The Stories of Banks Peninsula: Connecting Maori Oral Traditions, European History, and Geological and Ecological Perspectives

Camille Honoré Dwyer\textsuperscript{1,2}

\textsuperscript{1}Department of Geological Sciences, University of Canterbury, Private Bag 4800, Christchurch, New Zealand
\textsuperscript{2}Department of Geosciences, Smith College, Northampton, Massachusetts 01063, United States of America

\textbf{ABSTRACT}

For generations, indigenous oral traditions have been misinterpreted and neglected from academic disciplines. Throughout the late 20\textsuperscript{th} and early 21\textsuperscript{st} century, autochthons’ spoken words have gained recognition in the modern world, because ethnographers understood the importance of history and symbology in oral traditions. By recognizing this significant discovery in cultural studies, this study will link the New Zealand’s South Island Maori iwi, Ngāi Tahu, oral traditions to the geology, ecology, and history of Banks Peninsula. The first section will describe how the Maori understood the volcanic history of Banks Peninsula through their oral traditions and the peninsula’s connection to North Island traditions. The next section outlines why the Maori settled in Banks Peninsula. They settled there because of the peninsula’s even-tempered climate, malleable landscape features, and bountiful resource supplies. The last section discusses how Maori oral traditions capture natural phenomena and how closely related are the cultural explanations to historical and scientific interpretations. Connecting the South Island’s Ngāi Tahu’s oral traditions, European historical accounts, and scientific data, will inform others of the cultural, historical, and geological significant areas of Banks Peninsula.

\textbf{INTRODUCTION}

Oral traditions of autochthon societies have been neglected, misinterpreted and even forgotten in our modern society because of European and North American colonization. Written communication has taken precedent over oral traditions to record knowledge, but some native communities still utilize this customary practice. The
Aborigines, a native society of Australia have concepts and beliefs about The Dreaming, which is passed down through songs, story telling, dance art, craft making, and given instructions and directions (“Oral Traditions,” n.d.). Oral tradition is the main premise of how knowledge is “reproduced, preserved and conveyed from generation to generation” and creates connections between the past and present through memory (Hanson, 2009). It relies on rhythm, balance, repetitions, and dependence on the speaker’s memory (Sullivan, 2009). The purpose of oral tradition is to understand the symbology that can explain an event, instead of remembering how an event exactly happened (White, 1998).

Native societies’ oral traditions have been perceived as uncivilized and uncomplicated compared to modern written societies. However, oral traditions and written documents are complementary to each another and their strengths can help to create a better story (Hanson, 2009). As Albert Sonny McHalsie wrote, written communication and oral traditions are complementary because they build upon past knowledge and both recognize that “learning is a life-long quest” (Hanson, 2009). By taking into account how written communication and oral traditions both contribute to knowledge, this study will connect the New Zealand’s South Island Maori iwi, Ngāi Tahu, oral traditions to the scientific data and historical accounts of Banks Peninsula (Figure 1). Maori oral traditions have a dual nature like many other native societies’ sources of communication. They have a historical element to recall the past and a symbolic element to communicate beliefs to future generations (Te Maire Tau, 2003). Also for Maori oral tradition, their whakapapa (genealogy) is used to connect traditions using their ancestors and past events (Te Maire Tau, 2003).

The purpose of this study is to construct three lenses for how the Maori used oral tradition to interpret the historical and scientific data of Banks Peninsula. The first section will relate to the accuracy of Maori oral tradition and the volcanic geology of Banks Peninsula. The second segment will discuss why the landscape of Banks Peninsula was suitable for the Maori by comparing oral tradition and ecological and geological details. The last portion will examine how the Maori interpreted natural phenomena and the scientific data that recorded these events. By recognizing the importance and strengths of academic disciplines and oral traditions, this study creates
connections through the culture, history, geology, and ecology of Banks Peninsula, New Zealand.

**BACKGROUND**

**Natural History Background: The Geological and Ecological Changes of Banks Peninsula**

*Banks Peninsula’s Geological History*

Banks Peninsula was volcanically active millions of years ago and is composed of four major volcanic groups: Lyttelton (11-9.7 Ma), Akaroa (9.0- 8.0 Ma), Mt. Herbert (9.7 Ma- 8.0 Ma), and Diamond Harbour (8.1- 5.8 Ma) (Hampton, 2012). In the Quaternary period, the volcanic material eroded, and sand and gravel accumulated on the coast by longshore drift currents and the Rakaia and Waimakariri Rivers (Hampton, 2012).

*Banks Peninsula’s Ecological Changes*

Before Polynesian arrival, 85%- 90% of New Zealand was covered with low bush and the South Island had closed canopy forests with beech dominating in wetter, higher elevations, and podocarps in drier, lower elevations (McWethy et al., 2010). Over 40% of the island had been cleared by fire when European settlers arrived in the 1800s and the landscape altered from canopy forests to tussock grassland and fern-shrubland (McWethy et al., 2010). The Maori also caused the extinction of the moa and the Haast eagle (Canterbury Museum, 2013). They altered the landscape in 200 years with intensive use and management of wild terrestrial, freshwater, and marine resources. The Maori had advanced methods of land stewardship to manage land resources, cultivate agricultural crops, and harvest wild edible plants (McWethy et al., 2010).

**Historical Background: European Perspective of Banks Peninsula Maori History**

The three tribes of Banks Peninsula are the Waitaha, the Ngati Mamoe, and the Ngai Tahu. They all originate from the homeland of Hawaiki (Stack, 1893). The Waitaha, or the moa hunters, arrived in the 1300s to the South Island (Bassett et al., 2004). They came from the Bay of Plenty and were conquered by the Ngati Mamoe in the 1500s (Stack, 1893). The Ngāi Tahu conquered the former iwi (sub-tribe) a hundred years later and they are still the major tribe of the South Island today (Te Maire Tau, 2012) (Table 1).
Many tribal conflicts occurred in Banks Peninsula, but the biggest battle was between the Ngāi Tahu and Ngati Toa in the mid 1830s. English Captain John Stewart helped North Island Ngati Toa chief, Te Rauparaha, to capture Ngāi Tahu chief, Te Maiharanui of Takapunek. John Stewart and Te Rauparaha destroyed the pa (fortified settlement) of Takapunek in Akaroa. Since the English helped the Maori to kill off other Maori tribes, the Treaty of Waitangi was signed (Te Maire Tau, 2012).

METHODOLOGY

Literature Review and Interviews

An extensive literature review was conducted by reviewing Maori oral traditions collected by late 19th and early 20th century ethnographers, Maori oral traditions dissected by late 20th and early 21st century anthropologists, and scientific articles related to Banks Peninsula’ geology and ecology. Interviews were conducted with Meri from Ōnuku Marae in Akaroa Harbour about the perspective and importance of Maori culture in Banks Peninsula and with Maori Resources Librarian, NekenekeiteRangi Paul to learn how to interpret oral traditions correctly.

Interpreting Maori Oral Tradition

Maori oral tradition was not always taken seriously and was interpreted incorrectly. Before the 1980s, there were two approaches: separating “fact” from fiction and the minimalist method. For the first approach, early European writers completely disregarded symbology and only focused on historical accounts. Since the disciplines of ethnography and anthropology were in their infancy in the late 19th century, they used Maori oral tradition to reflect prevailing colonialists theories of time (Prendergast-Tarena, 2008). Most 19th century ethnographers did not have any formal training and were “amateurs of little formal education” (Ballara, 1998). Even though these ethnographers had a very flawed approach to collecting oral tradition, they should be acknowledged and valued in gathering first hand knowledge, even though the ethnographers would misinterpret and skew the knowledge during collection (Ballara, 1998). With the second approach, the minimalist method, it dismissed the historical component of Maori oral tradition and only looked at the symbology (Prendergast-Tarena, 2008). However in the 1980s, these approaches changed because of Te Maori. Te Maori was the first international art exhibition of Maori cultural objects and this
showcase created recognition of the importance of Maori culture and was taken seriously by scholars (N. Paul, 2013). Afterwards, Maori oral tradition was both seen as symbolic and historical instead of just historical or just symbolic (Prendergast-Tarena, 2008).

**DISCUSSION**

**How did the Maori Interpret the Geological History of Banks Peninsula’s Volcanism?**

*Maori Oral Tradition: “How the Fire Came to Banks Peninsula”*

Tamatea and his crew travel around Te Waipounamu (the South Island). They return to Horomako (Banks Peninsula) to rest and warm up from their long adventure, but they realize their fire stopped burning. This sacred fire originated from Hawaiki and was carried by chief Uenuku from the Arai-te-Uru canoe. The Arai-te-Uru canoe overturned near Oamaru, but the crew saved the fire. The place where the fire was saved is called Te Ahi a Uenuku or Uenuke’s Fire (Parsons, 1988).

Tamatea calls upon his friend, Ngatoro-i-rangi of the North Island, for help. Ngatoro-i-rangi sends the fire from Hawaiki. The fire follows a route- White Island, Ngauruhoe, and the hot thermal pools towards Banks Peninsula to warm up Tamatea and his crewmembers. Tamatea and his teammates are saved and the eruption of the fire is known as Te Upoko o Kuri (Parsons, 1988).

*How the Maori Understood the Geological History of Banks Peninsula*

“How the Fire Came to Banks Peninsula” is significant because the Maori understood that Banks Peninsula had volcanic origins. In the first portion of the oral tradition, the location where the fire was saved, Te Ahi a Uenuku, is composed of lignite (Parsons, 1988). Lignite is brown coal and resembles ordinary wood (Kopp, 2013). By having the Maori know that Te Ahi a Uenuku is lignite is significant the fire was burning wood and lignite resembles wood. Their ancestors’ fire is composed differently from the other rocks around Banks Peninsula. They recognized the sedimentary aspects of Te Ahi a Uenuku and recognized that lignite is not of igneous origins. In the oral tradition’s second part, Te Upoko o Kuri is Witch Hill that is located east of Giant’s Causeway (Parsons, 1988; Andersen, 1927). Giant’s Causeway protrudes from the hilltop just above Rapaki and is a well-known volcanic dike (Andersen, 1927). The Maori named
Giant’s Causeway, “The Fire of Tamatea,” because they understood the grey-white rock was of volcanic origins and connected it to a fire source (Cowan, 1923).

The Maori of Banks Peninsula were knowledgeable and were able to recognize the peninsula’s volcanic features. This South Island legend connects to the volcanic activity or “internal fires” of the North Island (Cowan, 1923). By recognizing that the North Island and Banks Peninsula both have volcanic features is important because they understood the geological origins of New Zealand. The only difference between an oral tradition interpretation and a scientific interpretation is that the Maori attributed the geological history of Banks Peninsula to their ancestors’ journeys, while geologists attributed the peninsula’s origins to volcanic activity. The result is the volcanic rocks are present in the geological record, but there are different approaches and stories to reach the same conclusion that Banks Peninsula was previously volcanically active.

**Why Did the Maori Settle in Banks Peninsula?**

Maori Oral Tradition “Kā Puna Wai Karikari o Rākaihautū- The Springs Excavated by Rākaihautū”

The oral tradition, Kā Puna Wai Karikari o Rākaihautū (The Springs Excavated by Rākaihautū), is told by the Te Runanga o Ngāi Tahu representative, David Higgins (“Statement of Evidence of David Higgins,” 1991). Rākaihautū came in the great waka, Uruao, and landed at Whakatū (Nelson). The canoe split into two groups. Rākaihautū explored the South Island interior and his son, Rakihouia, explored its coastline.

Rākaihautū carved the biggest lakes using his ko (Polynesian digging stick) named Tūwhakaroria while his son and his son’s wife, Tapuiti, collected food, and named areas of significance related to their food gathering. After exploring the entirety of Te Waipounamu, Rākaihautū and his son had a reunion in South Canterbury where they adorned themselves with shells and greenstone. During this reunion, Tapuiti cooked a hao (small eel). They continued with their festivities and arrived in Banks Peninsula. In Banks Peninsula, Rākaihautū sculpted two more lakes, Te Kete Ika a Rākaihautū (the Fish Basket of Rākaihautū), and Te Pātaka a Rākaihautū- (The Food Storehouse of Rākaihautū). After Rākaihautū finished carving the island, he threw his ko into Mt. Bossu which is the prominent peak in Akaroa Harbour. This peak is known as Tuahiraki (the Digging stick of Rākaihautū) (“Statement of Evidence of David Higgins,” 1991).
A pa is a fortified settlement and a “home base for seasonally mobile populations” (Orchiston, 1979). The Maori used every “suitable headland, island, and projection” to construct a pa (Skinner, 1911). There are many facets to these settlements. A well-constructed pa had a view of the coastline to watch for incoming invaders. Entry to the pa was difficult to prevent tribes from entering into their settlement. Pas must have access to easy food and water resources. Food resources could include seafood such as cockles, mussel beds, shark, and eel. The pa had to be located near freshwater springs and have ruas (underground pits) to store vegetables like kumara that needed a cold and dry climate to keep from molding (Skinner, 1911).

Banks Peninsula has many sea headlands and inlets. The Banks Peninsula pas are “specialist activities sites” because the Maori had a close proximity to natural resources and could retreat to the pa in times of danger (Orchiston, 1979). The pas of Banks Peninsula were constructed on low, but steep hills, and horticultural sites were cultivated on sheltered slopes (Challis, 1995). The Barkers Bay and Menzies Bay pas are adjacent to the lowland coastal sites and stone alignments. The three pas of Lake Ellesmere have close proximity to flattish well-drained land. Banks Peninsula pas were built because of an increase in population and the result of the local Kaihuanga feud (Orchiston, 1979).

**Anthropogenic Effects Cause Environmental Change**

With the moa’s extinction and heavy deforestation from increased activity of deliberate forest fires, there was a change in protein sources from hunting moa to marine fishing, shell fishing, and fowling. Banks Peninsula had extensive river systems and a great resource of shellfish and fish resources and evidence of fishing-related artifacts are plentiful in Canterbury (Challis, 1995). Also two lakes, Te Waihora (Ellesmere) and Te Wairewa (Forsyth), on Banks Peninsula provided food resources, eels and waterfowl, and flax for building equipment (Bassett et al., 2004).

After the death of the moa, planting of kumara became essential (Canterbury Museum, 2013). In Banks Peninsula, the climate is wetter and warmer than the Canterbury Plains, which is better for growing kumara. Banks Peninsula was the southernmost location of kumara planting because it was 1.5°C higher and had 300mm/year more rainfall than the Canterbury Plains (Bassett et al., 2004). However
Challis (1995) writes that kumara cultivation was more favorable during the 13th or 14th century in Horomaka and was small scaled in the early 19th century (Challis, 1995). The tree cropping of ti kouka (the cabbage tree) was more of a prominent agricultural pursuit of the Banks Peninsula Maori than kumara cultivation (Challis, 1995).

Connecting Oral Traditions and Banks Peninsula’s Landscape

In the oral tradition, Kā Puna Wai Karikari o Rākaihautū, Rākaihautū and his son, Rakihouia, first explore the South Island and finally meet in Banks Peninsula. According to another oral tradition, He Korero mo Te Motu Pounamu, there was tribal conflict between the Ngāi Tahu and Ngāti Māmoe. When the tribal conflict ceased, the Ngāi Tahu lived in Banks Peninsula because of the landscape’s abundant food and water resources (Te Maire Tau, 2003). These oral tradition can relate to the Maori’s timeline of acquiring natural resources around the South Island because when the Maori first arrived, they travelled around the South Island acquiring greenstone and food resources, and migrating from tribal conflict (Te Maire Tau, 2003). The Maori settled in Banks Peninsula instead of the South Island due to anthropogenic induced environmental changes like the extinction of the moa and deforestation due to deliberate forest fires. Banks Peninsula had a natural landscape with coastal headlands that were perfect for constructing ideal pas or “specialist activities sites” (Orchiston, 1979). After the extinction of the easy prey, the moa, the Maori could easily obtain protein sources like seals, fish, penguins, and forest birds on coastal Banks Peninsula (Challis, 1995). Banks Peninsula had more food resources to offer the inhabitants and a better climate to grow kumara and the ti kouka or cabbage tree (Challis, 1995). Just like their ancestors, the Maori settled in Banks Peninsula because of its perfect natural landscape to construct pas, its numerous and diversified water and food sources, and a favorable coastal climate that was less extreme than other South Island environments.

What Caused the Maori to Move Settlements Around Banks Peninsula?

This section focuses on how Maori oral traditions record natural phenomena. The natural phenomena are primarily tsunamis and these natural disasters affected their movement of pa sites and other settlements. This section will differ from the previous two sections as it first discusses the geological and historical evidence surrounding tsunamis of Banks Peninsula, the oral traditions surrounding natural phenomena, and how
geological science and oral traditions overlap. It is important to note that this is an interpretative section.

Evidence of Tsunamis in Banks Peninsula, New Zealand

Banks Peninsula is vulnerable from South American sourced tsunamis because of its long narrow harbors and bays that amplify tsunami waves’ heights. Tsunami wave heights can reach up to 8m based on topography and Banks Peninsula’s inlets (Lane et al., 2012). In 1868, a 9.0 earthquake on the Peru-Chile border caused a trans-Pacific tsunami that trashed the Chatham Islands and caused damage on the eastern coast on New Zealand including Banks Peninsula (de Lange and McSaveney, 2012). Captain Fred D. Gibson recorded the largest wave as 7.5m in Lyttleton Harbour, with wave disturbances for the rest of the day and the wave heights ranged from 4.5m to 5.4m (Gillibrand et al., 2011). The Maori village of Tupuangi village was destroyed and one villager drowned because he was carried out to sea by trying to retrieve an unanchored boat. Since the water swelled through their homes, the Maori and Europeans scrambled for higher ground (de Lange and McSaveney, 2012).

Goff and Chagué-Goff (2012) have found information and dates of seven possible paleo-tsunamis by using geological (sedimentology and stratigraphy), chemical analysis, biological, archaeological (sediment layer overlying anthropogenic artifacts), anthropological (oral traditions), geomorphological, and contextual details (Figure 2).

For the purpose of this paper, two tsunamis are significant: the 1250 C.E. - 1350 C.E. tsunami and 1604 C.E tsunami are relevant because the Maori inhabited the South Island during these time periods (Goff & Chagué-Goff, 2012).

Maori Oral Tradition on Tsunamis: Taniwha, Tuna Troro, and Purau Bay

The oral traditions of taniwha, sea monster, are found throughout all of Polynesian. According to some Maori iwi of New Zealand, the taniwha resembles a sea lizard that kills man and can dwell in a cave, live in the sea, or inhabit the underground (Best, 1899). At the end of all taniwha oral traditions, the monster is slain by the Maori (Best, 2007). Purau Bay of Banks Peninsula has its own taniwha legend. The Ngati Mamoe lived in Purau Bay and had their dominant pa site on Mt. Herbert. Purau Bay was once said to be the home of Tuna Tuoro, a sea monster (Goff & Chagué-Goff 2012; “Purau,” 2012).
Goff and Chagué-Goff (2012) present how taniwha can be connected to tsunami natural disasters. From “A Northern Story- The Taniwha of Kaipara,” when the monster gets loose and becomes angry, it kills a multitude of people. It says that the survivors flew in all directions, but the survivors that fled to the sea were pursued by taniwha (Best, 2007). If the taniwha is compared to a tsunami event, it is understandable the monster would attack the people who fled to the sea, because if the people fled to higher ground, they would be safe from heightened wave action.

Oral Tradition: Pa of Nga-Toko-Ono

According to the oral tradition of the Pa of Nga-toko-ono (The Pah of Six), there was a pa on a cliff edge where six chiefs lived located on Goat Point between Fisherman’s and Paua Bay. One day, the six men went fishing and never returned to their pa because they were “blown off the coast of their own land.” Chatham Islanders say that some of their ancestors come from the foot of Te Ahu Patiki, Mount Herbert (Stack, 1893).

Oral Tradition: Selection of He Korero mo Te Motu Pounamu

Tetahi waka hi! Ko te took ono i haxx A certain fishing boat of six men [haere] went out
Ki te hi Ika e puhia ana i te Hau i fishing and was blown by the wind.
Parakakariki te wahi i hop atu ai ki They rowed out from the Parakākāriki
Waho he hau e mauru nana i pupuhi and it was the Nor’ West wind which
blew.
Kaore i rongona iho. E mahi They were not heard of afterwards. They
went along
He arotia ara koi a nga mooriori a the passage and indeed this is the Moriori
Whare Kauri.
of the Chatham Islands.

(Te Maire Tau, 2003, pgs. 200 & 206)

Discussion between Two Oral Tradition: Pa of Nga-Toko-Ono and Selection of He Korero mo Te Motu Pounamu
The Moriori of Chatham Islands say that some of their ancestors come from mainland New Zealand (Howe, 2012) or from Te Ahu Patiki (Mount Herbert) of Banks Peninsula (Stack, 1893; Ogilvie, 1990). The six men arrived at Chatman Island after being blown by a violent windstorm. Could the violent windstorm be a tsunami that carried these six men to the Chatham Islands? According to ocean currents from Banks Peninsula to Chatham Islands, the Southland Current of east coast extends 130km offshore and at Chatham Rise, it moves east to become part of the subtropical gyre (Stevens and Chiswell, 2012) (Figure 3).

The intriguing aspect of this oral tradition is that the six men are originally from near Akaroa -Goat Point- (Stack, 1893), but the Chatham Islanders believe that their ancestors come from Mount Herbert, which is located in Lyttelton Harbour (Stack, 1893; Ogilvie, 1990). Even though there are discrepancies in these oral traditions, it is important to note that some Moriori ancestors descend from Banks Peninsula. When rowing a boat far away from Banks Peninsula, the highest peak of Banks Peninsula would be Mount Herbert. Since it is the tallest and easiest landscape feature to spot from offshore, it concludes why the Moriori believe themselves to have some connection to Banks Peninsula.

Also, there are some misinterpretations within these two oral traditions. When consulting D.R. Simmons (1976) directed by Te Maire Tau (2003), Te Mathorohanga was the source to Percy Smith’s Lore of the Whare Wananga on the origin of the Chatham Islanders. The group Tini o Taitawaro originally settled the Chatham Islands and also Kahu and Whatonga was said to have landed in the Chathams (Simmons, 1976). These six men did not populate the Chatham Islands by themselves, (some women are necessary for reproduction) but they actually met with previous Moriori who inhabited the Chatham Islands. These six men had relations with the natives and some Moriori are descended from Banks Peninsula. The origins of the Moriori of the Chatham Islanders are from six canoes, not six men (Simmons, 1976).

Selection of Pa Sites Based on the Natural Phenomena of Tsunamis

Early Maori settlers recognized the surrounding dangers of tsunami based on archaeological evidence (Figure 4). The Maori abandoned low lying sites like Moa Bone Point Cave for Moncks Cave, a higher elevation settlement because of the 1250 C.E. -
1350 C.E tsunami (Goff & Chagué-Goff 2012). Historical and prehistorically tsunamis reflect the “notable changes in food resources, abandonment of coastal settlements, movement to safer locations and the subsequent reoccupation of favored sites that all reflect and the direct impact of tectonic activity (Goff & Chagué-Goff, 2012, p. 138).” Due to the 1250-1350 C.E tsunami, the Maori knew of theses natural disasters impending doom. Even though pas were built on high cliffs to the view of the coastline to watch for incoming invaders (Skinner, 1911), could the pas also be constructed to avoid high tsunami wave action?

By regarding pa sites around Banks Peninsula using Brailsford (1981), Challis (1995), and Taylor (1894), this study plot locations of pa sites using Google Earth (Table 2). By using these sources and Google Earth, it is recognized that most pa sites were situated on high cliffs on the East Coast of Banks Peninsula (Figure 5). The East Coast of Banks Peninsula is where a tsunami would have the most effect of the Maori inhabitants (Gillibrand et al., 2011; Lane et al., 2012). Pa Island Pa, Te Puke-ki-waitaha of Pa Bay, and Nga Toko Ono Pa of Goat Point are located on high cliffs. Another interesting aspect to this intriguing story is the southwest section pas of Banks Peninsula are mostly built on flat ground. The three pas of the Western end of the Kaitorete Spit and the four pas near Lake Forsyth are located on the Southwest of Banks Peninsula where a tsunami would not target these pas. Another point of interest includes a pa used after the Kai huanga feud of the early 1800s was constructed on an exposed beach of Goughs Bay on the Eastern Coast of Banks Peninsula. This pa would be affected by a tsunami because it is built on low elevation on the Eastern Coast of Banks Peninsula.

However, this pa was built quickly and was only a temporary settlement and was abandoned by the early 1840s (Brailsford, 1981). The more elaborate, permanent and well-constructed pas on the eastern coast (Te Puke-ki-waitaha of Pa Bay and Nga Toko Ono Pa of Goat Point) were constructed to be permanent and thus would be built out of the way from a potential tsunami occurrence.

Based on correlating historical and geological events, could the oral tradition of the Purau Bay taniwha and Nga Toko Ono Pa link up with the same 1604 C.E. tsunami event? The Purau Bay Pa has low elevation, which could have been the most heavily affected by the tsunami. This could be the main reason why the taniwha lived in Purau
Bay because this pa would have been heavily damaged by a tsunami. Given the time constraints on Goff and Chagué-Goff’s (2012) data, the Nga Toko Ono Pa site could have been built after the 1250-1350 C.E. tsunami because on its high sea cliff location. It is important to note that an exact date cannot be pinpointed to these oral traditions, but it is more important to realize that the Banks Peninsula Maori have oral traditions connecting to tsunami events and natural phenomena. Based on their oral traditions and scientific evidence, it is inevitable to realize that another tsunami will hit New Zealand’s eastern coast and should be taken seriously.

**Future Research**

Based on all this data collection, aspects for future research could include the linkage between Ngāi Tahu occupation and 1604 tsunami event. The Ngāi Tahu conquered the Ngati Mamoe around mid 1600s in Banks Peninsula (Table 1). Did the Ngāi Tahu move to Banks Peninsula after the 1604 C.E. tsunami to look for more natural resources as well as higher ground to construct pas because of impending tsunami event? If a correlation could be found, then this would be another reason why the Maori settled in Banks Peninsula.

**CONCLUSIONS**

The Maori understood the geological and ecological significance of Banks Peninsula. They comprehended the volcanic geology, settled in Banks Peninsula because of its abundant resources, fair-weathered climate, and construable cliffs, and built their pa sites to avoid natural phenomena like tsunamis. Based on the collected Maori oral traditions and scientific data, the Maori had an extensive knowledge and understanding of their environment. Their knowledge should be listened to and accounted for in upcoming scientific research on Banks Peninsula. Also, aborigine knowledge should not be belittled and should be integrated in learning about environments and landscapes around the world. It is important to recognize the benefits of connecting many disciplines to create a well-constructed and well-established story.

**ACKNOWLEDGEMENTS**

I would to acknowledge the Frontiers Abroad Program coordinator, Dr. Darren Gravley, on projects relating to Banks Peninsula. I would like to thank to Nekenekeite Rangi Paul for presenting me with oral traditions relating to the geology of
Banks Peninsula. I would like to thank my Sue Lovett for introducing us to Meri of the Ōnuku Marae and for Meri presenting us to the wharenui. I would also like to acknowledge my Frontiers Abroad classmate, Shanna Williamson for giving me information on tsunamis around Banks Peninsula and the Goff and Chagué-Goff 2012 paper. I would like to extend thanks to Frontiers Abroad student, Ben Chiewphasa for giving information relating to pa sites around Banks Peninsula and for providing comments and edits on my working draft. I would also like to acknowledge Dr. Anekant Wandres, because he printed out pictures of animals for me as I wrote my final draft. Finally, my biggest extend of gratitude goes to Geol 356- Research Methods and Frontier Abroad course coordinator, Dr. Sam Hampton, because he commented on my paper, gave me many ideas and resources on the tsunami last section, and provided me with feedback on my topic.

REFERENCES CITED


Canterbury Museum. *Visit to the Museum*.


(Meri, personal communication, April 28, 2013).

(N. Paul, personal communication, March 26, 2013).


**Figure Captions**

**Figure 1.** Banks Peninsula, Zealand is the study area. (Hampton, 2010, Figure 1.1).

**Figure 2.** For geological evidence, there are four buried organic layer/sand couplets in Okains Bay relating to four separate tsunami events- the 1868 C.E. and three disputed dates for paleo-tsunamis (Goff & Chagué-Goff, 2012, Figure 3a). For the purpose of this study, the 1250 C.E.- 1350 C.E. tsunami and 1604 C.E. tsunami are taken into account.

**Figure 3.** The Southland Current of New Zealand’s South Island east coast lengthens 130km offshore. This ocean current includes Banks Peninsula and extends to the Chatham Islands. At the Chatham Rise, the current moves east to become part of the subtropical gyre (Stevens & Chiswell, 2012, Ocean currents around New Zealand).

**Figure 4.** This figure represents Moa Bone Point Cave. After the 1250 C.E. – 1350 C.E. tsunami, the Maori abandoned the low elevation cave for higher elevation settlements, Moncks Cave (Goff & Chagué-Goff, 2012, Figure 3b).

**Figure 5.** This figure is adopted from Challis (1995), Figure 20, and indicates all known pa sites on Banks Peninsula. Most of the pa sites on the eastern coast are built on high, steep cliffs to be protected from invading tribes and tsunami waves (Pa of Nga Toko Ono, Pa Island Pa, Te Puke-ki-waitaha, Para-kakariki, Old Pa by Kokohina, and Pae Karoro Pa). However two pas (Okaruru Pa and Panau Pa) on the eastern coast were built on low elevation and would be affected. The pas in Lyttelton Harbour (Ripapa Pa and Purau Bay) are built on low elevation and would be affected by tsunamis. However the Kaitara Pa of Port Levy was built on cliffs and would be safe from tsunami action. The pas on the southwest side of Banks Peninsula, locations including Birdlings Valley and the Western End of Kaitorete Spit could be built on flat low-lying land because they would...
not be affected by tsunamis. For more information on these pa sites, please refer to Table 2.

### TABLES

#### Table 1 - Iwis of the South Island

<table>
<thead>
<tr>
<th>Iwi (Tribe)</th>
<th>Origins</th>
<th>Place First Arrived</th>
<th>Canoe</th>
<th>Travels</th>
<th>Conquered by:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waitaha</td>
<td>Hawaiki</td>
<td>Maketu</td>
<td>Arawa</td>
<td>From Bay of Plenty to South Island</td>
<td>Ngati Mamoe in 1577</td>
</tr>
<tr>
<td>Ngati Mamoe</td>
<td>Hawaiki</td>
<td>Poverty Bay; East Coast of North Island</td>
<td>Tokomaru</td>
<td>From Poverty Bay to South Island</td>
<td>Ngāi Tahu (100 years later)</td>
</tr>
<tr>
<td>Ngāi Tahu</td>
<td></td>
<td>East Coast Tribe</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Table 2 - Pa Sites Around Banks Peninsula

<table>
<thead>
<tr>
<th>Pa of Nga Toko Ono</th>
<th>Site</th>
<th>Latitude Longitude</th>
<th>Date</th>
<th>Tsunami Exposure</th>
<th>References Cited</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goat Point</td>
<td>Long Bay's South</td>
<td>43°51'7.82&quot;S</td>
<td>173° 4'40.52&quot;E</td>
<td>No- High cliffs on East BP</td>
<td>Brailsford 1981: 150</td>
<td>Very old pa site</td>
</tr>
</tbody>
</table>

---

**Notes:**
- Last occupied site on BP
- Associated with Pa Island
- Ngati Mamoe Pa; Associated Oral Tradition
<table>
<thead>
<tr>
<th>Location</th>
<th>Collection</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Native Name</th>
<th>Elevation Notes</th>
<th>Side Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purau Bay Pa</td>
<td></td>
<td>43°38'19.84&quot;S</td>
<td>172°44'55.91&quot;E</td>
<td>Yes- Low Elevation in Lyttelton Harbour</td>
<td>Goff and Chagué-Goff 2012 Taylor 1894 Old Pa; Oral Tradition of Taniwha</td>
<td></td>
</tr>
<tr>
<td>Old Pa by Kokohina</td>
<td></td>
<td>43°37'06.89&quot;S</td>
<td>172°53'30.35&quot;E</td>
<td>No- East BP on high cliffs</td>
<td>Taylor 1894</td>
<td></td>
</tr>
<tr>
<td>Te Puia Pa</td>
<td></td>
<td>43°48'34.54&quot;S</td>
<td>172°41'44.83&quot;E</td>
<td>No- SW BP</td>
<td>Taylor 1894</td>
<td></td>
</tr>
<tr>
<td>Waikakahi Pa/ Birdlings Pa</td>
<td></td>
<td>43°48'02.10&quot;S</td>
<td>172°40'35.47&quot;E</td>
<td>No- SW BP</td>
<td>Andersen 1927 Challis 1995 1.25 southeast of Motumo tuao Lagoon Exposed Beach Front with no natural defenses Built after Kai huanga feud</td>
<td></td>
</tr>
<tr>
<td>Te Mata Hapuka</td>
<td></td>
<td>43°49'13.03&quot;S</td>
<td>172°42'30.00&quot;E</td>
<td>No- SW BP</td>
<td>Challis 1995: 110 Taylor 1894</td>
<td></td>
</tr>
<tr>
<td>Pa Name</td>
<td>Location</td>
<td>Latitude</td>
<td>Longitude</td>
<td>Time</td>
<td>Tsunami Exposure</td>
<td>Occupation Notes</td>
</tr>
<tr>
<td>------------------</td>
<td>---------------------------------</td>
<td>-----------</td>
<td>-------------</td>
<td>--------</td>
<td>------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Pae Karoro Pa</td>
<td>Flea Bay</td>
<td>43°52'48.17&quot;S</td>
<td>173°00'43.00&quot;E</td>
<td>No- steep cliffs 30m a.sl. on east BP</td>
<td>Brailsford 1981: 176, Challis 1995: 110</td>
<td></td>
</tr>
<tr>
<td>Orariki, Taumutu Pa</td>
<td>Western End of Kaitorete Spit</td>
<td>No- SW BP</td>
<td>Challis 1995; Brailsford 1981</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Te Pa a Moki</td>
<td>Western End of Kaitorete Spit</td>
<td>No- SW BP</td>
<td>Challis 1995</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pa Hakitai</td>
<td>Western End of Kaitorete Spit</td>
<td>No- SW BP</td>
<td>Challis 1995</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ngutu Piri</td>
<td>Western Bay on Akaroa</td>
<td>No- SW BP</td>
<td>Challis 1995</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table Captions**

**Table 1.** This table describes the three iwis of the South Island and their arrival to Banks Peninsula (Stack, 1893).

**Table 2.** This table describes the pa, its location, its latitude and longitude, its time of occupation, if it would be exposed to a tsunami event, and additional information. Latitude and longitude coordinates are based on relative locations of pa sites plotted in Google Earth. There is not enough data on occupation dates. Tsunami exposure was determined by Taylor (1894)’s Maori Place Names of Banks Peninsula Map, projected points using Google Earth, archeological evidence from Brailsford (1981) and scientific data from Challis (1995). There are probably more pa sites to be found on Banks Peninsula. Refer to Figure 5 for some pas locations around Banks Peninsula.