The use and misuse of nineteenth-century English and American ceramics in archaeological analysis. In M.B. Schiffer (ed.), *Advances in Archaeological Method and Theory, Volume 11*, pp.97–209. San Diego: Academic Press.

Marianas Visitors Authority 2016 Commonwealth of the Northern Mariana Islands: Visitor Arrival Statistics.

Marshall, Y. 2002 What is community archaeology? *World Archaeology* 34(2):211–219.

Masao, S. 2000 At the end of a desertion. In O. Mariko (ed.), *Pagan Island in the Distance*, pp.98–100. Tokyo: Pagan Island HP Management Committee.

Maxwell, C. 1937 Arm-Chair Radio Set. *Popular Science Monthly*:74–75.

Maxwell, D.B.S. 1993 Beer cans: A guide for the archaeologist. *Historical Archaeology* 27(1):95–113.

Mayne Correia, P.M. 1997 Fire modification of bone: A review of the literature. In M.H. Sorg and W.D. Haglund (eds), *Forensic Taphonomy: The Postmortem Fate of Human Remains*, pp.275–294. Boca Raton: CRC Press.

Mazurek, C.A. and M.W. Kaschko 1991 Interim Summary Report: Phase I Archaeological Inventory Survey of the Proposed Kagman Golf Course Project Area Saipan, Commonwealth of the Northern Mariana Islands. Unpublished report prepared for The Northern Islands Company by the International Archaeological Research Institute, Inc., Honolulu.

McCurry, J. 2007 *Change of Name for Iwo Jima*. Retrieved July 23 2016 from <https://www.theguardian.com/world/2007/jun/21/secondworldwar.japan>.

McKinney, L.C.L.L. 1949 Portable Flamethrower Operations in WWII. U.S. Army Historical Division.

McKinnon, J., J. Mushynsky and G. Cabrera 2014a A fluid sea in the Mariana Islands: Community archaeology and mapping the seascape of Saipan. *Journal of Maritime Archaeology* 9(1):59–79.

McKinnon, J.F. 2014 Difficult heritage: Interpreting underwater battlefield sites. In D.A. Scott-Ireton (ed.), *Meeting Challenges in the Public Interpretation of Maritime Cultural Heritage: Between the Devil and the Deep*, pp.173–187. New York: Springer Press.

McKinnon, J.F. 2015a Memorialization, graffiti and artifact movement: A case study of cultural impacts on WWII underwater cultural heritage in the Commonwealth of the Northern Mariana Islands. *Journal of Maritime Archaeology* 10(1):11–27.

McKinnon, J.F. 2015b "They drank their own tears": Archaeology of conflict sites. In J.F. McKinnon and T.L. Carrell (eds), *Underwater Archaeology of a Pacific Battlefield*, pp.147–155. New York: Spinger Briefs in Archaeology.

McKinnon, J.F. 2015c Underwater archaeology of a WWII battlefield. In J.F. McKinnon and T.L. Carrell (eds), *Underwater Archaeology of a Pacific Battlefield*, pp.1–14. New York: Springer Briefs in Archaeology.

McKinnon, J.F. and T.L. Carrell 2011 Saipan WWII Invasion Beaches Underwater Heritage Trail. Unpublished report prepared by Ships of Discovery, Santa Fe, NM.

McKinnon, J.F., T.L. Carrell, H. Burke, G. Cabrera, J. Raupp, J. Mushynsky and J. Kimura 2014b A Preservation Plan for the Protection of WWII-Related Caves on Saipan. Unpublished report prepared by Ships of Discovery, Santa Fe, NM.

McKinnon, R., J.B. Carillet and D. Starnes 2008 *Papua New Guinea and Solomon Islands*. Melbourne: Lonely Planet.
McNab, C. 2015 *The Flamethrower*. Oxford: Osprey Publishing.
McNutt, R. 2014 Finding Forgotten Fields: A Theoretical and Methodological Framework for Historic Landscape Reconstruction and Predictive Modelling of Battlefield Locations in Scotland, 1296-1650. Unpublished PhD thesis, School of Humanities, College of Arts, University of Glasgow, Glasgow.
Meller, N. 1999 *Saipan's Camp Susupe.* Occasional Paper 42. Center for Pacific Islands Studies. Honolulu: University of Hawaii.
Memmott, M. 2015 What Can This Be? A Practical Workshop on Tin Can Identification and Analysis. Nevada Archaeological Association 44th Annual Meeting. Wendover, Nevada.
Micronesian Area Research Center 1981a *The War Years on Saipan Transcripts of Interviews with Residents, Volume One*: U.S. Park Service/MARC Oral History Project, Miscellaneous Publications, No, 6, University of Guam.
Micronesian Area Research Center 1981b *The War Years on Saipan Transcripts of Interviews with Residents, Volume Two*: U.S. Park Service/MARC Oral History Project, Miscellaneous Publications No, 6, University of Guam.
Milgram, S. 1974 *Obedience to Authority: An Experimental View*. New York: Harper and Row.
Military Intelligence Division 1944 Papuan Campaign: The Buna-Sanananda Operation, 16 November 1942-23 January 1943, Washington, D.C.
Military Intelligence Service 1944 *Soldier's Guide to the Japanese Army*. Military Intelligence Service Special Series No, 27. Washington D.C.: War Department.
Military Sealift Command Public Affairs 1997 *Maritime Prepositioning Ships: Let the Adventure Begin*. Retreived July 23 2017 from <http://www.msc.navy.mil/publications/pressrel/press97/press73.htm>.
Miller, D.L. 2008 *D-Days in the Pacific*. New York: Simon and Schuster.
Miller, J.J. 1949 *The War in the Pacific: Guadalcanal: The First Offensive*. Washington, D.C.: U.S. Government Printing Office.
Miller, J.J. 1959 *The War in the Pacific: Cartwheel: The Reduction of Rabaul*. Washington, D.C.: U.S. Government Printing Office.
Mills, B. 1970 *Porcelain Insulators and How They Grew*. LeRoy N.Y.: Brent Mills.
Milner, S. 1989 *Victory in Papua*. Washington, D.C.: Center of Military History, United States Army.
Minerals Education Coalition n.d. *Mica*. Retrieved April 20 2016 from <https://www.mineralseducationcoalition.org/minerals/mica>.
Mohlman, G. 2011 Final Report: Archaeological Survey and National Register Nomination for Japanese Defensive Complex, Rota Island, CNMI. Unpublished report prepared for the Commonwealth of the Northern Mariana Islands Department of Community and Cultural Affairs Division of Historic Preservation by Southeastern Archaeological Research, Inc., Saipan.
Moore, A.W. 2013 An insatiable parasite: Eating and drinking in WWII armies of the Asia-Pacific Theatre (1937–1945). In K.J. Cwiertka (ed.), *Food and War in Mid-Twentieth-Century East Asia*, pp.109–130. London: Routledge.
Moore, D.R. and R.L. Hunter-Anderson 1987 A Report on an Archaeological Survey of the Marianas Public Land Corporation Homestead area Tinian Island, Commonwealth of the

Northern Marianas. Unpublished report prepared for the Marianas Public Land Corporation, Saipan.
Moore, D.R. and R.L. Hunter-Anderson 1988 Report on a Survey of the Ginalangan Defensive Complex, Rota, Commonwealth of the Northern Marina Islands. Unpublished report prepared for the Historic Preservation Division Department of Community and Cultural Affairs Commonwealth of the Northern Mariana Islands.
Moore, D.R., R.L. Hunter-Anderson, E.F. Wells and J.R. Amesbury 2001 Final Report on Phase III Archaeological Survey and Testing Voice of America (VOA) Mariana Radio Relay Station Site Within Area A, Tinian Island, Commonwealth of the Northern Mariana Islands. Unpublished report prepared for SCS/CRMS, Inc. and U.S. Army Corps of Engineers by Micronesian Archaeological Research Services, Guam.
Moore, D.R., D.A. Sheldon and J.R. Amesbury 1990 Archaeological Survey of the As Matuis and Kagman Homestead Areas. Unpublished report prepared for Marianas Public Land Corporation by Micronesian Archaeological Research Services, Guam.
Morton, L. 1953 *War in the Pacific: Strategy and Command: The Fall of the Philippines*. Washington, D.C.: Governmnet Printing Office.
Morton, L. 1962 *War in the Pacific: Strategy and Command: The First Two Years*. Washington, D.C.: U.S. Government Printing Office.
Morton, L. 2000 *War in the Pacific: Strategy and Command: The First Two Years*. Washington, D.C.: U.S. Government Printing Office.
Moser, S., D. Glazier, J.E. Phillips, L. Nasser el Nemr, M. Saleh Mousa, R. Nasr Aiesh, S. Richardson, A. Conner and M. Seymour 2002 Transforming archaeology through practice: Strategies for collaborative archaeology and the community archaeology project at Quseir, Egypt. *World Archaeology* 34(2):220–248.
Moshenska, G. 2008a Community archaeology from below: A response to Tully. *Public Archaeology* 7(1):51–52.
Moshenska, G. 2008b Ethics and ethical critique in the archaeology of modern conflict. *Norwegian Archaeological Review* 41(2):159–175.
Moshenska, G. 2008c A hard rain: Children’s shrapnel collections in the Second World War. *Journal of Material Culture* 13(1):107–125.
Moshenska, G. 2009a Contested pasts and community archaeology: Public engagment in the archaeology of modern conflict. In N. Forbes, R. Page and G. Pérez (eds), *Europe's Deadly Century: Perspectives on 20th Century Conflict Heritage*, pp.73–79. Swindon: English Heritage.
Moshenska, G. 2009b Resonant materiality and violent remembering: Archaeology, memory and bombing. *International Journal of Heritage Studies* 15(1):44–56.
Moshenska, G. 2010a Gas masks: Material culture, memory, and the senses. *Journal of the Royal Anthropological Institute* 16(3):609–628.
Moshenska, G. 2010b Working with memory in the archaeology of modern conflict. *Cambridge Archaeological Journal* 20(1):33–48.
Moshenska, G. 2012 *The Archaeology of the Second World War: Uncovering Britain's Wartime Heritage*. South Yorkshire: Pen and Sword Archaeology.
Moshenska, G. 2013 Conflict. In P. Graves-Brown, R. Harrison and A. Piccini (eds), *The Oxford Handbook of the Archaeology of the Contemporary World*, pp.351–363. Oxford: Oxford University Press.

Moshenska, G. and S. Dhanjal 2011 Introduction: Thinking about, talking about and doing community archaeology. In G. Moshenska and S. Dhanjal (eds), *Community Archaeology Themes, Methods and Practices*, pp.1–5. Oxford: Oxbow Books.

Moshenska, G. and A. González-Ruibal 2015 Introduction: The only way is ethics. In A. González-Ruibal and G. Moshenska (eds), *Ethics and the Archaeology of Violence*, pp.1–17. New York: Springer.

Mushynsky, J. 2011 Sea Fluidity: Recording Indigenous Seascapes and Maritime Cultural Landscapes in Saipan, Commonwealth of the Northern Mariana Islands. Unpublished M.A. thesis, Department of Archaeology, Flinders University, Adelaide.

Myers, A.T. 2010 Telling time for the electrified: An introduction to porcelain insulators and the electrification of the American home. *Technical Briefs in Historical Archaeology* 5:31–42.

Mytum, H. 2013 Materiality matters: The role of things in coping strategies at Cunningham's Camp Douglas during World War I. In H. Mytum and G. Carr (eds), *Prisoners of War: Archaeology, Memory, and Heritage of 19th- and 20th-Century Mass Internment*, pp.169–188. New York: Springer Science+Business Media.

Mytum, H. and G. Carr 2013 Prisoner of war archaeology. In H. Mytum and G. Carr (eds), *Prisoners of War: Archaeology, Memory, and Heritage of 19th- and 20th-Century Mass Internment*, pp.3–22. New York: Springer Science+Business Media.

Na, H. 2015 *The Beginning of the End*. Retrieved February 25 2017 from <http://usa.chinadaily.com.cn/epaper/2015-08/19/content_21648484.htm>.

Nakanishi, R. 1991 *Japanese Military Uniforms 1930–1945*. Tokyo: Dai Nippon Kaiga Co Ltd.

Nakata, T. and T.B. Nelson 1987 *Imperial Japanese Army and Navy Uniform and Equipments*. London: Arms and Armour Press Ltd.

Ness, L. 2014 *Rikugun Guide to Japanese Ground Forces 1937-1945. Volume 1: Tactical Organization of Imperial Japanese Army and Navy Ground Forces*. West Midlands: Helion and Company Ltd.

Ness, L. 2015 *Rikugun Guide to Japanese Ground Forces 1937-1945. Volume 2: Weapons of the Imperial Japanese Army and Navy Ground Forces*. West Midlands: Helion and Company Ltd.

Ngirmang, S. 2010 Palau. In U. Guérin, B. Egger and V. Penalva (eds), *Underwater Cultural Heritage in Oceania*, pp.77–80. Paris: UNESCO.

Nicholas, G.P., J.R. Welch and E.C. Yellowhorn 2008 Collaborative encounters. In C. Colwell-Chanthaphonh and T.J. Ferguson (eds), *Collaboration in Archaeological Practice: Engaging Descendant Communities*, pp.273- 298. Lanham: AltaMira Press.

NIDS n.d. *Military Archives*. Retrieved February 11 2016 from <http://www.nids.go.jp/english/military_archives/index.html>.

Nila, G. 2002 *Japanese Naval Aviation Uniforms and Equipment 1937–45*. Oxford: Osprey Publishing Ltd.

Nila, G. and R.A. Rolfe 2006 *Japanese Special Naval Landing Forces: Uniforms and Equipment 1932–45*. Oxford: Osprey Publishing Ltd.

NMI Humanities Council 2016 *About Us*. Retrieved February 11 2016 from <http://northernmarianashumanities.org/sec.asp?secID=2>.

NMI Museum of History and Culture n.d. *About*. Retrieved March 4 2016 from <http://cnmimuseum.wix.com/welcome#!about>.

North, O.L. 2004 *War Stories II: Heroism in the Pacific*. Washington D.C.: Regnery Publishing.

NPS 2000 American Battlefield Protection Program Battlefield Survey Manual. Compiled by David W. Lowe, Washington, D.C.
NPS 2016 *Frequently Asked Questions*. Retrieved February 8 2016 from <http://www.nps.gov/aboutus/faqs.htm>.
Nunn, P., L. Kumar, I. Eliot and R.F. McLean 2016 Classifying pacific islands. *Geoscience Letters* 3(7):1–19.
Nunn, P.D. 2010 Pacific atolls: A world apart. In P. Migon (ed.), *Geomorphological Landscapes of the World*, pp.349–356. New York: Springer.
O'Neill, J.G. and D.H.R. Spennemann 2001 German Colonial Heritage in Micronesia. *CRM* 1:46–47.
OEESC Inc. 2001 Cultural Resources Survey of the Military Leaseback Area, Tinian, Commonwealth of the Northern Mariana Islands, Volume 2: Site Descriptions and Excavation Results, Eastern Leaseback Areas 8-14. Unpublished report prepared by Ogden Environmental and Energy Services Co., Inc. Honolulu.
Office of Historic Preservation 2011 *Preservation CNMI Caring for the Past in an Uncertain Future: Commonwealth of the Northern Mariana Islands Historic Preservation Plan 2011-2015*. Saipan: CNMI Office of Historic Preservation.
Ogawa, M. 2009 Spirit of the samurai. In M. Ogawa (ed.), *Art of the Samurai: Japanese Arms and Armor, 1156-1868*, pp.3–36. New York: Metropolitan Museum of Art.
Olmo, R.K. 1992 Phase 1 Archaeological Inventory Survey, Kanaya Property, Laulau Bay, Saipan. Unpublished report prepared for the Northern Islands Company by International Archaeological Research Institute, Inc. Honolulu.
Olopai, L.M. and J. Flinn 2005 *The Rope of Tradition: Reflections of a Saipan Carolinian*. Saipan: Northern Mariana Islands Council for the Humanities.
Pacific STAR Center for Young Writers 2004 *"We Drank Our Tears": Memories of the Battles for Saipan and Tinian as Told by Our Elders*. Saipan: Pacific STAR Center for Young Writers.
Pantaleo, J.J., S.D. Clark, J. William R. Fortini, A. Sinoto and J.L. Babauta 1992 Archaeological Inventory Survey of the Kagman/Unai Alaihai Village Homestead Subdivision Saipan, CNMI. Unpublished report prepared for The Marianas Public Land Corporation by AB Business Management and Consulating Services, Saipan.
Parry, R.L. 2011 *War Remains Recovery Mission Turns Sour*. Retrieved July 23 2017 from <http://www.theaustralian.com.au/news/world/war-remains-recovery-mission-goes-sour/story-e6frg6so-1226151318736>.
Peattie, M.R. 1988 *Nan'yo: The Rise and Fall of the Japanese in Micronesia, 1885-1945*. Honolulu: University of Hawaii Press.
Peck, W.M. 1988 Albert Toves and the pit. *Islander* 5:5–9.
Perez, P. n.d. *Latest Developments*. Retrieved October 15 2016 from <http://www.chamorro.com/docs/2016-7-27-EJ-AZC-Complaint.pdf>.
Perring, D. and S.v.d. Linde 2009 The politics and practice of archaeology in conflict. *Conservation and Management of Archaeological Sites* 11(3–4):197–213.
Petchey, P. 2015 Second World War Japanese defences on Watom Island, Papua New Guinea. *Journal of Conflict Archaeology* 10(1):29–51.
Petty, B.M. 2002 *Saipan: Oral Histories of the Pacific War*. Jefferson: McFarland and Company, Inc.

Phelan, W.C. 1945 Japanese Military Caves on Peleliu. “Know Your Enemy!” CINCPAC-CINCPOA Bulletin 173-45. United States Navy.
Podruczny, G. and J. Wrzosek 2014 Lone grenadier: An episode from the Battle of Kunersdorf, 12 August 1759. *Journal of Conflict Archaeology* 9(1):33–47.
Pollard, T. 2014 Taking the hill: Archaeological survey and excavation of German communication trenches on the summit of Mont St. Quentin. *Journal of Conflict Archaeology* 9(3):177–197.
Pollard, T. and I. Banks 2010 Now the wars are over: The past, present and future of Scottish battlefields. *International Journal of Historical Archaeology* 14(3):414–441.
Poyer, L. 2004 Dimensions of hunger in wartime: Chuuk Lagoon, 1943–1945. *Food and Foodways* 12(2-3):137–164.
Poyer, L., S. Falgout and L.M. Carucci 2001 *The Typhoon of War: Micronesian Experiences of the Pacific War*. Honolulu: University of Hawai'i Press.
Price, J. 2005 Orphan heritage: Issues in managing the heritage of the Great War in Northern France and Belgium. *Journal of Conflict Archaeology* 1(1):181–196.
Price, N. and R. Knecht 2012 Peleliu 1944: The archaeology of a South Pacific D-Day. *Journal of Conflict Archaeology* 7(1):5–48.
Price, N. and R. Knecht 2013 After the typhoon: Multicultural archaeologies of World War II on Peleliu, Palau, Micronesia. *Journal of Conflict Archaeology* 8(3):193–248.
Price, N., R. Knecht and G. Lindsay 2015 The Sacred and the Profane: Souvenir and Collecting Behaviours on the WWII Battlefields of Peleliu Island, Palau, Micronesia. In G. Carr and K. Reeves (eds), *Heritage and Memory of War: Responses from Small Islands*, pp.219–233. New York: Routledge.
Puckett, N.A. and M. Atwood 2012 Crime on the battlefield. In J.H. Laurence and M.D. Matthews (eds), *The Oxford Handbook of Military Psychology*, pp.79–91. Oxford: Oxford University Press.
Putzi, J.L., F.J. Eble, D.R. Moore, J.R. Amesbury and R.L. Hunter-Anderson 1997 Final Report Phase II Archaeological Survey and Testing at the Proposed Voice of America Relat Station Site within Area A, Tinian Island, Commonwealth of the Northern Mariana Islands. Unpublished report prepared for the United States Army Corps of Engineers Pacific Ocean Division by Garcia and Associates, Honolulu.
Raine, R. 2013 A dark tourist spectrum. *International Journal of Culture, Tourism and Hospitality Research* 7(3):242–256.
Ramos, M., F. Bognanni, M. Lanza, V. Helfer, C.G. Toralbo, R. Senesi, O. Hernández de Lara, C. Pinochet and J. Clavijo 2014 The archaeology of the Battle of Vuelta de Obligado, Buenos Aires Province, Argentina. *Journal of Conflict Archaeology* 9(2):69-92.
Reich, H.J. 1941 *Principles of Electron Tubes*. New York: McGraw-Hill Book Company Inc.
Reichel, J.D., C.T. Collins, D.W. Stinson and V.A. Camacho 2007 Growth and development of the Mariana Swiftlet. *The Wilson Journal of Ornithology* 119(4):686–692.
Riches, D. 1986 The phenomenon of violence. In D. Riches (ed.), *The Anthropology of Violence*, pp.1–27. Oxford: Basil Blackwell.
Roberts, N.A., J.W. Brown, B. Hammett and P.D.F. Kingston 2008 A detailed study of the effectiveness and capabilities of 18th century musketry on the battlefield. *Journal of Conflict Archaeology* 4(1-2):1–21.
Robertson, B.M. 2000 *Oral History Handbook*. Unley: Oral History Association of Australia.
Rogers, R.F. 1995 *Destiny’s Landfall: A History of Guam*. Honolulu: University of Hawaii Press.

Rohto Pharmaceutical Co. Ltd. n.d. *History 1899–1969*. Retrieved June 12 2016 from <http://www.rohto.co.jp/global/company/history/1899-1969/>.
Ross, D. 2012 Late-nineteenth and early-twentieth century Japanese domestic wares from British Columbia. In R. Hunter (ed.), *Ceramics in America*, pp.2–29. Fox Point, Wisc.: Chipstone Foundation.
Ross, D.E. 2009a Identification and dating of Japanese glass beverage bottles. *Technical Briefs in Historical Archaeology* 4:7–17.
Ross, D.E. 2009b Material Life and Socio-Cultural Transformation Among Asian Transmigrants at a Fraser River Salmon Cannery. Unpublished PhD thesis, Department of Archaeology, Simon Fraser University, Burnaby.
Ross, D.E. 2010 Comparing the material lives of Asian transmigrants through the lens of alcohol consumption. *Journal of Social Archaeology* 10(2):230–254.
Ross, D.E. 2011 Factors inluencing the dining habits of Japanese and Chinese migrants at a British Columbia salmon cannery. *Historical Archaeology* 45(2):68–96.
Ross, D.E. 2013 *An Archaeology of Asian Transnationalism*. Gainesville: University Press of Florida.
Rosson, G.W. 2007 *WWII Stories in Their Own Words*. Retrieved December 30 2016 from <http://carol_fus.tripod.com/army_iwo_gw_rosson.html>.
Rottman, G. 2004 *Saipan and Tinian 1944: Piercing the Japanese Empire*. Oxford: Osprey Publishing Ltd.
Rottman, G.L. 2003 *Japanese Pacific Island Defenses, 1941-45*. Oxford: Osprey Publishing.
Rottman, G.L. 2013a *The Big Book of Gun Trivia: Everything You Want to Know, Don't Want to Know, and Don't Know You Need to Know*. Oxford: Osprey Publishing Ltd.
Rottman, G.L. 2013b *US Marine Corps Pacific Theater of Operations 1943–44*. Oxford: Osprey Publishing.
Rowland, M. 2004 Myths and non-myths: Frontier 'massacres' in Australian history—the Woppaburra of the Keppel Islands. *Journal of Australian Studies* 28(81):1-16.
Rowlands, M. 2002 Heritage and cultural property. In V. Buchli (ed.), *The Material Culture Reader*, pp.105–114. Oxford: Berg.
Rubio Campillo, X. 2008 An archaeological study of Talamanca battlefield. *Journal of Conflict Archaeology* 4(1-2):23–38.
Russell, S. 1984 *From Arabwal to Ashes: A Brief History of Garapan Village, 1818 to 1945*. Saipan: Issla Program for Social Studies, Department of Education, Commonwealth of the Northern Marianas.
Russell, S. 1987 Laulau: Its History and Historic Resources. Unpublished report prepared for the Northern Islands Company, Saipan.
Russell, S. 1998 *Tiempon I Manmofo'na*. Saipan, CNMI.
Russell, S. 2001 Dealing with human remains: An approach from the Northern Marianas. *CRM* 1:23–24.
Russell, S. and G.S. Cabrera 2003 An Archaeological Survey of the Hachiman Jinja Site, Kannat Taddong Papago, Saipan. Unpublished report prepared for the Commonwealth of the Northern Mariana Islands, Division of Historic Preservation, Saipan.
Russell, S. and M. Fleming 1986 Archaeology in the Northern Mariana Islands: An overview. *The Journal of the Polynesian Society* 95(1):115–126.

Saltzman, A.L. 2000 The role of the obedience experiments in Holocaust studies: The case for renewed visibility. In T. Blass (ed.), *Obedience to Authority: Current Perspectives on the Milgram Paradigm*, pp.125–144. Mahwah: Lawrence Erlbaum Associates.
Sather-Wagstaff, J. 2011 *Heritage That Hurts: Tourists in the Memoryscapes of September 11*. Walnut Creek: Left Coast Press.
Saunders, N.J. 2000 Bodies of metal, shells of memory: 'Trench art', and the Great War re-cycled. *Journal of Material Culture* 5(1):43–67.
Saunders, N.J. 2002 Excavating memories: Archaeology and the Great War, 1914-2001. *Antiquity* 76(291):101–108.
Sayers, E. and D.H. Spennemann 2006 The attitudes of Japanese tourists towards cultural heritage attractions in the CNMI *Micronesian Journal of the Humanities and Social Sciences* 5(1/2):388–399.
Schiffer, N.N. 2000 *Imari, Satsuma, and Other Japanese Export Ceramics*. Atglen: Schiffer Publishing Ltd.
Schofield, J. 2004 *Modern Military Matters: Studying and Managing the Twentieth-Century Defence Heritage in Britain: A Discussion Document*. York: Council for British Archaeology.
Schofield, J. 2009a 1115 hrs, 24 June 2008 drama and the moment. In J. Schofield (ed.), *Defining Moments: Dramatic Archaeologies of the Twentieth Century*, pp.1–8. Oxford: Archaeopress.
Schofield, J. 2009b *Aftermath: Readings in the Aftermath of Recent Conflict*. New York: Springer Science + Business Media, LLC.
Schofield, J. 2015 Forget about 'heritage': Place, ethics and the Faro Convention. In T. Ireland and J. Schofield (eds), *The Ethics of Cultural Heritage*, pp.197–209. New York: Springer Science+Business Media.
Schofield, J., W.G. Johnson and C.M. Beck 2002 Introduction: Matériel culture in the modern world. In J. Schofield, W.G. Johnson and C.M. Beck (eds), *Matériel Culture: The Archaeology of Twentieth-Cenrtury Conflict*, pp.1–8. London: Routledge.
Schröder, I.W. and B.E. Schmidt 2001 Introduction: Violent imaginaries and and violent practices. In B.E. Schmidt and I.W. Schröder (eds), *Anthropology of Violence and Conflict*, pp.1–24. London: Routledge.
Scott-Ireton, D.A. and J.F. McKinnon 2016 As the sand settles: Education and archaeological tourism on underwater cultural heritage. *Public Archaeology* 14(3):157–171.
Scott, D.D., P. Bleed and A. Renner 2016 *Battlespace 1865: Archaeology of the Landscapes, Strategies, and Tactics of the Northern Platte Campaign, Nebraska*. Oxford: Oxbow Books.
Scott, D.D., R.A. Fox, M.A. Connor and D. Harmon 2000 *Archaeological Perspectives on the Battle of the Little Bighorn*. Norman: University of Oklahoma Press.
Scott, D.D. and A.P. McFeaters 2011 The archaeology of historic battlefields: A history and theoretical development in conflict archaeology. *Journal of Archaeological Research* 19:103–132.
Seaton, T. 2009 Purposeful otherness: Approaches to the management of thanatourism. In P.R. Stone and R. Sharpley (eds), *The Darker Side of Travel: The Theory and Practice of Dark Tourism*, pp.75–108. Bristol: Channel View Publications.
Segel, L. 1998 To die in Unit 731: Though not as well known as the butchery of Nazi doctors, the Imperial Japanese Army committed its own medical atrocities. *Medical Post* 34(4):9.

Seldan, M. 2004 The United States and Japan in twentieth-century Asian wars. In M. Seldan and A.Y. So (eds), *War and State Terrorism: The United States, Japan, and the Asia-Pacific in the Long Twentieth Century*, pp.19–40. Lanham: Rowman and Littlefield Publishers.
Sen, S. 2002 Community boundary, secularized religion and imagined past in Bangladesh: Archaeology and historiography of unequal encounter. *World Archaeology* 34(2):346-362.
Sharpley, R. 2009a Dark tourism and political ideology: Towards a governance model. In R. Sharpley and P.R. Stone (eds), *The Darker Side of Travel: The Theory and Practice of Dark Tourism*, pp.145–166. Bristol: Channel View Publications.
Sharpley, R. 2009b Shedding light on dark tourism: An introduction. In P.R. Stone and R. Sharpley (eds), *The Darker Side of Travel: The Theory and Practice of Dark Tourism*, pp.3–22. Bristol: Channel View Publications.
Shew, D.O. and A.E. Kamp-Whittaker 2013 Perseverance and prejudice: Maintaining community in Amache, Colorado's World War II Japanese internment camp. In H. Mytum and G. Carr (eds), *Prisoners of War: Archaeology, Memory, and Heritage of 19th- and 20th-Century Mass Internment*. New York: Springer Science+Business Media.
Shin'ichi, K. 2000 Military facilities on Pagan island. In O. Mariko (ed.), *Pagan Island in the Distance*, pp.88–90. Tokyo: Pagan Island HP Management Committee.
Shin, G.-W. 2014 Historical reconciliation in Northeast Asia: Past efforts, future steps, and the U.S. role. In D. Chirot, G.-W. Shin and D. Sneider (eds), *Confronting Memories of World War II: European and Asian Legacies*, pp.157–185. Seattle: University of Washington Press.
Shurtleff, W. and A. Aoyagi 2004 *History of Soybeans and Soyfoods, 1100 B.C. to the 1980s*. Lafayette, California: Soyfoods Center.
Shurtleff, W. and A. Aoyagi 2012 *History of Soy Sauce (160 CE To 2012)*: Soyinfo Center.
Simpson, P., L. Kitto and K. Sodeoka 2014 *The Japanese Pottery Handbook*. New York: Kodansha USA.
Simpson, P., K. Sodeoka and L. Kitto 1979 *The Japanese Pottery Handbook*. Tokyo: Kodansha International.
Skiles, S.A. and B.J. Clark 2010 When the foreign is not exotic: Ceramics at Colorado's WWII Japanese internment camp. In C.D. Dillian and C.L. White (eds), *Trade and Exchange*, pp.179–192. New York: Springer.
Slaughter, M.A. 2013 An archaeological and ethnographic examination of the acquisition, presence and consumption of saké at Camp Amache, a World War II Japanese internment camp. In H. Mytum and G. Carr (eds), *Prisoners of War: Archaeology, Memory, and Heritage of 19th- and 20th-Century Mass Internment*, pp.285–302. New York: Springer Science+Business Media.
Sledge, E.B. 1981 *With the Old Breed, at Peleliu and Okinawa*. New York: Oxford University Press.
Smith, A. 2007 Colonialism and the bomb in the Pacific. In J. Schofield and W. Cocroft (eds), *A Fearsome Heritage: Diverse Legacies of the Cold War*, pp.51–72. Walnut Creek: Left Coast Press, Inc.
Smith, L. 2008 *Iwo Jima: World War II Veterans Remember the Greatest Battle of the Pacific*. New York: W. W. Norton and Company.
Smith, L.T. 1999 *Decolonizing Methodologies: Research and Indigenous Peoples*. London: Zed Books.

Smith, P. 1991 Codes and conflict: Toward a theory of war as ritual. *Theory and Society* 20(1):103–138.
Smith, R.R. 1953 *The Approach to the Philippines*. Washington, D.C.: Center of Military History.
Smith, R.R. 1963 *The War in the Pacific: Triumph in the Philippines*. Washington, D.C.: U.S. Government Printing Office.
Smith, S.D. 1994 Archaeological perspectives on the Civil War: The challenge to achieve relevance. In C.R.G. Jr. and S.E. Winter (eds), *Look to the Earth: Historical Archaeology and the American Civil War*, pp.3–20. Knoxville: The University of Tennessee Press.
Smoot, M. 2015 Saipan Village Boundaries. ArcGIS Online Basemap.
Spennemann, D.H. 2006a Gauging community values in historic preservation. *CRM Journal* 3(2):6–20.
Spennemann, D.H.R. 1992 The politics of heritage: Second World War remains on Central Pacific Islands. *The Pacific Review* 5(3):278–290.
Spennemann, D.H.R. 1999 Cultural heritage conservation during emergency management: Luxury or necessity? *International Journal of Public Administration* 22(5):745–804.
Spennemann, D.H.R. 2006b Physical reminders of the British-Japanese armament trade in Micronesia. *Micronesian Journal of the Humanities and Social Sciences* 5(1/2):113–129.
Spennemann, D.H.R. 2013 Hindcasting the Japanese military base on Midway Atoll (Central Pacific). *Journal of Conflict Archaeology* 8(2):136–159.
Spennemann, D.H.R., D.W. Look and K. Graham 2001 *Perceptions of Heritage Eco-tourism by Micronesian Decision Makers. The Johnstone Centre Report Number 147*. Albury: Charles Sturt University.
Spoehr, A. 1957 *Marianas Prehistory: Archaeological Survey and Excavations on Saipan, Tinian and Rota* Fieldiana: Anthropology. Chicago: Chicago Natural History Museum.
Spoehr, A. 2000 *Saipan: The Ethnology of a War-Devastated Island*. Saipan: N.M.I. Division of Historic Preservation.
Stafford, K.W., J.E. Mylroie and J.W. Jenson 2002 Karst Geology and Hydrology of Tinian and Rota (Luta), CNMI: A Preliminary Report, Technical Report No. 96. Water and Environmental Research Institute of the Western Pacific, University of Guam.
Stephens, J. 2010 'Remembering the wars': Documenting memorials and war commemoration in Western Australia. *The Journal of Architecture* 15(5):637–650.
Stitt, I. 1974 *Japanese Ceramics of the Last 100 Years*. New York: Crown Publishers, Inc.
Sturdy Colls, C. 2015 *Holocaust Archaeologies: Approaches and Future Directions*. Switzerland: Springer International Publishing.
Suntory Holdings Ltd. n.d. *History: Timeline*. Retrieved May 10 2016 from <http://www.suntory.com/about/history/timeline/index.html>.
Sutherland, T. and M. Holst 2005 Battlefield Archaeology: A Guide to the Archaeology of Conflict. British Archaeological Jobs Resource. Unpublished report prepared for the British Archaeological Jobs Resource, University of Bradford, Bradford.
Suydam, C.R. 1960 *The American Cartridge*. Santa Ana: G. Robert Lawrence.
Swift, M., R.A. Harper and M.A. Fleming 1996 Christian Service Center Development Intensive Archaeological Survey. Unpublished report prepared for Henry K. Pangelinan and Associates by Swift and Harper Archaeological Resource Consulting, Saipan.

Swift, M.K., R.S. Brown and A.E. Haun 1991 Archaeological Inventory Survey Proposed Talufofo Mega Resort Golf Course. Unpublished report prepared for Gecko Consulting Services, Saipan, CNMI by Paul H. Rosendahl Inc., Guam.
Swift, M.K., R.A. Harper and M.A. Fleming 2003 Archaeological Mitigation Chalan Monsignor Guerrero Phase III Roadway Expansion and Improvements. Unpublished report prepared by Swift and Harper Resource Consulting, Saipan.
Sykes, G.M. 1958 *The Society of Captives*. New Jersey: Princeton University Press.
Taboroši, D. 2004 *Field Guide to Caves and Karst of Guam*. Honolulu: Bess Press.
Taboroši, D. and J.W. Jenson 2002 World War II artefacts and wartime use of caves in Guam, Mariana Islands. *Capra* 4:1–8.
Tanaka, H. 2012 *Personality in Industry: The Human Side of a Japanese Enterprise*. London: Bloomsbury Publishing.
Tarlow, P. 2005 Dark tourism: The appealing 'dark' side of tourism and more. In M. Novelli (ed.), *Niche Tourism: Contemporary Issues, Trends and Case*. Amsterdam: Elsevier.
Tarlow, S. 2000 Emotion in archaeology. *Current Anthropology* 41(5):713–746.
Tarlow, S. 2007 *The Archaeology of Improvement in Britain, 1750–1850*. Cambridge: Cambridge University Press.
Tarlow, S. 2012 The archaeology of emotion and affect. *Annual Review of Anthropology* 41:169–185.
Teri 2006 *Nambu World: Teri Visits the WWII Battlefields and Caves of Okinawa*. Retreived June 6 2016 from <http://members.shaw.ca/nambuworld2/okinawa.htm>.
The Australian War Memorial n.d. *Collection*. Retrieved June 6 2017 from <https://www.awm.gov.au/collection/P04245.005>.
The Great Sakes of Hiroshima n.d. *Suishin Yamane Honten Brewery*. Retrieved January 7 2017 from <http://sake-hiroshima.com/en/kura/suishinyamane.php>.
The History Place 1999 *World War II in the Pacific: U.S. Troops in Action 1942-1945*. Retrieved April 8 2017 from <http://www.historyplace.com/unitedstates/pacificwar/index.html>.
The War Times Journal 1999 *Guy Gabaldon: An Interview and Discussion*. Retrieved June 7 2016 from <http://www.wtj.com/articles/gabaldon/>.
Thomas, S. 2014 Making archaeological heritage accessible in Great Britain: Enter community archaeology. In S. Thomas and J. Lea (eds), *Public Participation in Archaeology*, pp.23–34. Woodbridge: The Boydell Press.
Thompson, C. 2002 *The 25 Best World War II Sites: Pacific Theater: The Ultimate Traveler's Guide to the Battlefields, Monuments and Museums*. San Francisco: Greenline Publications.
Tod, J.H. 1977 *A History of the Electrical Porcelain Industry in the United States*. Phoenix: Jack H. Tod.
Toshiba Corporation 2016 *History*. Retrieved July 6 2016 from <http://www.toshiba.co.jp/worldwide/about/history.html>.
Totorobaga 2014 *The Battle of Okinawa*. Retrieved February 27 2017 from <https://totorobaga.com/2014/01/01/the-battle-of-okinawa/>.
Toulouse, J.H. 1971 *Bottle Makers and Their Marks*. New York: Thomas Nelson Inc.
Toyo Seikan Co., L. n.d. *Home*. Retrieved August 10 2016 from <http://www.toyo-seikan.co.jp/e/>.
Trefalt, B. 2003 *Japanese Army Stragglers and Memories of the War in Japan, 1950-75*. London: Routledge Curzon.

Trefalt, B. 2009 After the Battle for Saipan: The internment of Japanese civilians at Camp Susupe, 1944–1946. *Japanese Studies* 29(3):337–352.
Trefalt, B. 2017 Collecting bones: Japanese missions for the repatriation of war remains and the unfinished business of the Asia-Pacific War. *Australian Humanities Review* 61:145–159.
Trigger, D. and R.J. Martin 2016 Place, indigeneity, and identity in Australia's gulf country. *American Anthropologist* 118(4):824–837.
Tully, G. 2007 Community archaeology: General methods and standards of practice. *Public Archaeology* 6(3):155–187.
Turnbridge, J.E. and G.J. Ashworth 1996 *Dissonant Heritage: The Management of the Past as a Resource in Conflict*. Chichester: John Wiley and Sons, Ltd.
Turner, L. and J. Ash 1975 *The Golden Hordes International Tourism and the Pleasure Periphery*. London: Constable and Company Ltd.
Turner, V. 1996 Liminality and communitas. In R.L. Grimes (ed.), *Reading in Ritual Studies*, pp.511–520. Upper Saddle River: Prentice Hall.
Turner, V.W. 1969 *The Ritual Process*. London: Routledge and Kegan Paul Limited.
U.S. Army Corps of Engineers 2012 Site Inspection Report North Field Banaderu, Saipan, CNMI, Unpublished report pepared for the U.S. Army Corps of Engineers Honolulu District and U.S. Army Engineering and Support Center, Huntsville.
U.S. Army Corps of Engineers n.d.-a *Formerly Used Defense Sites Program*. Retrieved October 3 2016 from <http://www.usace.army.mil/Missions/Environmental/Formerly-Used-Defense-Sites/>.
U.S. Army Corps of Engineers n.d.-b *FUDS Inventory*. Retrieved October 3 2016 from <http://www.usace.army.mil/Portals/2/docs/Environmental/FUDS/FUDS_Inventory/FUDS_Inventory_NorthernMarianaIslands.pdf>.
U.S. Department of the Army Headquarters 1960 *Ammunition of Anti-Aircraft, Tank, Anti-Tank and Field Artillery Weapons*. Technical Manual No. 9-1300-203.
U.S. Environmental Protection Agency 2016 *Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Federal Facilities*. Retrieved October 3 2016 from <https://www.epa.gov/enforcement/comprehensive-environmental-response-compensation-and-liability-act-cercla-and-federal>.
U.S. Geological Survey 2010 *Metals and Minerals: U.S. Geological Survey Minerals Yearbook 2008*. Washington D.C.: U.S. Government Printing Office.
U.S. Marine Corps World War II Dog Tags 2015 *About Dog Tags of WWII*. Retrieved August 11 2016 from <http://usmcwwiidogtags.com/about.html>.
U.S. NARA 2014 Fiscal Year 2014–2018: Strategic Plan, College Park, Maryland.
U.S. Pacific Fleet and Pacific Ocean Areas 1946 Field Survey of Japanese Defenses on Truk. CINCPAC-CINCPOA Bulletin No. 3-46. Headquarters, United States Pacific Fleet and Pacific Ocean Areas.
U.S. Tenth Army 1945 Operation Iceburg: The Okinawan Campaign, Washington D.C.
U.S. War Department 1942 Intelligence Bulletin Volume 1 Number 1, Washington.
United States Army Medical Department 1962 *Wound Ballistics*. Washington, D.C.: Office of the Surgeon General Department of the Army.
United States War Department 1944 *Japanese Field Artillery*. Washington, D.C.: United States Government.
Van Gennep, A. 1960 *The Rites of Passage*. London: Routledge.

Van Patten, J.F. 1998 *Collector's Encyclopedia of Nippon Porcelain: Identification and Values*. Paducah: Collector Books.
Vilar, M.G., C.W. Chan, D.R. Santos, D. Lynch, R. Spathis, R.M. Garruto and J.K. Lum 2012 The origins and genetic distinctiveness of the Chamorros of the Mariana Islands: An mtDNA perspective. *American Journal of Human Biology*:1–7.
Villahermosa, C.A.E. 2016 '*How dare you touch the bones of our ancestors!*'Retrieved July 23 2017 from <http://www.mvariety.com/cnmi/cnmi-news/local/84020-how-dare-you-touch-the-bones-of-our-ancestors>.
Villanueva-Dizon, F.S. 2016 Newly Found Underground Japanese Tunnel 'Very Close' to Fuel Tank. *Saipan Tribune*.
Voss, B.L. and R. Allen 2010 Guide to ceramic MNV calculation qualitative and quantitative analysis. *Technical Briefs in Historical Archaeology* 5:1–9.
Wakamoto Co. Ltd. n.d. *Company Information: History*. Retrieved July 23 2016 from <http://www.wakamoto-pharm.co.jp/english/company/history.html>.
Walker, P.L., K.W.P. Miller and R. Richman 2008 Time, temperature and oxygen availability: An experimental study of the effects of the environmental conditions on the color and organic content of cremated bone. In C.W. Schmidt and S.A. Symes (eds), *The Analysis of Burned Human Remains*, pp.129–136. London: Elsevier Limited.
Wallis, L., H. Burke, M. Tutty, B. Barker, N. Cole, I. Davidson, E. Hatte and K. Lowe in press The Homestead as Fortress: Fact or Furphy? *Aboriginal History*.
Walters, I. 1997 Vietnam Zippos. *Journal of Material Culture* 2(1):61–75.
War Department 1944a Handbook on Japanese Military Forces, Technical Manual TM-E 30-480. September 15.
War Department 1944b *Japanese Radio Communication Equipment*. Washington: U.S. Government Printing Office.
Ward, G. and M. Pickering 1986 The Japanese bone collecting expedition on Tinian, Mariana Islands, March 1985: Its impact upon historic resources. *Bulletin of the Indo-Pacific Prehistory Association* 6:116–122.
Watkins, D. 2012 *6 to 10 November-Rabaul War Relics (Papua New Guinea)*. Retrieved January 8 2017 from <http://davidwatkinstravels.blogspot.ca/2012/12/rabaul-war-relics.html>.
Wedding, J.R., A.L. Heindl and D.C. Smee 2012 An archaeologist's field guide for identifying World War II and Cold War era military food cans. *Nevada Archaeologist* 25:77–85.
Weingartner, J.J. 1992 Trophies of war: U.S. troops and the mutilation of Japanese war dead, 1941–1945. *The Pacific Historical Review* 61(1):53–67.
Westfall, D. and R. Kimihira 2014 *The Taking of Saipan: Two Sides to Every Battle in WWII*. Orange, CA: The Paragon Agency.
White, C.B. 2003 *Collector's Guide to Made in Japan Ceramics Identification and Values*. Paducah, KY: Collector Books.
Willcox, R.R. 1954 A WHO study of treatment schedules for early syphilis in use throughout the world. *Bulletin of the World Health Organization* 10:579–617.
Winston, G. 2015 *Japanese World War II Tunnels Discovered in China's Mount Laifeng*. Retrieved January 18 2017 from <https://www.warhistoryonline.com/war-articles/japanese-world-war-two-tunnels-discovered-chinas-mount-laifeng.html>.
Wobst, H.M. 2005 Power to the (Indigenous) past and present! or: The theory and method behind archaeological theory and method. In C. Smith and H.M. Wobst (eds), *Indigenous*

Archaeologies: Decolonizing Theory and Practice, pp.17–32. Abingdon, Oxon: Routledge.
Woodward-Clyde Consultants 1993 Final Remediation Plan Kagman Caves, Kagman Saipan, Commonwealth of the Northern Mariana Islands. Unpublished report prepared for the U.S. Army Corps of Engineers.
Wright, D. 2002 *To the Far Side of Hell: The Battle for Peleliu, 1944*. Marlborough: Crowood.
Wright, M.D. and L. Knight 2000 *Now for Then: The Marianas Marine Scouts*. Commonwealth of the Northern Mariana Islands: Office of the Resident Representative to the United States.
Yaguchi, Y. 2007 War memories across the Pacific: Japanese visitors at the Arizona Memorial. In M. Gallicchio (ed.), *The Unpredictability of the Past: Memories of the Asia-Pacific War in U.S.-East Asian Relations*, pp.234–252. Durham: Duke University Press.
Yamasa 2016 *Yamasa Brand*. Retrieved April 21 2016 from <http://www.yamasausa.com/yamasa-brand/>.
Yanaihara, T. 1976 *Pacific Islands Under Japanese Mandate*. Westport, Connecticut: Greenwood Press.
Yokohama WW2 Japanese Military Radio Museum 2015 *WWII Japanese Navy Radio Equipment*. Retrieved July 23 2016 from <http://www.yokohamaradiomuseum.com/tenjitop.html>.
Yow, V.R. 2015 *Recording Oral History: A Guide for the Humanities and Social Sciences*. Lanham: Rowman and Littlefield Publishers.
Zimmerman, L.J. 2013 Homelessness. In P. Graves-Brown, R. Harrison and A. Piccini (eds), *The Oxford Handbook of the Archaeology of the Contemporary World*, pp.336–350. Oxford: Oxford University Press.
Zingzing 2012a *Meal time of the 2nd Japanese War*. Retrieved June 6 2017 from <http://m.blog.naver.com/zingzing71/150134350305>.
Zingzing 2012b *Second World War and Sake*. Retrieved June 6 2017 from <http://m.blog.naver.com/zingzing71/150131476207>.

Appendix A: Community Consent

Re: Letter of Support

From: **Rock Art Gen** (putut6837@gmail.com)
Sent: April-24-14 6:18:55 AM
To: Julie Mushynsky (ju_mushy@hotmail.com)

Hey there Julie,

I hope that this missive finds you back up and feeling tip-top!

Please consider this reply as my full understanding and endorsement of your change in research emphasis. I think the shift to WWII Karst Defences a very practical move in that it is a workable and dynamic field of study with a high potential for sub-component focus on the application of preservation models.

You have, as previously stated, my full support. I have no doubt that the work you undertake would stand to benefit not only your academic goals and objectives, but that of the NMI communities as well.

I look forward to working with you again!

Gen

RE: PhD Proposal

From: **fred camacho** (fred_booku@yahoo.com)
Sent: April-18-14 12:59:15 AM
To: Julie Mushynsky (ju_mushy@hotmail.com)

Hi Julie,

Glad to hear that you are back, safe and sound.
I am not sure how formal this letter needs to be, but yes, I will assist you in locating sites on private property and meeting with landowners.
I like my new title, "co-researcher."

For your information we will be entering the rainy season, here on Saipan, and that may delay some survey.
Your proposal gave me a better understanding of your research and, if at all possible, please send me a simple (1 page, w/ Flinder's letterhead) letter that can give to landowners that introduces you and your project and identifies me a: your co-researcher. I think this will give you a jump-start as I meet landowner: before you get here in June/July. If the Flinder's letterhead is not possible, perhaps your name and contact information will suffice.

Thank you, take care, and hope to hear from you soon.
Happy Easter!

Fred

RE:

From: **john Diego Palacios** (jdpalacios1@hotmail.com)
Sent: July-08-13 12:31:43 AM
To: Julie Mushynsky (ju_mushy@hotmail.com)

Hafa adai Julie,

I am truly sorry about last Friday. A memorandum was issued by the CNMI's Governor's Office very late Wednesday afternoon, right after working hours, 3 July, granting administrative leave to all employees under the Executive
Branch, so we did not report for work that day.

Anyways, regarding your planned archaeological research for your PhD. in Saipan for next year, personally, I am in full support of that. Anything that relates to research and study of the CNMI's history, archaeology and culture, is truly very welcoming for me. As a matter of protocol, I will certainly discuss this information with my superiors, Ms. Laura T. Ogumoro (CNMI's Acting State Historic Preservation Officer) and Mrs. Mertie T. Kani (CNMI's HPO's Acting Director) as they are the appropriate individuals who are authorized in granting approval on any request concerning HPO matters. I am very much optimistic that these individuals will consider your project highly significant and very much worth supporting.

I will be updating you as soon as I discussed this matter with my superiors.

With Best regards,

JP

Appendix B: Funding and Support from NMI Humanities Council

Northern Marianas Humanities Council

Navigating the Human Experience

August 21, 2014

Serial: 4017
File: 6.2.80

Julie Mushynsky
611-3144 Edinburgh Drive
Regina, SK
S4V1A9, Canada

Dear Ms. Mushynsky:

I am delighted to inform you that the Northern Marianas Humanities Council has approved for funding the project entitled "The Archaeology of WWII Karst Defenses in the Pacific."

For your record, the grant number is GPH14-00236; the amount of the outright grant is $5,659; the project director is Julie Mushynsky; and the grant period is 16 August 2014 to 15 August 2015.

The final financial report, narrative and evaluation are due on or before 15 November 2015.

You may indicate your acceptance of this grant by signing and returning the enclosed Certification and Compliance Agreement form. Please do not hesitate to contact me should you have any questions regarding this grant.

Sincerely,

Scott Russell
Executive Director

enclosure

P.O. Box 506437, Saipan, MP 96950 ● Telephone (670) 235-4785 ● Fax (670) 235-4786
Email: srussell@pticom.com ● Website: www.northernmarianashumanities.org

Appendix C: Ethics Approval

Dear Julie,

The Chair of the Social and Behavioural Research Ethics Committee (SBREC) at Flinders University considered your response to conditional approval out of session and your project has now been granted final ethics approval. This means that you now have approval to commence your research. Your ethics final approval notice can be found below.

FINAL APPROVAL NOTICE

Project No.:	**6536**
Project Title:	The Archaeology of Inland Karst Defences in the Pacific
Principal Researcher:	Ms Julie Mushynsky
Email:	julie.mushynsky@flinders.edu.au
Approval Date:	16 June 2014
Ethics Approval Expiry Date:	**30 June 2018**

The above proposed project has been **approved** on the basis of the information contained in the application, its attachments and the information subsequently provided.

RESPONSIBILITIES OF RESEARCHERS AND SUPERVISORS

1. Participant Documentation

Please note that it is the responsibility of researchers and supervisors, in the case of student projects, to ensure that:

- all participant documents are checked for spelling, grammatical, numbering and formatting errors. The Committee does not accept any responsibility for the above mentioned errors.
- the Flinders University logo is included on all participant documentation (e.g., letters of Introduction, information Sheets, consent forms, debriefing information and questionnaires – with the exception of purchased research tools) and the current Flinders University letterhead is included in the header of all letters of introduction. The Flinders University international logo/letterhead should be used and documentation should contain international dialling codes for all telephone and fax numbers listed for all research to be conducted overseas.
- the SBREC contact details, listed below, are included in the footer of all letters of introduction and information sheets.

This research project has been approved by the Flinders University Social and Behavioural Research Ethics Committee (Project Number 'INSERT PROJECT No. here following approval'). For more information regarding *ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on 8201 3116, by fax on 8201 2035 or by email human.researchethics@flinders.edu.au.*

2. Annual Progress / Final Reports

In order to comply with the monitoring requirements of the *National Statement on Ethical Conduct in Human Research (March 2007)* an annual progress report must be submitted each year on the**16 June** (approval anniversary date) for the duration of the ethics approval using the annual / final report pro forma available from Annual / Final Reports SBREC web page. *Please retain this notice for reference when completing annual progress or final reports.*

If the project is completed *before* ethics approval has expired please ensure a final report is submitted immediately. If ethics approval for your project expires please submit either (1) a final report; or (2) an extension of time request and an annual report.

Student Projects

The SBREC recommends that current ethics approval is maintained until a student's thesis has been submitted, reviewed and approved. This is to protect the student in the event that reviewers recommend some changes that may include the collection of additional participant data.

Your first report is due on **16 June 2015** or on completion of the project, whichever is the earliest.

3. Modifications to Project

Modifications to the project must not proceed until approval has been obtained from the Ethics Committee. Such matters include:

- proposed changes to the research protocol;
- proposed changes to participant recruitment methods;
- amendments to participant documentation and/or research tools;
- change of project title;
- extension of ethics approval expiry date; and
- changes to the research team (addition, removals, supervisor changes).

To notify the Committee of any proposed modifications to the project please submit a Modification Request Form to the Executive Officer. Download the form from the website every time a new modification request is submitted to ensure that the most recent form is used. Please note that extension of time requests should be submitted prior to the Ethics Approval Expiry Date listed on this notice.

Change of Contact Details

Please ensure that you notify the Committee if either your mailing or email address changes to ensure that correspondence relating to this project can be sent to you. A modification request is not required to change your contact details.

4. Adverse Events and/or Complaints

Researchers should advise the Executive Officer of the Ethics Committee on 08 8201-3116 orhuman.researchethics@flinders.edu.au immediately if:

- any complaints regarding the research are received;
- a serious or unexpected adverse event occurs that effects participants;

- an unforseen event occurs that may affect the ethical acceptability of the project.

Kind regards,

Mikaila

Mrs Andrea Fiegert and **Ms Mikaila Crotty**
Ethics Officers and Joint Executive Officers, Social and Behavioural Research Ethics Committee
Telephone: +61 8 8201-3116 | Andrea Fiegert (Monday, Tuesday and Wednesday – all day)
Telephone: +61 8 8201-7938 | Mikaila Crotty (Wednesday, Thursday and Friday - mornings only)
Email: human.researchethics@flinders.edu.au
Web: Social and Behavioural Research Ethics Committee (SBREC)

Manager, Research Ethics and Integrity – Dr Peter Wigley
Telephone: +61 8 8201-5466 | email: peter.wigley@flinders.edu.au

Research Services Office |Union Building Basement
Flinders University
Sturt Road, Bedford Park | South Australia | 5042
GPO Box 2100 | Adelaide SA 5001

Appendix D: Letter of Introduction

Department of Archaeology
Flinders University
GPO Box 2100
Adelaide SA 5001
Tel: 08 8201 5875
Fax: 08 8201 2784

www.flinders.edu.au
CRICOS Provider No. 00114A

LETTER OF INTRODUCTION (interviewees)

Dear Sir/Madam'

This letter is to introduce Julie Mushynsky who is a PhD student in the Department of Archaeology at Flinders University. She can produce her student card, which carries a photograph, as proof of identity.

She is undertaking research leading to the production of a thesis and other publications on the subject of WWII-related caves and tunnels in Saipan. Her local co-researchers on the project include Fred Camacho and Genevieve Cabrera.

She would be most grateful if you would volunteer to assist in this project, by providing her with information which covers certain aspects of this topic.

You are, of course, entirely free to discontinue your participation at any time prior to thesis completion and/or publication or to decline to answer particular questions.

Since she intends to make a tape-recording of the information you provide, she will seek your consent, on a separate form, to record your information to use in preparing her thesis, report or other publications. The recording will not be made available to any other person.

Any enquiries you may have concerning this project should be directed to the following:

Person:	Amy Roberts	Jennifer McKinnon
Telephone:	61 8 8201 2217	252 328 6788
E-mail:	amy.roberts@flinders.edu.au	mckinnonje@ecu.edu

Thank you for your attention and assistance.

Yours sincerely

Amy Roberts
Senior Lecturer in Archaeology
Flinders University
Department of Archaeology

Jennifer McKinnon
Assistant Professor in Maritime Studies
East Carolina University
History Department

This research project has been approved by the Flinders University Social and Behavioural Research Ethics Committee (Project Number 6536). For more information regarding ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on 8201 3116, by fax on 8201 2035 or by email human.researchethics@flinders.edu.au.

Department of Archaeology
Flinders University
GPO Box 2100
Adelaide SA 5001
Tel: 08 8201 5875
Fax: 08 8201 2784

www.flinders.edu.au
CRICOS Provider No. 00114A

LETTER OF INTRODUCTION (people with artefacts)

Dear Sir/Madam'

This letter is to introduce Julie Mushynsky who is a PhD student in the Department of Archaeology at Flinders University. She can produce her student card, which carries a photograph, as proof of identity.

She is undertaking research leading to the production of a thesis and other publications on the subject of WWII-related caves and tunnels in Saipan. Her local co-researchers on the project include Fred Camacho and Genevieve Cabrera.

She would be most grateful if you would volunteer to assist in this project, by allowing her to record artefacts you have in your possession. You are, of course, entirely free to decline.

She will seek your consent, on a separate form, to record your artefact(s).

Any enquiries you may have concerning this project should be directed to the following:

Person:	Amy Roberts	Jennifer McKinnon
Telephone:	61 8 8201 2217	252 328 6788
E-mail:	amy.roberts@flinders.edu.au	mckinnonje@ecu.edu

Thank you for your attention and assistance.

Yours sincerely

Amy Roberts
Senior Lecturer in Archaeology
Flinders University
Department of Archaeology

Jennifer McKinnon
Assistant Professor in Maritime Studies
East Carolina University
History Department

This research project has been approved by the Flinders University Social and Behavioural Research Ethics Committee (Project Number 6536). For more information regarding ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on 8201 3116, by fax on 8201 2035 or by email human.researchethics@flinders.edu.au.

Department of Archaeology
Flinders University
GPO Box 2100
Adelaide SA 5001
Tel: 08 8201 5875
Fax: 08 8201 2784

www.flinders.edu.au
CRICOS Provider No. 00114A

LETTER OF INTRODUCTION (landowners)

Dear Sir/Madam'

This letter is to introduce Julie Mushynsky who is a PhD student in the Department of Archaeology at Flinders University. She can produce her student card, which carries a photograph, as proof of identity.

She is undertaking research leading to the production of a thesis and other publications on the subject of WWII-related caves and tunnels in Saipan. Her local co-researchers on the project include Fred Camacho and Genevieve Cabrera.

She would be most grateful if you would volunteer to assist in this project, by allowing her to survey caves or tunnels on your property. You are, of course, entirely free to decline.

She will seek your consent, on a separate form, to access sites on your property.

Any enquiries you may have concerning this project should be directed to the following:

Person:	Amy Roberts	Jennifer McKinnon
Telephone:	61 8 8201 2217	252 328 6788
E-mail:	amy.roberts@flinders.edu.au	mckinnonje@ecu.edu

Thank you for your attention and assistance.

Yours sincerely

Amy Roberts	Jennifer McKinnon
Senior Lecturer in Archaeology	Assistant Professor in Maritime Studies
Flinders University	East Carolina University
Department of Archaeology	History Department

This research project has been approved by the Flinders University Social and Behavioural Research Ethics Committee (Project Number 6536). For more information regarding ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on 8201 3116, by fax on 8201 2035 or by email human.researchethics@flinders.edu.au.

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CRICOS Provider No. 00114A

LETTER OF INTRODUCTION (fieldwork participants)

Dear Sir/Madam'

This letter is to introduce Julie Mushynsky who is a PhD student in the Department of Archaeology at Flinders University. She can produce her student card, which carries a photograph, as proof of identity.

She is undertaking research leading to the production of a thesis and other publications on the subject of WWII-related caves and tunnels in Saipan. Her local co-researchers on the project include Fred Camacho and Genevieve Cabrera.

She would be most grateful if you would volunteer to assist in this project, by participating in fieldwork. She will also ask you a few questions about your interests in caves and tunnels.

You are, of course, entirely free to discontinue your participation at any time.

Since she intends to take photographs of your fieldwork participation, she will seek your consent, on a separate form, to take your photograph and use it in subsequent publications and her thesis. You are of course free to decline to have your photograph taken and can refuse to have it used in her thesis or publications.

Any enquiries you may have concerning this project should be directed to the following:

Person:	Amy Roberts	Jennifer McKinnon
Telephone:	61 8 8201 2217	252 328 6788
E-mail:	amy.roberts@flinders.edu.au	mckinnonje@ecu.edu

Thank you for your attention and assistance.

Yours sincerely

Amy Roberts
Senior Lecturer in Archaeology
Flinders University
Department of Archaeology

Jennifer McKinnon
Assistant Professor in Maritime Studies
East Carolina University
History Department

This research project has been approved by the Flinders University Social and Behavioural Research Ethics Committee (Project Number 6536). For more information regarding ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on 8201 3116, by fax on 8201 2035 or by email human.researchethics@flinders.edu.au.

Appendix E: Information Sheet

Julie Mushynsky
School of Humanities
Department of Archaeology
Flinders University
GPO Box 2100
Adelaide SA 5001
Tel: 08 8201 5875
Fax: 08 8201 2784
Julie.mushynsky@flinders.edu.au
CRICOS Provider No. 00114A

INFORMATION SHEET (interviewees)

Title: The Archaeology of WWII Karst Defences in the Pacific

Principal Researcher:

Julie Mushynsky
Department of Archaeology
Flinders University
Ph: 670 989 8477

Description of the study:

This study is part of the project entitled *The Archaeology of Karst Defences in the Pacific.* This project will investigate use and construction of caves and tunnels during WWII. This project is supported by the Flinders University Archaeology Department.

Purpose of the study:

This project aims to find out:

- Whether there were army and navy specific caves in Saipan
- The defensive strategies people used during the war
- How the defensive strategies related to wider societal attitudes and conditions in Saipan and the Pacific
- How people relate to these sites today

What will I be asked to do?

You are invited to attend a one-on-one interview with PhD student and primary researcher, Julie Mushynsky, who will ask you a few questions about how you or someone you know used or constructed WWII-related caves and tunnels in Saipan and your interests in caves. The interview will take maximum 2 hours and will be recorded using a digital voice recorder. Once recorded, the interview will be transcribed (typed-up) and stored as a computer file and then stored in a secure place. Participation is voluntary.

What benefit will I gain from being involved in this study?

You will benefit by sharing your experiences and allowing your history and knowledge to be recorded to pass down to future generations. Recording your information will help improve archaeological studies in Saipan and also contribute to Saipan's cultural heritage management.

The information you provide will give locals more knowledge about the caves and tunnels on Saipan and can be used to increase tourism in the future.

Will I be identifiable by being involved in this study?

The information you provide the researcher and your name will be used in subsequent publications. Once your information has been transcribed, you will have the opportunity to amend the details of your information prior to it being used in any publications. However, on the attached consent form, you may choose to remain nameless in publications or use a pseudonym. Choosing to remain nameless in publications cannot guarantee that you will remain anonymous as the details included in the information you provide may allow people to identify you. Any information un-related to the study will be kept confidential. You can also withdraw your information from the project at any time prior to thesis completion and/or publication.

Photographs may also be taken to document your participation in the project. You can agree or disagree to having your photograph taken on the attached consent form.

Are there any risks or discomforts if I am involved?

The researcher anticipates few risks from your involvement in this study. If you have any concerns regarding anticipated or actual risks or discomforts, please raise them with the researcher. If you experience severe discomfort and wish to speak to a professional, it is recommended you contact the CNMI Community Guidance Center at (670) 323-6560.

How do I agree to participate?

Participation is voluntary. At any time you may answer questions with 'no comment' or refuse to answer any questions and you are free to withdraw from the project at any time without effect or consequences prior to thesis completion and/or publication. A consent form accompanies this information sheet. If you agree to participate please read and sign the form.

How will I receive feedback?

You can receive feedback in a number of ways. If you provide your email address to Julie, she can email you outcomes from the project. If you wish to be contacted, Julie can also call you with outcomes. Julie will also conduct a public meeting to let the community know about outcomes of the project. This will be advertised in the newspaper. She can also let you know when this meeting will take place by email or telephone. Alternatively, you may also receive outcomes by mail if you prefer. Finally, a poster of the results from this project will be kept at the HPO office.

Thank you for taking the time to read this information sheet and we hope that you will accept our invitation to be involved.

This research project has been approved by the Flinders University Social and Behavioural Research Ethics Committee (Project Number 6536). For more information regarding ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on 8201 3116, by fax on 8201 2035 or by email human.researchethics@flinders.edu.au

Julie Mushynsky
School of Humanities
Department of Archaeology

Flinders University

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Adelaide SA 5001
Tel: 08 8201 5875
Fax: 08 8201 2784
Julie.mushynsky@flinders.edu.au

CRICOS Provider No. 00114A

INFORMATION SHEET (people with artefacts)

Title: The Archaeology of WWII Karst Defences in the Pacific

Principal Researcher:
Julie Mushynsky
Department of Archaeology
Flinders University
Ph: 670 989 8477

Description of the study:

This study is part of the project entitled *The Archaeology of Karst Defences in the Pacific.* This project will investigate use and construction of caves and tunnels during WWII. This project is supported by the Flinders University Archaeology Department.

Purpose of the study:

This project aims to find out:

- Whether there were army and navy specific caves in Saipan
- The defensive strategies people used during the war
- How the defensive strategies related to wider societal attitudes and conditions in Saipan and the Pacific
- How people relate to these sites today

What will I be asked to do?

You are asked to allow PhD student and primary researcher, Julie Mushynsky, to record the artefact(s) from caves and/or tunnels you possess. Julie will also ask you a few questions about which cave and/or tunnel the artefact(s) you possess were found in or around and your interests in caves.

What benefit will I gain from being involved in this study?

You will benefit by allowing your history to be recorded to pass down to future generations. Recording your artefacts will help improve archaeological studies in Saipan and also contribute to Saipan’s cultural heritage management. The information you provide will give locals more knowledge about the caves and tunnels on Saipan and can be used to increase tourism in the future.

Will I be identifiable by being involved in this study?

The information you provide the researcher and your name will be used in subsequent publications. You will have the opportunity to amend the details of your information prior to it being used in any publications. However, on the attached consent form, you may choose to remain nameless in publications or use a pseudonym. Choosing to remain nameless in publications cannot guarantee that you will remain anonymous as the details included in the information you provide may allow people to identify you. Any information un-related to the study will be kept confidential. You can also withdraw your information from the project at any time prior to thesis completion and/or publication.

Photographs may also be taken to document your participation in the project. You can agree or disagree to having your photograph taken on the attached consent form.

Are there any risks or discomforts if I am involved?

The researcher anticipates few risks from your involvement in this study. If you have any concerns regarding anticipated or actual risks or discomforts, please raise them with the researcher. If you experience severe discomfort and wish to speak to a professional, it is recommended you contact the CNMI Community Guidance Center at (670) 323-6560.

How do I agree to participate?

Participation is voluntary. At any time you may answer questions with ‘no comment’ or refuse to answer any questions and you are free to withdraw from the project at any time without effect or consequences prior to thesis completion and/or publication. A consent form accompanies this information sheet. If you agree to participate please read and sign the form.

How will I receive feedback?

You can receive feedback in a number of ways. If you provide your email address to Julie, she can email you outcomes from the project. If you wish to be contacted, Julie can also call you with outcomes. Julie will also conduct a public meeting to let the community know about outcomes of the project. This will be advertised in the newspaper. She can also let you know when this meeting will take place by email or telephone. Alternatively, you may also receive outcomes by mail if you prefer. Finally, a poster of the results from this project will be kept at the HPO office.

Thank you for taking the time to read this information sheet and we hope that you will accept our invitation to be involved.

This research project has been approved by the Flinders University Social and Behavioural Research Ethics Committee (Project Number 6536). For more information regarding ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on 8201 3116, by fax on 8201 2035 or by email human.researchethics@flinders.edu.au

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Fax: 08 8201 2784
Julie.mushynsky@flinders.edu.au

CRICOS Provider No. 00114A

INFORMATION SHEET (landowners)

Title: The Archaeology of WWII Karst Defences in the Pacific

Principal Researcher:
Julie Mushynsky
Department of Archaeology
Flinders University
Ph: 670 989 8477

Description of the study:

This study is part of the project entitled *The Archaeology of Karst Defences in the Pacific.* This project will investigate use and construction of caves and tunnels during WWII. This project is supported by the Flinders University Archaeology Department.

Purpose of the study:

This project aims to find out:

- Whether there were army and navy specific caves in Saipan
- The defensive strategies people used during the war
- How the defensive strategies related to wider societal attitudes and conditions in Saipan and the Pacific
- How people relate to these sites today

What will I be asked to do?

You are asked to allow PhD student and primary researcher, Julie Mushynsky, to record and survey the cave and/or tunnels on your property. Julie may also ask you a few questions about your interests in caves. Participation is voluntary.

What benefit will I gain from being involved in this study?

You will benefit by allowing your history to be recorded to pass down to future generations. Recording your site will help improve archaeological studies in Saipan and also contribute to Saipan's cultural heritage management. The information will give locals more knowledge about the caves and tunnels on Saipan and can be used to increase tourism in the future.

Will I be identifiable by being involved in this study?

The information you provide the researcher and your name will be used in subsequent publications. You will have the opportunity to amend the details of your information prior to it being used in any publications. However, on the attached consent form, you may choose to remain nameless in publications or use a pseudonym. Choosing to remain nameless in publications cannot guarantee that you will remain anonymous as the details included in the information you provide may allow people to identify you. Any information un-related to the study will be kept confidential. You can also withdraw your information from the project at any time prior to thesis completion and/or publication.

Photographs may also be taken to document your participation in the project. You can agree or disagree to having your photograph taken on the attached consent form.

Are there any risks or discomforts if I am involved?

The researcher anticipates few risks from your involvement in this study. If you have any concerns regarding anticipated or actual risks or discomforts, please raise them with the researcher. If you experience severe discomfort and wish to speak to a professional, it is recommended you contact the CNMI Community Guidance Center at (670) 323-6560.

How do I agree to participate?

Participation is voluntary. At any time you may answer questions with 'no comment' or refuse to answer any questions and you are free to withdraw from the project at any time without effect or consequences prior to thesis completion and/or publication. A consent form accompanies this information sheet. If you agree to participate please read and sign the form.

How will I receive feedback?

You can receive feedback in a number of ways. If you provide your email address to Julie, she can email you outcomes from the project. If you wish to be contacted, Julie can also call you with outcomes. Julie will also conduct a public meeting to let the community know about outcomes of the project. This will be advertised in the newspaper. She can also let you know when this meeting will take place by email or telephone. Alternatively, you may also receive outcomes by mail if you prefer. Finally, a poster of the results from this project will be kept at the HPO office.

Thank you for taking the time to read this information sheet and we hope that you will accept our invitation to be involved.

This research project has been approved by the Flinders University Social and Behavioural Research Ethics Committee (Project Number 6536). For more information regarding ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on 8201 3116, by fax on 8201 2035 or by email human.researchethics@flinders.edu.au

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Fax: 08 8201 2784
Julie.mushynsky@flinders.edu.au

CRICOS Provider No. 00114A

INFORMATION SHEET (fieldwork participants)

Title: The Archaeology of WWII Karst Defences in the Pacific

Principal Researcher:
Julie Mushynsky
Department of Archaeology
Flinders University
Ph: 670 989 8477

Description of the study:

This study is part of the project entitled *The Archaeology of Karst Defences in the Pacific.* This project will investigate use and construction of caves and tunnels during WWII. This project is supported by the Flinders University Archaeology Department.

Purpose of the study:

This project aims to find out:

- Whether there were army and navy specific caves in Saipan
- The defensive strategies people used during the war
- How the defensive strategies related to wider societal attitudes and conditions in Saipan and the Pacific
- How people relate to these sites today

What will I be asked to do?

You are asked to accompany, Julie Mushynsky, to record cave/tunnel construction and the artefacts from caves and/or tunnels. Participating in fieldwork will give you a better idea of what this project entails and give you a chance to be a part of archaeological fieldwork. You will also be asked general questions about your interests in caves. Participation is voluntary.

What benefit will I gain from being involved in this study?

You will benefit by taking part in recording your history to pass down to future generations. Your participation will help improve archaeological studies in Saipan and also contribute to Saipan's cultural heritage management. The information you record will give locals more knowledge about the caves and tunnels on Saipan and can be used to increase tourism in the future.

Will I be identifiable by being involved in this study?

Your name and information will be used in subsequent publications. You will have the opportunity to amend the details of your information prior to it being used in any publications. However, on the attached consent form, you may choose to remain nameless in publications or use a pseudonym. Choosing to remain nameless in publications cannot guarantee that you will remain anonymous as the details included in the information you provide may allow people to identify you. Any information un-related to the study will be kept confidential. You can also withdraw your information from the project at any time prior to thesis completion and/or publication.

Photographs may also be taken to document your participation in the project. You can agree or disagree to having your photograph taken on the attached consent form.

Are there any risks or discomforts if I am involved?

The researcher anticipates few risks from your involvement in this study. If you have any concerns regarding anticipated or actual risks or discomforts, please raise them with the researcher. If you experience severe discomfort and wish to speak to a professional, it is recommended you contact the CNMI Community Guidance Center at (670) 323-6560.

How do I agree to participate?

Participation is voluntary. At any time you may answer questions with 'no comment' or refuse to answer any questions and you are free to withdraw from the project at any time without effect or consequences prior to thesis completion and/or publication. A consent form accompanies this information sheet. If you agree to participate please read and sign the form.

How will I receive feedback?

You can receive feedback in a number of ways. If you provide your email address to Julie, she can email you outcomes from the project. If you wish to be contacted, Julie can also call you with outcomes. Julie will also conduct a public meeting to let the community know about outcomes of the project. This will be advertised in the newspaper. She can also let you know when this meeting will take place by email or telephone. Alternatively, you may also receive outcomes by mail if you prefer. Finally, a poster of the results from this project will be kept at the HPO office.

Thank you for taking the time to read this information sheet and we hope that you will accept our invitation to be involved.

This research project has been approved by the Flinders University Social and Behavioural Research Ethics Committee (Project Number 6536). For more information regarding ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on 8201 3116, by fax on 8201 2035 or by email human.researchethics@flinders.edu.au

Appendix F: Consent Form

Flinders UNIVERSITY

CONSENT FORM FOR PARTICIPATION IN RESEARCH (interviewees)

The Archaeology of WWII Karst Defences in the Pacific

I …..

being over the age of 18 years hereby consent to participate in the research project on WWII-related caves and tunnels in Saipan, CNMI.

1. I have read the information provided.
2. Details of procedures and any risks have been explained to my satisfaction.
3. I agree/disagree to being photographed as a means of documenting my participation in the project (please circle one).
4. I am aware that I should retain a copy of the Information Sheet and Consent Form for future reference.
5. I agree/disagree to having my name used in publications and educational materials produced from this research (please circle one). Pseudonym preferred? Y/N (please circle one).
6. I agree/disagree to audio-recording of my information (please circle one).
7. I understand that:
   - I may not directly benefit from taking part in this research.
   - I am free to withdraw from the project at any time prior to thesis completion and/or publication and am free to decline to answer particular questions.
   - I may ask that the recording be stopped at any time, and that I may withdraw at any time from the session or the research without disadvantage prior to thesis completions and/or publication
   - My information will be used in publications and educational materials produced from this research.

- I will be able to amend any information provided to the researcher prior to publication.

8. I have been compensated $25.00 for participation as an interviewee.

Participant's signature……………………………………Date…………………...

I certify that I have explained the study to the participant and consider that she/he understands what is involved and freely consents to participation.

Researcher's name…………………………….…………………….................

Researcher's signature…………………………………..Date……………………

<u>Transcription Section</u>

1. I, the participant whose signature appears below, have read a transcript of my participation and agree to its use by the researcher as explained.

Participant's signature……………………………………Date…………………...

2. I, the participant whose signature appears below, have read the researcher's report and agree to the publication of my information as reported.

Participant's signature……………………………………Date…………………...

CONSENT FORM FOR PARTICIPATION IN RESEARCH (person with artefacts)

The Archaeology of WWII Karst Defences in the Pacific

I ……………………………………………………………………………………………………

being over the age of 18 years hereby consent to participate in the research project on WWII-related caves and tunnels in Saipan, CNMI.

1. I have read the information provided.
2. Details of procedures and any risks have been explained to my satisfaction.
3. I agree/disagree to being photographed as a means of documenting my participation in the project (please circle one).
4. I am aware that I should retain a copy of the Information Sheet and Consent Form for future reference.
5. I agree/disagree to having my name used in publications and educational materials produced from this research (please circle one). Pseudonym preferred? Y/N (please circle one).
6. I agree to having artefacts in my possession recorded for this project.
7. I understand that:
    - I may not directly benefit from taking part in this research.
    - I am free to withdraw from the project at any time prior to thesis completions and/or publication and am free to decline to answer particular questions.
    - My information will be used in publications and educational materials produced from this research.
    - I will be able to amend any information provided to the researcher prior to publication.

9. I have been compensated $25.00 for participation as a person with artefacts to record for the study.

Participant's signature……………………………………Date…………………...

I certify that I have explained the study to the participant and consider that she/he understands what is involved and freely consents to participation.

Researcher's name…………………………….……………………................

Researcher's signature…………………………………..Date……………………

<u>Transcription Section</u>

2. I, the participant whose signature appears below, have read the researcher's report and agree to the publication of my information as reported.

Participant's signature……………………………………Date…………………...

CONSENT FORM FOR PARTICIPATION IN RESEARCH (landowners)

The Archaeology of WWII Karst Defences in the Pacific

I …..

being over the age of 18 years hereby consent to participate in the research project on WWII-related caves and tunnels in Saipan, CNMI.

1. I have read the information provided.
2. Details of procedures and any risks have been explained to my satisfaction.
3. I agree to having sites and artefacts on my property recorded for this project.
4. I allow/do not allow volunteer fieldwork participants to assist the primary researchers (Mushynsky, Camacho and Cabrera) with research on the site located on my property (circle one).
5. I agree/disagree to being photographed as a means of documenting my participation in the project (please circle one).
6. I am aware that I should retain a copy of the Information Sheet and Consent Form for future reference.
7. I agree/disagree to having my name used in publications and educational materials produced from this research (please circle one). Pseudonym preferred? Y/N (please circle one).
8. I understand that:

   - I may not directly benefit from taking part in this research.
   - I am free to withdraw from the project at any time prior to thesis completions and/or publication and am free to decline to answer particular questions.
   - My information will be used in publications and educational materials produced from this research.

- I will be able to amend any information provided to the researcher prior to publication.

9. I have been compensated $25.00 for participation as a property owner with site(s) on my property to be recorded for the project.

Participant's signature……………………………………Date…………………...

I certify that I have explained the study to the participant and consider that she/he understands what is involved and freely consents to participation.

Researcher's name……………………………….…………………….................

Researcher's signature…………………………………..Date……………………

Transcription Section

1. I, the participant whose signature appears below, have read the researcher's report and agree to the publication of my information as reported.

Participant's signature……………………………………Date…………………...

CONSENT FORM FOR PARTICIPATION IN RESEARCH (fieldwork participants)

The Archaeology of WWII Karst Defences in the Pacific

I …..

being over the age of 18 years hereby consent to participate in the research project on WWII-related caves and tunnels in Saipan, CNMI.

1. I have read the information provided.
2. Details of procedures and any risks have been explained to my satisfaction.
3. I agree/disagree to being photographed as a means of documenting my participation in the project (please circle one).
4. I am aware that I should retain a copy of the Information Sheet and Consent Form for future reference.
5. I agree/disagree to having my name used in publications and educational materials produced from this research (please circle one). Pseudonym preferred? Y/N (please circle one).
6. I assume all risks associated with taking part in fieldwork.
7. I understand that:

   - I may not directly benefit from taking part in this research.
   - I am free to withdraw from the project at any time prior to thesis completions and/or publication and am free to decline to answer particular questions.
   - My information will be used in publications and educational materials produced from this research.
   - I will be able to amend any information provided to the researcher prior to publication.

Participant's signature……………………………………Date…………………...

Participation for minors:

1. I, the participant whose signature appears below, assume all risks associated with taking part in fieldwork for both myself and the minor (under 18 years of age) I am accompanying on fieldwork.

2. I, the participant whose signature appears below, agree/disagree to having the minor I am accompanying being photographed as a means of documenting their participation in the project (please circle one).

3. I, the participant whose signature appears below, agree/disagree to having the minor's name used in publications and educational materials produced from this research (please circle one).

Name of Minor:……………………………………………………………………..

Participant's signature……………………………………Date…………………...

<u>Child's Section</u>

I …...

being under the age of 18 years hereby consent to participate in the research project on WWII-related caves and tunnels in Saipan, CNMI.

1. Details of procedures have been explained to my satisfaction.
2. I agree/disagree to being photographed as a means of documenting my participation in the project (please circle one).
3. I am aware that I should retain a copy of the Information Sheet and Consent Form for future reference.
4. I agree/disagree to having my name used in publications and educational materials produced from this research (please circle one).

Participant's signature……………………………………Date…………………...

I certify that I have explained the study to the participant and consider that she/he understands what is involved and freely consents to participation.

Researcher's name……………………………….……………………................

Researcher's signature………………………………..Date……………………

<u>Transcription Section</u>

I, the participant whose signature appears below, have read the researcher's report and agree to the publication of my information as reported.

Participant's signature…………………………………Date…………………...

Appendix G: Summary of Interview with Eugenio Borja

Interview with Eugenio A. Borja as related to Julie Mushynsky, Fred Camacho and Ike Borja on December 4, 2014

Eugenio A. Borja was around 16-years-old when the war started. At that time, he and his family lived in the As Teo area of Saipan.

Before the war, Eugenio used to clean the offices and make tea at the police station in Garapan and was given the key to the office. His father was a farmer who grew corn, sweet potato and bananas and raised chickens and cows for the family. Eugenio attended 5 years of Japanese school which at the time was equivalent to being a 12th grader. He couldn't use English during Japanese times or he would get whipped. He remembers Kanji was very difficult to learn. Typically in those days once Chamorro people graduated (at the Plaza) they became farmers. Chamorro people could not own stores. He remembers that his father was instructed to plant food for the soldiers once the war started. The area from Atkins Kroll down to San Jose used to be a sweet potato plantation during the war, but they weren't ready for harvest once the war broke out.

Before the war, the Japanese people in Saipan were nice and the products were inexpensive. A huge, fresh slab of meat was only equivalent to 50 US cents and a can of coffee was only 15 cents. People only made about 5 dollars a day during the Japanese Period. Right before war, everything was closed and there was no food. The ships stopped coming in with supplies and so 5 dollars was useless. It was only after the war when you saw "chow" again.

Prior to the invasion, Eugenio recalls meeting a Japanese soldier who spoke English and spent lots of time in Hawaii even though it was a US base. He felt very sorry for the Japanese man as he wanted to go back to visit his family in Japan, but was recruited to join the military instead.

Eugenio was in As Teo when the Japanese told Eugenio's family that the US was coming. The Japanese warned them about the bombings and told them that they better go hide. The Japanese also rang a siren when the bombers were coming to warn people. He and his family went to hide in a cave nearby. He remembers having two days of sirens before his family went into the cave.

Eugenio recalls that in preparation for the war, the Japanese dug tunnels and used coconut logs, leaves and dirt to cover these defences in order to camouflage. He doesn't know of any Chamorro people who dug any tunnels.

Eugenio remembers the caves he hid in were large, but the ceiling was low and they had to crouch down to enter. People would take personal items with them to the cave like jewellery, gold rings, earrings that were on the person. He was in the cave for 21 days and there were about 50 people in the cave with him, maybe more. Everyone had to huddle together and they were cramped; no one was able to stretch out.

While in the cave he remembers being very hungry and thirsty and could hear the bombing. He had no water for 21 days so his family would drink coconut water and the juice from sugarcane.

You would come out just to relieve yourself or look for food then go back in because there was so much shooting going on. They would eat things like breadfruit, sweet potato, taro, banana and yam. Whenever there was a flare it would brighten up the night so you could see what food you could go out and collect. He remembers Japanese soldiers telling him to stay crouched down when a flare went up. If you stood up, the US soldiers would think you were a soldier and shoot at you.

You had to collect food that didn't require cooking during the war because the smoke would give away your location. If you cooked and there was smoke, Japanese soldiers would shoot you.

Eugenio's family hid in two caves. They were in one cave and the Japanese told them to get out and moved to another. The Japanese left after two days and when the Japanese left for Talofofo, they went back into the first cave. At this time the US was invading the south and east side of the island. The US ships came to the backside to get the Japanese out.

After the Battle, he remembers that every week the "Grumman" airplane, likely the Grumman F6F Hellcat, a US fighter aircraft, would come. At 2pm he would see the planes fly by and would see them again the next morning. Some were lucky and flew back around undamaged, but others he noticed were flying slanted with a propeller broken. Some planes never made it and would crash on their journey. He specifically remembers seeing one of the Grumman's propellers was broken.

He also remembers a Japanese civilian on his way to Talofofo, giving him a half-gallon bottle, similar to a Kikkoman soy sauce bottle, filled with water. He was told by the Japanese person that if the US soldiers found them they would take the civilian women and would kill the men. He was told the bottle was filled with poison and if the US soldiers came he should drink the poison so that the US soldiers could not take him or kill him. Although Eugenio told the Japanese person he would drink it before the US came, he threw it away instead.

Eugenio describes himself as a monitor lizard during the war in that he was always running in and out of the cave and climbing trees to see the action. He liked watching the battle and when the US was bombing As Lito and Chacha airfields and when tanks were shooting at the mountain. His mother would yell at him, "Will you come here? You are going to get hurt!" He remembers the bodies of Japanese soldiers were lined up near the water source near Santa Lourdes. Eugenio collected the watches from the soldiers' bodies. His mom said, "Where did you get this from?" He told her he took them from the Japanese soldiers. He had about seven watches on his arm and his mother scolded him.

He remembers two Japanese soldiers were in the cave with him. They would feed Eugenio Japanese crackers and give him water from their canteen. They said to him "Anchang!" or "Boy! This is a secret so don't tell anyone, but the US will take over this island." The Japanese were preparing to go to Suicide Cliffs. The next day, the Japanese soldiers planned on leaving the cave because the US soldiers were coming. While all three were at the cave, Eugenio was without his mother, the entrance to the cave was shot at and Eugenio was grazed by a bullet or shrapnel on his left shoulder area. The two Japanese soldiers were killed. After he got hit, he went back to the cave where his mom was and took of the watches he had and threw them away.

He remembers that some Japanese thought that the Americans were stupid and that the US would never win the war. Some soldiers would say, "We were going to kill them. I don't care about the US, I'm gonna fight them."

He heard of stories of Japanese people taking food or whatever they wanted from local people, but this never happened to him or his family. He witnessed some US soldiers on a Japanese motorcycle with a sidecar take some Japanese soldiers. They used parts of a khaki uniform to blindfold the Japanese soldiers and also handcuffed them. This was near Old Man By The Sea and he is not sure where they went or what happened to them.

US soldiers retrieved Eugenio and his family from the cave in As Teo. They would yell, "Come on Chamorro. Come on Chamorro! Pas (peace) Chamorro. Pas Chamorro. " One soldier spoke Spanish and was able to speak to Eugenio's great grandfather, Ben who also spoke Spanish. Tanks were prepared to shoot if you didn't get out of the cave. You needed to come out with your hands up and you could not take anything out of the cave. Once you were out of the cave you couldn't go back in. If you didn't come out then the US suspected there were Japanese soldiers in the caves and would then use flamethrowers. They gave you a chance, if you didn't surrender then they would use the flamethrower or bomb it. Eugenio remembers being picked up by a US soldier. The soldier slung his gun over his shoulder and picked him up. Before it got dark the US took the locals and Japanese civilians to Camp Susupe.

Eugenio remembers seeing US soldiers walking around looking for Japanese soldiers. While doing this, the US soldiers would often play the guitar or harmonica. Eugenio thought they were crazy. Even while fighting the war and risking their lives these soldiers were playing and happy. He thinks that some of the US soldiers went in and looted some of the caves. People would leave their personal items inside the cave including jewellery and gold and when they returned to the cave everything was missing.

Eugenio did not lose any family members during the invasion and everyone in his cave survived the battle. During the war there were 7 of them and they all survived, but some got sick while in the camps. His one sister fell and passed away. She would have been 88 or 89 today. A second female relative died of old age at 80 years. He had three older brothers die before the war; Manual, Franscisco and Vicente. Four of them are left and still living. His oldest sister is currently 91 years old.

Eugenio doesn't visit any caves today and those 21 days during the war were the last time he went to a cave. He describes caves as "souvenirs" for the locals and something that should be protected. Caves are also significant to animals, as they often use caves to shelter themselves from weather. Eugenio thinks it is okay for tourists to visit caves and tunnels, but if they are on private property, they need permission from property owners. He thinks property owners are usually okay with people visiting sites tourists just need to get permission first. Some caves in Saipan have no access. People also need to be careful about UXO and he knows there are lots of hand grenades lying around. He knows that many people also hunt fruit bats and coconut crab, inside and around caves so people need to be careful. Eugenio used to hunt pig, but not much anymore. He remembers not killing the larger pigs because it was too difficult carry out of the jungle. Chamorro people hunted more often before the war.

Eugenio knows that Tank Beach had a reinforced cave with a window or opening where the Japanese would shoot machine guns from. He knows that many US soldiers died there, coming in from the sea.

Before the war, people didn't typically go into caves. If the cave was clean it meant the spirits were there, the older spirits; caves were their home. Sometimes people would go into these caves and would be sickened by the spirits. During the war the spirits left the caves. Now the spirits are no longer there.

Appendix H: Summary of Interview with Rosa Castro

Interview with Rosa T. Castro as related to Julie Mushynsky, Fred Camacho and Marcellina Castro on December 18, 2014

The youngest of four girls, Rosa was born February 17, 1931 and was 14-years-old when the Battle for Saipan broke out. Her and her family lived in Tanapag. Before the war, she helped out at home, which was typical of young women at this time. She took first and second grade Japanese school.

When the war began, Rosa remembers sirens ringing and Japanese people yelling that the enemy is here and already in the ocean so they should gather together and leave Tanapag. You could see the ships in the ocean and the planes overhead. The bombing began and each person ran for their lives. Rosa and her family followed the Amparo Deleon Guerrero family, who made their way through Tanapag from the south, to San Roque "towards the mountain." The Amparo family went up and hid in one cave and Rosa's family hid in the cave a bit further north towards the San Juan/Marpi area for about 3 days. The two families lost contact at this point. When they got to the cliffline, they met up with the Jesus Guerrero family who then went further back towards the creek.

The caves were big enough that many people hid in the caves together. There were some people on the upper and inner portions and some on the outer. The ones that arrived first took the inner portions of the cave while the rest had to stay close to the entrance. Rosa's family shared the cave with Japanese civilians and since her mom was older she was told to move further into the cave. Rosa remembers hiding in caves for about 3 or 4 days and being scared of the big guns. She remembers being out of food and chewing on sugarcane. They wanted to make fire, but they were told not to.

Rosa also had her nephew, Antonio Camacho, strapped on her back as she ran and hid. Her family raised Antonio and so Rosa felt an obligation to protect him. There were about 7 people in her family including 3 or 4 children. Luckily, Rosa never lost any family members during the war.

They could only take minimal supplies with them when they left Tanapag and they tied small items to themselves like maybe some crackers or biscuits and they only took cooked food. They had no time to prepare they just wrapped what was there and left. She remembers taking a small container of water for herself.

During her time in the cave, Rosa and her family knew in their hearts that they were going to die because it was so dangerous. They thought they were going to die inside the cave, until the U.S. forces came to retrieve her and her family. It was very traumatic for Rosa and she cannot recall what the U.S. forces said or did. She remembers having to leave everything behind in the cave.

Rosa and her family got on a truck and were taken to Camp Susupe. She remembers a woman giving birth at the camp and Rosa was put in charge of taking care of the baby because the mother and father had to do other things.

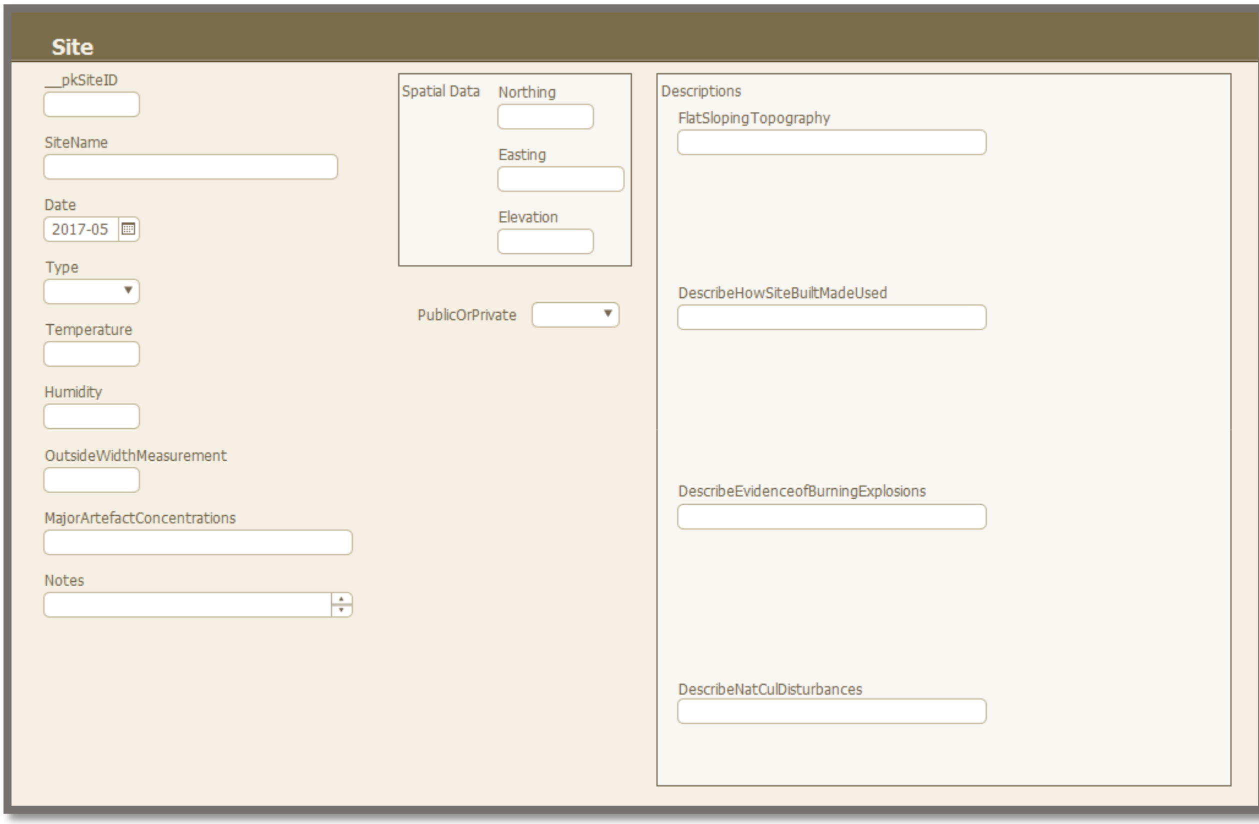
After the war she became a nurse's aid/medical assistant at Tuturam/San Vicente hospital for soldiers and those who were injured during the war. She later became a babysitter for the government and worked at the Hyatt.

Rosa believes that the study of WWII caves and tunnels is a sad study. From her heart she feels that the researcher has come a long way to study and learn something that is bad. She feels sorry for the researcher because it is not a happy study.

Rosa is indifferent to the significance of WWII-related caves and also to tourists visiting caves. All she has is information and it is up to the researcher to make something of it. She would not get in tourists' way if they wanted to visit caves. Now, whenever she hears or talks about WWII caves, she will remember the researcher's face.

As for the spirits in and amongst the caves, Rosa cannot say whether they exist or not, it is what you see and what you know that determines how you feel.

Appendix I: Site Recording Form



Site

__pkSiteID

SiteName

Date

2017-05

Type

Temperature

Humidity

OutsideWidthMeasurement

MajorArtefactConcentrations

Notes

Spatial Data

Northing

Easting

Elevation

PublicOrPrivate

Descriptions

FlatSlopingTopography

DescribeHowSiteBuiltMadeUsed

DescribeEvidenceofBurningExplosions

DescribeNatCulDisturbances

Legs

_fkSiteID

SPS2 Easternmost Gualo Rai I-Tunnel

ID L1

Length

7m

Height

1.7m at entrance to 1.5 at rear

Width

1.5m

Notes

Pockets

ID P1

_fkSiteID

SPS14 Kagman Y-Tunnel

Baseline

Starts at 8.4m

CompassBearing

Width

0.46m

Height

0.70m

Depth

0.33m

Notes

In L2 at the very end of the SW wall

Shelves

ID S1

_fkSiteID

SPS14 Kagman Y-Tunnel

BaselinePoint

Inside P1 of L3 from 7.4m to 8.3m on the

Height

0.61m

Width

0.39m

Depth

0.36m

HeightFromFloor

0.57m

Notes

The hieght from the floor is as above but

Appendix J: Artefact Recording Forms

Ceramics

_fkSiteID
SPS41 Talafofo Rohto Cave

BaselineOffset
2.4m, 3.27m from

CatNo 4546

GeneralDescription
one of those vessels with the f

Photographs

Diagnostic
Yes

Waretype (use laminated sheet and
porcelain

Element
body

Form

Completeness
0-50%

FunctionalType
tableware

Length
32.5mm

Width
16mm

BaseDiameter

RimDiameter

ArcLength

PasteColour
white

GlazeType
clear/lead glaze

DecorationMethod
stenciling

DecorationColour (include Munsell

VisibleMotifs
flowers and cross hatched leaf

DecorationPatternName
floral

MakersMark

Number of frags 1

Number of Vessels

Thickness
4.5mm

ConjoinsWith

Glass

_fkSiteID	SPS4 Lower Navy Hill Tunnel	**CatNo**	2537
NumofFrags	1		
BaselineOffset	9.54m, 95cm from Sw wall of L3		
Diagnostic	Yes		
Colour	Brown/amber		
FragLocation	finish/seal		
Completeness	Tiny Fragment 0-24%		
VesselType	container (bottle/jar)		
TablewareType			
FragLength	69.5mm		
FragWidth	48mm, neck is 26mm diameter		
FragThickness	3.5mm		
BaseDiameter			
BaseThickness			
KickupDepth			
PontilMark			
TechnologicalBaseMarks			
Horizontal Shape			
ProbableContents	medicine		
ShoulderWidth			
CompleteHeight			
NumofMouldSeams	2 that go through finish		
MouldType			
Bore Diameter	15.5mm		
MouthWidth	24mm		
AppliedFinish	No		
FinishType	external screw thread		
ClosureType	screw cap		
StretchMarks	No		
WhitePatination	Yes		
Burnt	Yes		
TrademarksLocation			
MarksDecoration			
ConjoinsWith			
OtherFeatures	slightly melted		
Photographs			

Human Remains

_fkSiteID	SPS4 Lower Navy Hill Tunnel	**CatNo**	1881
BaselineOffset	9.4m, 1.84m from south wall of L4		
Length	47mm		
Width	12.5mm		
BodyPart	unidentified		
Element			
PartSpecimen	fragment		
Side	unidentified		
Age	unide		
Modification	calcined		
ModificationLocation			
Description	2mm thick small bone frag one side the		

Faunal Remains

_fkSiteID	SPS4 Lower Navy Hill Tunnel	**CatNo**	2223
BaselineOffset	1.95m, 1.86m from north wall of L2		
Class	mammal (pig/deer)		
Length	21mm		
Width	52mm		
BodyPart	skull		
Element	mandible		
PartSpecimen	complete		
Side	left		
Age			
Modification			
ModificationLocation			
ButcheryType			
MeatCut			
Description	canine or feline lower mandible with 2		

Metal

CatNo	1917
_fkSiteID	SPS4 Lower Navy Hill Tunnel
BaselineOffset	15.8m, 0.83m from south wall of L4
MetalType	copper alloy
Length	4mm
Width	20mm
Thickness	
Colour	
CorrosionColour	
CorrosionPattern	
Magnetic	No
Weight	
Plating	
FabricationMarks	
MakersMarks	
Function	grommet

ButtonDiameter	
ButtonLigneSize	

NailType	
NailHeadShape	
NailLength	
NailCrossSectionShape	

NutBoltWashScrewManufacture	
BoltScrewHeadShape	
NutBodyShape	
WasherBodyShape	
ScrewBodyShape	
BoltBodyShape	
Description	hole diameter 6.5mm
Photographs	

Miscellaneous

CatNo	193
_fkSiteID	SPS14 Kagman Y-Tunnel
BaselineOffset	0.47m, 0.59m from Sw wall of L4
Length	62mm
Width	47mm
Thickness	0.3mm
Colour	yellow
Shape	rectangle
Type	plastic
Decoration	
Description	flat plastic piece, broken, 3mm edges on

Beads	CatNo 3821
_fkSiteID	SPS37 As Falipe Tunnel
BaselineOffset	3.95m, 50cm from SW wall of L1
Type	molded or pressed
Colour	dark brown
Length	6.5mm
Diameter	12mm diameter
Shape	oblate
Decoration	
Opacity	
Description	another at 1.2m, 60cm from SW wall of

Appendix K: Artefact Database Fields

RECORDED FOR ALL SITES:
Fk SiteID: The site number and name the artefact is associated with.

Baseline Offset: The location of the artefact within the site. The location along the tape measure is recorded first, then the distance from a certain wall indicated by cardinal direction (SW wall) and the leg or pocket the object is within (6m, 1m from east wall of L1).

Catalogue Number: Entered by recorder in chronological order.

CERAMICS:
Diagnostic: A yes or no response. An artefact is diagnostic if it is a rim or base fragment or a body fragment with decoration or maker's mark.

Waretype: Identifies whether the artefact is earthenware, stoneware or porcelain.
Earthenware: a white paste colour with an opaque and porous body.
Stoneware: a white, grey, buff or tan paste colour with an opaque body and little or no porosity.
Porcelain: a white to pale grey paste colour with a translucent or opaque body and little to no porosity.

Element: The part of the formerly whole object to which the artefact belongs (base, rim, body, etc.)

Form: A specific description of the vessel if known from determining the precise plate or bowl size using a base/rim diameter chart (plate, bowl, tea cup, etc.).

Completeness: How much of the original artefact is present.
Complete: 95 to 100%
Large fragment: 50 to 95%
Small fragment: 0 to 49%.

Functional Type: A functional group of objects to which the artefact belongs. Includes tableware, personal/hygiene, household general, electronic.

Length, Width and Thickness: A measurement in mm or cm and usually only the maximum dimension is recorded.

Base Diameter: A measurement of the vessel's foot ring (the resting surface of the vessel) based on the base/rim diameter chart.

Rim Diameter: A measurement of the original vessel's rim based on the base/rim diameter chart.

ArcLength: Uses the base/rim diameter chart to measure the percentage of the original item represented by the fragment.

Paste Colour: The colour of the clay from which the vessel is made including buff, tan, grey, white, green, etc.

Glaze Type: The surface treatment of the vessel.
Salt glaze: when added to the kiln during firing, the salt vapourises and settles in tiny, thin transparent drops and appears as orange-peel texture. Usually on stoneware.
Single colour glaze: a solid coloured glaze.
Lead glaze: clear, transparent or translucent glaze. Decoration is under this glaze.
Tin glaze: white, opaque enamel glaze made from glass, lead and tin. Decoration is on top of a tin glaze.
Rockingham: brown mottled glaze.
Unglazed
This field also has the option of selecting *single colour slip* (a thick semi-solid fluid composed of clay and water often appears raised from the surface and under a glaze), although this is typically considered a decoration method.

Decoration Method: The type of physical modification or added decorative effect.

Decoration Colours: The colour(s) of the decoration determined by the Munsell colour chart.

Visible Motifs: Any decorative motifs visible on the sherd.

Decoration Pattern Name: The particular decorative pattern name determined from a mark on the sherd or from research.

Maker's Mark/Trademark: All maker's marks or similar, where they occur on the vessel and what they consist of.

Conjoins With: Records the catalogue number of another sherd that can be refitted to the present piece.

General Description: Any further information not included in the other fields.

Number of Fragments: Used in post processing and not a field used during recording.

Number of Vessels: Used in post processing and not a field used during recording.

GLASS:
Diagnostic: A yes or no response. An artefact is diagnostic if it is a base, closure, mouth or any fragment with a maker's mark or technologically identifiable element (more than one mould seam, stretch marks, etc.) or datable feature.

Colour: The colour of the object after shining a torch through it and relating it to a colour chart.

Fragment Location: Where on the original vessel the fragment originates (finish, base, etc).

Completeness: How much of the original artefact is present.
Complete: 95 to 100%
Large fragment: 75 to 95%
Medium fragment: 50 to 75%
Small fragment: 25 to 49%
Tiny fragment: 0 to 24%

Vessel Type: A description or function of the object (container, flat glass, lighting device, etc.)

Tableware Type: Domestic tableware glass vessel types (cut glass, pressed glass, plain moulded, etc.)

Length, Width, Thickness: A measurement in mm or cm. Often only the maximum dimension is recorded.

Grouped Non-Diagnostic Fragements:
Number of Fragments: The number of fragments of the same colour under one catalogue number.

Group Max Length, Width, Thickness: Measurement in mm or cm of longest, widest and thickest sherd in the group.

Group Min Length, Width, Thickness: Measurement in mm or cm of shortest, narrowest and thinnest sherd in the group.

Base Diameter: External base diameter in mm or cm.

Base Thickeness: Thickest portion of the base in mm or cm.

Kickup Depth: A steep rise or pushed up portion of the base. It is measured in mm or cm from the external heel to the centre of the kickup or pushup.

Pontil Mark: A scar or roughage left on the base of a bottle by a pontil rod. A yes or no response as to whether one is present.

Technological Base Marks: Types of bottle bases according to diagnostic features (ie. push up, suction scar, etc.) on the Society for Historical Archaeology Historic Glass Bottle Identification and Information Website.

Horizontal Shape: The external shape of the vessel base.

Probable Contents: What the vessel likely once contained.

Shoulder Width: Measurement in mm or cm.

Complete Height: Measurement in mm or cm

Number of Mould Seams: Quantity visible on the sherd.

Mould Type: Type of mould used to produce the bottle as per the Society for Historical Archaeology Historic Glass Bottle Identification and Information Website.

Bore Diameter: Measurement in mm or cm.

Wouth Width: Measurement in mm or cm.

Applied Finish: A yes or no response as to whether the finish was applied seperately by hand or with a finishing tool.

Finish Type: A specific finish category according to features and types on the Society for Historical Archaeology Historic Glass Bottle Identification and Information Website.

Closure Type: A specific closure category according to features and types on the Society for Historical Archaeology Historic Glass Bottle Identification and Information Website.

Stretch Marks: Whether stretch or tension marks are visible on the neck of the bottle.

White Patination: The presence of a pitting and white surface coating denoting weathering.

Burnt: A yes or no response.

Trademarks and location: All marks or similar, where they occur on the vessel and what they consist of.

Decoration: Any decorative motifs or other marks visible on the sherd.

Conjoins With: Records the catalogue number of another sherd that can be refitted to the present piece.

Other Features: Any further information not included in the other fields.

FAUNAL REMAINS:
Class: Mammal, reptile, etc.

Length, Width: Measurement in mm or cm.

Body Part: Identifies where the bone comes from out of ten general body areas (hind limb, fore limb, trunk, skull, limb, hoof, tooth, whole, claw, unidentified).

Element: The specific bone the artefact represents (rib, femur, etc.)

Part/Specimen: The specific part of the element (complete, shaft, proximal, proximal and shaft, epiphyses, dorsal, ventral, caudal, cranial, lateral, unidentifiable).

Side: The area of the body the artefact is from (right, left, medial, unidentified).

Age: Based on the state of bone fusion (fused, unfused, worn, unidentified).

Modification: Butchered, crushed, burnt, etc.

Modification Location: Place on the bone where the modification occurs (shaft, proximal, distal, etc.)

Butchery Type: The kind of butchery mark (Crader 1990:705–706):
Cut: appears as straight, narrow, incised lines probably made with a metal knife.
Chop: similar to cuts except that they are wider marks where a cleaver or ax-like tool has removed a small wedge of bone.
Scrape: where a shallow layer of surface bone has been removed leaving numerous, irregular striations.
Shear: straight-walled, planar surfaces where the bone has been split apart, probably by a powerful blow with a cleaver or ax-like implement.
Saw: regular, parallel striations where a metal saw was repeatedly drawn back and forth through the bone tissue

Meat Cut: The part of the animal represented (prime rib, sirloin, etc.)

Description: Any further information not included in the other fields.

HUMAN REMAINS:
Length, Width: Measurement in mm or cm.

Body Part: Identifies where the bone comes from out of ten general body areas (lower limb, upper limb, torso, skull, limb, foot, hand, tooth, whole, unidentified).

Element: The specific bone the artefact represents (femur, phalange, mandible, etc.)

Part/Specimen: The specific part of the element (complete, shaft, proximal, proximal and shaft, epiphyses, distal, distal and shaft, dorsal, ventral, caudal, cranial, lateral, unidentifiable).

Side: The area of the body the artefact is from (right, left, medial, unidentified).

Age: Based on the state of bone fusion (fused, unfused, worn, unidentified).

Modification: Burnt, calcined, crushed, etc.

Modification Location: Place on the bone where the modification occurs (shaft, proximal, distal, etc.)

Description: Details of the object not included in any of the previous fields.

METAL:
Metal Type:
Copper Alloy: alloys made of copper blended with tin (bronze), zinc (brass) or lead or other metals. Not magnetic. Can have a blueish, greenish or reddish hue.
Nickel Silver: a base metal on silver-plated flatware. Resists corrosion and is not magnetic.
Iron: magnetic, typically highly corroded in archaeological contexts with a reddish hue.
Lead: heavier and may have a white soft layer of corrosion over its surface.

Length, Width, Thickness: Measurement in mm or cm and often only the maximum dimension is recorded.

Colour: Colour of uncorroded portion of object.

Corrosion Colour: The colour of the corroded portion of the object.

Corrosion Pattern: The location of the corrosion on the object.

Magnetic: A yes or no response after using a magnet on the object.

Weight: A general description that is only used when something is notably or surprisingly heavy or light.

Plating: A yes or no response to whether an object has a metal coating or plating added to the object.

Fabrication Marks: A blemish or mill mark on the object, where it is located and what it consists of.

Maker's Marks: All maker's marks or similar, where they occur on and what they consist of.

Function: What the object is (nail, can, spoon, etc). If a guess it has a question mark e.g. Nail?

Button Diameter: Measurement in mm or cm.

Button Ligne Size: Size using a ligne size chart.

Nail Type:
Hand forged: shaft tapers on all four sides and ends in a point or spade. Shaft thickness will vary and the head will not be uniform.
Cut nails: square or blunt ends and have two tapering or two parallel sides.
Wire: uniform round shafts.

Nail Head Shape:

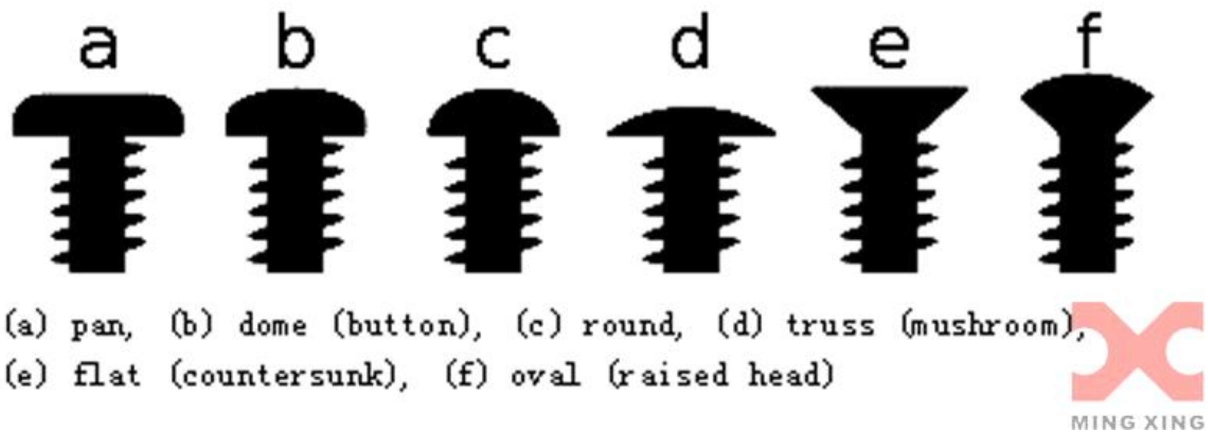
Flat
Rose: flattened facets with a slight point at the top.
Crown: angled head with a flattened top.
Rhomboid: shape with four sides where only the opposite sides and angles are equal.

Nail Length: Full nail length measurement in mm or cm.

Nail Cross Section Shape: Cross sectional shape of the shaft.

Nut/Bolt/Washer/Screw Manufacture:
Hand forged: irregularities in construction.
Machine made: a level of finishing and symmetrical.
Unknown.

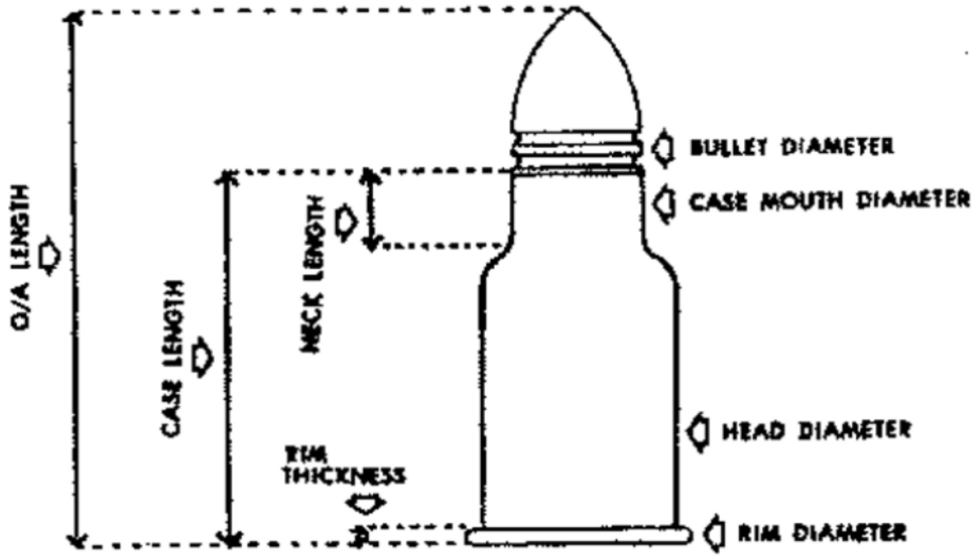
Bolt/screw Head Shape: Pan, button, round, truss, countersunk, oval (Dongguan MingXing Hardware Products Factory 2016):



Nut/washer/screw/bolt Body Shape:
Nuts: hexagonal, square, wing, other.
Washers: flat, spring, other.
Screws: Philips, slot, wood screw (screw with any head shape, a sharp shaft point and usually an unthreaded portion just below the head), other.
Bolts: Carriage (round or countersunk head, short square section under the head).

Bullets: Bullets are recorded using the following terminology (Suydam 1960:27):

Case dimensions:



The term bullet refers to the entire object. The shell refers to the metal (usually brass) casing and the projectile is the portion that is shot from the gun and penetrates the target. The calibre of a bullet is determined by the diameter of the widest portion of the projectile.

Description: Details of the object not included in any of the previous fields.

BUILDING MATERIALS:
Type: The function of the object (shoe) and/or the material it is made from (leather).

Length/width: Measurement in mm, cm or m.

Shape: Observed shape of the object.

Colour: Observed colour of the object.

Decoration: Any type of decoration or mark added to the object and location of the decoration.

Description: Details of the object not included in any of the previous fields.

BEADS:
Type:
Drawn: manufactured by stretching molten glass between two pontils or rods and then cutting the hollow tube into pieces. Usually cylindrical in shape.
Wound: manufactured by heating a small segment of hollow glass then winding it around a wire and twirling it in the heat until a desired shape is formed. Usually spherical or ellipsoidal in shape.
Moulded or pressed: manufactured by compressing warm glass in a two-part mould. Comes in a range of shapes.

Colour: The standard colour of the bead body determined with a Munsell colour chart.

Length: Measurement in mm or cm.

Diameter: Measurement in mm or cm.

Shape: The shape of the bead.

Decoration: Any type of decoration or mark added to the object and its colour.

Opacity: If the bead can be penetrated by light (opaque, translucent, transparent, other).

Description: Details of the object not included in any of the previous fields.

MISCELLANEOUS:
Length, Width, Thickness: Measurement in mm or cm.

Colour: Colour of the object based on recorder's observation.

Shape: Shape of object.

Type: The function of the object (fuse plug) and/or the material is is made from (plastic).

Decoration: Any type of decoration or mark added to the object, its location on the artefact and its colour.

Description: Details of the object not included in any of the previous fields.