

Defending Starlight as a Cultural Resource: the Use of Environmental Legislation in Aotearoa/New Zealand

**A thesis submitted in partial fulfilment of the requirements
for the Degree**

of Master of Science in Geography

In the University of Canterbury

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University of Canterbury

2013

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Acknowledgements

This thesis is dedicated to my parents Hugh and June Clarke who have encouraged and supported me throughout my university journey. Thank you for caring for Ali and Youssef during school holidays to enable me to complete my studies. I know you are proud of me, but I am equally as proud of you and your remarkable achievements. Thanks mum and dad, I love you!

I would like to thank my wonderful sons, Ali and Youssef. I love you so much and am very proud of the fine young men you have been growing into while I have been studying. Now is the time for us to have those fun adventures that were put on hold!

I am grateful to my partner Larbi for his moral support and calming influence. You have kept me grounded. Thank you for all of your practical help that has allowed me to complete my thesis on time.

I am indebted to my supervisors, David Conradson, Garth Cant, Alison Loveridge and Nicole Gombay. You have each provided me with wise guidance and gentle encouragement in your unique ways. I thank David particularly for saving my sanity by working on the formatting with me. I have immense respect for each of you as academics and as people. Thank you for helping me through those tough periods!

I also wish to thank the staff and students in the Geography Department. I have thoroughly enjoyed working and studying with you over the last seven years and appreciate the support and friendship you have shown me.

Thank you to my boss Jenny at the Waterways Centre for allowing me to use the quiet times to work on my thesis, and to my colleague Suellen for helping me with the final formatting touches and reference list. Your patience with me during this crazy period has been much appreciated.

Finally, I share the credit of my work with the participants of this study. Pauline Harris, Ken McAnergney, David Higgins, and John Wilkie, this would not have been possible without your generosity in sharing your stories with me. It has been a privilege to work with you and a pleasure to know you. I hope that this thesis makes a positive contribution to starlight protection.

Abstract

In 2012, a large area within the Mackenzie District of Te Waipounamu/South Island of Aotearoa/New Zealand was designated as the Aoraki Mackenzie International Dark Sky Reserve (AMIDSR). While lighting restrictions within the AMIDSR promise to protect starlight visibility in that location for the foreseeable future, this thesis considers instruments provided by the Resource Management Act 1991 (RMA) that could be applied in protection of starlight as a natural resource of cultural significance to Māori. The celestial realm is a vital element of Māori cosmology. Tātai aroraki/Māori astronomy was responsible for the Polynesian discovery and settlement of this nation. Traditionally the moon and stars also played a role in mahika kai/food gathering and other cultural practices. Tātai aroraki is a body of knowledge that was developed through continued observation and use of the natural resource of starlight, and both the knowledge and the natural resource itself are embedded within the whole mahika kai resource chain. Interviews with local kaumātua/elders and a Māori astrophysicist were conducted to determine whether tātai aroraki is still practiced and important to contemporary Kāi Tahu, an iwi/tribe with close ties to the Mackenzie District. Results confirmed that despite the eroding effects that colonisation, urbanisation and new technologies have had on traditional environmental knowledge in general, remnants of tātai arorangi remain and are still used by a few Kāi Tahu individuals and families. For many Māori, their cultural identity is closely linked to traditional knowledge and practices, a form of cultural capital. A strong cultural identity is an important element of cultural wellbeing. Applying the RMA to the protection of starlight from light pollution would protect a resource important for mahika kai and therefore indirectly enhance the potential for Kāi Tahu to provide for their cultural wellbeing. As the RMA is a national statute this has implications for iwi in other regions of Aotearoa who have similar astronomical traditions. This thesis extends previous research on the AMIDSR within a growing body of scholarship on starlight protection. It also makes a contribution to RMA scholarship and Actor-Network Theory literature on the natural environment by including the celestial realm within resource networks.

Glossary

Throughout this thesis I use the traditional Kāi Tahu (Ngāi Tahu) spelling of the following Māori words by replacing 'ng' with 'k' where appropriate. Notable exceptions include the titles and wording of statutes, the names of committees or companies which have used a standardized Māori spelling, and direct quotes. Readers will therefore find both spellings in the same sentence in some instances. I apologize if this labours the reader but my priority is to respect Kāi Tahu by supporting the preservation of their unique Southern dialect.

Aotearoa	New Zealand
Atua	Deity, indicating categories of responsibilities in the natural world of Māori
Hapū	Sub-tribe, extended whanau
Iwi	Tribe
Kāi Tahu	Ngāi Tahu, an iwi in Te Waipounamu, descendants of Tahu
Kāi Tahu Whānui	The entire Kāi Tahu tribe being an amalgamation of Kāti Mamoe, Waitaha and Kāi Tahu and all their hapū
Kāti Mamoe	Ngāti Mamoe, one of the primary iwi of Kāi Tahu Whānui
Kaitiaki	Guardians, custodians
Kaitiakitaka	Kaitiakitanga, the exercise of guardianship by the tangata whenua of an area in accordance with tikanga Māori in relation to natural and physical resources; and includes the ethic of stewardship
Kaumātua	Māori elder
Kaupapa Māori	Māori values and principles
Ki Uta Ki Tai	From the mountains to the sea
Kuia	Elderly Māori woman, grandmother
Mahika Kai	Food and other resources, the way they are gathered, and the places where they are gathered
Mana	Integrity, respect, prestige, authority
Mana Māori	Māori well-being (Henare, 1988)
Mana whenua	Traditional/customary authority or title over land and the rights of ownership and control of usage on the land, forests, lakes and rivers.
Māori	Indigenous people of New Zealand
Marae	Traditional Māori open meeting ground. All important matters affecting an iwi must be discussed, and ultimately decided, in their own traditionally recognised marae
Matariki	The constellation of Pleiades or Seven Sisters
Mauri	Life-supporting capacity, spiritual essence
Nohoaka	Nohoanga, temporary campsite (stopover) for seasonal gathering of food and resources

Pākehā	Non-Māori person, generally referring to New Zealanders of European descent
Papatipu Rūnaka	Papatipu Rūnanga, local representative groups, traditional Rūnaka
Pounamu	Greenstone, nephrite, New Zealand jade
Rohe Potae (rohe)	Territory or boundary of tribal groups
Tākata Whenua	Tāngata Whenua, in relation to a particular area, means the iwi, or hapū that holds mana whenua over that area
Taoka	Taonga, treasured possessions and resources, material or abstract including language and beliefs
Tātai aroraki	Māori astronomy
Te Reo	Māori language
Te Rūnaka o Kāi Tahu	Te Rūnanga o Ngāi Tahu, recognised iwi authority representing the tribal collective of Kāi Tahu Whānui – as established by the Te Rūnanga o Ngāi Tahu Act 1996
Te Waipounamu	The South Island of New Zealand
Tikaka Māori	Tikanga Māori, rights, customs, accepted protocol, rule, traditions, lore or law, the correct Māori way, beliefs, values and practices (Christchurch City Council, nd)
Tohuka	Tohunga, priest, teacher, expert
Upoko	Head
Wāhi taoka	A range of resources and places important to iwi, taoka signifies the whakapapa (genealogical tree) of the Maori world, and wāhi taoka are the various branches of that tree (Clutha District Council, 1998)
Waitaha	One of the primary iwi of Kāi Tahu Whānui
Whakapapa	The genealogy, history and inter-relationships of a complex kinship system that emphasises a person's place both in the land and as part of a continuum of people that stretch from legendary origins and into a possible future (Bennett, 2007:12)
Whanau	Family

(Unless otherwise stated, all translations are taken from the current Canterbury Regional Policy Statement (Environment Canterbury (2013:184-185) as all resource managers and resource consent applicants are required to consult and comply with this document. However much of the credit for these translations should be given to respected authors such as Mason Durie, Hirini Mead and others who pioneered academic research in relevant topics)

Chapter 1: Introduction

The air, sky, stars, moon, winds and weather are important to tangata whenua in terms of both human health, history, and spiritual association. The use of stars for navigation, and the role of the moon in harvesting cycles and mahinga kai highlight the relationship between tangata whenua and celestial bodies (Te Taumutu Rūnanga, 2003:45).

Introduction

This thesis argues that the stars are a natural resource of cultural significance to Māori, the Indigenous people or tākata whenua of Aotearoa/New Zealand, and considers how existing environmental legislation may be applied to protect starlight visibility from light pollution. Kāi Tahu are a Māori iwi/tribe whose rohe/tribal area covers the majority of Te Waipounamu/South Island. The excerpt above, from a Kāi Tahu resource management document, describes their relationship with the celestial and atmospheric environment. In 2012 Kāi Tahu's cultural association with the stars formed part of the basis of a successful application to the International Dark Sky Association to have an area covering more than 4,300 square kilometres in Te Waipounamu's Mackenzie District designated as an international dark sky reserve. Using the Aoraki Mackenzie International Dark Sky Reserve (AMIDSR) to provide a geographical context, this thesis presents interview data from three Kāi Tahu kaumātua/elders whose rohe overlap the reserve, and a Māori researcher of astrophysics and Māori astronomical star lore, to argue that traditional knowledge of tātai aroraki/Māori astronomy is still used by contemporary Kāi Tahu. Starlight may therefore be considered a natural resource utilised by some Kāi Tahu individuals and families.

I consider relevant sections and processes of The Resource Management Act 1991 (RMA) that could be applied to protect starlight as a natural resource. The RMA is unique for its deliberate attempt to incorporate indigenous values within resource management practice and its inclusion of *cultural well-being* alongside economic, environmental and social well-beings in its definition of sustainable resource management. As celestial deities are essential to Māori cosmology and whakapapa/genealogy, and tātai aroraki forms part of the skills and knowledge associated with mahika kai/traditional food gathering, protecting starlight visibility would protect the relationship of Kāi Tahu with their atua/gods and ancestors and the source of tātai aroraki knowledge. Traditional knowledge and cultural practices positively reinforce a sense of indigenous cultural identity. Therefore, applying the RMA to the protection of starlight visibility would enable Kāi Tahu to provide for their cultural well-being.

This chapter introduces the concept of light pollution as a growing environmental issue. This is important because it positions light pollution, the greatest threat to starlight visibility, as an issue to be considered seriously by resource and environmental managers. Beginning with a broad context, I present reasons for protecting starlight visibility from light pollution and introduce some international initiatives that have evolved over the last decade. This positions the concept of starlight protection and

protection practices in Aotearoa within their international network. A brief history and description of the AMIDSR then locates this study within the Mackenzie District of Te Waipounamu. Kāi Tahu Whānui and Arowhenua, Moeraki and Waihao Rūnaka are introduced within the context of the Treaty of Waitangi and the Ngāi Tahu Claims Settlement Act 1998 (NTCSA) because for administrative purposes they have been defined by these documents. Their cultural association with the land, sky and natural resources in the area of the AMIDSR provides the basis of my argument that starlight is a natural resource of cultural significance to Kāi Tahu. This is relevant because the RMA contains specific clauses intended to protect the environmental values of Māori, so even if the AMIDSR had not been established, legislative instruments exist that can protect starlight on cultural grounds. This has implications for *all* Māori and every region of Aotearoa. Finally, the purpose and structure of the RMA is described, my argument summarized, and the structure of this thesis is outlined.

Starlight and Light Pollution

The stars have fascinated every society that has ever lived on planet Earth. Different knowledge systems have developed in every culture out of the wonder evoked by the night sky and careful study of celestial movements and their relation to life on Earth. Whether it is indigenous cosmologies, traditional astrology, or modern astronomy, the observation of the stars has continuously inspired humankind to contemplate our place in the universe (Ruggles, 2009). Moreover, the features of the night sky such as the moon, stars and constellations, continue to hold spiritual and cultural significance for many indigenous peoples around the world (Ruggles, 2009). The complex cosmologies of the tākata whenua, of Aotearoa are based on events and deities originating from the celestial realm (Best, 1922). Astro-navigation techniques were used during both the epic Māori migrations and European settler journeys to this land. For millennia the stars have been a visible, cherished and *utilised* part of the natural environment and therefore may be considered as a natural resource.

While stars are a part of our nocturnal environment, they are seldom considered by natural resource and environmental managers to be within their jurisdiction of protection. One obvious reason for this is their extra-terrestrial location. However, the electromagnetic radiation emitted by celestial bodies reaches Earth in the form of visible light, radio frequencies and some ultraviolet light, all of which affect our environment in a variety of ways. For example, many migratory birds are guided by the light of the stars at night (Lockwood, Couturier & Wren, 2005). Upon hatching, baby sea turtles orient themselves by heading towards the moonlight and starlight reflected on the ocean (Blackburn et. al, 2007; National Park Service, nd). The electromagnetic spectrum also contains a range of frequencies which enable such technologies as radio, television and wireless internet.

Yet the advent of artificial outdoor lighting, coupled with the rapid urbanisation of the Earth's population over the past two centuries, now threatens starlight visibility in many inhabited areas. Light pollution is recognised today as an environmental issue in many parts of the world (Marin & Jafari,

2007). Fortunately the stars are still abundantly visible in many areas within Aotearoa due to a relatively low population density (in global terms). Nevertheless some Kāi Tahu resource management documents (such as the one quoted above) have begun to mention “celestial darkness” as an amenity value they wish to protect from light pollution (Te Rūnanga o Kaikoura, 2009; Te Taumutu Rūnanga, 2003). The following section defines the term *light pollution* and describes its environmental effects, including its affect on starlight visibility.

Global Context

Only in recent decades has there been dedicated study of the environmental effects of light pollution including the reduction of starlight visibility (Marin & Jafari, 2007). The Royal Astronomical Society of New Zealand (2010: unpaginated), defines light pollution as “any adverse effect of artificial light, including sky glow, glare, light trespass, light clutter, decreased visibility at night, and energy waste”. Sky glow, also referred to as sky brightness, is of particular concern to astronomers as it reduces their ability to observe celestial objects (Marin & Jafari, 2007; Lighting Research Centre, nd). While there are natural celestial sources of sky glow, electric lighting is the main anthropogenic source. A number of factors contribute to sky glow, such as atmospheric conditions and the quantity of particulate matter and gas molecules in the air. However, artificial light that is directed upwards or reflected off the ground or other surfaces is scattered by dust, gas and water in the atmosphere producing a luminous background (Lighting Research Centre, nd). Figure 1.1 below shows the night sky of New York aglow with artificial light, and a starless Auckland skyline.

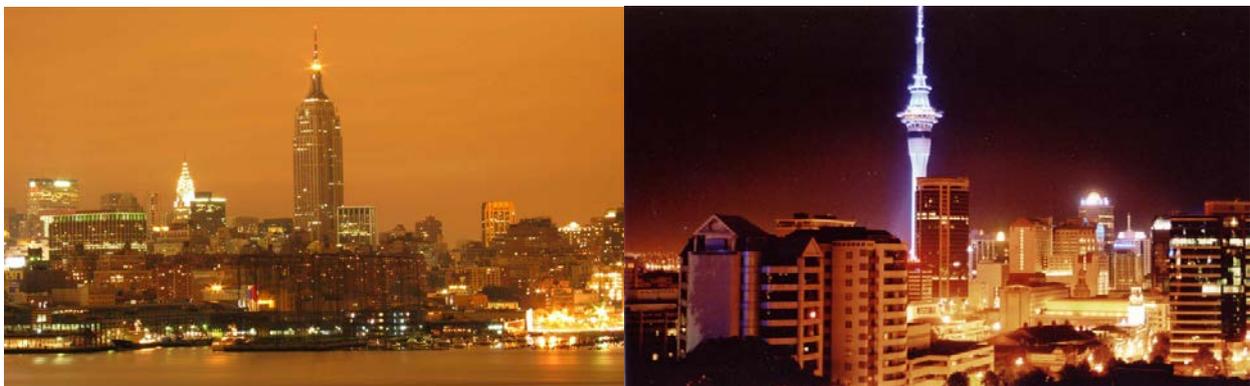


Figure 1.1: *Light pollution in New York (left) and Auckland (right)* Sources: Wikimedia Commons/Charliebrown7034 retrieved from: <http://news.softpedia.com/news/CPRE-Calls-for-Reduced-Light-Pollution-139865.shtml> and <http://jmason.org.s3-website-eu-west-1.amazonaws.com/albums/2002-Round-The-World-Trip-New-Zealand/tn/auckland-by-night.jpg.index.html> (copyright: creative commons)

Notwithstanding some obvious differences in the aperture, angle and timing of these photographs, the most populous city in Aotearoa is a fraction of the size and population density of New York which clearly results in a darker night sky.

Over half of the world’s population now live in urban areas and urbanisation is an increasing trend in all countries (United Nations, 2011). Figure 1.2 below shows city lights across the globe being

clearly visible in satellite images of Earth at night. The most developed and densely urbanised areas in the world have the highest levels of artificial sky brightness or light pollution.



Figure 1.2: *Earth Lights*. Source: Data courtesy Marc Imhoff of NASA GSFC and Christopher Elvidge of NOAA NGDC. Image by Craig Mayhew and Robert Simmon, NASA GSFC. Retrieved 27 June 2013 from: <http://www.darksky.org/resources/images>

Holker et. al, (2010: unpaginated) claim that in recent years there has been a dramatic increase in artificial lighting at night around the globe, with increases between 0 and 20 percent depending on geographical area. This means that starlight visibility is increasingly *reduced* for much of the world's population. According to Cinzano et. al (2001:689):

About two-thirds of the World population...live in areas where the night sky is above the threshold set for [light] polluted status. Assuming average eye functionality, about one-fifth of the World population...have already lost naked eye visibility of the Milky Way.

Although this thesis focuses on applying legislative and policy instruments to reduce light pollution so as to protect starlight visibility, other important environmental effects should also be noted. Light pollution is known to negatively affect the nocturnal habitat of many species, including insects, birds, bats, and sea turtles, and research on the ecological effects is increasing (Cheney, 2012; Holker, et. al, 2010). In North America, for example, many newly hatched sea turtles mistakenly head towards bright city lights instead of the twinkling moonlight and starlight on the ocean and perish as a result (Cheney, 2012; Blackburn et. al, 2007). The migratory patterns and reproductive behaviour of birds can be disrupted by artificial light, and collisions with buildings can also occur as a result of light pollution (Kempenaers et. al, 2010; Gehring, et. al, 2009). Furthermore, research now suggests a link between increased exposure to artificial light at night and breast cancer in humans (Figueiro et. al, 2006; Stevens & Rea, 2001). Light pollution is clearly an increasing environmental issue in the densely populated Northern Hemisphere which many cities and organisations are now beginning to address.

However, not only is there recognition of the negative effects of light pollution for ecological and human health, but awareness of the *positive* effects of mitigating it, such as reducing energy waste and preserving starlight visibility, is also growing. As urbanisation steadily reduces the areas on the planet where stars are still abundantly visible, the potential for astro-tourism (such as star-gazing and astro-photography) in such places is being realised (Starlight Initiative, 2007). *Starlight Destinations*, *Dark Sky Parks* and *Starlight or Dark Sky Reserves* are being promoted in some nations, including Aotearoa, for the outstanding quality of their night skies. These initiatives are seen as an effective means of mitigating the light pollution caused by our 24 hour society’s “colonisation of the night” and ever-increasing urbanisation (Marin & Jafari, 2007; Krietzman, 1999:77). The majority of these destinations are in or near national parks and rural areas and therefore have required little change to their current lighting policies as they already have relatively good night sky quality. However, Figure 1.3 below, which shows the Bortle Scale developed by an amateur astronomer of almost 50 years’ experience, demonstrates that astronomical observability *decreases* as urban density *increases*, clearly linking reductions in starlight visibility with urbanisation. The Mackenzie Basin is evaluated as 1 on the scale.

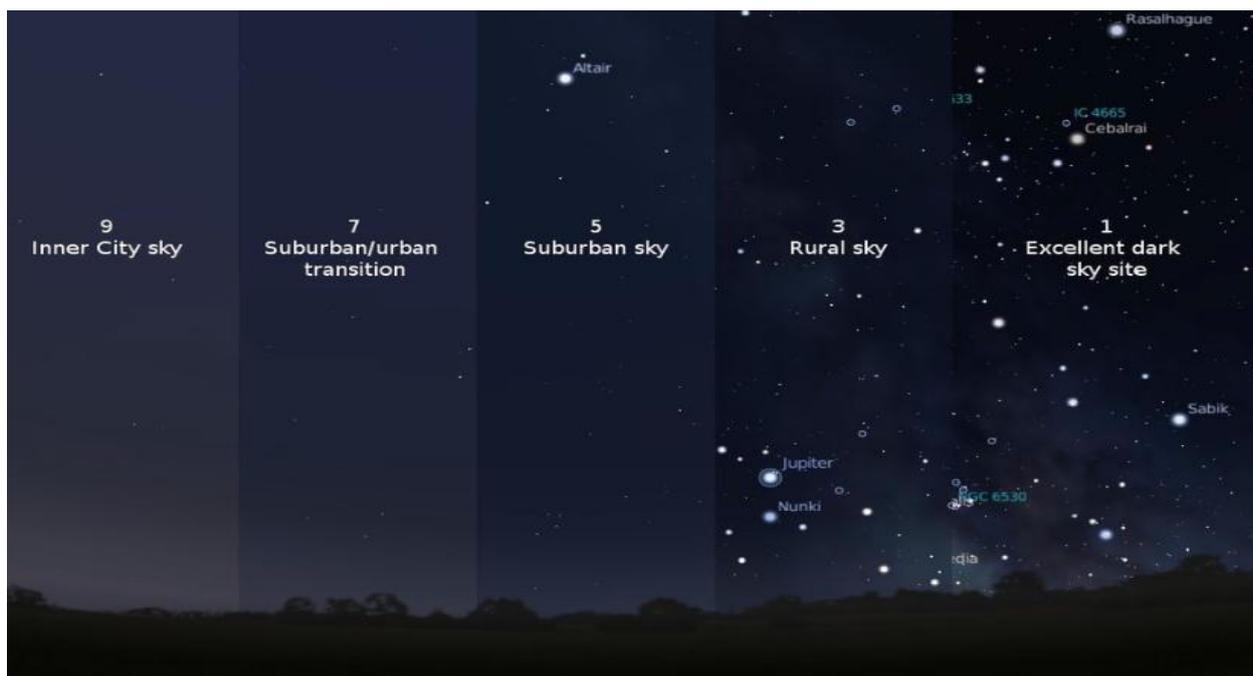


Figure 1.3: *The Bortle Scale of Astronomical Observability*. (Source: Bortle, (2001) Retrieved from: http://stellarium.org/features_in_0.10.0.php)

The ability to observe the stars is being framed by some not only as a tourist activity but an *inalienable human right*. In 2007, at a conference in La Palma, Spain the “Declaration in Defence of the Night Sky and the Right to Starlight” was formulated and agreed upon by international agencies and

institutions from 23 nations (Starlight Initiative, 2007). One of the agreed principles of the Declaration is that:

the conservation, protection, and revaluation of the natural and *cultural heritage* associated with nocturnal landscapes and the observation of the firmament represents a prime opportunity and a universal obligation for cooperation in safeguarding the quality of life (Starlight Initiative, 2007:3, emphasis added).

Cultural values and indigenous knowledge associated with the night sky are a major focus of the Starlight Initiative. Some of the founders of the AMIDSR were directly involved in the La Palma Starlight Declaration. One of the objectives of the Declaration is to promote responsible astro-tourism as an instrument for protecting the night sky and this is priority of the AMIDSR. Other initiatives, not based on tourism, have also followed from this Declaration. Some cities and regional administrations around the world have already adopted policies aimed at reducing light pollution (Starlight Initiative, 2007). These are more commonly initiated to protect the research of astronomical observatories but are also increasingly being introduced simply for the amenity value of the night sky. *Starlight Cities* is an initiative of cooperation between the UNESCO Man and Biosphere Programme and the Covenant of Mayors of the European Commission that aims to “develop models and tools that allow the inclusion of the night dimension in the planning and design of new settlements and cities” (Starlight Initiative, 2007: unpaginated). Given that over half of the world’s population is now urbanised and that this trend is increasing, it is particularly important for city administrators and planners to engage with issues of light pollution. In Auckland, Aotearoa, there has been a fifty percent rise in population over the last two decades alone (Auckland Council, 2013).

In 2009 a Starlight Tourism Certification System was presented to the World Trade Organisation as a means of bringing science and tourism together for the purpose of protecting the interests of observatories near large population centres (Starlight Initiative, 2012). Recognising that “scientific facts per se will not mobilize political institutions”, it is envisioned that:

The right coupage of science and tourism could contribute to the global acceptance of the “new ways”, the “green economy” and the “global sustainable village”. In this framework, the Starlight Certification sets a model for the use of Science both as a resource for tourism and an essential part of sustainable tourism practices (Science and Tourism Under the Stars, 2010: unpaginated).

Due to a decreased ability within many Northern Hemisphere nations to view the stars, Aotearoa’s relatively sparse urban areas and low levels of light pollution make it an ideal astro-tourism destination. The Auckland Observatory and Planetarium promotes astronomy with displays and exhibits designed to entertain and educate visitors, and these efforts generated almost two million dollars in revenue over the financial year ended in June 2011 (Auckland Observatory and Planetarium Annual Report, 2011). The Mt John University Observatory site at Lake Tekapo in the Mackenzie District arguably has the best viewing conditions in Aotearoa due to its isolated location and dry atmospheric climate. The astro-

tourism potential of this location has been recognised by the local community, entrepreneurs and observatory staff.

Aotearoa/New Zealand Context

On 9 June 2012 over 4300 square kilometres of the Mackenzie District in Te Waipounamu, became Aotearoa's first dark sky reserve. The largest of only five in the world to be recognised by the International Dark Sky Association, it is the first to achieve *gold status* due to its pristine night sky (International Dark Sky Association, 2012). The region, located in the centre of Te Waipounamu (see Figure 1.4 below), hosts some of the most iconic landscape features in the country and tourism, as in most other places in Aotearoa, is predominantly based upon the beauty of the natural environment. The Mackenzie District Council protects starlight visibility in the area, primarily for research work at the nearby Mt John University Observatory but also for the general public, through the implementation of a policy in their District Plan called the Lighting Ordinance (Mackenzie District Council, 2004). This sets restrictions on such things as the size, type, and angle of outdoor lighting, and imposes a curfew on certain types of lighting between 11pm and sunrise (Mackenzie District Council, 2004). Although these lighting restrictions have been in place since the 1980s the Mackenzie District Council now has an added incentive to enforce them because of the astro-tourism potential of the AMIDSR for the region.

One of the driving forces behind establishing the dark sky reserve has been to promote astro-tourism to the area, although other values such as ecological conservation, and the cultural significance of the land-sky-scape were acknowledged in the application as equally important (AMIDSR Working Group, 2012). Previous research by the group had considered the feasibility of applying to the World Heritage Convention (WHC) to have the land and skyscape recognised for its outstanding natural and cultural heritage (Abbari et al, 2011). That project was included in an *Extended Case Studies and Dark Sky Issues* report that was commissioned by a Memorandum of Understanding between UNESCO and the International Astronomical Union in order to develop astronomy as a world heritage theme (*Astronomy and World Heritage*, 2012). Due to the significant expense and long time-frame involved in making an application to the WHC, the IDA application seemed an obvious intermediate step towards consolidating starlight protection in the area.

The AMIDSR is a significant achievement for the region that is already bearing fruit. Visitor numbers have reportedly increased by 20 percent over the last season and this has been attributed primarily to stargazers (Ashton, 2013; Littlewood, 2013). Tekapo had previously been considered by many tourists as a place to stop on route from Christchurch to Queenstown or Aoraki/Mt Cook and few consecutive overnight bookings were secured by accommodation providers (Murray, pers. comm., 2011). More tourists are now staying overnight and for longer in order to enjoy the star-gazing opportunities promoted by the AMIDSR (Littlewood, 2013).

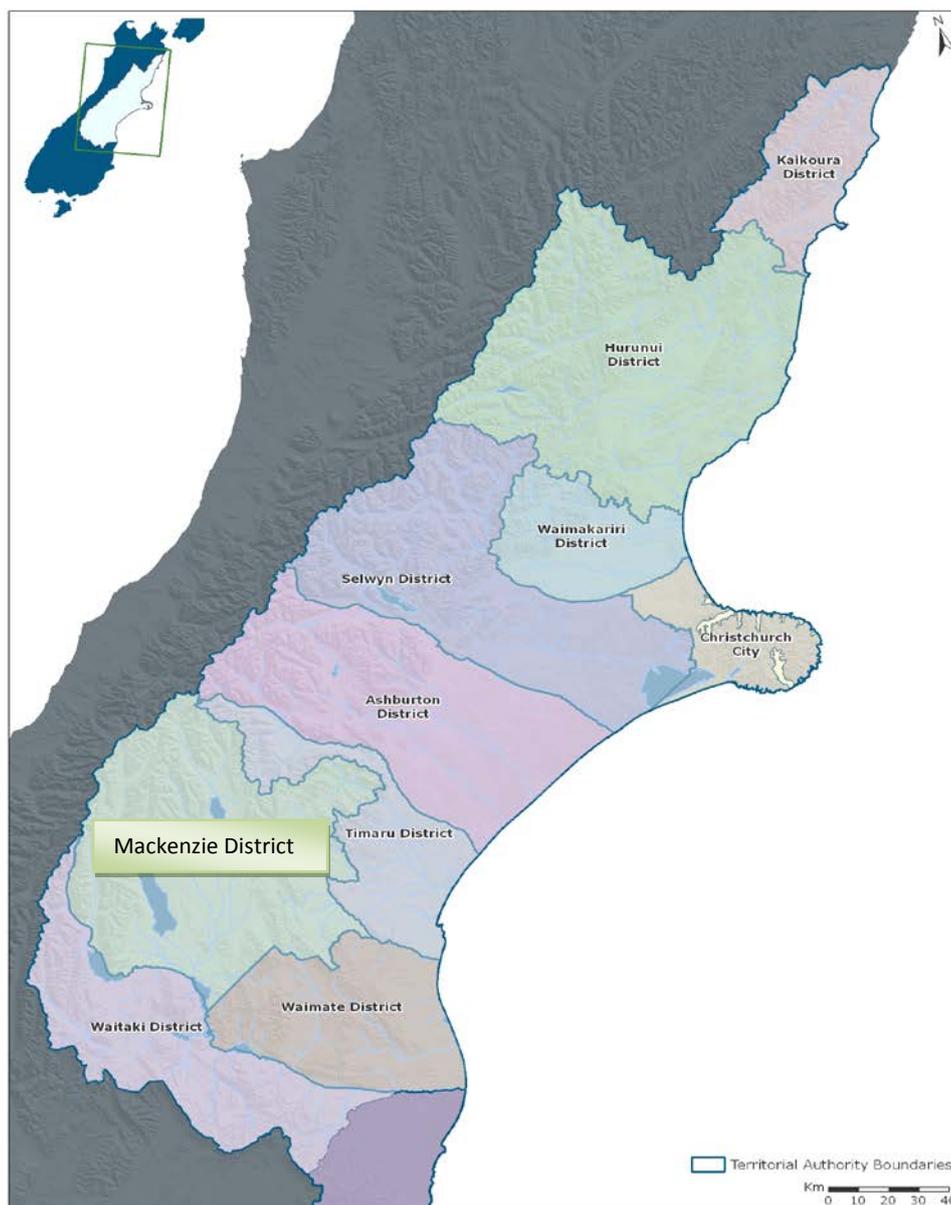


Figure 1.4: *The Mackenzie District within the Canterbury Region, Te Waipounamu, Aotearoa* (source: Environment Canterbury (2011). Retrieved from: <http://ecan.govt.nz/publications/General/map-territorial-authorities-150110.jpg>).

The dark sky reserve covers the area of the Lighting Ordinance and extends to include Aoraki/Mt Cook Village and part of the Aoraki/Mount Cook National Park (see Figure 1.5 below). The national park has its own similar lighting restrictions in place (Department of Conservation, 2004). The communities of Tekapo, Twizel and Mount Cook Village supported the application to the International Dark Sky Association as each centre has astro-tourism operations capitalising on the remarkable night sky conditions.

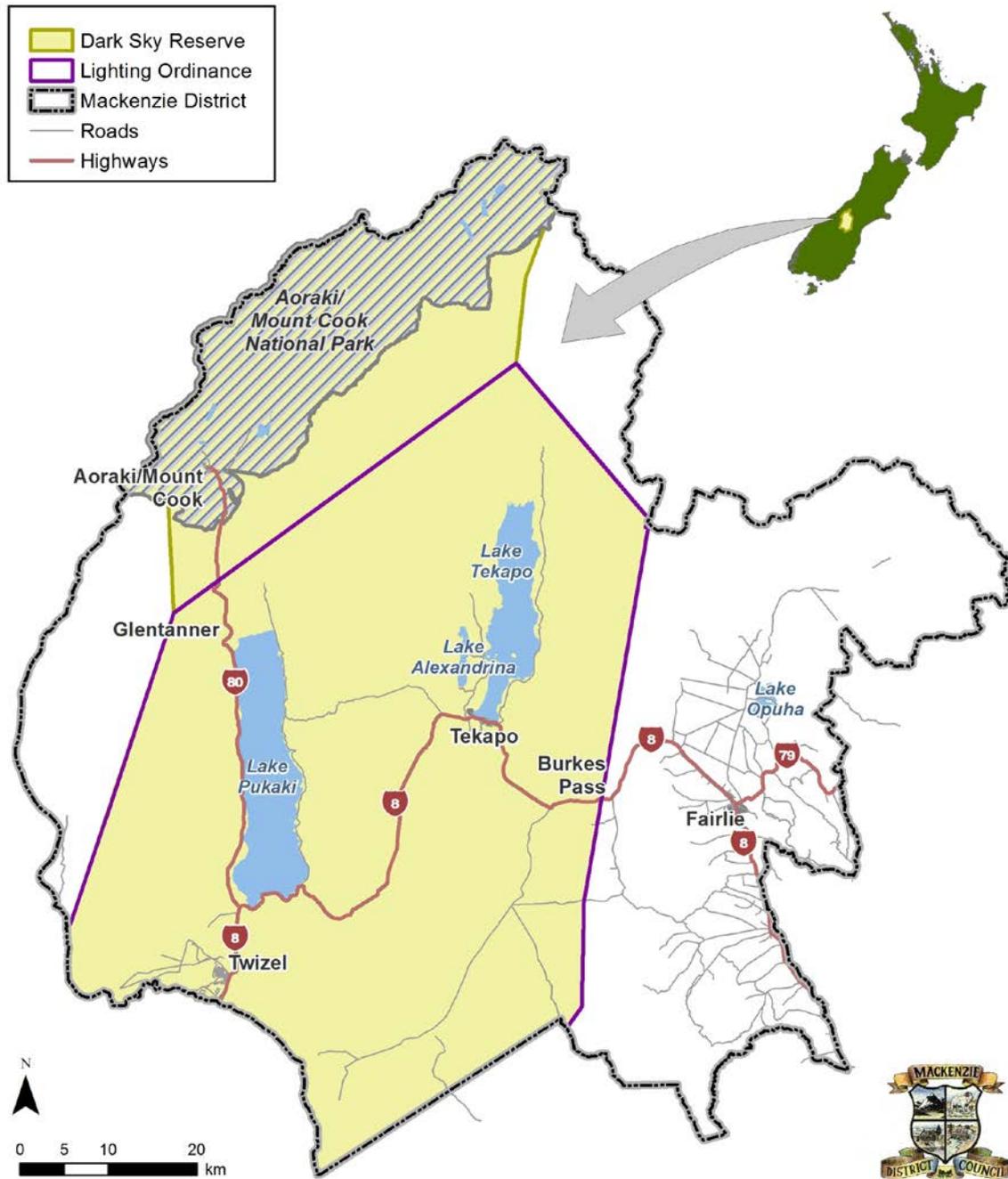


Figure 1.5: *The Aoraki Mackenzie International Dark Sky Reserve* (Source: Mackenzie District Council (2013)).

From the very inception of the idea of a dark sky reserve one of its founding members, Hon. Margaret Austin, recognised the cultural value of the night sky. She met with kuia/grandmothers from the Waitaha iwi, part of Kāi Tahu Whānui, who shared with her the cultural significance of the night sky to Southern Māori (Austin, 2009). With their permission she then shared their stories at the launch of the 2009 International Year of Astronomy at UNESCO, Paris in a bid to have the cultural heritage value of the firmament recognised by the World Heritage Committee. As mentioned above, the protection of cultural values and indigenous knowledge are a priority of the Starlight Initiative. It was through my

contact with Margaret, as well as Arowhenua Marae, that I was introduced to one of my participants (see Chapter 2). Whilst that Starlight Initiative is an ongoing project with international collaboration, the values that Māori associate with the night sky nevertheless contributed to the establishment of the AMIDSR. As the focus of this thesis is on Kāi Tahu, because they hold manawhenua/tribal authority over the area of the AMIDSR it is therefore *their* cultural values I am interested in, I shall now briefly explain their historical context. Later, in Chapters 5 and 6, Actor-Network Theory (ANT) helps to explain the ways in which legislation, including the RMA, has helped form Kāi Tahu group identity.

Kāi Tahu Whānui

Prior to the arrival of Pākehā/non-Māori, Māori were not a single politically or socially organised group but rather traditionally identified themselves in terms of whānau, hapū or iwi (Lai, 2010; Coates, 2008). Each of these social units held specific authority and responsibilities, and subtle differences in cultural practices sometimes existed between them (Coates, 2008; Walker, 1989a). As Temm (cited in Rata, 2003:47) explains, “every Māori is identified by his or her *whakapapa* or genealogy, and that *whakapapa* relates him or her to the parent, to the *whānau* (the family), the *hapū* (the clan), and from the *hapū* to the tribe itself”. In 1840, about half a century after the first Pākehā whalers and sealers came into contact with Kāi Tahu, The Treaty of Waitangi was signed by representatives of the Crown and over 500 Māori chiefs. Not all iwi were represented and some chose not to sign the document which effectively provided a constitutional basis for establishing British law in Aotearoa (Royal, 2013; Orange, 1987). The Treaty paved the way for subsequent waves of Pākehā settlers to arrive and eventually outnumber the indigenous population.

The processes of colonisation were very complex with strategic trade and cultural exchange initiated by many Māori and Pākehā individuals for the various perceived benefits. However it is widely accepted that Māori as a group, like many indigenous peoples, disproportionately suffered the negative consequences of colonisation. Pākehā soon established cultural hegemony through imposing institutions based on British law (especially English Property Law) and customs, and this precipitated devastating losses upon Māori who suffered physically (from the introduction of European diseases and alcohol), economically (through the alienation of their land) and culturally (through assimilationist policy and legislation) (Orange, 1987). In the 20th century, the post-war urbanisation of Māori also contributed to cultural loss as ties with iwi were weakened by the separation of kin and distance from the social and cultural centre of the marae/traditional meeting ground (Barcham, 1998). These culturally devastating processes began earlier for Kāi Tahu than other iwi due to their familiarity with Pākehā whalers and sealers gained in the late 18th century.

During the 1960s, 70s and 80s, inspired in part by international events such as the civil rights movements in the United States and anti-apartheid protests against the 1981 Springbok rugby tour, Māori grievances against the Crown in relation to land alienation and breaches of the Treaty became the

focus of nationwide pan-Māori protest (Rata, 2003; Sisson, 1995; Walker, 1990). In response, the government established the Waitangi Tribunal to investigate specific claims and make recommendations about individual cases to the Crown. Rata (2003:47) argues that the ethnic revivalism of that period is linked to late capitalism as the movement became reshaped as neotribal capitalism. She argues that, “despite the pan-Māori nature of the revivalism movement in the 1960s and 1970s (that led to the government’s acceptance of reparations for historical injustices), pan-Māori claims were redefined as tribal claims within the process of the reparation settlements” (Rata, 2003:47).

Due to the desire of the Crown to negotiate claim settlements with recognised iwi rather than either a pan-Māori collective or a multitude of hapū and individual whānau, and in order to facilitate the legal transfer of assets and settlement funds, legislation was passed to make each iwi into a legal entity; a body corporate. The establishment of Iwi Authorities, for bureaucratic purposes, “forced many tribes to define more explicitly their membership, boundaries and representative structures” (Sissons, 1995:66). According to Maaka (cited in Barcham, 1998:306), the Treaty claims process and re-iwi-isation of Māori society has had the effect of “freezing the tribes” at the signing of the Treaty. Barcham (1998:306) on the other hand, contends that indigenous elites had a hand in the freezing of Māori social structure and tradition as an attempt to “stop any further assimilation and culture loss from the colonisation process”. Such are the powerful interactions between legislation and group identity that will be elaborated upon in Chapter 6.

Te Rūnanga o Ngāi Tahu Act 1996 legally established five South Island hapū descended from three iwi (described below) as Ngāi Tahu Whānui. The term Ngāi Tahu Whānui then properly refers to the legal amalgamation of the first three iwi to arrive and settle in Te Waipounamu between the 13th and 17th centuries (Royal, 2013; Stack, 1898a). They were, in order of arrival, Waitaha, Kāti Māmoe and Kāi Tahu. Legislation was not the only process by which these iwi amalgamated. The narratives of the three iwi are complicated by periods of conflict, intermarriage and the strategic changing of alliances between them but Kāi Tahu eventually established manawhenua over the majority of Te Waipounamu. Kāi Tahu Whānui therefore are, “the collective of individuals who descend from the five primary hapū of Kāi Tahu, Kāti Māmoe and Waitaha, namely Kāti Kurī, Kāti Irakehu, Kāti Huirapa, Kāi Tūāhuriri and Kāi Te Ruahikihiki” (Environment Canterbury, 2011: unpaginated).

The Ngāi Tahu Claims Settlement Act 1998 (NTCSA) delivered a formal apology from the Crown for, among other things, breaching Article Two of the Treaty of Waitangi which promised to protect Māori use and ownership of their land and valued possessions (Waitangi Tribunal, 1991). In its apology the Crown acknowledged the “suffering and hardship caused to Ngāi Tahu, and for the harmful effects which resulted to the welfare, economy and development of Ngāi Tahu as a tribe” (Ngāi Tahu Claims Settlement Act, 1998:Part 1, 6.6). Reflecting the natural capital lost by Kāi Tahu since 1840, their grievances were described as “Nine Tall Trees” which related to eight different areas of land purchased by the Crown from Kāi Tahu, and mahika kai or food resources. Grievances attached to each of the nine

tall trees were referred to as “branches”, and a number of smaller claims as “undergrowth” (Waitangi Tribunal, 1991). While most of the land purchases occurred with the consent of Kāi Tahu, the conditions under which they were sold were not always honoured by the Crown and therefore generated the grievances that led to the Treaty Claims.

Te Rūnanga o Ngāi Tahu (TRoNT), the body corporate, administrates the assets and settlement funds received by Kāi Tahu Whānui (otherwise known simply as Kāi Tahu or Ngāi Tahu) through a tribal council of representatives from each of the 18 constituent papatipu rūnaka (councils representing local kin-groups), 11 of which are either based within the Canterbury region or overlap it (see Figure 1.6 below).

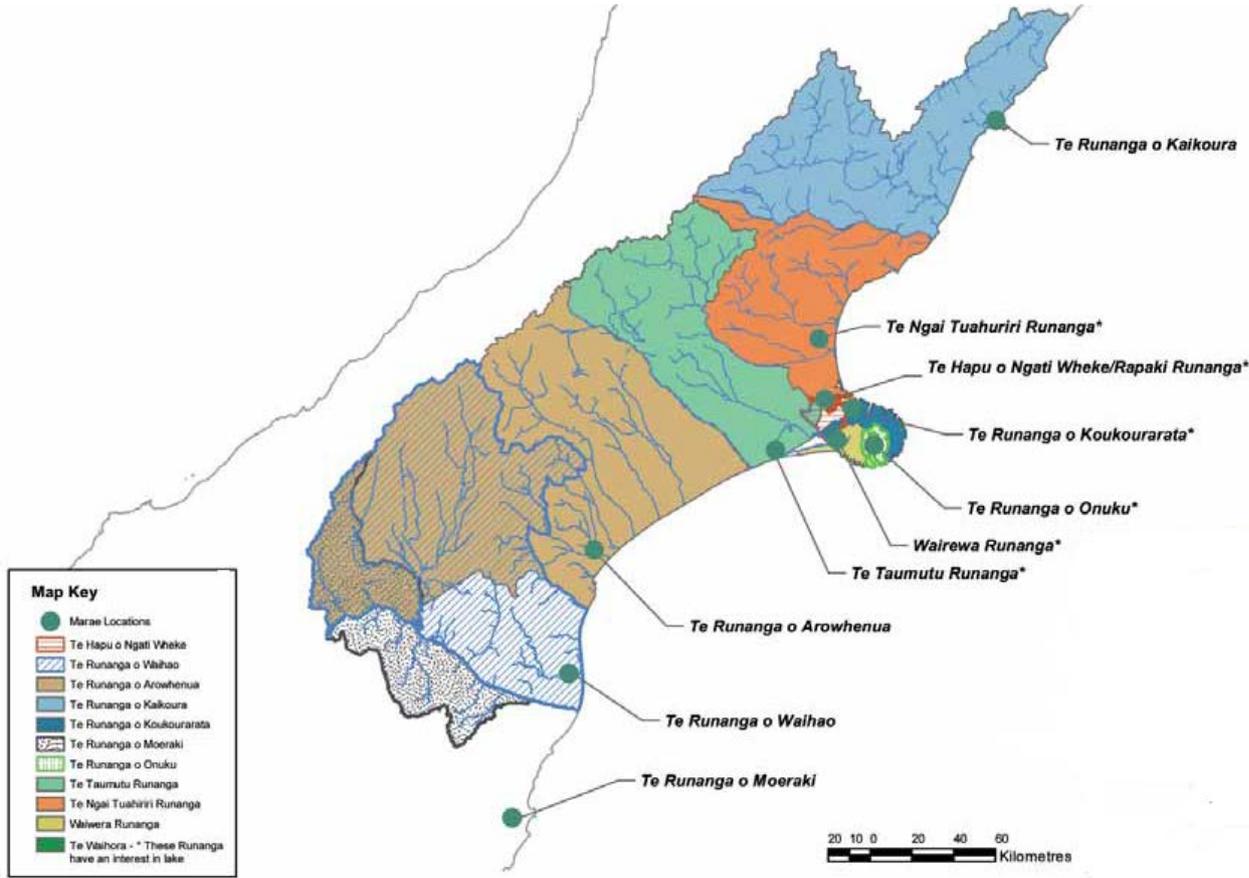


Figure 1.6: Marae locations and papatipu Rūnaka boundaries in the Canterbury region. Source: Environment Canterbury (2013:12).

TRoNT, whose legitimacy and accountability is firmly grounded in local participation, acts as “an intermediary, or buffer, between the tribal life-world of consensus politics and the state system of bureaucratic hierarchy...and legal control” (Sisson, 1995:69-72). TRoNT also oversees the distribution of profits received from Kāi Tahu’s substantial business interests for the development of the iwi as a whole. Kāi Tahu’s considerable economic assets place the iwi in a relatively powerful position. Rata (2003:45) however is critical of how the Treaty settlement process and concomitant restructuring of traditional

governance models into neotribal capitalist organisations has excluded detribalised Māori, those mostly urban Māori who can no longer identify their tribal connections. She suggests that:

both traditional resources and tribal members are now regulated according to capitalist class relations as a consequence of the new relation between people and the capitalized resources. People are either in possession of tribal resources as a consequence of their tribal affiliation, or, for the non-tribal Māori, dispossessed from the traditional lands and waters (Rata, 2003:53).

Such exclusions are not uncontested but are the inevitable result of decisions about criteria necessary to the allocation of resources. Neotribal capitalism is perhaps an example of the cultural hybridity that occurs in colonial contact zones as indigenous groups gain proficiency in using the economic and political tools of the coloniser (Bhabha, 1994). It could be argued then that urban Māori are those *most* culturally vulnerable to the loss of starlight due to light pollution. Christchurch is Aotearoa's third largest city and the largest in Te Waipounamu, so Kāi Tahu (being the iwi earliest affected by Pākehā culture and urbanisation) have good reason to insist on the protection of starlight visibility. The AMIDSR in the Mackenzie District is a relatively rural area but provides examples of how appropriate lighting policies that can also be implemented in urban areas. Lighting to reduce sky glow is one element that Margaret Austin and others are campaigning for in the Christchurch rebuild.¹

The three Kāi Tahu rūnaka who have traditional ties with the area of the AMIDSR are Arowhenua, Waihao and Moeraki. Although their maraes are located on the coast, their rohe extend inland to the Southern Alps and overlap in the Mackenzie District (see Figure 1.6 above). Arowhenua are recognised by the Mackenzie District Council as kaitiaki/guardians or custodians of Kāi Tahu interests within the district (Mackenzie District Council, 2004). These papatipu rūnaka have strong whakapapa connections to Waitaha, one of the original iwi of Kāi Tahu Whānui and the earliest inhabitants to Te Waipounamu, who named the land and coastal areas and are considered the source of much of Kāi Tahu's traditional environmental knowledge (Te Rūnanga o Kāi Tahu, 1996; Te Ana Māori Rock Art, 2011).

Preservation of Māori Knowledge

Much of what is publically known (particularly by non-Māori) about late 19th and early 20th century Māori culture, and Kāi Tahu in particular, was recorded by Pākehā ethnographers such as Rev-Cannon James Stack, Elsdon Best and James Herries Beattie. Rock Art found in limestone caves throughout Canterbury was an ancient way of preserving knowledge that is now being protected by Kāi Tahu as part of their cultural heritage, but little is known about the true meaning of the artworks (Te Ana Māori Rock Art, 2011). Oral tradition continues as a way of transmitting knowledge, but modern conditions make

¹ The Christchurch CBD and much of its Eastern suburbs were severely damaged through a series of devastating earthquakes that began on 4 September 2010. 185 lives were lost during the magnitude 6.3 earthquake that occurred on 22 February 2011. The city is now being rebuilt according to a new Plan which the public were invited to make submission on.

this more difficult and tapu/sacred knowledge in many cases is never published or shared beyond the whanau or hapu (Harmsworth, 2002). Furthermore, much traditional knowledge can only be effectively gained through engagement in cultural practices. This presents another reason to protect starlight visibility which will be discussed in Chapter 4. Nevertheless, Stack, Best and Beattie have made a significant contribution to the preservation of Māori knowledge (Holman, 2008; Harmsworth, 2002).

Stack, the son of a missionary, was born on a Māori pā and grew up remote from Pākehā settlement and so became familiar with the Māori world and proficient in the language. One of his most cited works is *South Island Maoris: a sketch of their history and legendary lore* published in 1898. He held a long-term and unrealised hope of setting up a Māori church within the Church of England (Murray, 2012). Best, on the other hand, wrote primarily on northern Māori having spent considerable time with Tūhoe iwi in the Ureweras (Holman, 2008). His more conventional publications were preferred by academic historians at the time over Beattie's which unfortunately reinforced an erroneous perception that northern Māori traditions and customs were the standard across the nation (Anderson, 2012). Nevertheless, Best made significant contributions to *The Williams Dictionary of the Māori Language* and his works are still considered "the most exhaustive studies of pre-contact Māori society" (Holman, 2008:97). Beattie, born in Southland, gained a detailed knowledge of Māori traditions as a young man through his strong acquaintance with Māori of the Henley area (Anderson, 2012). He was known for using a wide range of material but his critics claim it was "not always obvious to which informant material should be attributed" and that "he did not discriminate between sources of varying quality" (Anderson, 2012: unpaginated).

Stack, Best and Beattie were three very different men who likely possessed different motives for recording Māori culture and knowledge. However, they were from a generation of Pākehā scholars and folk-scholars who largely held extinctionist beliefs about Māori cultural forms and were eager to preserve as much of it as possible before it was fatally diluted by increasing assimilation and cross-cultural marriage. Best's beliefs about the cultural durability (or vulnerability) of indigenous groups may have been influenced by his experience in the United States where he "saw first-hand the effects of westward expansion on Native American peoples" (Holman, 2008:95). Their informants were also variously motivated to provide their stories and knowledge to these authors. Some saw these men as "offering the last chance to preserve substantial areas of traditional knowledge that they thought were not properly appreciated by their descendants", and others saw an opportunity for gaining equality "and the benefits of modernity on their own terms" (Anderson, 2012: unpaginated; Holman, 2008:96).

Some of their notable Kāi Tahu informants include Teone (Hōne) Taare Tikao, Taare Te Maiharoa, and Hore Kerei Taiaroa. Tikao was involved in early Kāi Tahu claims over the reservation of mahika kai and his "lively intellect, wide knowledge, and willingness to fuse tradition with the modern world made him an influential figure" (O'Regan, 2012: unpaginated). Having been taught from an early age by notable tribal scholars, he possessed an "encyclopaedic knowledge of Kāi Tahu natural lore and

history pertaining to the Canterbury area” (O’Regan, 2012: unpaginated). His uncle, Hōne (John Love) Tikao was a signatory to the Treaty of Waitangi at Akaroa in 1840. Te Maiharoa was the son of famed Kāi Tahu prophet, from Arowhenua and of Waitaha descent, Hipa Te Maiharoa. He preserved his father’s knowledge through oral tradition and by relating it to Herries Beattie who recorded it (Somerville, 2012: unpaginated). Taiaroa was the only surviving son of prominent Kāi Tahu chief Te Matenga Taiaroa of Taumutu. His most lasting achievement was a commission of inquiry over the Otago, Kemp’s block, Murihiku and Akaroa land purchases which:

had taken detailed evidence from many Māori witnesses who had been present at the land purchases, and this, together with the detailed record of mahika kai (places where food was produced or procured) and the associated kainga Nohoaka (seasonal settlements) which Taiaroa collated from meetings of elders, constituted a priceless record of the Kāi Tahu view of the land purchases and of their traditional way of life (Evison, 2012: unpaginated).

He, like the others, was an informant for *both* Best and Beattie whose writings were used in the 1990s as historical support for the eventually successful Kāi Tahu Treaty claims. Notably, his esteemed father never signed the Treaty of Waitangi.

Among the traditional knowledge and customs that were relayed to Stack, Best and Beattie by their informants was tātai aroraki. In Best’s *The Fishing Methods and Devices of the Māori* (1929) and *The Māori Division of Time* (1922), for example, are recorded details of Māori star names and meanings and the ways in which the ‘nights of the moon’ influenced cultural activities such as fishing or harvesting food. Since the time in which these authors published their works, much traditional knowledge has been lost due to the processes of colonisation and urbanisation and the rapid development of new technologies. Contemporary Kāi Tahu now have access to global positioning systems, online weather information and other technologies that could render traditional astronomical knowledge superfluous for such activities as fishing. However, the Māori renaissance that began in the late 1960s has revived some traditions, including astro-navigation. Māori have begun to reclaim their traditional knowledge and Stack, Best, and Beattie (among others) have provided a rich source of information which has been reappropriated to fit the Kaupapa Māori philosophy of ‘by Māori, for Māori and (often) in Māori’ (Holman, 2008:94). Māori environmental knowledge has much to offer resource management practices. The following section explores the ways in which indigenous knowledge and values have become accepted within environmental management practice in Aotearoa.

Resource Management, Indigenous Knowledge and Cultural Wellbeing

Cultural values are increasingly being recognised in resource and environmental management fields (Dalziel et. al, 2009; 2006; Matunga, 2000). For example, since the passing of the Conservation Act 1987, Māori cultural values relating to the environment must be accommodated in conservation management decisions (Bosselmann & Taylor, 1995). Sites such as national parks, managed by the Department of Conservation, now usually provide information for tourists conveying the Māori

perspective and values for the landscape (Carr, 2004). Many landscape features such as mountains, lakes and rivers, for example, are considered *taoka*/treasures and should be treated with respect and culturally appropriate behaviour by tourists (Carr, 2004). Some Māori place names have been reinstated as a result of the Act as these names signify their traditional ties with the land.

Māori cultural values, or *discourses* (a term that will be defined further in Chapter 2), regarding the environment differ from those of Pākehā who often view the environment from a Western scientific perspective (Park, 2002; Matunga, 2000). In contrast, Māori traditionally hold a more holistic view of the environment, and place names emphasise the spiritual value attached to the land which forms the basis of their tribal identity (Carr, 2004). The Māori worldview understands that:

All things have the qualities of wairua (spiritual dimension) and mauri (life force), are living, and have genealogical relationship with each other. Mauri provides the common centre between the natural resources (taoka), the people or guardians who care for the taonga (the kaitiaki), and the management framework (tikanga) of how taonga are to be managed by the kaitiaki. It is through kawa (protocol) that the relationship between taonga, tikanga and kaitiakitanga is realised (Environment Canterbury, 2013:13)

Indigenous knowledge, especially that relating to the environment, has gained respect within Western discourse in recent decades as changes in development theory and practice have recognised the value of localised knowledge and practice (UNESCO, 2010). UNESCO (2010: unpaginated) for example, suggest that:

Indigenous people have a broad knowledge of how to live sustainably. However, formal education systems have disrupted the practical everyday life aspects of indigenous knowledge and ways of learning, replacing them with abstract knowledge and academic ways of learning. Today, there is a grave risk that much indigenous knowledge is being lost and, along with it, valuable knowledge about ways of living sustainably.

Cultural values, knowledge and practices may be considered collectively as embodied *cultural capital* (Bourdieu, 1986). While Bourdieu coined the term in reference to the subtle ways of knowing and being that can gain a person purchase within the dominant class culture, I believe it can also be applied to indigenous culture. For example, cultural capital such as fluency in te reo, and extensive knowledge of tikaka Māori and whakapapa, are recognised elements of a strong Māori identity that would enable those who possess it to conduct themselves with a level of confidence and ease in a Māori environment, and within Māori networks, that is less attainable for someone who does not possess the same cultural capital (Coates, 2008). As Lai (2010:14) argues, “there is a strong Māori view that knowledge and use of Māori cultural practices are important for a Māori person’s sense of identity, and connectedness to other Māori and important Māori institutions like marae”. As traditional knowledge has already been substantially eroded by the mechanisms mentioned above, perhaps indigenous cultural capital is more valued now than ever.

Moreover, the cultural capital of Māori has been appropriated and objectified by non-Māori as a commodity as it adds value to the tourism industry and export market (Lai, 2010). Therefore it could be

argued that, while the benefits ought to be claimed by Māori, indigenous cultural capital is important to the economic growth of Aotearoa. It should be noted that *economic well-being* is stated within the RMA to be one of the intended outcomes of sustainable resource management. Cultural capital has also begun to be recognised within sustainability frameworks as a component of social capital, one of a number of forms of capital considered to be sustainability indicators (Dalziel et. al, 2009). Because it reinforces cultural identity it can also be considered a measure of cultural *well-being* (Dalziel et. al, 2009) which is described by the Ministry of Cultural Heritage (cited in Lai, 2010:14) as:

the vitality that communities and individuals enjoy through: participation in recreation, creative and cultural activities; and the freedom to retain, interpret and express their arts, history, heritage and traditions.

While many nations have adopted a triple bottom line approach to sustainable resource management by incorporating social, economic and environmental well-beings as desired outcomes, the overarching environmental legislation in Aotearoa has the unusual feature of including *cultural well-being* (Dalziel, 2009). Just as cultural values regarding the environment have been recognised in legislation such as the Conservation Act 1987 and Resource Management Act 1991, there is a direct relationship between the respect of cultural environmental values and cultural well-being, as iwi identity is closely connected to specific environments (Panelli & Tipa, 2007). Moreover, cultural knowledge is often tied to environmentally specific practices. Therefore, cultural values, knowledge and practices (embodied cultural capital) are intimately connected with specific landscapes, and skylscapes, so it is entirely appropriate that cultural well-being is incorporated into environmental legislation.

The night sky also displays distinctive features which are imbued with cultural significance for Māori. The cultural meanings associated with the night sky are place-specific as latitude and landscapes affect what part of the sky is visible in any particular location (Ruggles, 2009). The moon and stars are both culturally and materially connected to human activities so, in a sense, the night sky could be considered part of the *cultural landscape*, or a cultural skyscape (Busatta, 2009; Sauer, 1925). Over the past decade there has been a resurgence of interest in the rising of Matariki/Pleiades as the marker of the Māori New Year (Harris, 2013). Matariki celebrations have been embraced by many Māori and Pākehā throughout the nation. The AMIDSR is a particularly good place for viewing this constellation. So, by conserving the dark sky over the Mackenzie basin, the AMIDSR is protecting a *cultural skyscape* embedded with knowledge and values important to the cultural well-being of Kāi Tahu.

The Resource Management Act 1991

As mentioned above, the RMA cites social, economic and cultural well-being as the desired outcome of sustainable resource management. Significantly, the traditional environmental values of Māori, cited in a series of Waitangi Tribunal claims against the Crown in the 1980s, helped pave the way for the establishment of the Ministry for the Environment (Pawson, 2012). Lauded by some for its integrated

framework and for incorporating the principle of sustainability, the RMA was “criticised by developers as time-consuming and expensive, and by environmentalists as giving too much encouragement to developers” (Pawson, 2012:4). Nevertheless, the Act was introduced as the result of comprehensive environmental law reform. Its enactment “repealed 78 statutes and regulations, and amended numerous others” (*Historical Overview*, nd). The RMA now acts as the primary legislative umbrella over environmental issues and resource use in Aotearoa although numerous amendments have been made since its introduction.

The Act delegates administrative responsibility to Regional and District Councils. Regional Councils are obliged to prepare Policy Statements which articulate the resource management issues within their regions. Both Regional and District Councils then prepare Plans which provide the strategies and rules to implement the specific goals of the Regional Policy Statement. Both of these stages require local governments to consult with iwi and explicitly incorporate Māori resource management concerns into their Policy Statements and Plans. Within the Canterbury region, Kāi Tahu are recognised as tākata whenua and consultation at the Regional Council level would take place with TRoNT while District Councils are expected to consult with the local rūnaka. In the case of the Mackenzie District that would primarily be Arowhenua, however for some resource management issues Moeraki and Waihao may also need to be consulted (see Figure 1.7 above).

Iwi Natural Resource Management Plans (often simply referred to as ‘Iwi Plans’) may be prepared by iwi and lodged with the Regional or District Council. Such plans outline the specific resource management issues of concern to iwi and list the locations which are of particular cultural significance and sensitivity. Councils are obliged to take Iwi Plans into account when developing their own policy statements and plans. Kāi Tahu have several plans as their large takiwā/area covers several regions of Te Waipounamu. The first that was developed in 1990 for the whole Canterbury region was *Te Whakatau Kaupapa* which was then reprinted in 1992 to incorporate reference to the RMA. While it is still lodged with the Canterbury Regional Council, other iwi plans have emerged for various papatipu rūnaka, including Arowhenua. Moeraki interests have been incorporated within the *Kai Tahu Ki Otago* plan for the Otago region, and Waihao are incorporated within *Te Whakatau Kaupapa*. In 2013 a new document, *Mahaanui Iwi Management Plan* was developed which details Kāi Tahu values and customary interest in the area ranging from the Hurunui river in the north to the Ashburton river in the South. This plan includes the interests of Te Taumutu Rūnaka who share particular interests with Arowhenua. As well as informing local government, iwi plans should also inform resource consent applicants of iwi values and interests.

If an individual or company wish to develop a piece of land, they must apply to either the Regional or District Council for *resource consent* and in some circumstances must consult with iwi and other parties who may be affected by their project. Their application must show their intention to conform to the standards and policies set at each of the governance levels as shown in Figure 1.8 below,

and provide evidence of how they intend to avoid, remedy or mitigate any adverse environmental effects. Their application should be as detailed and specific as possible to avoid costly processing delays.

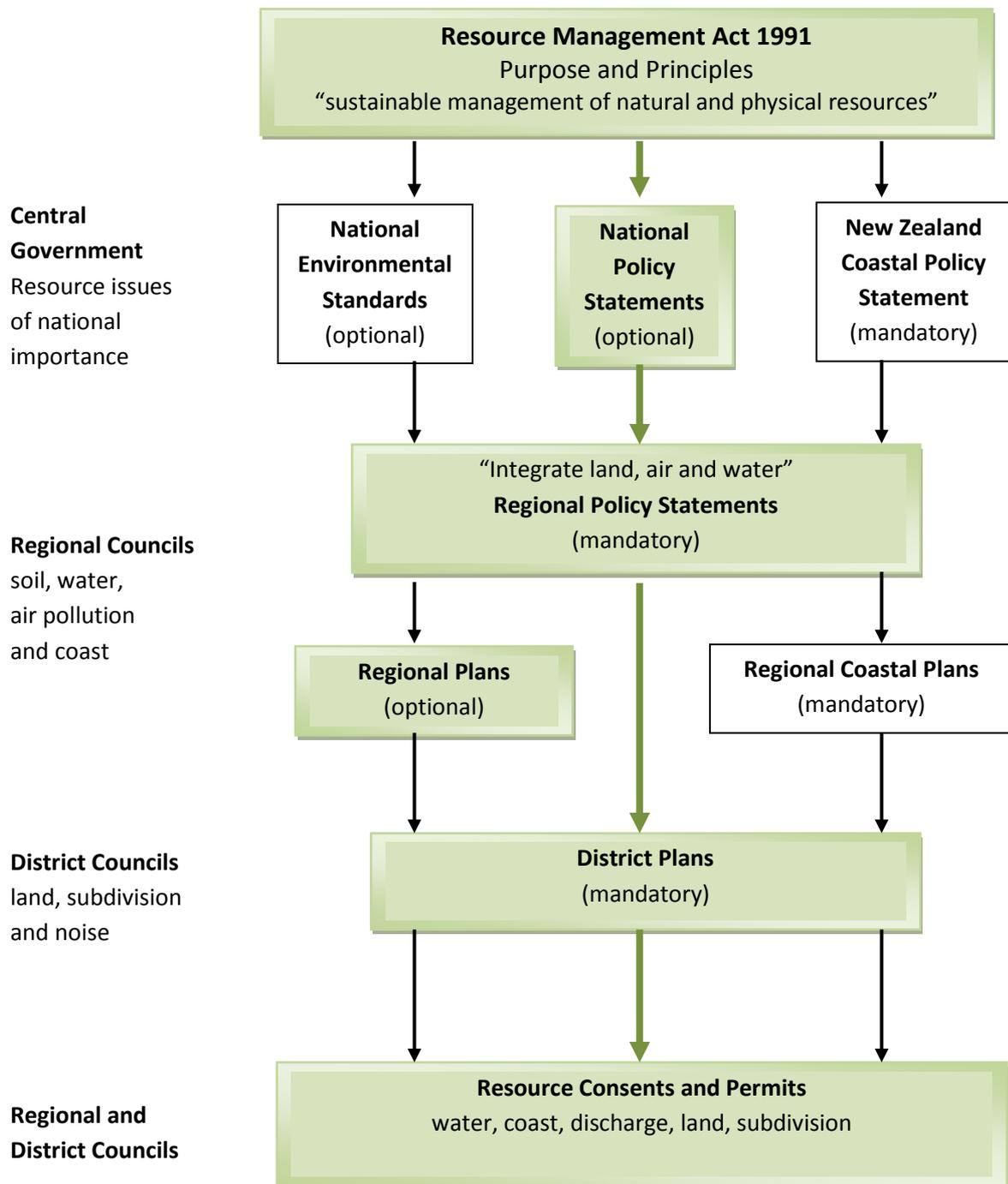


Figure 1.8: *Administrative Structure and Functions of the RMA.* (Cant & Todd, 2011)

While consultation with iwi and reference to iwi plans is required to take place at each level, and in the preparation and revision of each of the documents outlined in Figure 1.8 above, this thesis will only consider those highlighted in green because of their particular relevance to the protection of starlight. Using ANT (the tenets of which are explained in Chapter 2) the RMA will also be considered (in Chapter 6) for its knowledge preservation and group-formation potential which also positively

contributes to cultural well-being. This happens both in spite of, and because of, the adversarial nature of RMA processes. Therefore the RMA may be considered as an *intermediary* within various networks of environmental knowledge construction or preservation and group-formation. What should become clear is that the visibility of starlight is not the only thing of value that may be lost if we fail to mitigate light pollution in our ever-expanding urban areas. I shall now summarize my argument and present the structure of this thesis.

Summary

This thesis argues that despite the erosion of much traditional knowledge precipitated by colonisation, urbanisation, and new technologies, some contemporary Kāi Tahu still have knowledge of tātai aroraki and use it in customary ways. Celestial bodies play an important role in Kāi Tahu cosmology and whakapapa and their position in the sky traditionally provides practical guidance in navigation, seasonal time-keeping and weather forecasting. A resurgence of interest in celebrating Matariki as the Māori New Year, and traditional astro-navigation has appeared over the past decade on the back of a tide of Māori renaissance that began in the 1970s. Protecting starlight visibility would protect the knowledge and practice of tātai aroraki. Traditional knowledge and cultural practices reinforce indigenous identity and this positively affects cultural well-being. The RMA states cultural wellbeing as an intended outcome of sustainable resource management therefore this should be applied in protection of starlight visibility. However, the RMA also provides group-formation opportunities within its processes which, in themselves, contribute to cultural well-being as they strengthen indigenous identity.

Starlight is a natural resource of cultural significance to Kāi Tahu. Light pollution is an increasing environmental issue in many developed nations as it is known to have negative effects on ecology and human health. In the Mackenzie District starlight is protected by lighting restrictions imposed within the AMIDSR. The cultural values of Kāi Tahu, the tākata whenua of that area, helped secure international recognition for the dark sky reserve but their takiwā actually covers a much broader area comprising of much of Te Waipounamu. This thesis argues that the instruments provided by the RMA can be applied in all areas within the takiwā of Kāi Tahu to protect the natural resource of starlight from light pollution. Moreover, starlight is of cultural significance to *all* Māori and the RMA is a *national* legislation therefore this study has wider implications for Aotearoa.

Structure of Thesis

Chapter 1 has provided the context within which this thesis is situated. It has introduced light pollution as an environmental issue to be managed and outlined ways in which this is being achieved in other nations. The Mackenzie District has been identified as the location under study in this thesis, and Kāi Tahu identified as the people who have a traditional association with this area and a cultural interest in

starlight. The structure of the RMA has been presented and my central argument of applying it to the protection of starlight as a natural resource of cultural significance to Māori has been outlined.

Chapter 2 describes the ways in which my methodology was influenced by Kaupapa Māori literature. Actor-Network Theory, Discourse Analysis and Postcolonial Theory are described for their usefulness as methods of interpreting interview data and providing theoretical insight into this area of study. My positionality as a Pākehā student is analysed for the ways in which it has influenced both the method and outcome of my research. Finally, the actors and networks identified in this study are introduced.

Chapter 3 introduces starlight as a cultural resource. Māori cosmology and the concept of whakapapa are described in relation to the celestial realm. Interview data is used to describe the loss and subsequent reclamation of traditional knowledge including tātai aroraki. I describe the topologies of time and space in which the RMA is located. I then follow the many associations between the stars, Māori rock art, authors such as Stack, Best and Beattie, my participants, and three images in an iwi plan to demonstrate how the natural environment, people and technologies have preserved traditional knowledge.

Chapter 4 introduces starlight as a natural resource by describing its use in mahika kai activities. Interview data is used to show that contemporary Kāi Tahu still hold remnants of tātai aroraki and use it in customary ways. I describe the ways in which the natural environment has been a co-agent of environmental knowledge production and retention. Finally, the importance of learning from observation and experience is described as a traditional method of transferring knowledge of tātai aroraki to the next generation.

Chapter 5 presents interview data as both evidence of improvements and ongoing issues with iwi participation in resource management. Specific sections of the RMA that may be applied in protection of starlight as a natural resource are described. Instruments at the Regional and District Council level are also considered for their potential application to starlight protection. Finally, the RMA is also considered for its potential for protecting and revitalising traditional knowledge and as a product and producer of cultural hybridity.

Chapter 6 summarizes my argument that starlight is a natural resource of cultural significance to Māori and that protecting starlight is in the interests of the cultural well-being of Māori because it protects their cultural capital and taoka. Using Actor-Network Theory, I destabilize the binaries of Māori/Pākehā and nature/culture and highlight the group-formation opportunities that are presented by the RMA. I conclude that the instruments provided by the RMA can be effectively applied to protect starlight from light pollution because it is a natural resource and doing so would be consistent with the purpose of the Act as well as the Treaty of Waitangi and NTCSA.

Chapter 2: Methodology and Positionality

Introduction

The previous chapter has provided the context and rationale for this study and geographically located it within the bounds of the Aoraki Mackenzie International Dark Sky Reserve (AMIDSR). I shall now describe the methodology used in this study. The main research questions underpinning this thesis are; in what ways is starlight visibility important to contemporary Kāi Tahu? And, can the Resource Management Act 1991 (RMA) be applied to protect starlight from light pollution on cultural grounds? Aware of my positionality and the culturally sensitive nature of my research, I chose Actor-Network Theory (ANT) as a framework for analysis due to its compatibility with the Māori concept of whakapapa. Whakapapa/genealogy is a way of ordering important knowledge related to people, events and natural phenomena through 'folk taxonomies' (Roberts, 2012). ANT allowed me to explore the relations between the heterogeneous elements of my study – people, the natural environment, legislation and technology – and to recognize the agency of both humans and non-humans. Like the concept of whakapapa, ANT also provided a sense of emancipation from the Modern nature-culture divide which underpins the Western-scientific worldview.

In order to understand what the humans in my study do and why they do it, I chose to conduct semi-structured interviews with kaumātua who have a traditional association with the area of the AMIDSR. Insights gained from Kaupapa Māori scholarship were used for the practical task of recruiting participants, including the principles of reciprocity and negotiating face-to-face introductions through a trusted gatekeeper. I then employed ANT, along with Postcolonial Theory and Discourse Analysis, to analyse the interview data in order to understand the different narratives and power relations that motivate people. The interview data were also triangulated with textual analysis of legislation, Waitangi Tribunal reports, iwi submissions over resource consent applications, and renowned scholarship on Māori culture. Insights from Postcolonial Theory help to illuminate the geohistorical context behind the loss of Kāi Tahu traditional knowledge and subsequent efforts towards cultural revitalization in what is essentially a postcolonial setting. Discourse Analysis fits well with Latour's (2005) description of group-formation in so far as we understand discourses as every day practices and the performative nature of group identity. ANT however is the dominant method of analysis used in this thesis.

This chapter introduces the central tenets of ANT along with a brief overview of Discourse Analysis and Postcolonial Theory in their relation to ANT. My method of data collection and positionality are then disclosed before I describe the ways in which Kaupapa Māori scholarship has informed both my method and writing. Finally, I introduce the human *actors* in this study.

Actor-Network Theory

This thesis contains such disparate elements that it sometimes made the complexity of the project overwhelming, but this complexity lent itself well to an ANT approach. ANT arose from science and technology studies in the 1980s to become one of the most influential theories in contemporary social science. A number of human geographers have embraced ANT for, among other things, its ability to deal with the complexity of 'the social', its conceptualization of 'power as effect', and its non-Euclidean spatiality (Bosco, 2006; Murdoch, 1998). While there has been an interest in networks and relational theories for some time now in human geography, ANT offers a more nuanced and open-ended view of networks and relations than either the traditional spatial analysis of networks or social-network analysis (Bosco, 2006). Bosco (2006:140) suggests that "ANT is perhaps the first approach since spatial network analysis in geography from the late 1960s and 1970s that makes networks the explicit focus of attention for the study of *all* phenomena". Under ANT, society takes shape through the juxtaposition of people, animals, plants, objects, discourses, texts, and the relational flows between them (Hitchings, 2003).

ANT provides a useful tool of analysis that explains phenomena by tracing the associations and flows between heterogeneous elements, both human and non-human (Latour, 2005). As Van der Duim (2007:962) succinctly puts it, "the researcher has to follow how meanings and tasks are attributed to and distributed among people and things". This process by which *actors* are recruited and networks are built is described by Callon (1986) as *phases of translation*. Translation refers to "the processes of negotiation, representation and displacement which establishes relations between actors, entities and places" (Murdoch, 1998:362). Networks are never permanent, but through the on-going process of *translation* they may achieve stability and durability over time.

In addition to providing a way of bringing disparate elements (times, spaces, people, ideas and things) together within one theoretical framework, there are other advantages to using ANT. ANT offers a way of describing the relationships between heterogeneous *actors* within a network while avoiding the binaries of nature-culture, micro-macro analysis, action-structure, or local-global, that characterise traditional scientific analyses (Murdoch, 1998). In this research ANT allowed me to conclude the discussion of my results by deconstructing the binary terms of Māori and Pākehā and nature and culture, thereby also avoiding re-inscribing colonial relations through the process of 'othering' (Tuhiwai Smith, 1999). ANT does not privilege any *actor*, but recognises that each asserts its own influence within the network and that power is not static or something that can be possessed, but is an effect of flows and relations within the network (Law, 1992; Murdoch, 1998). In this sense, power is generated in a relational and distributed manner (Law, 1992).

Murdoch (1998:364) states that "the effects of power and resistance are intertwined" and network stability is the result of resistance being overcome between heterogeneous actors. Furthermore, *actors* may fluctuate between dominance and resistance depending upon their network

relations at the time. ANT does not assume that humans or human institutions are the main *actors*, or have power over other *actors*, or the network as a whole. As Law (1992:3) suggests, “there is no reason to assume, a priori, that either objects or people in general determine the character of social change or stability”. A stable network, such as a human institution, which performs in a relatively predictable manner with little change, is simply the manifestation of “its components – the hierarchies, organisational arrangements, power relations, and flows of information...the uncertain consequences of the ordering of heterogeneous materials” (Law, 1992:8). In this way, organisation is seen as the precarious effect of resistances that have been overcome. The Resource Management Act 1991 (RMA), or any other piece of legislation for example, may be viewed in this way as a relatively stable network of associations. Murdoch (1998) describes “spaces of prescription” and “spaces of negotiation” as identified by the varying levels of remote control or autonomy which they allow, the former being more prevalent within stable networks. However he also argues that we should “avoid seeing particular spaces as containing singular identities – for instance, ‘central’ or ‘marginal’, ‘dominant’ or ‘resistant’ – for spaces are rarely, if ever, polarised in such a fashion” (Murdoch, 1998:364).

Another advantage of using ANT is that it recognises the role of *non-human actors* within the social collective, and in the case of this study this includes elements of the land and sky, flora and fauna, discourse, policy and legislation, astronomical instruments, photographic equipment, computers, buildings, and transport infrastructure (Hitchings, 2003). All of these and more become recruited within the network at particular times, for particular purposes, and to varying degrees. Following the relations and flows between all network components helps us to understand the ‘why’, ‘where’ and ‘how’ certain outcomes occur as they do. Recognizing non-humans as network *actors* is particularly useful in allowing us to see the ways in which nature has agency. Previous social theories have tended to exclude ‘things’, such as material objects and technologies, under the assumption that non-humans are not part of ‘the social’ and therefore beyond the scope of the analysis (Bosco, 2006). The principle of *symmetry* is therefore applied to all *actors* in order to allow their actions to direct the research. This means that human and non-human *actors* are treated equally without any prior assumptions of their ability to act or affect action.

ANT also has some resemblance to the Māori worldview that considers the relationships between people and things. For example, Taupo (2006:30) suggests that ANT’s “attention to networks, and relationships between people and things...overlaps with understandings of whakapapa and mauri”. Another similarity lies in allowing for the possibility of non-human agency. In these ways ANT challenges western scientific rationality. ANT therefore provides a framework which seems compatible with the emancipatory aims and principles of a Kaupapa Māori approach to research (discussed below).

ANT’s concept of time is usefully seen as ‘pleated’ and ‘folded’ by networks, as they draw things together in various combinations of association (Murdoch, 1998). The various network components within my case study span over time periods ranging from months, years, centuries and even to the

beginning of the universe. ANT thus enables us to trace flows and relations between different spaces and times which link heterogeneous components together within the network whole. As Murdoch (1998:360) states, “there is no one time or space, rather there are a number of co-existing space-times”. The analytical possibilities that ANT presents us with are endless, and the challenge for the researcher is to decide which *actors* and network connections to exclude from the study and so arbitrate the boundaries of the network being studied. Some important ANT terms are described below.

Actors and Actants

The terms *actor* and *actant* are sometimes used interchangeably and inconsistently in ANT literature, but I prefer Latour’s (1992a:241) simple definition of *actors* being “entities that do things” whether they are human or non-human. One crucial difference between them is that only *actors* have volition (although not all of them do). They can be further defined as “whatever acts or shifts action” (Akrich & Latour, 1992:259). An *actant*, on the other hand, is without volition or will but can be turned into an *actor* by being “endowed with a character” and competencies (Akrich & Latour, 1992:259). Using these definitions, celestial bodies are *actants* which possess no will or volition but are turned into *actors* once human actors have ascribed competencies to them. They may then be enrolled to act within a *mahika kai* network of people, the natural environment and technologies. For example, the predictable movements of the moon and constellations, and the clarity of their light, are their *acts* which move other actors within a *mahika kai* network into action. As human actors ascribe competencies such as time-keeping, weather forecasting, or mauri to the celestial actants, their actions then influence the decision of human actors to proceed with a *mahika kai* trip or not. This is how celestial *actants* are enrolled within the network as *actors* that “act or shift action” (Akrich & Latour, 1992:259).

Stalder (1997) stressed that “actors have an independent reality outside the settings that turn them into actors that do particular things”. It is important to note that actors within any network may also be associated with numerous other networks and be enrolled for different purposes. My interview participants have multiple identities influenced by discourses relating to gender, age, class, and ethnicity, and the salience of these factors may alter from one situation to another. For example, Dr Pauline Harris’ identity as a PhD certified Astrophysicist may be most salient within academic networks of Physics and Astronomy, but her whakapapa and identity as a Māori woman become most salient within her iwi networks, and both may be employed together in her research on Indigenous Astronomical Traditions. Multiple identities may also be ascribed to celestial bodies. For example, within the Western Scientific worldview, the moon becomes a mass of minerals with a core, mantle and geologically dead crust that orbits the Earth’s magnetic field. Within the Māori worldview one of the personifications of the moon is *Hina* who, among other things, presides over childbirth (Best, 1922). Lore surrounding the moon may differ slightly between different iwi, but a concept common to all is that the moon is personified with certain characteristics and attributes that may change with the *nights*

of the moon (Best, 1922). So, depending on the nature of the network, the actions of the moon may be interpreted differently and therefore affect the network differently. The same moon, enrolled within the very different *knowledge networks* of Western-scientific astro-physics and indigenous astronomical traditions, influences them differently according to the attributes each network has assigned to it (or her). In other words, actants and actors are shaped by the relationships they have with other actors and the network whole (Latour, 2005).

Translation and Delegation

The term *translation* refers to the process of network creation and, according to Callon (1986), consists of four phases; *problematization*, *interessement*, *enrolment* and *mobilization*. The *problematization* phase involves defining the problem and the relevant *actors*. It could be argued, for example that in passing the Resource Management Act 1991 (RMA), the central government defined the problem (how to sustainably manage natural resources in a democracy) and the *actors* who would henceforth be obliged to act according to the terms specified in the Act. The primary *actor* then positions himself or herself as an *obligatory passage point* between other actors and the network, becoming indispensable (Callon, 1986). The RMA was in this sense set it up as an *obligatory passage point* between resource consent applicants, local government, and other actors such as affected parties, iwi, experts, the general public, and the natural environment.

The *interessement* phase involves actors negotiating the terms of involvement, and *enrolment* involves the acceptance of those terms, ascribing competencies to the actors and delegating tasks (Callon, 1986). RMA processes such as resource consent and Environment Court hearings expose examples of *interessement* and *enrolment*. For example, scientists and lawyers are ascribed competencies as experts, their terms of involvement having been accepted, and are delegated tasks according to their client's needs. The *mobilization* phase involves *intermediaries* who are enrolled to "transport meaning or force without transformation" (Latour, 2005:39). For example, a highly sophisticated panel of local government commissioners "may become a perfectly predictable and uneventful intermediary in rubber stamping a decision made elsewhere" (Latour, 2005:39). According to Bijker and Law (1992:25 cited in Stalder, 1997: unpaginated), an intermediary is "anything that passes between actors in the course of relatively stable transactions".

However, dissident intermediaries may "transform, translate, distort, and modify the meaning or the elements they are supposed to carry" and thus become *mediators* (Latour, 2005:39). The mobilization of meaning or force, whether distorted by mediators or held intact by intermediaries, is required in order to either enrol new actors or stabilize the roles of existing actors. Action is constantly happening within each of the phases of translation. For this reason, we should conceive of networks as always in flux and contested and negotiated at every turn. Much of the action however can become hidden, or black-boxed, if there is a high degree of stability within a network.

Punctualization and Black Boxes

Callon and Latour (1981:285) suggest that “a black box contains that which no longer needs to be considered, those things whose contents have become a matter of indifference”. Terms such as Māori and Pākehā or nature and culture, for example, may be considered as assemblages of actors, intermediaries and so forth which, although they continue to be contested, formed and reformed, have nevertheless achieved relative stability over time. Seldom interrogated, they have become black boxes. Their stability is influenced by the costs of reopening them (Bijker & Law, 1992). Stalder (1997: unpaginated) describes how legislation is black-boxed:

In its formation stage a law is a contested set of competing sentences around which occasionally large alliances are built to influence their specific shape. During the legislative process they are fluid and open. Once the legislation has been passed, contested sentences turn into a black box, sealing all the elements, however arbitrary they might be, in a fixed and stable relationship that cannot be questioned easily.

Punctualization is simply the creation of black boxes; the point at which a network has become so stable that it may be considered as a point in a larger network (Williams-Jones & Graham, 2003). As a ‘closed’ black box its contents no longer need to be explicitly known in order for it to function within the larger network. The examples provided above of concepts of Māori and Pākehā, nature and culture, or legislation, illustrate how networks that have become black-boxed continue to function but become more difficult to ‘open’ and contest or alter their contents. However, conceiving of ‘the collective’ of humans and non-humans in network terms creates an emancipatory politics because network stability can be understood as dependent on the actions of every actor, and is therefore never a permanent or guaranteed effect (Latour, 1999). Whilst I do use the terms Māori and Pākehā, nature and culture, throughout this thesis, readers should understand them as black boxes and anticipate their de-punctualization in my conclusion. I shall now discuss the ways in which Discourse Analysis and Postcolonial Theory have informed my use of ANT.

Discourse Analysis and Postcolonial Theory

Discourses are culturally acquired, often subconscious, assumptions and beliefs that underpin our identity, worldview, attitudes and behaviour (Wylie, 2006). Discourse Analysis, as a method of critical enquiry, has been significantly influenced by Foucault (Harrison, 2006; Wylie, 2006). This method seeks to “describe how certain identities and narratives are produced, privileged, sometimes naturalized, and asserted over identities and narratives which are comparatively marginalized, excluded or silenced” (Wylie, 2006:305). ANT was influenced by Foucault’s concept of power, which he suggests is everywhere and not held exclusively by anyone, but rather emerges from specific local practices (Matless, 1992). The repetition of such practices over time can result in the underlying assumptions and narratives, as well as the practices themselves (together forming a *discourse*), being naturalized as

'common sense'. This, I believe, is related to Murdoch's (1998) *spaces of prescription* and *spaces of negotiation* where domination and resistance are continually negotiated between actors and (in the former) can result in a stabilized network. Or, in the terminology of Discourse Analysis, a *dominant discourse*. After all, a discourse does not exist in isolation, but owes its existence and power to a network of repeated performances between humans and non-humans. In this sense, discourses which achieve dominance over competing discourses are punctualized and become black boxes accepted as 'common sense'.

Foucault (1977) insisted that discourses should be considered in terms of power. For example, his concept of *governmentality* described how sovereign powers, such as the state, use mechanisms of knowledge production to control their subjects (Rose-Redwood, 2006). Knowledge, power and governance are therefore interrelated. Resource management practices may be seen as ways of governing the environment through particular discourses about nature. Discourses are always contested and change over time, and Foucault (1977) used the term *genealogy* as a means of tracing how ideas have evolved throughout history. He posited that the geohistorical contexts within which ideas and knowledge are grounded create the conditions which make certain knowledge possible and thereby restricting what may or may not be known (Foucault, 1970). Foucault coined the term *episteme* to describe such knowledge epochs. Discourse analysis allows us to question "the geohistorical constitution of ideas, concepts and values which underpin the most apparently unquestionable and normal of attitudes and assumptions" (Harrison, 2006:125). I believe the Foucauldian concepts of *discourse*, *episteme*, *genealogy* and *governmentality* are useful tools for opening *black boxes* and therefore complement ANT.

Postcolonial Theory also has much to offer, and it too has been influenced by Foucault. Said's (1978) *Orientalism*, for example, used Foucault's ideas of *discourse* to critique Western representations of the Orient, and became one of the founding texts of postcolonialism. Fanon (1967) and Bhabha (1994) respectively describe how colonized peoples learned to imitate the culture of the colonizer, but also how the cultures of both are affected by their interactions which often lead to cultural hybridity. Postcolonial theorist such as Fannon and Bhabha provide valuable insight into how Māori engage with the government over land and environmental matters.

Furthermore, the quest to reclaim traditional knowledge may also be viewed in light of Postcolonial Theory. Spivak (1988), for example, criticized the ways in which academic researchers often spoke *for* those marginalized by colonization which resulted in their voices being effectively silenced. Māori, like many other indigenous peoples, are building the capacity to research and record their *own* histories and traditional knowledge rather than have these recorded on their behalf by non-Māori. Tuhiwai Smith (1999) describes how this continues to be problematic for Māori, as the legacy of colonization has left its deep imprint in the methods of academia. Although Iwi Natural Resource Management Plans are produced within a local government planning context rather than academia,

they are an important development in iwi capacity building through the methods of Kaupapa Māori. Postcolonial Theory has informed the Kaupapa Māori approach to research, which I describe below. Nonetheless, ANT holds the dominant theoretical and methodological position in this thesis whilst Discourse Analysis and Postcolonial Theory are used to provide additional support to the analysis. I shall now briefly describe the methods I used to gain data.

Method

Qualitative research methods in social geography, developed in part as a reaction against quantitative social geography, have well-known strengths and weaknesses (Baxter and Eyles, 1997; Crang, 2002). One noted strength is their ability to describe the more nuanced and subjective elements of human experience. Some perceived weaknesses are the reliance on non-positivist forms of methodological rigour, and an apparent lack of “standardized procedures and modes of reporting” that are more typical of quantitative methods (Baxter and Eyles, 1997:505). There is an inherent tension between the spontaneity of the research process and evaluation of the same. For example, Baxter and Eyles (1997:506) suggest that, “qualitative researchers are encouraged to allow the research situation to guide research procedures in order that they may gain access to human experiences. Yet for the research to be evaluated there must be clarity of design and transparency in the derivation of findings”. Baxter and Eyles (1997:506-508) claim that “the most common ways to ensure rigour [in qualitative methods] are the provision of information on the appropriateness of the methodology, the use of multiple methods, information on respondent selection and the presentation of verbatim quotations”. With this in mind, the following is a description of my method.

Conducting interviews is one method that enables researchers to unpack some of the complexities of peoples’ lived experience. Unstructured or semi-structured interviews allow for flexibility in lines of questioning, and allow “the person interviewed [to be] more a participant in meaning making than a conduit from which information is retrieved” DiCicco-Bloom and Crabtree (2006:314). In the context of my study this method seemed respectful as I felt it had the potential to enable collaboration, important in a Kaupapa Māori approach to research, and diffuse the power inherent in the interview act itself.

Conducting interviews however is not unproblematic. Baxter and Eyles (1997:509) argue that, “one of the main threats to ensuring qualitative validity is the misinterpretation of meanings expressed through interview conversations”. They suggest that allowing participants to check and edit interview transcripts or revisiting participants to check interpretation may help overcome this problem. The potential for misinterpretation in my study was heightened by its cross-cultural nature, so participants were followed up, post-interview, via email and telephone in order to check interpretation. Using qualitative methods such as interviews, therefore, has its limitations. Nevertheless, interviewing participants seemed a logical way of finding out what they think about the stars above and whether or

not protecting their visibility is important to them.

Latour (1999:19) states that ANT is a method “of being faithful to the insights of ethnomethodology: actors know what they do and we have to learn from them not only what they do, but how and why they do it”. To further understand contemporary Māori perspectives on whether or not starlight should be protected I chose to conduct interviews with Māori who live near, and may be affected by, the newly established AMIDSR. Some participants were known to me already through my previous work on the starlight reserve, and others were introduced to me during a marae based workshop at Arowhenua. After initial contacts were established, a chain-referral method was applied which allowed the participants themselves to select other participants from their collective iwi. A chain-referral method is deemed appropriate when seeking to speak with ‘experts’, working with ‘hidden’ communities, or when the information sought may not be ‘public’ (Heckathorn, 1997).

I sought participants to interview based on their level of authority or knowledge of tātai aroraki, resource management or mahika kai. Semi-structured interviews were recorded with Upoko/heads and Kaumātua/elders of Waitaha and Kāi Tahu iwi connected with the three rohe/tribal areas that the AMIDSR lies within. Interviews were also conducted with an academic authority on Tātai Aroraki/Māori Astronomy. The locations where the interviews took place varied according to where was most convenient and comfortable for the participants. For example, one interview was conducted in a private room at the participant’s workplace, one in a participant’s home, one in a café, and one in a hotel lounge. Themes that were explored within the interviews were; astro-tourism, resource management, astronomy, cultural practices and knowledge revitalization. Participants were given the opportunity to review the interview transcripts and change or delete material as they felt appropriate. The transcripts of the interviews were then analysed using discourse analysis.

This was done by identifying words, phrases or textual sections that revealed either similar or different statements about themes such as nature, culture, astronomy, knowledge production and transmission, resource management, or legislation. Keller (2011) suggests that researchers often analyse their data by seeking the presence of discourses in the text or speech that have already been assumed to exist. This leads to a rather reductionist ‘confirmation’ of their presence and can leave little room for surprising results or new understandings. In order to overcome this tendency, as many different interpretations as possible were considered then, through a process of elimination, convincing patterns emerged in which discourses could be identified based on a collection of comparable statements.

Keller’s (2011) approach to discourse analysis, which seeks to bridge the gap between macro and micro analysis by combining Foucault’s concepts relating to discourse as power/knowledge, and Berger and Luckmann’s social constructivist approach to the sociology of knowledge, seemed appropriate. Keller’s approach differs from other theoretical approaches to discourse in that it seeks to combine theory and method by going “from social processes of production and circulation of knowledge

through symbolic structures and back, to the orientation and practices of actors in historical worlds of knowledge and meaning” (Keller, 2011: unpaginated).

Analysing interview data requires care and thought. Gilbert & Mulkay (1984:2 cited in Talja, 1999:461) claim, “not only do different actors tell different stories, but over an entire interview, it is often exceedingly difficult to reconstruct or summarize the views of one participant, because each actor has many different voices”. The context-dependent nature and cultural logic of answers to interview questions can often be missed as researchers seek to summarize interview data and find consistency. Talja (1999:462) argues that “consistency is an achievement of the researcher rather than a feature of the participant’s discourse”. I attempted to overcome this problem by emailing the interview transcripts to participants with specific sections highlighted as being of interest, and participants were then asked to pay particular attention to reviewing those sections for clarification. In this way participants were given the opportunity to change or delete any data they felt could be misinterpreted.

Other information was gained from textual sources such as: renowned scholarship on Māori history and culture; legislation; Waitangi Tribunal reports; iwi submissions on resource consent applications; iwi natural resource management plans; regional and district council plans; and critical scholarship on the legislation relevant to this study. Interview data was then triangulated with these sources in order to further illuminate the research themes mentioned above. Triangulation as a research method is also not without its critics. For example, Winchester (1999:63, cited in Crang, 2002:652) “casts doubt on the popular response of using the triangulation of different methods – worrying that the complementarity may be illusory rather than real, and, more fundamentally, raising concerns that rigour is being equated with an empirical realist, objectivist generalizability”.

Whilst I agree with Winchester’s concern that attempts to increase rigour in *particular ways* within social science may undermine the reflexive turn that has allowed multiple subjectivities to be acknowledged, I disagree with her concern that complementarity of methods may be illusory rather than real. Certainly different methods produce different types of knowledge. However, if we accept that there are multiple, sometimes contradictory, ways in which an object may be ‘known’, and that nothing can ever be ‘fully known’, then triangulating different research methods surely allows a broader view than the use of a single method alone. Furthermore, triangulation may mitigate some of the effects that my positionality may have had on the research. The following section describes my positionality, and my attempts to overcome the limitations that it posed, drawing on insights from Kaupapa Māori scholarship.

My Positionality

My thesis grew from my interest and contacts made during a summer research project that contributed to the eventual designation of the AMIDSR. I am therefore an *insider*, in a small way, in relation to the AMIDSR. Or, using the terminology of ANT, I am an *actor* who was recruited within the

AMIDSR network. I am aware that this position impacts upon my desire to be seen as impartial or objective and gives me a conflicted sense of loyalty and obligation. Nonetheless, ANT allows me to explore my own positionality for the *associations* that developed from it within this research.

Furthermore, during the recruitment and interview process, I found myself also being recruited by my participants to act within *different* networks, for different purposes. This will be explained further in Chapters 3, 4 and 5. However, what is clear is that I became an active participant within the very associations and networks I was trying to trace and understand from the *outside*. Therefore, clearly I have affected my research just as my research has affected me. For example, my positionality affected the kinds of knowledge that my participants were willing to share with me. Being an *outsider* to Kāi Tahu networks, certain details of *tātai aroraki*, that which are guarded as sacred within whanau and hapū, were not shared with me. I also did not have sufficient time to deepen the relationship of trust between myself, my contacts and participants, which is something that would have developed more quickly had I been an *insider*. My topic also piqued interest from some participants in particular ways that they saw as being useful to their own interests, and as a result their participation and the information they shared with me appeared somewhat strategic. I believe this to be an example of the messy entanglements of research and the social collective that are described by Latour (1999) and Callon (1986).

In contrast to being an *insider* within the AMIDSR network, as a Pākehā/European New Zealander I am inescapably an *outsider* in relation to my Māori participants. Trying to find a common ground on which to build a relationship of trust and integrity with my participants forced me to examine my own identity and confront the uncomfortable truths of our nation's history. The more contact I had with my participants, the more I was confronted with the recognition that my ethnicity connects me to early European settlers, the colonizers, who profoundly contributed to the legacy of cultural and material loss suffered by Māori. Inquiring about their cultural knowledge and practices felt uncomfortably intrusive to me at times, and on one occasion the potential for an interview to become fraught with tension was almost palpable.

Māori have suffered before from culturally insensitive scholarship, the kind that perpetuates colonial relationships, dominates, or misrepresents Māori and their cultural knowledge. As Tuhiwai Smith (1999:1) says, "'research' is probably one of the dirtiest words in the indigenous world's vocabulary". Therefore, the politics of my positionality loomed larger in this project than perhaps would have been the case had I not been engaged in cross-cultural research. Kaupapa Māori scholarship provided some principles and guidelines that were instructive in showing ways that non-Māori researchers, such as myself, might avoid constructing (re)colonizing knowledge.

Towards A Kaupapa Māori Approach to Research

Since the 1980s the public sector in Aotearoa has become increasingly bicultural with the promotion of Māori language and culture recognized as an important factor in improving race relations and reducing socio-economic and educational inequalities between Māori and Pākehā (Wheen and Hayward, 2012). McClean et al. (1997:9) however, suggest that a discourse of biculturalism has joined, rather than superceded, the assimilationist and integrationist ideas of earlier decades and “has tended to reinforce the hierarchies of the colonial Māori/Pākehā binary”. Tuhiwai Smith (1999) also suggests that despite significant progress within academia brought about by critical theories, such as the body of scholarship known as Postcolonial Theory, research methodologies in Aotearoa still largely continue to be based on Pākehā values. In seeking to find a “decolonizing” methodology, I found McClean, et al (1997) had useful practical advice. They used the metaphor of “crossing borders” when arguing for the development of a “responsible geography” with the potential for “(re)forming the relations of social scientific research in Aotearoa” (McClean, et al, 1997:9).

My first visit to the Arowhenua Marae, as part of the 2010/2011 summer research project, was an essential part of *crossing borders* in order to build a relationship with Arowhenua. The act itself was physical, but the weight of its symbolism was tangible to me as I had never visited a Marae before and I was doing so alone. A second visit, this time with two of my thesis supervisors, afforded another opportunity to meet people and build relationships. On that particular visit I became acutely aware of the very different experiences that Māori and Pākehā have of our nation’s history, and indeed the present. Portraits of people from generations of Arowhenua who have passed away lined the walls along with exquisite examples of craftwork. A beautiful large piece of pounamu/greenstone that was gifted to the marae upon the signing of the Kāi Tahu Claims Settlement Act 1996 sat proudly near the stage. The whare/meeting house seemed tangibly filled with a proud history. The hospitality I experienced on the Marae was very warm and generous. Although the marae was foreign territory to me, the visit(s) were a necessary step toward crossing cultural boundaries and meeting (potential) Māori participants on *their* terms, in *their* place, where *their* language and culture dominates.

Reading Newman (2011) and Coates (2008) I became aware that hierarchies of respect between Māori themselves are sometimes constructed around whether or not one speaks Te Reo/Māori language, or has a strong association with their Marae and knowledge of tikaka/custom. This awareness only reinforced my feeling of being an *outsider* and increased my sense of its permanency. Bridging this cultural divide on an individual level, without disregarding its power and collective pain, became my priority. McClean et al (1997:10) suggest that the process of “building structures” to guide the research should be collaborative. For example, a Kaupapa Māori approach, which privileges Māori values, is recommended along with “face-to-face contact between the researcher and the participants, who together in collaboration negotiate the research process” (McClean, et al, 1997:10).

My intention was to discuss these issues with my participants so that together we could come to agreement about the purpose and shape of the project, and intellectual property rights. For example, some scholars who have conducted cross-cultural research with Māori have agreed to allow the ownership of the research, and control over access to it, to remain within iwi hands as an acknowledgement of whose knowledge the research was based upon (Bishop, 1998). Others have negotiated with their Māori participants to ensure that their project creates reciprocal benefits for both the researcher and the iwi as a whole (Bishop, 1998). Unfortunately my inexperience in cross-cultural research prevented me from explicitly creating such a collaborative framework. Due to these shortcomings, I cannot claim to have used a Kaupapa Māori research method, but my research approach has been *informed* by Kaupapa Māori scholarship. Nevertheless, the principle of reciprocity was discussed with one participant who was satisfied that my project would, in some way, 'give back' to the iwi by generating discussion and revitalising interest in Tātai Aroraki.

Kaupapa Māori as theory and practice has been heavily influenced by Post-colonial Theory and is popular for "its ability to both acknowledge and accommodate Māori ways of being within an approach that remains academically rigorous" (Mahuika, 2008:2). It has an emancipatory potential. Mahuika (2008:4) claims that "inherent in this approach is an understanding that Māori have fundamentally different ways of seeing and thinking about the world and simply wish to be able to live in accordance with that specific and unique identity". It seeks to "challenge and disrupt the commonly accepted forms of research in order to privilege our own [Māori] unique approaches and perspectives, our own [Māori] ways of knowing and being" (Mahuika, 2008:4).

Many Kaupapa Māori scholars argue that this approach is intended for use by Māori researchers, and some understandably suggest that it is inappropriate for non-Māori researchers to undertake Māori research at all (Tuhiwai Smith, 1999). The assumption is that non-Māori researchers, who have little or no knowledge of tikaka or te reo, do not share the same worldview, values, or colonial experience as Māori, and cannot therefore fully understand the nuanced meanings behind what Māori research participants may say or do. The resultant research report or publication is therefore more likely to perpetuate non-Māori values and interests. Mahuika (2008) acknowledges that many Māori researchers also have little knowledge of tikaka or te reo. Similarly, Māori researchers who whakapapa to a different iwi may find that their different tikaka affects the way they interpret certain practices, and being from a different iwi can also impact on what participants may feel comfortable about sharing with them (Mahuika, 2008).

Had I realized the implications of cross-cultural research before embarking on this thesis I may have structured my topic in a different way. I may also have been able to adopt a Kaupapa Māori approach more confidently from the outset rather than apply the accumulated insights retrospectively. However, I have more than trebled my knowledge and appreciation of te reo and tikaka Māori during the process and formed relationships with Māori that I may not have otherwise had the opportunity to

meet. For these reasons, I feel it is important for Pākehā researchers like me to be informed by a Kaupapa Māori approach to research rather than shy away from Māori research altogether. Māori have been forced to adapt to Pākehā ways of being and knowing for the past two hundred years. In this more culturally 'enlightened' millennium it is time that Pākehā learned to engage with Māori on the basis of Kaupapa Māori values. Although it does have its critics, most notably for potentially homogenising Māori culture, Kaupapa Māori is arguably the best approach available to researchers in Aotearoa who seek to avoid reinscribing colonial relations (Mahuika, 2008). Likewise ANT, due to its similarity with the concept of whakapapa, seemed the most appropriate framework for my research. My deliberate use of the Kāi Tahu dialect throughout this thesis is intended to highlight iwi differences in knowledge and tradition, to promote its preservation, and demonstrate respect for my Kāi Tahu participants.

For the purpose of discussing the connections between nature, culture, knowledge, and law in the location of the AMIDSR, I have chosen to focus on the following human actors whom I interviewed:

David Higgins – Upoko and Kaumātua from Moeraki; grandfather; previous positions include Arowhenua member of the Ngāi Tahu Māori Trust Board; Executive Chairman of Ngāi Tahu Fisheries Company; Canterbury Conservancy's Pou Kura Taiao for Te Papa Atawhai/Conservation Department. I met David at his home in Christchurch after being introduced to him by my supervisor Dr Garth Cant via email. David now lives at Moeraki.

John Wilkie – Kaumātua from Waihao; Regional Water Management Committee member and Zone Water Management Committee member (Upper Waitaki) for the Canterbury Water Management Strategy; Waihao representative in Tuia (agreement between Te Rūnanga o Ngāi Tahu and Environment Canterbury); grandfather. I first met John during my second visit to the Arowhenua Marae where he spoke to a small group of students (of whom I was a member) about resource management issues within the rohe.

Robert Kenneth (Ken) McAnergney – Kaumātua from Waitaha; Manager, Airport Planning, Christchurch International Airport; grandfather. I first met Ken at the Third International Starlight Conference at Lake Tekapo in 2012. After my second visit to Arowhenua Marae, an esteemed kuia there recommended I speak with Ken. Hon. Margaret Austin had contacted Ken, through the same kuia, during her work in establishing the AMIDSR and Ken continues to be involved with the reserve.

Dr Pauline Harris – of Rongomaiwahine and Ngāti Kahungunu descent with close familial ties with Kāi Tahu; Post Doctoral Fellow at Victoria University/Te Whare Wananga o te Upoko o te Ika e Maui researching astrophysics and Māori astronomical star lore; member of the Society of Māori Astronomical Research and Traditions; mother. I first met Pauline while working on the Starlight Reserve studentship in 2010 and again at the Third International Starlight Conference at Lake Tekapo in 2012. She later accompanied me on a trip to meet with John Wilkie and an Upoko from Arowhenua.

Summary

This chapter has described my chosen theoretical framework of Actor-Network Theory, and another approach that seemed appropriate and important in both practical and ethical terms – Kaupapa Māori. Both of these, I believe, have enabled me to overcome some of the difficulties associated with researching this topic and provided culturally sensitive tools of analysis. For example, ANT was useful in deconstructing binaries, such as Māori and Pākehā, nature and culture, and using this in conjunction with insights from Kaupapa Māori, I hope to have avoided simply reinscribing colonial relations and Pākehā values. Similarities between ANT and the Māori worldview based on the concept of whakapapa also help to mitigate these potential research problems.

The insights that Postcolonial Theory and Foucault's work may offer this project were also briefly outlined, as well as the method of data collection and analysis. I have described my positionality within this project and the ways in which my choice of methodology was influenced by my endeavours to overcome the challenges that it posed. I believe that the use of ANT, informed by Kaupapa Māori insights, is appropriate for engaging with the complexity of my research topic and my own subjectivities within it.

My status as a novice researcher is likely to have limited my success in attempting to overcome some of the perceived weaknesses in qualitative research methods. Further research involving a greater number of participants and more in-depth, targeted interviews may provide more robust conclusions. The depth of trust and understanding that is required for successful cross-cultural research can only develop over time through relationship-building. Unfortunately, time is a luxury that Masters students seldom have, and I regret that this weakness may be reflected in my work. Previously I had only had academic exposure to Kaupapa Māori research methods and Postcolonial Theory and my understanding has now been enriched by *experiencing* the challenges that my research raised for me. I can very much relate to what John Wilkie says (in Chapter 4, page 62), that unless you “walk the talk” you may fail to understand the fullness of the lesson.

The following chapters present a discussion of the results of my research by tracing the networked associations of human and non-human *actors* through the interview and textual data.

Chapter 3: Starlight as a Cultural Resource

Introduction

This chapter discusses starlight as an intangible cultural resource. The Resource Management Act 1991 (RMA) aims to recognise and provide for “the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and *other taonga*” (Resource Management Act 1991, Pt2, S6(e), emphasis added). Taoka may be translated as tangible or intangible treasure (Wai 11, 1986). Henare (1988:26) defined taoka as being important to mana Māori/Māori wellbeing as taoka are considered to “have meaning at both a physical and spiritual level”, and are inherited from past generations. Previous Waitangi Tribunal decisions have acknowledged that te reo/Māori language, and cultural knowledge (particularly traditional environmental knowledge) are forms of taoka that Article Two of the Treaty of Waitangi promised to protect (Wai 11, 1986; Wai 262, 2011).

The stars and constellations are at the centre of Māori cosmology and creation stories. Just as the Big Bang Theory is passed on within educational institutions and televised nature documentaries founded upon the Western scientific worldview, so too are Māori creation stories passed on within a cultural context. Both traditions claim that all life began with activity in the heavens and this belief forms the basis for understanding our environment and our place within it. The importance of cosmology is described by Taonui, (2006:24) as “the most sacred of all traditions” due to its fundamental role in structuring other knowledge and experience. Tātai aroraki includes cosmology and creation stories and is a body of traditional environmental knowledge that may be considered taoka. Furthermore, Māori trace their whakapapa back to the celestial atua they consider to be ancestors to the human race. Therefore, protecting the visibility of starlight would protect two forms of taoka; the body of traditional environmental knowledge relating to tātai aroraki, and the relationship of Māori to their ancestors.

Starlight, Cosmology and Whakapapa

Māori cosmology bears similarities with other Polynesian cosmologies as cultural knowledge was shaped by migrations and contact with other groups before their arrival in Aotearoa (Anderson, 2009). While there are some iwi differences in cosmology, there are also many thematic similarities (Henare, 1988; Harris, pers. comm., 2012). According to Leather and Hall (2004) there are ten myth cycles or eras that place different creation events within their contexts. The names of celestial features may change according to which myth cycle and creation event is being referred to. Therefore, the myth cycles are a way of structuring information and placing it within its correct context (Leather & Hall, 2004). The separation of Rakinui/sky father and Papatuanuku/earth mother is considered one of the major celestial events that set in motion other creation events that would culminate in the creation of all life on Earth,

including the human race. Figure 3.1 below illustrates one version of the genealogical connection between the celestial ancestors and humans.

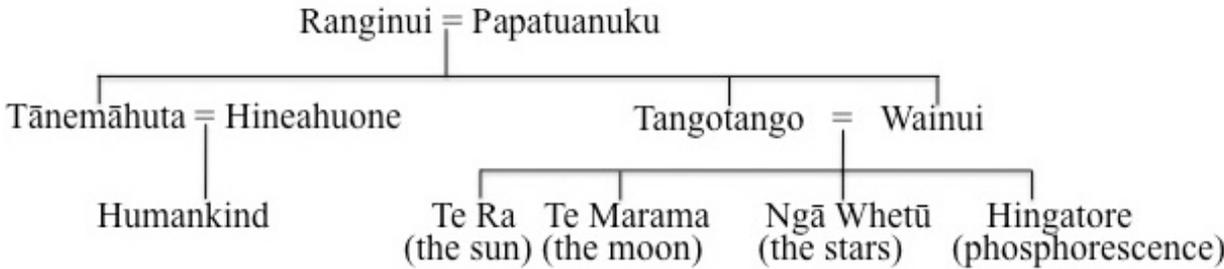


Figure 3.1: *The Relationship Between Humans and the Celestial Objects* (Harris, 2012).

Within Māori creation stories the celestial and terrestrial realms are interconnected, and this point may be further illustrated by the Kāi Tahu legend of Aoraki/Mt Cook. In Kāi Tahu cosmology, Aoraki was the eldest of four sons of Rakinui:

We know that it was Aoraki, along with his brothers, who brought his great waka down from the heavens in order to visit their step-mother, Papatūānuku. When attempting to return to the heavens some time later, Aoraki misquoted his karakia and the canoe fell back into the water and turned over onto its side. As the brothers moved on to the back of the overturned canoe they turned to stone, and they remain there today as the principal mountains in the Southern Alps, with Aoraki being the highest. It is for this reason that Ngāi Tahu knows Te Waipounamu as 'Te Waka o Aoraki' (Aoraki - Te Rūnanga o Ngāi Tahu, 1996).

The above story connects the celestial atua (Rakinui) with the terrestrial atua (Aoraki) in the form of a mountain. Aoraki is considered by Kāi Tahu as the most sacred of ancestors. Whakapapa stems from such creation stories and, according to Henare (1988:11), is a “direct link with nga atua: supernatural powers. Many whakapapa connect the membership to atua. It is said, that from the atua came the ancestors”. For Kāi Tahu, maintaining the view of Aoraki is an important aspect of maintaining a relationship with their esteemed ancestor. A Cultural Impact Assessment undertaken regarding a proposed change to the Mackenzie District Plan highlights this:

The visual catchments and view shafts between the southern shores of the lakes and the mountains in the north were particularly important to Ngāi Tahu for the purpose of maintaining relationships with those places (Boffa Miskell Limited, et. at, 2008:33)

According to my participants, maintaining the visibility of the stars would similarly help maintain the relationship that Kāi Tahu have with their celestial ancestors. However, the cultural connection that Kāi Tahu has with the stars belongs not only to the distant cosmological past. Ken explains how the stars are associated with the whole cycle of life:

The stars, the moon, the planets, their clarity, their brightness, their appearance, their locations, were all intimately linked and tied to life, and we say that we return to the stars at the end of our life, at the end of the tangi you knock on the end of the coffin, call the special words, then

the Wairua of the departed goes to join the ancestors in the big shoal of inanga, as I call it, the Milky Way. So you go back to where you came from, it's a concept.

Starlight visibility is therefore important for protecting the intangible taoka of tātai aroraki as a body of knowledge, *and for maintaining a relationship* with important ancestors and atua. Furthermore, protecting such values as traditional knowledge and relationships with the natural world would directly contribute to cultural wellbeing – one of the primary purposes of the RMA.

Knowledge Reclamation, Cultural Revitalisation and Wellbeing

Conversely, the *loss* of starlight visibility would negatively affect the cultural wellbeing of Māori in two ways; by reducing opportunities to reclaim tātai aroraki, and by causing an imbalance in the natural environment. This is clearly described by Pauline:

If the stars were no longer visible you could project that there would be less of a chance of reclamation of the star knowledge if the stars aren't there. But in terms of fundamental belief within an idealized Māori belief system, that would cause imbalance in the world. I think it's implicit in terms of if there's an imbalance with nature then we will become unwell.

Pauline elaborates further on the connection between the wellbeing of the natural environment and human wellbeing:

if there's an imbalance of not being able to see the stars then that will affect everything else, and particularly up in the North, because I just don't know anything about the South, but they talk about how the stars are relevant to the health and wellbeing of the body, and that stars relate to different points on the body for health....If we couldn't see the stars I think that would be significantly detrimental to the health and wellbeing of the community really.

The book *Whispers of Waitaha* (Ruka Te Korako & Ruka Te Korako, 2006)² contains numerous references to the ways in which the moon and stars are believed to affect the human body. For example, it claims that Waitaha believed that the moon affects the water in the body much as it does the ocean tides, causing either an increase or decrease of energy. Therefore healers would take note of the phases of the moon and “at the optimum times of the effects of the moon on some of the

² There is some controversy surrounding the books *Song of Waitaha* and *Whispers of Waitaha* based on debate over the authenticity of their content. Kāi Tahu, originally supportive of the project of collating and recording Waitaha stories, withdrew their support amidst growing concern over the authenticity of the informants and integrity of historical accounts (Tau, 1995). O'Regan (1992) believes the books to be an assertion of manawhenua by a small but subversive group within Kāi Tahu Whānui called the *Ancient Nation of Waitaha*. His expressed concern (written at a time when Kāi Tahu were working through the Treaty claims process with the Crown), was that these assertions may, intentionally or otherwise, have the effect of undermining Kāi Tahu's position under the Treaty of Waitangi. O'Regan (1992) and others (King, 2003; Howe, 2003; Anderson, 1997; Tau, 1995), claim that the books misrepresent and even fabricate South Island Māori history. However, it is not within the scope of this thesis to enter this debate, merely to inform the reader that serious debate exists over the historical and cultural accuracy of these books. My academic interest in the Waitaha-Kāi Tahu debate is derived simply from examining how traditional environmental knowledge is being revitalised through the RMA process and how this relates to cultural wellbeing. It should also be noted that aside from claiming Waitaha whakapapa, and referring to his desire to strengthen Waitaha identity, at no point in my interview with Ken did he *explicitly* claim to be a member of the *Ancient Nation of Waitaha* movement.

patients...special medicines were gathered and prepared for use only on these times of critical power of the moon” (Ruka Te Korako & Ruka Te Korako, 2006:284). Knowledge of the stars was considered an important life-skill; “now moko, you must learn the rituals and concepts of the stars and all of the things that help us move in and around the world that we understand” (Ruka Te Korako & Ruka Te Korako, 2006:189). The Māori worldview understands all things in the universe to be interconnected, therefore the loss of a natural and cultural resource such as starlight would be perceived as an imbalance in the environment, as Pauline suggested. Additionally, reduced starlight visibility may reduce opportunities for those who hold knowledge of tātai aroraki to transmit it to the next generation.

The loss of traditional knowledge is known to have a negative effect on the cultural identity of subsequent generations (Jackson, 2004; Hingangaroa Smith, 2000). Henare (1988) suggests that cultural identity is important to cultural wellbeing. Sadly the complex processes of colonization have already affected the traditional knowledge of Māori. Harris (2012:2) describes the decline of tātai aroraki:

Māori suffered due to the arrival of foreign settlers, introduced diseases, land alienation, war, displacement and a dedicated policy of assimilation...[and] urbanisation of the Māori population increased cultural debasement, and saw a decline in the number of Māori language speakers, and Māori knowledge experts. Many tribal groups lost significant and unique aspects of their culture, and part of this overall decline included Māori astronomy.

One piece of assimilative legislation that was particularly devastating for the transmission of cultural knowledge was The Tohunga Suppression Act 1907. Aimed at preventing the dangerous use of traditional medicines by fraudulent tohuka, the Act was introduced and supported by Māori MPs (Wai 262, 2011). Unfortunately, the effects of the Act were widely felt as it not only discouraged fraudulent tohuka from practicing, but “tohunga throughout the country declined to pass on oral traditions, leaving Māori society bereft of a vast range of traditional and customary knowledge” (Maxwell, 2012:9). Because the Act was intended to replace traditional healers with modern medicine and characterize their knowledge as bogus superstition rather than wisdom, it can be considered a *mediator* (Latour, 2005). It was an attempt to *interrupt* traditional knowledge transmission and *change* the nature of Māori knowledge. It effectively changed the actions of many tohuka who took their knowledge to the grave rather than risk prosecution. Stack, Best and Beattie’s informants who were willing to share their knowledge were greatly sought after by ethnographers as the true effects of the Act became understood. For example, Beattie (1939:159) describes the general opinion concerning the death of his informant Teone (Hōne) Taare Tikao in 1927, only twenty years after the Act was passed:

He is gone, and his knowledge of Māori folk lore and of the South Island Māoris’ history has all gone with him, for there was certain knowledge which the old members of the race could not impart to the present Europeanised Māori, according to their laws.

The Act was eventually repealed in 1962 but much of tātai aroraki had been lost due to the influence of the Act on knowledge transmission. David tells of the effects of the Act on Kāi Tahu and Waitaha in the Rūnaka of Moeraki, Waihao and Arowhenua:

it had a huge effect on our people and when Tiramorehu, himself of Moeraki, when he moved towards Christianity he took a lot of the other chiefs with him because he was the, I guess the receptacle of most of the knowledge, particularly the Kāi Tahu knowledge of that time, whereas Te Maiharoa and the others having more linkage to Waitaha. So the Tohunga Suppression Act really had a huge effect on Waitaha.

While acknowledging the impact of the Act on Waitaha knowledge, Ken believes that some of it remains intact due to the continuity of the wānanga system:

whilst we may be on the cusp of losing a lot of our teachers, there are enough of us who have attended Waitaha wānanga to have a store of information that is important to the future of our people in these islands, and by 'our people' I mean everybody because we are now sharing.

Since the 1970s, when concern over the loss of cultural knowledge, and te reo/Māori language reached its fullest expression, there has been a strong movement towards cultural revitalisation. An important part of this process has been knowledge reclamation; the active seeking out of remaining cultural experts, recording or creating opportunities for the transmission of that knowledge to others, and filling in the blanks by tracing the whakapapa (so to speak) of knowledge to other Polynesian cultures that have historical connections of knowledge exchange with Māori. Pauline Harris is the Chairperson of the *Society of Māori Astronomy Research and Traditions* (SMART), a non-profit organisation dedicated to the collation, preservation and revitalisation of tātai aroraki. A crucial difference between SMART and Best, Beattie and Stack (that Pauline pointed out) is that SMART is:

reclaiming the knowledge, reclaiming the identity, reclaiming the right to obtain that knowledge *ourselves* instead of other people doing it.

The motivation is deeply personal and reflects the emotional legacy of colonisation:

I'm really worried that other people are going to take our knowledge and write it up and make it their own. Ethnographers have done that, and anthropologists have traditionally done that, so when we have our own capacity and we can do it ourselves within a cultural context of knowing how things work, it's actually quite different, and the reasons why we do it are really different. For me, it's like a calling. (Pauline)

Since the introduction of written script to Māori in the late 18th century, some traditional knowledge has been kept in manuscript form and passed down within families. Not all traditional knowledge has been recorded in written form however, and much of the higher (sacred) knowledge continues to be carefully guarded and passed on orally. Pauline is hopeful that SMART's methodology, based on the Kaupapa Māori approach, will make a positive difference in their project:

I think we're in a better condition than the Hawaiians, just in terms of catalogue size, like how many star names they have and how many we have, but a lot of our stuff is still locked up in manuscripts and in people. A crucial part of our work is that the people who hold the knowledge will have the decision about how the knowledge will be used and who the

knowledge will be given to. Some don't want anything written down but some do want it recorded.

A different approach to knowledge reclamation, practiced by Ken and some others from Waitaha, is to exploit opportunities to have traditional knowledge recorded within government institutions, such as the Environment Court:

what has happened in the last few years is there has been an opportunity for Waitaha people with knowledge to air it publically in the Environment Court and in Council hearings...So we now have, in several instances, a track record if you like, of evidence which is based on our ancient knowledge of cause and effect, and we take great care about what we say and what we publish.
(Ken)

The potential effect of this for Waitaha may be three-fold: traditional knowledge is recorded in public documents making it available to future generations; traditional knowledge is further legitimized within a predominantly Pākehā system; and the identity of Waitaha is strengthened. Ken explains further:

we say it in a way that we know that is going to be recorded as having been given under oath, and we believe that protects our information and puts it out there. In many cases that information that we put out is new to everybody....I for my part, would like to see Waitaha have its own identity in Te Waipounamu, in the lower South Island....We are from time to time prepared to go and stand before Councils and speak our minds and tell our knowledge.

In a sense, what Ken and others are doing is *punctualizing* their traditional knowledge by having it recorded in official documents (Latour, 2005). It becomes legitimized in the Pākehā system through the perceived accuracy, permanency and high status of official records so becomes *black-boxed* and less open to interrogation or change. In this way official records help to preserve the knowledge. What all of my participants are clearly passionate about is arresting the decline of traditional knowledge. More than this, they intend to *strengthen* what knowledge remains in order to support cultural revitalisation.

Aside from the continuing effects of colonisation, environmental change is another threat to traditional ecological knowledge. David points out the subtle effects that environmental change, such as the loss of starlight visibility, can have on cultural forms:

in Alaska, in those isolated areas where they have traditional hunting grounds...when Russia was undergoing its massive industrial growth – these were modern Inuit that I was sitting with and talking to – their sky had changed as a result of the pollution, and they talked about how they would sing and chant to their gods and to the sky, and they changed their chants because they were losing half of the sky. It happened in a generation, and it was really sad to see and hear. I reflected back on what it's like here, we're just as isolated as they are.

Māori, like many indigenous peoples have lost much of their traditional knowledge and culture but, according to Pauline, are well positioned to reclaim some of their astronomical traditions. On the back of a wave of Māori cultural renaissance that began in the 1970s, interest in Māori astronomy has gained momentum over the last decade (Harris, 2012). Matariki or Māori New Year celebrations have been at the forefront of this and embraced by Pākehā as well as Māori. While this may be seen as something

positive, it is important to note that not all iwi regard the rising of Matariki to herald the New Year. Latitude affects seasonality and which stars are visible and the times of their rising and setting. For example, Kāi Kahu traditionally recognize the rising of the star Puaka/Rigel as marking the New Year and this occurs a few days *before* Matariki is seen (Christchurch City Council, 2010). If efforts are not made to reclaim *iwi-specific* tātai aroraki knowledge then nationally recognised celebrations such as Matariki may homogenise Māori astronomical practice. New Zealand is fortunate enough to have pristine dark skies over much of the country due to large areas of it being rural or uninhabited (see Figure 1.3 in Chapter 1). But just as efforts are being made to prevent the decline of tātai aroraki, we must also prevent the decline of starlight visibility which is so crucial in transmitting tātai aroraki in a meaningful context. Furthermore, as Pauline suggested above, according to the Māori worldview the loss of starlight visibility would cause an environmental imbalance which may be detrimental to community health. So, for the sake of cultural wellbeing, starlight should be actively protected by the RMA.

Topologies of Time and Space

Viewing the RMA through an Actor-Network Theory (ANT) lens we can see that the associations that can be traced from it transcend time and space, nature and culture. The RMA is not simply a piece of legislation. It is an *assemblage of actors, actants and intermediaries* that include people from two cultures (despite the increasing multicultural demography of Aotearoa), their discourses and ideologies, the natural environment, and a multitude of different technologies. Its discursive seeds were planted centuries ago in Europe and Polynesia. For example, English Property Law, which brought the concept of private property rights to Aotearoa, and the Māori concept of mauri/life force, which may be applied to assess such things as water quality, originated from distant times and places. Two cultures possessing very different worldviews came to Aotearoa, and the epistemological conflict and negotiation that ensued over the past two centuries between them has arguably produced hybrid cultures, hybrid environmental knowledge, and hybrid environmental legislation. The associations do not only trace to the past, but also to the future as the RMA aims to facilitate sustainable resource management to “meet the reasonably foreseeable needs of future generations” (Resource Management Act 1991, Pt2.5a).

Allen (2011:285) suggests that “in a topological world distance is not a good indicator of either separation or proximity; that the idea of folded landscapes is helpful in that respect because it conveys a rather abstract point about the possibility of space and time as non-metric”. Serres and Latour (1995) used the analogy of a handkerchief to illustrate how two distant points (at either end of a handkerchief) can become suddenly closer or even superimposed once the handkerchief is folded or crumpled into someone’s pocket. So, in terms of *time* and *space*, the RMA draws points from the past, present and future closer together, and condenses the geographic space between the historic birthplaces of our two cultures from whence came the discourses and ideologies that underpin the Act.

In addition, the character of certain sections, and some amendments, has clearly been influenced by conflicts between binding neoliberal trade agreements and pressure from social movements whose origins can also be found in the Northern Hemisphere. For example, Grundy and Gleeson (1996:211) claim that the RMA was underpinned by neoliberal ideology, and that the political intent behind the legislation was to reduce the role of government and planning and encourage market processes. Furthermore, the OECD publication, *Environment and Regional Trade Agreements* (2007:29), claims that through the RMA the New Zealand government created a “framework for integrating environment standards and trade agreements” in order to “harmonise New Zealand’s objectives in trade, while recognising that environment standards should not be misused for protectionist reasons”. This illustrates that “the RMA...is an unstable hybrid of the contradictory agendas of market liberalism and environmentalism” (Grundy & Gleeson, 1996:211).

Talshir (2002) argues that environmental movements, particularly since the 1980s when global warming first gained public attention, have successfully entered mainstream politics and begun to influence policy and legislation. The civil rights movement in the United States during the 1960s influenced the Māori renaissance of the 1970s. Ideologies such as neoliberalism, and grassroots campaigns such as the environmental and civil rights movements, found local expression in Aotearoa as they were strategically enrolled by various *actors* to address local problems. Allen (2011:288) claims that, “what happens elsewhere, in far-off places, and what is drawn from the past to make the present possible, are all part of the topological equation, where presence does not have to be local, nor part of the same moment or time period, to be a link in a newly formed networked arrangement”.

Michaels and Laituri (1999:78) claim that “the emphasis on sustainable development has occurred at the same time as there has been an international renaissance with regard to indigenous knowledge”. The resulting bicultural turn within New Zealand legislation is transforming the physical, cultural and legal landscapes of this nation (Johnson, 2003). The whakapapa of the RMA therefore has connections across time, space, nature and culture.

The concept of networks and topologies has much in common with the Māori worldview. According to Roberts (2012:749), “in Māori society both space and time are subordinate to a world view in which time is not linear; the past is said to be before us, and space is not measured in terms of physical distances between things but rather in terms of their perceived genealogical relationships”. Whakapapa can consist of both living and non-living entities and cross the boundaries of nature and culture, a concept which is shared by ANT. For example, the whakapapa of the kumara, according to Roberts, et al (2004), includes a star (Vega), caterpillars, a moth and a rat, as well as other plants and vegetables. They are related by actions such as the rat’s predation on the kumara tubers and the caterpillars’ consumption of its leaves. Moreover, this whakapapa is expressed as a moral narrative involving theft, shame and punishment, which aids memorisation but also serves as a lesson to those familiar with it. Western science would not classify such heterogeneous things together, but whakapapa

reflects things that are considered important for survival so organises the necessary knowledge accordingly as 'folk taxonomies' (Roberts, 2012).

The whakapapa (or networked-associations and topologies) of the RMA are similarly heterogeneous, as explained above. Iwi Natural Resource Management Plans are included as documents to be consulted within RMA processes, and I shall now trace aspects of tātai aroraki within one of these documents through their various associations with people, technology and nature, back to the moon and stars themselves.

Celestial Bodies and Intermediaries

Although several Kāi Tahu iwi plans now exist, and the most recent one has explicit reference to tātai aroraki and mahika kai, the following discussion is focused on the most comprehensive plan which covers the Mackenzie District. Within the pages of *Te Whakatau Kaupapa: Kāi Tahu Resource Management Strategy for the Canterbury Region* (1990) are images and references to celestial objects. The whakapapa of Kāi Tahu, sung by raketira Matiaha Tiramorehu, appears in printed form on page 3.4, and naturally includes Rakinui and Papatuanuku. Three images following within the document are significant for this discussion: an illustration of the *Star Pathways in the Southern Sky* (p3.1); *Marama/the moon* (p5.41); and *Matariki/the Pleiades* (p5.43).³ The first is an illustration or a map of two hemispheres with dots and lines representing stars and their movements. It appears under the heading *The Kāi Tahu Relationship with the Environment* so it is clear that the celestial realm is part of the environment as understood by Kāi Tahu. The poor quality of the print obscures what are likely to be the names of the dots/stars. Nevertheless, the function of this image is to *represent* a part of the environmental knowledge that Kāi Tahu Whānui possess, and declare its cultural value. The document in its entirety, as well as these images, can be considered in ANT terms as an *intermediary* because it is designed to represent, in a more mobile and durable form, Kāi Tahu values and their cultural association to the Canterbury environment (land, water and sky). In tangible printed form, the *intangible* values and environmental relationships of Kāi Tahu (first published pre-internet) have been scanned and stored on the Canterbury Regional Council's website, allowing them to be accessed instantaneously by any computer in the world that has an internet connection. The knowledge of star pathways, once stored within one or more persons' memory, is now more durable than the neurons and synapses which first created and stored that information. The images of the moon and Matariki appear to be photographs. Unlike the star map, which may have originally been sketched on paper by hand, the images of these celestial objects required photographic technology to transform them into *intermediaries*. In each case,

³ My effort to find the original source of these images has proved unfruitful as they were not cited in the document and the authors no longer recall where they came from. One suggestion was that they may have been provided by an esteemed kaumātua who was connected to the project and was in the possession of a significant number of historical manuscripts and other documents.

three-dimensional moving objects have been changed by technology (pen, paper, camera, and computer) into two-dimensional static images, yet are enrolled to faithfully represent the originals.

The document was created prior to the introduction of the RMA to assist planners, politicians and resource managers in identifying the resources values and objectives of Kāi Tahu (Tau, et. al, 1990). The RMA now requires the Canterbury Regional Council to take the document into account in resource management planning. One relationship between the three images and RMA processes can be found in mahika kai. According to the RMA, “the relationship of Māori and their culture and traditions with their ancestral lands...and other taonga” are to be provided for and mahika kai combines all of these elements (Resource Management Act 1991, Pt2, s6(e)). Traditional Kāi Tahu mahika kai sites are listed within *Te Whakatau Kaupapa*, but appear in more detail within the Ngāi Tahu Claims Settlement Act 1998, which sets out the legal rights and responsibilities of iwi and landowners towards the sites. Features of the celestial realm such as the moon, Matariki, and the observed pathways of Southern stars, were a natural resource employed in mahika kai and were graphically represented within *Te Whakatau Kaupapa*, which is now enrolled within RMA processes to represent and articulate Kāi Tahu values. So far we have considered three images within one document with associations with two pieces of legislation. Associations can also be traced from these pieces of legislation to three of my participants, David, John and Ken.

John is active in resource management issues concerning Te Rūnaka o Waihao and is a member on the Upper Waitaki Zone Committee for the Canterbury Water Management Strategy. He has considerable experience of attending resource consent hearings. David was involved in the preparation of *Te Whakatau Kaupapa* and presented substantial evidence for the Kāi Tahu fisheries claim (Wai 27) to the Waitangi Tribunal. He has also presented evidence in resource consent hearings over applications to take, divert and dam water for irrigation in the upper Waitaki catchment (*Statement of Evidence of David Thomas Higgins*, 2009). Evidence was also given by Barry Brailsford and Peter Ruka on the Kāi Tahu fisheries claim (Wai 27, 1992).⁴ Brailsford and Ruka authored the books *Song of Waitaha* and *Whispers of Waitaha* respectively (see footnote 2, page 39). Ken’s mother was involved with the latter book, and the former was recommended to me by a contact at Arowhenua, who also referred me to Ken. These books may also be considered either as *intermediaries* or *mediators*, depending on whether they faithfully represent Waitaha knowledge and culture or distort and change it into something new (Latour, 2005). Either way, they have been put into circulation by *actors* to serve a purpose. Whether it is to enrol further *actors* into the politically motivated *Ancient Nation of Waitaha* or to genuinely represent and preserve Waitaha knowledge (or perhaps both), is not for me to know.

Some of the evidence before the Waitangi Tribunal recorded in the *Ngāi Tahu Report* (Wai 27,

⁴ Ruka’s evidence was later withdrawn by the Wai 27 claimant council on the grounds that much of it was taken from David Graham’s (1953) *A Treasury of New Zealand Fishes* rather than an unnamed kaumātua informant as claimed (Wai 27:48, Sea Fisheries Report).

1991) has come from written works by Beattie presented by the close relatives of his informants. According to O'Regan (1992) and Tau (n.d), much of the material that Beattie recorded can be reliably traced to sources such as family manuscripts. However, O'Regan (1992:25) makes a clear distinction between what was recorded by Beattie and what was *published* "with the encouragement and editorial assistance of Percy Smith". Tau (n.d.) also claims that errors in translation from Māori to English have been responsible for historical misinformation published by Stack, Best and Beattie, but by referring back to the original manuscripts, many such errors have since been corrected.

Nevertheless, the variety of purposes for which their work has since been employed shows the great influence that these 19th and early 20th century men have had on the preservation of Māori culture and knowledge. For example, Holman (2008:94) claims that "today, the Kaupapa Māori movement, sprung from the cultural renaissance of the 1970s has reappropriated those parts of Best's writing that fit with their guiding philosophy: 'by Māori, for Māori and (often) in Māori'". In addition, Pauline's first forays into tātai aroraki began by reading Best's works, and her passion has since found expression in SMART – and so the influence of these authors continues to widen (pers. comm., June 13, 2012). Unlike Pauline and her colleagues in SMART, Stack, Best and Beattie belonged to a generation of Pākehā who believed that Māori was a dying culture, and this belief drove their motivation to record Māori knowledge before it disappeared.

Stack (1877) also copied Māori rock drawings in the Opihi country. One possible purpose of the original cave art may have been to teach and preserve traditional knowledge, including tātai aroraki. The technology used to record knowledge has obviously advanced over time. In *Te Whakatau Kaupapa*, not only have paper and ink been enrolled in transforming an intangible mind-map of star paths, and the tangible moon and Matariki into forms capable of enduring time and distance and being strategically (re)presented, but computer and internet technology have enhanced these attributes considerably. In this sense, the document is an *intermediary* because it "transports meaning or force" without major distortion (Latour, 2005:39).

Back in the time of Best, Beattie and Stack, the written word was the most advanced way of preserving knowledge and Kāi Tahu used this technology to their advantage by recording their knowledge in manuscript form which was handed down within families. Focusing on Kāi Tahu between the late 18th and 19th centuries, Ballantyne (2011:234) provides an insightful look at "how paper itself was entangled with colonialism and its place in the transformation of indigenous knowledge traditions". He claims there is a clear link between the technology enrolled in knowledge preservation and transmission, and culture, in that "the ways in which the media that knowledge is stored in and transmitted through shapes social patterns, cultural practices, and cosmologies".

So, in terms of the kinds of technological media employed to preserve Kāi Tahu Whānui

knowledge of tātai aroraki, we can begin with O'Regan's (1992:21) comment that Waitaha "secrets have been hidden in the land, in the trees and in the stones".⁵ Waitaha, the earliest inhabitants of Te Waipounamu, are credited as the likely creators of the rock art. The media of rock and natural dye or paint were possibly used to transform celestial objects, such as the moon, Matariki and the knowledge associated with them, into *intermediaries* that would endure time. This is what Ken believes and is recorded within the pages of *Whispers of Waitaha*, the book his mother was involved with.

Then, sometime after paper and ink came print, computers and the internet. Interestingly, wireless internet employs the electromagnetic spectrum in order to transmit information. Therefore, we may say that *starlight* (in the form of radio-waves) is enrolled by contemporary Māori to preserve traditional ecological knowledge, much as the constellations themselves were enrolled by ancient Māori as memory aids during long migrations. It would also seem that RMA processes such as producing iwi plans, making submissions on resource consents, and attending council hearings and the Environment Court, are opportunities not only for iwi to voice concerns about environmental issues, but to (re)tell their history and form a "material base of knowledge storage" (Ballantyne, 2011:236).

The moon, star paths and Matariki, were transformed into two-dimensional celestial images within *Te Whakatau Kaupapa* which, aside from their decorative value, were enrolled as *intermediaries* to represent Kāi Tahu values and knowledge within Canterbury RMA processes. Their transformation required the recruitment of individuals such as Stack, Best and Beattie, their Kāi Tahu informants and their descendants, and various technologies. The motivations of each of these people were sometimes conflicting. For example, Holman (2008:94-95) claims that Best "appropriated Māori knowledge to further his own career", and his belief that Māori culture was doomed to extinction may well have been influenced, in part, by his first-hand experience of the effects of westward expansion on Native American peoples. Nevertheless, this may have motivated him to take great care in recording of Māori knowledge, therefore having a positive effect on its preservation.

Best's informants, on the other hand, held no such extinctionist beliefs. Rather, they were future-focused and motivated to share their knowledge by a desire for equality with Pākehā (Holman, 2008). Pauline and her colleagues in SMART are motivated to collate and preserve tātai aroraki by their desire for Māori to retain control over this process. As Callon (1986) suggests, each new *actor* is initially recruited into a role within a network through appeals to their self-interest. The potential *actor* must see some value or reason to participate, and then only through negotiation and agreement can the *actor's* role be defined and actions begin (Callon, 1986). *Intermediaries* and *mediators* are often enrolled in the process of persuasion and substantialising connections between *actors*. Allen (2011:289)

⁵ O'Regan (1992:21) seemed somewhat dismissive of this claim by members of the *Ancient Nation of Waitaha* as the information published in the Brailsford (1994) and Ruka (2006) books had never previously come to light.

argues that it is the substance of the connections, not the fact of them, that configures a network and directs its influence:

Mediation is not something that merely traverses the distance between 'here and there' or which links actors directly to other places and times...it also enables those physically distant in space and time to be, somewhat paradoxically, both absent and present in terms of their authority and influence.

In this sense, the mediation technologies of paper, print and the internet have enabled Stack, Best and Beattie to continue their influence in the 21st century among a generation that did not exist at the time of their writing. This is also true for the power of the scientific establishment. Arguably, these technologies also allow the moon and stars to be distant yet near, and continue to influence mahika kai actions today as they did when those elderly Kāi Tahu informants first shared their knowledge with the Pākehā authors in the late 19th century.

In the process of researching this thesis, I believe I was enrolled into knowledge preservation networks by two of my participants, Pauline and Ken. In the case of Ken, my completed thesis is a public document which has been subject to academic scrutiny and is kept in a form which is durable over time and distance. This gives it potential as an *intermediary* if it advances Waitaha identity. I am sure that Ken considered this when he agreed to my interview although we did not discuss it. In contrast, Pauline and I *did* discuss my role in her network of knowledge reclamation:

Because at the moment Māori for the last 25-35 years have been going through these periods of reclamation and revitalization and...I think they are ready for it around about now, and by you actually coming and talking to people about it, that can actually spark those memories in people and spark the motivation in people to reclaim that knowledge, which I think is interesting as well, that you actually become part of that reclamation process.

I sincerely hope that this thesis is used by others to protect starlight visibility however, as this discussion shows, documents, legislation, people, technology and the natural environment can all be enrolled within a multitude of different networks, formed for specific purposes at specific times, so long as their interests align. The effect of such networks is not always predictable as it depends on the actions of each *actor*, *intermediary* and so forth (Latour, 2005). Kāi Tahu may have invested some hope in *intermediaries* such as *Te Whakatau Kaupapa* to represent their atua, values, and preserve traditional knowledge, but there is little doubt that protecting the visibility of celestial atua in their *original* form in the night sky is important to the iwi and this will become clearer in the following chapters.

Conclusion

This chapter has considered starlight as a cultural resource important in cosmology and whakapapa traditions. These are ways of organising knowledge and understanding the universe and humankind's place within it. Celestial atua such as Rakinui are connected to the landscape of Te Waipounamu through related atua such as Aoraki and are considered ancestors to Kāi Tahu. As the tākata whenua of

the Mackenzie District their cultural identity and traditional knowledge is embedded within the landscape and skyline. Traditional knowledge, including tātai aroraki, is important for strengthening cultural identity.

An understanding of the relationship between a secure cultural identity and cultural wellbeing has informed the Māori renaissance of the 1970s, and continues to underpin knowledge reclamation efforts today. Legislation has affected traditional knowledge in a number of ways. The Tohunga Suppression Act 1907 interrupted the transmission of much traditional knowledge, but the RMA now appears to offer opportunities for preserving it. This would be consistent with the purpose of the Act which states cultural wellbeing as a desired outcome of sustainable resource management.

However, protecting starlight, the source of tātai aroraki, would positively affect cultural wellbeing in a number of ways. As Pauline suggested, starlight visibility is important for maintaining balance in the natural environment and consequently the health and wellbeing of people. Starlight visibility also ensures that there are opportunities for the transmission of tātai aroraki knowledge. Most importantly, maintaining starlight visibility allows Kāi Tahu to maintain their relationship with their ancestors. These may be considered to be intangible taoka. The following chapter considers the *tangible skills* associated with tātai aroraki that are important to mahika kai, thereby illuminating other important connections between the celestial and terrestrial realms.

Chapter 4: Starlight as a Natural Resource

Introduction

The previous chapter described how the stars have featured strongly in Māori culture over past centuries. Stack, Best and Beattie were three Pākehā authors, generally considered to have been the first to have recorded Māori Oral Traditions, including tātai aroraki, in print. Collectively they amassed a significant literary body of recollections from their (generally male) Māori informants during the late 19th and early 20th centuries. Aside from these historical literary sources, the knowledge of tātai aroraki also lives on in the minds and bodies of some contemporary Kāi Tahu. This knowledge is sometimes used in present day mahika kai activities just as it was in the past.

The Resource Management Act 1991 (RMA) aims for resource consent applicants and councils to have regard for Māori cultural land and water-based traditions such as mahika kai. The Ngāi Tahu Claims Settlement Act 1998 (NTCSA) lists the locations and species of particular interest to Kāi Tahu and states that mahika kai properly refers to “the customary gathering of food and natural materials and the places where those resources are gathered” (Ngāi Tahu Claims Settlement Act 1998, s167). Among other things, the NTCSA offers to allow opportunities for tribal members to re-establish their relationship with ancestral lands. It refers to nohoaka as providing “all Ngāi Tahu with an opportunity to experience the landscape as their tipuna did, and to rekindle the traditional practices of gathering food and other natural resources, so long an essential part of Ngāi Tahu culture” (Te Rūnanga o Ngāi Tahu, 1996). For Māori, mahika kai does not merely refer to a natural resource and its location, but the knowledge and activities involved in gathering the resource, and the journey itself (Pauline Harris, pers. comm. 2012). Tātai aroraki serves several important purposes in mahika kai such as time-keeping (on a variety of scales), navigation, and weather forecasting. Therefore the RMA could be applied to protect the visibility of the stars as part of honouring the NTCSA in providing for nohoaka and mahika kai opportunities.

My participants told me how tātai aroraki knowledge was constructed, retained across time and space, and transmitted to the next generation. It became clear that the natural environment was, and is, along with people and technology a co-producer of environmental knowledge (including tātai aroraki). Moreover, these assemblages of environmental knowledge production are nested within topologies of time and space which include actors from previous generations such as Rakaihautu, Stack, Best, Beattie and their informants, the successful Kāi Tahu Treaty Claims negotiating team, my participants, and future generations yet to come. Below is confirmation that knowledge of tātai aroraki lives, not only in books of the past, but in living bodies engaged with the natural environment and their cultural heritage.

Starlight and Mahika Kai

Most official definitions of mahika kai, such as the statutory one cited above, include the locations where resources are gathered and the resources themselves. Some definitions also include the activity or methods involved in gathering the resources (Ministry for the Environment, 2013). The most comprehensive definition I have found is within the current *Canterbury Regional Policy Statement* which states:

The term mahika kai refers to the *whole resource chain*, from mountain top to the ocean floor. It encompasses social and educational elements (e.g. intergenerational transfer of knowledge) as well as the process of food gathering. It includes the way it is gathered, the place where it is gathered, and the actual resource itself (Environment Canterbury, 2013:15 emphasis added).

This definition is compatible with my argument that the traditional ecological knowledge (or embodied cultural capital) associated with mahika kai, and the journey itself (rather than simply the location of the resource), are embedded elements of mahika kai that are inseparable from the whole resource chain. Moreover, the above definition stresses the importance of the knowledge transfer that can take place during mahika kai trips. John and David recalled journeys with their grandfathers who would impart their traditional ecological knowledge (including tātai aroraki) during the journey, not only at the destination. Williams (2010) suggests that mahika kai always involved a journey to another place, away from permanent settlements. Ancillary resources were often gathered along the way, and as a result “in many cases where mahika kai existed, the [place] names are clustered around a single focal spot or *strung along a travel route*” (Williams, 2010:158 emphasis added). Keenan (2002:247, cited in Williams, 2010:160) referred to *resource trails* as being “a mix of actual seasonal trips and recollections of places along a route”. David suggested that a combination of landmarks and star positions were traditionally used to safely navigate from the coast through the high-country passes to the Mackenzie basin during seasonal mahika kai trips. I argue that the celestial bodies and tātai aroraki are part of the whole mahika kai resource chain alluded to in the *Canterbury Regional Policy Statement*.

Furthermore, Prebble and Mules (2004:53, quoted in Williams, 2010:151) suggest that mahika kai “is more significantly a mechanism for acculturating the landscape, as a Māori landscape”. This, presumably, involves the imparting of *embodied cultural capital* from one generation to the next, something which takes place on the journey and in the activity of mahika kai (Bourdieu, 1986). Salmond (1982, cited in Roberts, 2012) claims that knowledge and power are *talked into* physical objects and landscapes, and fixed there by name. The significance of the journey and the stories told to the younger generation is conveyed by Roberts (2012:747 emphasis added); “children were taught particular accounts *in the place to which that knowledge belonged*, so that the past is made present and space-time distances are collapsed”. Therefore, the knowledge and the land and sky-scapes are essential elements of the mahika kai journey. In a discussion of place-based notions of wellbeing, Panelli and Tipa

(2007:455) explain that Māori living within their rohe may be culturally, physically, and spiritually sustained by their interconnection with the people and the natural environment. Mahika kai is a crucial part of that interconnectedness and cannot simply be reduced to 'location, resource and activity' as if these had no greater meaning. Durie (2004) recognises that a secure cultural identity is an important element of Māori wellbeing. The development and maintenance of a strong cultural identity is as equally important to cultural wellbeing as are the economic benefits of mahika kai (Henare, 1998). Interestingly, Durie (2004) uses Te Pae Mahutonga/the Southern Cross to conceptualise the fundamental components of health promotion which begins with a secure cultural identity.

In centuries past, the Mackenzie basin and its lakes were abundant with birdlife and eels; "such was the reputation of Takapo as a mahika kai that people came from as far away as Kaiapoi, several hundred kilometers to the north, to trade for food" (Mikaere, 1998:75). As Ken suggests in Chapter 5, sound environmental knowledge was essential to the survival of the tipuna/ancestors of Arowhenua, Moeraki and Waihao hapū as they travelled to their high-country seasonal camps from the coast. Whilst the role of astronomy in Polynesian oceanic navigation is well documented, David claims that it was also essential for terrestrial navigation *within* Aotearoa:

My understanding is that some of the people who travelled inland, and that was all of our families for their seasonal gathering and hunting expeditions, utilized the stars at night to guide them to mountain passes and to areas where they had to cut through from one group of foothills to find the access ways...so I know they used to use them for navigation, as a tool, a pretty practical tool actually, to follow a particular star or a group of stars and make sure they kept that star in front of them.

Not only did the stars guide the *direction* to take on a mahika kai journey, but they also signalled *when* to go. This knowledge lives on among Kāi Tahu who have a customary association with the area:

It involves the alignment of certain stars and that's the seasonal thing, that's when you go birding, and when the stars are in a different celestial position, you know, it all revolves around that. It also tells you at certain times what sort of fish you're going to catch in the sea when you go, and when the crayfish are on the march, and the groper are in the right place, it all revolves around the celestial bodies.

This is consistent with the recollections of Best's (1929) informants, and evidence given half a century later by members of Kāi Tahu to the Waitangi Tribunal (Wai 27, 1991), demonstrating the endurance of this knowledge over time. John agreed with Ken, suggesting that the stars played an essential role in surviving the extreme weather conditions of the southern South Island and that due to this important role tātai aroraki may still be relatively strong in the South:

I think when you go down to Hokinui and Murihiku and Aparima, they're all pretty up there with their [star] knowledge because most of them whakapapa to the fisheries so they need that knowledge. Especially the guys down south with the weather patterns down there, they'd need signs for when to go and when not to go.

Although general knowledge of the Māori moon calendar, or "nights of the moon" has been recorded by Best (1929) and others (Beattie, 1995; Williams, 1929), more nuanced and tacit knowledge of the

celestial realm may be more likely to have been passed on in oral tradition within families. For example, the positions of stars, constellations or the moon dictate the seasons, but their clarity to the eye is an important indicator of the weather:

well it [the sharpness or clarity of the stars] tells you what's happening in the atmospheric pressure, once again that only comes with being out there, doing it, living it. Like the ring around the moon or the sun can be weather indicators, they've all got their own meanings, some of them are spiritual, and others are to do with the weather. (John)

Despite the historical importance of this knowledge for survival, John believes that within his hapū the number of people who still retain knowledge of tātai aroraki is likely to be low. As he explained, "there's one or two about but they're few and far between nowadays". David however feels that tātai aroraki may still be strong within particular families associated with the area of the Aoraki Mackenzie International Dark Sky Reserve (AMIDSR):

for those three particular marae, because I'd have to say that the Kāti Huirapa people of Arowhenua, the Kāti Hateatea people of Waihao and Moeraki are those who hold that knowledge that has been passed down from generation to generation. There's good reason for it, those groupings of families are connected by whakapapa to those marae in those areas and are the descendants of those original tohuka that held that knowledge and who taught that knowledge, Te Maiharoa, Te Mamaku, Rawiri Te Maire, those whakatira were those who passed the knowledge on in the old ways.

It is certainly evident through the writings of Best and Beattie that the famed tohuka Hipa Te Maiharoa had some knowledge of tātai aroraki, and that he may have passed that knowledge on to his son Taare. Taare Te Maiharoa was one of Beattie's informants from Arowhenua. Beattie recorded that "when he [Taare]...was a lad at Temuka he had seen his father put sticks in the ground, and observe the stars" (Beattie cited in Best, 1922a:31). David, John and Ken themselves all possess remnants of tātai aroraki but do not profess to be experts. What they remember however, that which has not been dulled by a modern reliance on technology, are practical aspects as they relate to mahika kai:

we now have diaries, calendars and clocks and weather forecasts, but I still refer to it. I still, at Stewart Island, fish by the moon. I still observe bird arrivals and departures of visiting birds in relation to moons. There are people who are engaged in food resource gathering who unknowingly do it by the moon and the constellations but that's now just because of the way in which we live.

Despite the body of literature that focuses on the Māori moon calendar, all of my participants agreed that the moon was not to be singled out in isolation for time-keeping. Other celestial objects would be studied also and their *relationship* to the moon was what was significant. For example, the constellation which the moon was travelling through at the time was of great significance:

we [Ken and a fellow from South Canterbury] talked extensively about eel harvesting, and the movement of the elver, the young, and the adult fish was all governed by the moon and by the 'right moon' and that moon was found by the location of some principle constellations of the sky. So you knew that this occurred on two moons or three moons after Matariki for example, but if you hadn't kept the absolute count you knew that it was the moon that is meant by a particular constellation. (Ken)

This is an important point, because light pollution does not obscure the moon so much as it does the stars. If it were only the moon that was important for mahika kai then there would be no need for the RMA to be applied in protection of its visibility. No amount of light pollution yet has ever prevented the moon from being visible. But it is the stars and constellations *in relation* to the position of the moon that are the seasonal markers and time-keepers. Tellingly, the Pākehā authors who first recorded Māori astronomical knowledge (Best and Beattie are two, but there were a handful of others), have recorded star names and the moon calendar as somewhat separate. Their writing is likely to have been influenced by the Western scientific worldview where knowledge specialisation is generated by the nature-culture ontological divide. For example, astronomy is considered as completely separate from astrology, or climatology and biology for that matter. For Māori, all things in both the celestial and terrestrial realms are connected and indigenous science is inseparable from mythology as all phenomena have spiritual meaning.

Pauline suggests that not only are the stars important to see but the dark spaces between them also have meaning:

In terms of eeling you want it to be dark, but in terms of the dark spaces being important...not just the constellations, it's actually the dark spaces in between the stars. The aborigines have this too...it's not necessarily just the stars or starlight that's important, but being able to recognise the dark spaces.

The Bortle Scale (Figure 1.3) in Chapter 1 shows how light pollution threatens the ability to distinguish the dark patches of the night sky with the naked eye. *Te Taumutu Rūnanga Natural Resource Management Plan* (2003:49) states that “one of the values that Tāngata Whenua associates with Te Waihora and Taumutu is the celestial darkness”. The rohe of Te Taumutu Rūnaka is adjacent to Arowhenua on the north side, and they share similar whakapapa and values. Tuna/eel has been a staple food source for Kāi Tahu that has gathered mythological significance (Best, 1929). The harvesting of tuna/eel requires a dark, moonless night unimpeded by light pollution. Te Taumutu Rūnaka listed the “inability to clearly see stars and full constellations as result of city lights; impact on mahinga kai (night eeling and other activities)” among environmental issues they would like to see addressed (Te Taumutu Rūnanga, 2003:49).

The celestial realm is briefly mentioned in *Te Whakatau Kaupapa - Resource Management Strategy for Canterbury* (1990) in reference to Kāi Tahu creation stories, and again in reference to the kinds of knowledge acquired in the traditional management of fisheries. *Te Taumutu Rūnaka Natural Resource Management Plan* (2003) links light pollution as an issue for mahika kai, and *Te Rūnaka o Kaikoura Environmental Management Plan* (2009) mentions celestial darkness as an amenity value. The *only* mention of starlight visibility as an environmental issue in relation to mahika kai *and* tātai aroraki is found in the recent *Mahaanui Iwi Management Plan* (2013:70) which states that; “light pollution can also affect the use of stars to signal the start of the tuna heke”.

These very limited references are likely due to pragmatism in prioritising those issues that are under the greatest or most immediate threat and have realistic opportunities for mitigation. As the Mackenzie District is largely rural, and has a Lighting Ordinance already in place, the threat of light pollution obscuring the stars may not have been perceived by Arowhenua, Moeraki or Waihao as significant enough (at the time of writing their Iwi Plans) for mention. My participants believed that the importance of the stars to Māori is implicit and therefore there may be an assumption that this does not need mentioning. Pauline also suggested that the lack of mention in Iwi Plans may be due to the breakdown of knowledge caused by colonisation:

For many it wouldn't even come into their mind set. For many Māori, they know little about their traditions or their religion, but for the ones that know and practice - this would be implicit as it is part of your own origins, and the cosmos and world around us are home to not only us but to our gods.

Capacity building is an ongoing challenge for many iwi, as engagement with RMA processes such as researching and writing Iwi Natural Resource Management Plans takes time, and the numbers of appropriately qualified young people who choose to return to the marae for such work are few (Matunga, 2000; David Higgins, pers. comm. 2012). It is possible that tātai aroraki may be under a greater threat of loss than the visibility of the stars themselves.

The night sky - with its moon, stars, constellations and dark spaces - was an invaluable tool in the past for navigation, time-keeping, and weather forecasting. These are essential skills involved in mahika kai, an activity still practiced by some contemporary Kāi Tahu. Although modern technology can now replace the information displayed in the sky, *reading the sky* (by day or night) has always been a much-loved part of the whole mahika kai experience. The nohoaka entitlement, promised to Kāi Tahu as part of a cultural redress package in the Ngāi Tahu Claims Settlement Act 1998, would be a poorer experience without tātai aroraki. Starlight is a natural resource just as important to contemporary Kāi Tahu as it was to the many generations before them. Tātai aroraki is implicitly connected to other forms of environmental knowledge within the holistic Māori worldview.

Nature as Co-producer of Environmental Knowledge

The kinds of environmental knowledge that a society may develop is in part contingent upon their discourses about nature. Although in this thesis I have referred to the indigenous and Western scientific worldviews in a polarized fashion, arguably neither of them is, nor have they ever been, static or immutable. They have both been influenced over time through contact with other cultures and environments and, as this thesis contends, legislation. Western theorists in the latter half of last century have tended to fall into one of two camps of thought in regards to *nature*; natural realism (nature as 'out there' and independent from society), and social idealism (nature as socially constructed) (Lincliff, 2007; Latour, 1999). Lincliff (2007:35) claims that both of these positions "tend to produce

a mute, inanimate nature, one that either provides a fixed bedrock to truth or one that simply gives in to human volition". Either way, suggests Linchcliffe (2007:36), both natural realism and social idealism make "nature unhistorical, unlively, unchanging, aspatial and uninteresting".

Nature, far from being mute or inanimate, sometimes 'speaks' and 'acts' in ways that contradict our *discourses*, forcing change upon our worldviews. For example, in the 17th century Galileo was able, with careful observation using a telescope, to confirm Copernican Theory that the Earth revolved around the sun, rather than the reverse which had been the popular discourse defended by religion at the time (O'Rourke, 2009). His 'discovery' caused a rupture in European thought that allowed other ways of thinking about mankind and the universe to become possible. Foucault (1970; 1972) coined the term *episteme* to describe a period in the genealogy of knowledge where thinking is constrained by the geohistorical discourses available at the time.

In order for knowledge to progress, a discursive rupture must occur in order to allow new ideas to be generated (Foucault, 1970; 1972). In the case of Galileo and his variable-focus telescope, *nature* (specifically the Earth and Sun) enabled the rupture in knowledge by acting contrary to the common discourse of the time. As Latour (1999) would say, the Earth and Sun were *objecting* to the stories being told about them. The *counter*-discourse of Copernican Theory was then able to gain more ground on the knowledge landscape. Using an Actor-Network Theory (ANT) approach, Linchcliffe (2007) suggests the process whereby new knowledge becomes possible is more nuanced:

where episteme or discourse tends to figure a way of doing things that can be rather too coherent, structured and set limits on what is possible, assemblage is potentially a little looser. An assemblage is in the process of forming and in so being, it is open to more possibilities.

This is not to suggest that there is no place for Foucauldian terms within ANT, as epistemes and discourses are merely assemblages themselves. Furthermore, many ANT theorists have been influenced by Foucault (Latour, 1990; Law, 1991). Galileo's discovery, of course, could not have been achieved without the actions of the Earth and Sun, or without the technological aid of his telescope. Galileo was not the first to posit that the Earth revolves around the sun, nor was he the first to use a telescope however, the addition of a variable-focused lens was a technological advancement that added to the assemblage of European astronomy and opened the possibility of new knowledge.

All knowledge is an outcome of networked associations or assemblages of people, the natural environment and things (Latour, 1999). The ANT concept of assemblages is somewhat compatible with the concept of whakapapa which forms the basis of the Māori worldview. For example, Royal (1998:4, cited in Graham, 2009:3) explains that whakapapa was a traditional *analytical* tool used by Māori to understand "the nature of phenomena, the origin of phenomena, the connections and relationships to other phenomena, describing trends in phenomena, locating phenomena and extrapolating and predicting future phenomena". Both whakapapa and ANT are interested in the relationships and networked associations between people, the natural environment and things. The following discussion

about how the traditional ecological knowledge of Kāi Tahu, particularly tātai aroraki, was constructed, retained and transmitted to future generations, is premised upon the ANT concept of knowledge as a *network effect*.

Knowledge Construction and Retention

By looking at the mechanisms of this knowledge construction, retention and transmission, the absurdity of the Modern nature-culture divide becomes apparent. Furthermore, the relationship between the natural environment, tātai aroraki and cultural wellbeing also becomes clear.

The period before European contact with Māori is when the ancient knowledge was first developed. Mātauranga Māori developed both in relative isolation and as a result of migration and contact with other Polynesian cultures (Wai 262, 2011). The ancestors of Māori came from South-East Asia and explored the many islands of the Pacific Ocean, including Rapanui/Easter Island (Henare, 1988; Royal, 2013). Stack (1898a) argued that the founder of the Waitaha tribe, Rakaihautu, was one of the original immigrants to Aotearoa from Hawaiki and legend tells that he carved out the great interior lakes of Te Waipounamu. Most of the Southern Māori place names are attributed to Rakaihautu and Waitaha. The Kāi Tahu prophet, Hipa Te Maiharoa, whose son became an informant to Stack, traced his whakapapa back to Rakaihautu. Ken can also recite his whakapapa back to this eponymous ancestor. David, John and Ken are among today's kaumātua who are the recipients of some of the knowledge that has since been passed down through the generations. Therefore, I chose to use their comments to help deconstruct the nature-culture divide, particularly in relation to the construction of traditional ecological knowledge, and tātai aroraki. Crucially, their comments reaffirm that tātai aroraki is not a thing of the past, but is important to contemporary Kāi Tahu.

In order to first gain astronomical knowledge tohuka needed to observe the movement of the stars. Ken suggests that observing the stars may have occurred incidentally at first, during the course of other duties:

Men were and are the guardians of the night, men ensured that the women and the children, the breeding stock and the future of the Waitaha nation, were kept safe....in Waitaha they slept during the day because they were awake all night, and they stayed awake all night to ensure the survival of their women and children. So in order to stay awake at night there had to be something for them to talk about, and what better to talk about than the journeys of the moon and the planets, principally, and the star groups.

The knowledge gained from such observations was contingent upon the celestial bodies acting in a predictable fashion. It could also be said that movements in the celestial realm have always played a role in the construction of humankind's environmental knowledge. For example, the Earth rotates on its axis and moves around the sun giving us day, night and seasons. Consequently there are different weather conditions, ocean currents and tides that are all put into action by movements in the celestial realm. All life on Earth has developed from and is affected by these circadian and seasonal rhythms.

The environment acts, people observe, then record the information and pass it on as environmental knowledge. In this way the natural environment may be considered an active participant in the construction of environmental knowledge (Hinchliffe, 2007).

Tātai aroraki has been a practical tool, not only for survival, but for the development and expansion of Māori society. In a similar fashion, the Western scientific tradition owes much to astronomy as the most ancient of sciences, and its role in navigation similarly aided the development trajectory of Western society. Clearly the actions of stars have influenced *human* action through the knowledge gained by their observation. Additionally, elements from both the celestial and terrestrial environments were enrolled in helping Māori retain their cultural knowledge across time and space.

Māori have traditionally used songs, games and stories to memorize and transmit their knowledge (Best, 1922; Hakaraia, 2004). Such methods sometimes included elements of the natural environment as aids in memorization. For example, carving notches on a stick (rākau whakapapa) would help a tohuka memorize and recite their ancestral history (Hakaraia, 2004). String games (whai waewae) used woven natural fibres to make patterns and symbols of constellations, birds and other creatures, with the fingers as part of intricate stories and songs (Hakaraia, 2004). David explains how the stars were used as memorization aids during the long migration journeys:

One of the techniques of retaining knowledge, and very few people know this, one of the methods used by our ancestors as they travelled across the great ocean was to impart their knowledge in song, waiata and chants, karakia and talk about the celestial heavens. Then they put traditions and stories *into* the heavens, and linked them to particular star constellations. Those stories were transferred up into the heavens. Those traditional stories were spoken of as being *heavenly stories*.

Upon arrival in Aotearoa, the knowledge contained in the *heavenly stories* was then embedded within the new terrestrial environment:

When they arrived here at this wonderful big land they transferred those stories back to the land from the heavens, that's why you get this sort of interlinking thing happening amongst many of the traditions of our Waitaha people...it's because they were transferring these stories so they could remember them. That's one of the ways that we transferred knowledge and retained it, was to transfer it to the heavens and then back onto the land. (David)

Ken describes how rocks and natural landscape features were used by Waitaha as aids in teaching the next generation tātai aroraki:

They set up teaching organizations, they used the rock overhangs in various parts of the limestone areas of Te Waipounamu as teaching places, they established other teaching places such as at Te Kohanga, or Castle Hill up here in the hinterland where they set up an astronomical system using the stones around the basin up there to teach the basic concept of the heavens.

As mentioned in the previous chapter, ancient Māori art is visible in rocky limestone overhangs and caves within the rohe of Kāi Tahu. Although interpretation of the art has been made difficult and uncertain due to the loss of knowledge over time and physical deterioration of the sites, it is generally

believed that the art belongs to Waitaha (Williams, 2011). Several Pākehā scholars have attempted to record the art for posterity since it was first ‘discovered’, but recent efforts are now appropriately being headed by Kāi Tahu themselves (Williams, 2011). There is general agreement that the art was purposeful and probably the work of tohuka inscribing their knowledge onto the rock for permanent record (Mackay, 1902; Williams, 2011). The natural environment was thus enrolled as an aid for knowledge transmission. Generations after its creation, the landscape and the rocks themselves have revealed more information about the art. For example, a comparison made in 1897 between the level of the Opihi river bed near a rock shelter and its former level made visible by “a line of patches of shingle cemented to the face of the limestone” indicated the great age of the drawings since they all appear *above* the higher line (Stack, 1898:4).

Technology has been enrolled with some surprising effects in the process of recording the art. Global positioning systems and digital cameras have enabled quicker and more accurate mapping of the sites. At one site near the Tengawai River the flash from a camera revealed information that was invisible to the naked eye as it “broke through the calcium veneer” (Williams, 2011). Where the art had degraded into “only random fragments of faded lines and shading” visible to the naked eye, the camera revealed a “whole taniwha...beautifully captured in one frame” (Williams, 2011). Early Māori had enrolled the limestone rock to tell a story which, several centuries later, a digital camera would aid in the telling. Without the camera, the taniwha of the Tengawai River may have been lost to ancient memories. Both the natural environment (the rock) and technology (the camera) became *intermediaries* as they transformed the taniwha (whether it was an astrological symbol or a mythological creature) into a form that could endure time and help enrol human *actors* (students of the tohuka) into a particular knowledge network. In the case of the camera, the digital representation gave the taniwha mobility across time *and* space, thus enrolling different human *actors* (tourists, ethnographers, conservationists and so forth).

As mentioned earlier, Ken’s mother was involved in a book that collated the stories of Waitaha women, called *Whispers of Waitaha* (Ruka Te Korako & Ruka Te Korako, 2006). It contains within it reference to how the landscape was enrolled to record astronomical knowledge; “the elders looked into the heavens and marked the various star houses into the landscape, normally into rock overhangs or scribed into the sides of caves” (Ruka Te Korako & Ruka Te Korako, 2006:286). The books are not universally accepted within Kāi Tahu, but Ken believes that the integrity of the knowledge within them remains intact. *Whispers of Waitaha* claims to have preserved some of the knowledge of a group of elder Waitaha women in story form and contains many references to the stars, moon and constellations. In contrast, Stack, Best and Beattie, for reasons of protocol, only recorded the stories of Māori *men*. An example of how knowledge was transferred in story form is provided by Ken as he refers to the personification of stars and planets:

They [men of Waitaha] described the heavens, they cut it up into a series of houses, they talked about the planets regularly going across, tracking across, going from where to where, as men and women, but men did anyway, often fathering children in different families across the land, so they did it across the skies. They then linked all of that to landscape features and so they had natural Stone Henge.

What these examples reveal is that within the Kāi Tahu worldview the celestial and terrestrial environments are intimately connected. For Kāi Tahu who lived in the period before European contact, knowledge of celestial-terrestrial relationships was crucial for survival. The celestial resources used in mahika kai practices may defy conventional resource management boundaries, but it is clear that starlight visibility is still important to contemporary Kāi Tahu.

Learning From Observation and Experience

Traditionally, specialized and sacred knowledge was held by priests or tohuka (Best, 1922a). This was passed on to chosen individuals within a wānanga setting. General knowledge for everyday practices was passed on to children from elder family members such as parents or grandparents. Children were taught by *doing* things within context, for example, children would accompany their parents or grandparents, observe and take part in their daily activities. These methods of knowledge transmission continue today (Moller, et. al, 2009). Ken was taught traditional knowledge through the wānanga system:

There are Waitaha wānanga for invited individuals to go and there have been over the past 10 years or so, a series of wānanga. After attending wānanga my life changed, I'm now a person driven by karakia...I'm governed by the moon, the tides, the stars, the planets, and my mountain and my river.

He also remembers learning through stories and is passing his knowledge on to his mokopuna:

For my part, I'm handing those life skills on to my children and grandchildren. Generally by just sitting and talking with them, at a certain point I might retire from my current work and spend more time talking about these matters with my children and grandchildren. (Ken)

Both David and John remember being involved in activities with their grandfathers and learning from them:

My grandfather would teach us all sorts of things and simple ways of doing things. (John)

I spent all of my young life from a very young age in commercial fishing, basically being taught that knowledge by my grandfather in a practical way. I remember my great-grandfather would go fishing. My grandfather who I grew up with would take me out and taught me the skills of seamanship and the knowledge required to be a good, safe seaman, without all of the technical flash gear that you have today. (David)

David and John also told me that they cannot always explain *how* they know certain things concerning the sky and its relationship to the tides, the weather, or the behaviour of fish, they “just know”. This can be described as *tacit* knowledge, information that has been so ingrained over time that it becomes

impossible to determine when it was first acquired. It is also typical of the kind of knowledge gained through experience, as Ken explains:

There are people who are engaged in food resource gathering who unknowingly do it by the moon and the constellations but that's just because of the way in which we live.

Bourdieu (1986) describes the knowledge and attitudes passed on to us by our families and communities as *embodied cultural capital*, a passively inherited social asset that helps us succeed or achieve status within our particular culture. Dalziel, et al (2009), suggest that *cultural capital* is a measure of cultural wellbeing and therefore should be included among other types of capital as sustainable development indicators. This would be consistent with the purpose of the RMA which includes cultural wellbeing within its definition of sustainable management.

On mahika kai journeys with their grandfathers, David and John were acquiring *cultural capital* through observing and taking part in the activities. Moller, et al (2009:243), observed that “traditional approaches, including observation, hands-on experience, and storytelling, continue as the main mechanisms for knowledge transmission” among southern Māori who practice traditional mahika kai. Tacit knowledge, or *cultural capital*, is difficult to pass on without having the apprentice perform the activity for which the knowledge is required. Context is crucial, as John explains:

you can give people all the [star] knowledge and tell them, but unless they actually go and do it and walk the talk, you could tell them something and they wouldn't even recognize it. They wouldn't be able to put it all together till they sat out there doing it.

Again, this demonstrates that environmental knowledge, including tātai aroraki, cannot be passed on effectively without engaging directly with the natural environment. Enrolling the star-filled night sky to act as a great blackboard in the heavens, today's kaumātua can take their mokopuna outdoors to teach them first-hand about how the moon and stars dictate the life-cycles of mahika kai species, and subsequently the actions of humans in gathering them.

Viewing environmental knowledge as an *assemblage* of people, the environment and things enables a more flexible concept of knowledge, one that is never certain and could change at any time with the introduction of a new *actor*, or an existing *actor* objecting to their assigned role or changing associations (Hinchliffe, 2007; Latour, 1999). Any change in the *assemblage* could cause a rupture in the *episteme* and allow new knowledge to develop (Foucault, 1972). In this sense, knowledge is continuously *performed*. This concurs with our understanding of how human memory and learning works and the importance of context for the transmission of tacit knowledge.

Conclusion

The movements of the stars have affected both Pākehā and Māori cultures profoundly by providing a means of oceanic navigation that enabled their subsequent geographical expansion and mass migrations to Aotearoa. Astronomy also enabled the former to develop a scientific approach to environmental

knowledge (the Western scientific worldview), and the latter to develop a holistic knowledge system (whakapapa) geared to physical and cultural survival. The natural environment of Aotearoa has played an active role in shaping both cultures, altering their original forms of knowledge and practice, and creating different cultural expressions (Wai 262, 2011). For Māori, the knowledge and practice of mahika kai evolved with localised tātai aroraki. This knowledge and practice lives on among some contemporary Kāi Tahu.

Despite the limited mention of stars in Iwi Natural Resource Management Plans, the participants in this study suggest that the visibility of starlight is very important to Māori. Knowledge of tātai aroraki is often transmitted to the next generation through meaningful and practical activities and sometimes becomes tacit knowledge. Context then becomes essential for this knowledge transmission. Some mahika kai and nohoaka opportunities for Kāi Tahu are explicitly protected under the Ngāi Tahu Claims Settlement Act 1998, and to be given particular regard under the Resource Management Act 1991. While these statutes refer to *access* to geographical locations and their natural resources, the implicit intent is to provide for cultural wellbeing by protecting the cultural practices themselves. Tātai aroraki underpins traditional mahika kai skills such as navigation, seasonal time-keeping and weather-forecasting, and is therefore an essential part of mahika kai activities which promote cultural identity and wellbeing. Protecting the visibility of the stars would protect the natural resource employed for such skills. Therefore it is wholly appropriate for the RMA to be applied in protection of starlight as a natural resource that enables Māori to provide for their cultural wellbeing. In order for those Kāi Tahu who still retain star knowledge to pass it on to the next generation within a mahika kai context, starlight visibility must be protected for mahika kai areas. The Mackenzie basin, the location of the AMIDSR is one such area.

Chapter 5: Starlight and Resource Management

Introduction

The two previous chapters in this discussion on starlight and the RMA have established that starlight is a natural resource of cultural significance to Māori and is still used by some contemporary Kāi Tahu. This chapter explores the experiences of my participants in terms of their participation in RMA processes. Their experiences appear somewhat consistent to the current literature on Māori participation in resource management over the past two decades since the introduction of the RMA. Yet when considering the RMA as a tool for preserving traditional knowledge and revitalising Māori culture, including tātai aroraki, the processes of the RMA take on a new dimension of significance. Iwi plans are the key to this process and there are educational benefits for both Māori and Pākehā in their development.

This chapter describes the specific sections of the RMA and policy instruments that are relevant to the protection of starlight as a natural resource important to the cultural wellbeing of Māori. The institutionalised biculturalism within the RMA may be viewed as a product of cultural *hybridity* with Māori environmental ethics being formally recognised within a predominantly Pākehā legal system. Yet the RMA is not only the *product* of cultural hybridity, but can be regarded as a *producer* of hybrid culture and environmental knowledge. The RMA can also be viewed as an *assemblage* of humans, the natural environment and technologies, which each work to affect the outcomes of RMA processes, including the generation of new environmental knowledge. New knowledge that is generated through RMA processes may therefore be considered as a network effect.

Generally my participants are optimistic about what can be achieved for the cultural wellbeing of Māori through the RMA.

Kāi Tahu Resource Management Traditions

Resource management, in the form of *kaitiakitaka*, has been practiced by Māori for centuries and is incorporated within *mahika kai* (Matunga, 2000; Roberts, et. al, 1995; Williams, 2010). Although it would be a mistake to romanticize indigenous practices as being inherently sustainable, we should note that Māori “have had considerably longer to learn environmental input-output rules in Aotearoa” than have Pākehā (Pawson, 2001:465). As the first human settlers to Aotearoa, Māori eventually developed complex codes of conduct through trial and error that were designed to protect resources from over-exploitation. Such knowledge of course is location-specific as the various resource types are geographically dispersed. Traditionally, resources are not viewed independently from their environment but are connected through *whakapapa* to other natural phenomena. As mentioned in previous chapters, *whakapapa* also connected terrestrial resources to celestial deities which reflected

the interdependence of the physical and spiritual realms (Environment Canterbury, 2013).

I argue that cosmology and whakapapa (as knowledge systems) and traditional mahika kai practices (including navigation, seasonal time-keeping, fishing and weather forecasting) also reflect the dependence of humans and their terrestrial resources on *celestial resources* such as the moon, important stars and constellations. For example, Ken describes how tātai aroraki was part of a greater body of Waitaha knowledge pertaining to resource management:

Waitaha knew and understood the pathways across the Southern Alps. They knew the ways of the weather. They knew the ways because they observed the stars and the moon, the climate, the colour and clarity of the heavenly bodies...and they knew how much moisture or how dry it was and how long the situation was going to last, and whether they could make the journey. I mean crossing those rivers and crossing those passes was incredibly dangerous, and there they were carrying stone across the mountains and then down the Waitaki River, it was epic.

Ken makes it clear that the gathering of pounamu/greenstone, a treasured resource now legally owned by Kāi Tahu, could not have been successful without the use of other natural resources such as the celestial objects deemed relevant to the exercise (Ngāi Tahu (Pounamu Vesting) Act 1997, s 3). This is an example of the *whole resource chain* (mentioned in the *Canterbury Regional Policy Statement* referred to in Chapter 4) which includes celestial *and* terrestrial resources and associated knowledge, as Ken explains further;

that's all part of what I say was our Ancient Waitaha Resource Management System. The location of all resources was known, they were managed, they knew the attributes and qualities of the resources, they knew when to go and get them, they knew how to transport them and they knew how to deal with them in a way that made them sustainable.

In addition to rules governing traditional resource-harvesting *practices*, there are rules that determined *who* has the right of access to a particular resource. These are generally based on whakapapa but the concept contains some fluidity (Roberts, et. al, 1995; Best, 1922). Ken explains how the rohe of different iwi traditionally formed a basic system of place-based access to resources, including mahika kai and pounamu:

Waitaha, in my family histories anyway, used the protein resource of the Sooty Shearwater, the Muttonbird, the Titi, and the stone as trading materials and they traded it up the coast of Te Waipounamu and the North Island and brought back other things that they needed like gourds, kumara, and obsidian for cutting. They set up a very rigidly controlled and managed system whereby people came into an area and they honoured the occupants there by bringing a koha and asked permission to go into these places. So it was a type of resource management with a system of entry and exit.

Improving Participation Experiences

Nowadays iwi resource management is governed by legislation such as the RMA. Although the Act is arguably one of the most progressive pieces of environmental legislation in Aotearoa in terms of its attempt to incorporate indigenous values and customs, the experiences of Māori in terms of process

and outcomes has been mixed (Matunga, 2006; Hutchings, 2006; Moller, et. al, 2000). John, for example, articulates his frustration with the kinds of power imbalances he has perceived in hearings:

in some aspects it [the RMA] probably makes [working with Councils] harder, but it doesn't matter, that's what the Act says and you've got to abide by it irrespective of someone standing up and asking heaps of questions, especially lawyers. They say 'but couldn't we do this' or 'couldn't we do that', and I say 'oh, so you're telling me as long as we do it your way?' That's what we get all the time, 'surely we could do this or that' - 'well as long as it's *your way*'.

John's experience is supported by recent research into 29 cases regarding Māori issues that were heard by the Environment Court, High Court, Court of Appeal and Privy Council (between 2001-2006) that generated outcomes affecting iwi kaitiaki interests (Hutchings, 2006). All of the assessments and decisions, according to Hutchings (2006:95) continued to "uphold the assumed power basis of the colonial hegemony as the dominant worldview and system for managing the environment in Aotearoa". The apparent disconnect between the enabling framework for iwi participation in the RMA and the experience of those 'on the ground' of resource management issues working with councils may be due to a lack of capacity on both sides. For example, many councils lack staff with a comprehensive understanding of tikaka Māori, and many iwi struggle with under-resourcing and specialised training issues (Hutchings, 2006; Parliamentary Commissioner for the Environment, 1998). Co-management arrangements, befitting of true treaty partners, may become more common if significant improvements in capacity-building occur.

The processes of the RMA have been criticized by many as being overly expensive and time-consuming (Hutchings, 2006). As mentioned above, when conflicts between worldviews happen during many of the RMA processes and judicial decisions, the hegemonic Pākehā worldview is generally upheld. Moreover, it could be argued that the professional middle class inherently have the upper hand in terms of both the ability to resource a sustained argument through legal proceedings, but also in terms of cultural capital – the worldview, protocols and vocabulary assumed throughout such proceedings. For example, although participation by the community is encouraged, the cost of researching and presenting a submission in the Environment Court can be prohibitive for many, including iwi, as John suggests:

developers and farmers can employ lawyers and pay them big money to put their case up in the Environment Court, and they can claim that off their tax, whereas any objector has to pay out of his own pocket and that's always made it extremely hard. Yet the law says there should be a level playing field, but it's not. And then they say 'you haven't got a scientific background to be able to say what you're saying'.

Nonetheless, John's experience has not been entirely negative. He described a personal connection he made with a freshwater scientist who appreciated his environmental knowledge despite their contrasting worldviews:

I mean you can say these things but because what you're saying doesn't fit into their idea of a science path that they're taking, you can't substantiate that because 'you haven't done this' or

‘you haven’t done that’ or ‘you haven’t got a PhD’. But I thoroughly enjoyed my times out with Don Jellyman because we’d sit and talk and talk and he enjoyed it too, it was good. (John)

Don, the scientist, defended John when, during a resource consent hearing, he talked about the life-cycle of a certain fish species and someone rose to their feet and accused John of ‘talking rubbish’. Don stood and concurred that recent scientific discoveries proved that John was correct. On this occasion science was ‘catching up’ with indigenous knowledge. I was recently fortunate enough to meet Don and ask him about this incident. He told me that he had great respect for John, and that indigenous knowledge and science often fit quite well together, as “science is often able to underpin the knowledge that Māori had developed through observation” (Don Jellyman, pers. comm. 11 August 2013).

As mentioned above, capacity-building is the key to achieving a greater understanding between the principal two parties (local government and iwi) who are legally sanctioned by the RMA to govern resource management issues. An increased understanding of one another’s views may then foster respect and trust which are keys to relationship-building. Conversely, cultural misunderstandings can severely hinder the process. Less than a decade after the RMA was first introduced, an assessment of Tākata whenua participation in environmental management found that “in many cases bad experiences between councils and tākata whenua [had] soured relationships, eroded trust and fostered hostile assumptions and attitudes” which then entrenched negative perceptions and expectations (Parliamentary Commissioner for the Environment, 1998:117). A great deal has improved since then but examples of co-management are still few (Hutchings, 2006; Moller, et. al, 2000). A notable example of co-management, however, is provided by the *Te Waihora Co-Governance Agreement* between the Te Waihora Management Board, Te Rūnanga o Ngāi Tahu, and the Canterbury Regional Council which is aimed at improving environmental outcomes within Te Waihora catchment (Te Rūnanga o Ngāi Tahu & Environment Canterbury, 2012). This agreement is a deliberate attempt by the abovementioned parties to stand “shoulder to shoulder” in support of the “cultural, biodiversity, mahinga kai, economic and recreational values” of Lake Te Waihora (Te Rūnanga o Ngāi Tahu & Environment Canterbury, 2012:5).

The experience of my participants is a testimony to the importance of fostering good relationships between individuals in working with local authorities. David, for example, has generally been encouraged by the reception he has received from audiences at public meetings when invited to present an iwi perspective on issues. However, in his recollection of one particular meeting, he too infers that building mutual respect and trust in relationships plays a significant role in this:

there was a big meeting held in Twizel...and all the groups gathered to put their case amongst each other. I was invited to attend to give an iwi perspective and...all the different groups came up and said ‘that was great David, we’ve never heard that before, we’ve learned something today’...but that’s always been the case whenever we’ve presented in front of Judge Skelton and all of those senior commissioners. They always take the iwi view very seriously because they understand that we are the Treaty partners, we’re not just an attachment. (David)

The process of relationship-building necessarily takes time so it is unsurprising that improvements happen only gradually. With the hindsight of history, David feels that the current status of Kāi Tahu participation in environmental management is in stark contrast to the past:

It's taken us some time. I mean we've gone from not being able to knock on the Mayor's door to actually having a very close relationship with those senior officials in district councils.

Good relationships and effective communication between *individuals* on the front line therefore are crucial for encouraging co-management arrangements or, at the very least, outcomes favourable to iwi interests. Both iwi *and* council capacity-building, and improved communication, may improve iwi participation experiences overall. In any case, David, John and Ken all agree that the RMA provides a forum where iwi concerns over the environment may be formally articulated and traditional knowledge officially recognised.

A Tool for Knowledge Revitalisation

With the introduction of iwi natural resource management plans the RMA has facilitated a remarkable tool for preserving and revitalising Māori knowledge, as David suggests:

The RMA is a vehicle, I guess, it's a tool that we can be quite proud of in this country, I think. It allows our iwi Māori people to reflect on those things that are important to us and whether or not the Act allows us to do certain things, it allows us to continue some of those cultural practices, or whether we can restore some of the environment where we used to practice those cultural relationships, the RMA is probably the only way that we can achieve these things.

David believes that as capacity increases and these plans are reviewed, more of those things that are important to Māori, including the stars, will be included in them. Referring to the decline of te reo/Māori language and traditional knowledge, John feels that the RMA may help prevent further loss of tātai aroraki:

if the RMA brings some of that [tātai aroraki] back, that's all good stuff. Even if it doesn't add to it, but it keeps it in sight so that we don't lose track of it, I mean it was the same with te reo, it just slowly died, and it's the same with everything else.

Carter (2005:21), making the link between language and the way people understand themselves to occupy landscapes, also views the RMA as an opportunity for the "reinsertion of Māori environmental literacy" into improved resource management strategies. She suggests that Māori place names are a permanent reminder of an alternative environmental perspective which is embedded into the landscape (Carter, 2005). Perhaps Māori star names will become a similar reminder in the night sky-scape. Furthermore, as the celestial bodies played a role in site-specific mahika kai practices, perhaps they should be named and recognised for their place within the "complex resource mosaics" that cover the landscape (Brooking et. al, 2003 cited in Carter, 2005:11).

As iwi-specific and context-specific star names are incorporated into iwi plans this may provide a way of formalising and *localising* the links between celestial and terrestrial resources. In future, as

traditional environmental knowledge is collated and features of the night-sky are mapped in order to guide kaitiaki and councils, perhaps iwi plans may be viewed as a contemporary equivalent to the ancient practice of “naming to own” landscapes (Carter, 2005). By localising traditional knowledge, the more detailed 2nd and 3rd generation iwi plans will have the effect of de-homogenising Māori culture in the eyes of Pākehā. For example, the observance and celebration of Matariki has now entered the Pākehā consciousness yet it is incorrect to assume that all iwi share exactly the same astronomical traditions and beliefs. As mentioned in previous chapters, due to differences in latitude some iwi celebrate the rising of Matariki, others the rising of the next new moon *after* Matariki, and Kāi Tahu traditionally recognise the rising of Puaka as signifying the New Year (Meredith, 2012; Harris, 2012). De-homogenizing Māori culture and presenting the Māori worldview in tangible ways is an aspect of RMA processes and working with councils that David appreciates. As he expressed it, “we have managed to re-educate them [Pākehā councils]”.

So, despite the tensions caused by an inherently adversarial structure, the RMA is perhaps doing more towards increasing Pākehā awareness of the intricacies of Māori culture than most other pieces of legislation, aside from the Treaty Claims Settlement Acts. Unlike the latter statutes however, RMA processes are applicant-driven so the general public arguably have more opportunities to engage with the RMA, and therefore with iwi-specific cultural values.

The collective process of preparing iwi plans is arguably also awakening traditional knowledge in elders that has remained buried in their memories after enduring lifetimes of assimilationist policies that dissuaded its use (Thomas & Nikora, 1992). Tacit knowledge is difficult to identify and transfer, and often requires great patience and gentle probing on behalf of the person seeking it from another, as deep memories gradually resurface. Wisner (2010) suggests that tacit knowledge is not often able to be articulated as it is embodied in practices. Participatory research, such as that conducted by iwi in the preparation of iwi plans, may draw tacit knowledge out and make it explicit. For this reason, my participants are hopeful about the potential of the RMA to revitalise cultural knowledge and traditions. Iwi plans will increasingly become a valuable source of information for anyone interested in learning about contemporary Māori culture. But more than this, the process of collating the information may spark new life into old traditions and strengthen the cultural identity of those involved. Both Māori and Pākehā potentially benefit from the educational value of iwi plans and RMA processes.

The purpose of iwi plans of course is to aid councils and resource managers in the implementation of the purpose and principles of the RMA. With the inclusion of iwi-specific information regarding the value of celestial darkness, stars and constellations of cultural importance, and their relevance to terrestrial sites and activities, then future iwi plans may provide a tool for the protection of tātai aroraki. Arguably, in order to protect the knowledge base, *access* to the natural and cultural resources in the night sky, in terms of visibility, must also be protected. The following outlines the RMA mechanisms by which this may be achieved.

Starlight and Sections of the RMA

The specific sections of the RMA which are most relevant to the protection of starlight as a natural resource of cultural significance are Part II: Purpose and Principles, sections 5, 6, 7 and 8. I shall now discuss each one in terms of the definitions and assumptions underpinning them that allow for the conception of starlight as a natural resource. Section 5 clearly declares the purpose of the Act:

5: Purpose

- (1) The purpose of this Act is to promote the sustainable management of natural and physical resources.
- (2) In this Act, **sustainable management** means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while—
 - (a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and
 - (b) safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and
 - (c) avoiding, remedying, or mitigating any adverse effects of activities on the environment.

Firstly, s5(1) states that the RMA is designed to help us manage *natural* resources which have been previously defined in the Act (Part I: Interpretation and Application) as:

2: Interpretation

- (1) In this Act, unless the context otherwise requires,—
natural and physical resources includes land, water, air, soil, minerals, and energy, all forms of plants and animals (whether native to New Zealand or introduced), and all structures

Celestial bodies have long been established by international treaties as natural resources with potential for terrestrial use (Moon Agreement 1979; Outer Space Treaty, 1967). The electromagnetic spectrum emitted from them has also been established as a natural resource. The Waitangi Tribunal accepted that the portion of the electromagnetic spectrum specific to starlight was known to Māori and used by them as a natural resource in navigation prior to, and at the time of, the signing of the Treaty of Waitangi (Wai 26 and 150, 1990; Wai 176, 1994; Wai 776, 1999). As the RMA definition of a natural resource in s2(1) includes *energy*, the electromagnetic spectrum which transmits starlight from the celestial bodies to Earth may therefore be included within this definition of a natural resource.

Secondly, s5(2) defines sustainable management as using and protecting natural resources in such a way that enables communities to provide for, among other things, their *cultural wellbeing*. Previous chapters have discussed the importance of starlight, and the traditional knowledge associated with it, to the cultural wellbeing of Kāi Tahu. Tātai aroraki, like much traditional knowledge must be *performed* in order for it to be learned. RMA processes such as resource consent and Environment

Court hearings, and the formulation of iwi plans, therefore provide *group-formation* opportunities which allow certain participants *become* Kāi Tahu through the expression of their *cultural capital* (Latour, 2005; Bourdieu, 1987). Group-formation, according to Latour (2005) is a continual process that involves the ongoing maintenance of group boundaries and the deflection of alternative group identities. My participants clearly partake in the group-formation opportunities provided by the RMA as they (like all of us) each have multiple identities that relate to gender, ethnicity, age, class and so forth, yet their Kāi Tahu identity becomes most salient within RMA processes. According to the definitions provided in the RMA, starlight *is* a natural resource and any adverse effects upon this resource would affect the *cultural wellbeing* of Kāi Tahu by reducing opportunities for *becoming* Kāi Tahu. The sustainable management of starlight is therefore fully consistent with the stated purpose of the RMA.

Moreover, the New Zealand High Court (1995, cited in Grundy, 2000:66) has emphasised that Part II of the Act, and Section 5 in particular, is paramount and of “overriding importance to environmental planning in New Zealand”. Interpretations of this section are often debated between a ‘narrow’ interpretation founded on neoliberal ideology which is concerned primarily with the effects of economic activities on the biophysical environment, and a ‘holistic’ interpretation which insists that economic, social, cultural and ecological concerns cannot be separated as they are interdependent (Grundy, 2000). The latter is more consistent with the Māori worldview and also my argument that starlight, and tātai aroraki, is a fundamental part of the practice of mahika kai and kaitiakitaka.

Section 6 of the Act then sets out the first group of broad principles which are to guide how the purpose of the Act is to be achieved. The matters listed below are described as being ‘of national importance’ and are to be recognised and *provided for*:

6: Matters of national importance

In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall recognise and provide for the following matters of national importance:

- (a) the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development:
- (b) the protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development:
- (c) the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna:
- (d) the maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers:
- (e) the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga:
- (f) the protection of historic heritage from inappropriate subdivision, use, and development:
- (g) the protection of protected customary rights

In terms of s6(b), the AMIDSR has already established rules to protect the ‘outstanding natural features and landscape’ over a large portion of the Mackenzie basin *and* its pristine night sky. This achievement adds further weight to this section of the RMA for addressing light pollution issues in local resource consent proceedings. However, s6(e) is also applicable to starlight as celestial bodies are considered ancestral deities and are therefore taoka, and the electromagnetic spectrum which carries their light is also considered taoka. In addition, the culture and traditions of Kāi Tahu Whānui associated with tātai aroraki (which include cosmology, whakapapa, navigation, seasonal time-keeping and weather forecasting) are grounded in their ancestral lands which include the area of the AMIDSR. Therefore, s6(e) requires resource managers not only to recognise, but to *provide for* the relationship that Kāi Tahu have with the stars. One way of providing for that relationship is to protect the visibility of the stars by avoiding, remedying or mitigating any adverse effects of light pollution.

Section 7 contains another list of guiding principles:

7: Other matters

In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall have particular regard to—

- (a) kaitiakitanga:
- (aa) the ethic of stewardship:
- (b) the efficient use and development of natural and physical resources:
- (ba) the efficiency of the end use of energy:
- (c) the maintenance and enhancement of amenity values:
- (d) intrinsic values of ecosystems:
- (e) *[Repealed]*
- (f) maintenance and enhancement of the quality of the environment:
- (g) any finite characteristics of natural and physical resources:
- (h) the protection of the habitat of trout and salmon:
- (i) the effects of climate change:
- (j) the benefits to be derived from the use and development of renewable energy

These matters are to be given *particular* regard to, and kaitiakitaka is at the top of the list. Kaitiakitaka is defined by the RMA in s2(1) as ‘the exercise of guardianship by the tāngata whenua of an area in accordance with tikanga Māori’. This is further defined as ‘Māori customary values and practices’ and these are necessarily based on the Māori worldview (RMA s2(1)). This suggests that the Māori worldview, and associated cultural values in relation to resource management, is to be considered among the guiding principles of RMA processes. As Merata Kawharu (2000:349) argues, “Kaitiakitanga continues to find centrality in Māori kin-based communities because it weaves together ancestral, environmental and social threads of identity, purpose and practice...[and] has clearly become a guiding principle in all bicultural policy between Māori kin groups and the Crown or other non-Māori in Aotearoa New Zealand”.

Moreover, M. Kawharu (2000:363) demonstrates the importance of boundaries in the assertion

of kaitiakitaka with a Ngāpuhi proverb; according to the proverb the *Sacred House of Ngāpuhi* consists of Papatuanuku as the foundation, Ranginui (sky father) as the overarching tuānui/roof, and the sacred mountains as the poupou/pillars. This suggests that the sky is included within the jurisdiction of the Ngāpuhi kaitiaki, which is also consistent with those few Kāi Tahu iwi plans which seek to protect celestial darkness by mitigating the effects of light pollution. It may be argued then that starlight is within the jurisdiction of Kāi Tahu kaitiaki and that tātai aroraki is a part of tikaka Māori and has a role in the exercise of kaitiakitaka.

The final section in Part II of the RMA of relevance to the protection of starlight is Section 8 which refers to the principles of the Treaty of Waitangi;

8: Treaty of Waitangi

In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi).

Hayward (1997:475) stresses that the Treaty is a “living document to be interpreted in a contemporary setting” and as such new principles are constantly emerging and old ones modified as cases are heard by the Waitangi Tribunal. This creates a certain amount of ambiguity which is open to interpretation and exploitation by lawyers. Nevertheless in 1989 the Labour government set out the principles by which it would act in relation to Treaty issues. I choose to use their interpretation here despite the changed political climate, as I imagine the Crown (regardless of which political party passes further Acts of Treaty Claims Settlement) is reliably likely to adopt the most conservative interpretations available. Yet even so, I believe they can be applied to the protection of starlight.

Among the principles set out by the 1989 government was the “rangatiratanga principle”, or “principle of self-management” (Hayward, 1997:494). This principle recognised that Article 2 in the Treaty guarantees to Māori “the control and enjoyment of those resources and taonga that it is their wish to retain...the preservation of a resource base, restoration of iwi self-management, and the active protection of taonga, both material and cultural” (Hayward, 1997:494). This thesis has already established that the celestial bodies, the cultural knowledge pertaining to them, and the light emitted from them may be considered taoka. It is clear from my participants and references to celestial darkness in some iwi plans, that starlight is a material, natural, and cultural taoka that many Māori *do* wish to retain and enjoy. Therefore, the rangatiratanga principle of the Treaty of Waitangi should be taken into account in regards to preserving starlight visibility as taoka.

Another principle identified by the 1989 Labour government is the “principle of reasonable cooperation” (Hayward, 1997:494). Interestingly, “duality and unity” were deemed to be of particular significance under this principle. According to Hayward (1997:494) “duality implies distinctive cultural development while unity implies common purpose and community. The relationship between community and distinctive development is governed by the requirement of cooperation...[and] the

outcome of reasonable cooperation will be partnership”. Matunga (1997a & 2000) argues that in 1840 the Treaty of Waitangi provided a framework for dual environmental planning which has not (yet) been realised. Kaitiakitanga, as a Māori planning tradition, has been excluded from this framework by the imposition of hegemonic colonial discourses on nature and environmental management (Matunga, 2000). Using Memon and Perkins’ (1993) definition of environmental planning, Matunga (2000:38) argues that the Treaty of Waitangi “can be credited with being New Zealand’s first national environmental policy statement”, and suggests that the decolonisation of environmental planning can only be achieved by re-centering the Treaty *Articles* as the framework of partnership rather than the rhetoric of principles. Therefore, the “principle of reasonable cooperation” may be fulfilled with the (re)instatement of the Treaty of Waitangi as a dual environmental planning framework which would make partnership the bottom line rather than consultation. In this way, the participation experiences of Māori would improve with a more consistent sense of *material* partnership. Presently the RMA only asks resource management practitioners to take the *principles* of the Treaty into account, yet these are not well defined. Perhaps if the Treaty of Waitangi *were* to be established within RMA framework as the overarching *National Policy Statement*, the principles would become clear within the definitions of the Articles themselves.

Nevertheless, subordinate to *National Policy Statements* are *Regional Policy Statements* and *Regional, District* and *Iwi Plans*. The following will now describe how these instruments may be applied in protection of starlight.

Starlight, Policy and Plans

National Policy Statements are instruments, available under the RMA, which are prepared at a central government level to guide regional and district authorities in resource issues of national importance (See Figure 1.8 in Chapter 1). Currently however, the only other *National Policy Statements* that have been prepared to date relate to energy generation and transmission, water resources, and the coastal environment, and none of them can be easily applied to the protection of starlight. However, at the mandatory level of *Regional Policy Statements* we find more actionable instruments.

The *Canterbury Regional Policy Statement* (CRPS) acknowledges that “the protection of the relationship of tāngata whenua with their taonga is included in Article II of the Treaty of Waitangi, Section 6(e) of the RMA, and more recently the Ngāi Tahu Claims Settlement Act 1998 (NTCSA)” (Environment Canterbury, 2013:14). It also recognises that the term mahika kai refers to much more than resources and their locations, but includes the “whole resource chain” and the “intergenerational transfer of knowledge” (Environment Canterbury, 2013:15). Starlight is a resource that is part of the whole mahika kai resource chain, and aspects of tātai aroraki form part of the knowledge that is transferred as families take part in mahika kai activities together. Within the CRPS therefore, are some fundamental acknowledgements that may allow starlight to be considered for protection alongside all

other mahika kai resources.

In addition, one of the issues that the CRPS highlights to be addressed is the “limited recognition of cultural landscapes in policy and planning, and the relationship between cultural landscapes and Ngāi Tahu culture, identity and well-being” (Environment Canterbury, 2013:18). The night sky could be considered a cultural landscape (or *skyscape*) in that there are distinctive features and markers in the sky that have cultural significance in much the same way as landmarks and natural features of landscapes do. Given that the AMIDSR is situated in Canterbury, it is surprising that there is no mention of it in Appendix 4 that lists Canterbury’s “outstanding natural features and landscapes”, even though the Mackenzie Basin is listed there in detail and the dark sky reserve is a significant feature of its night landscape that has economic value for its tourism potential. I suggest that the AMIDSR could be regarded as a cultural landscape (or *skyscape*) of importance to Kāi Tahu, and increasingly also to Pākehā, and should therefore be listed as such in the CRPS.

The next level of RMA instruments is *Regional Plans* which are prepared by Regional Councils. Here too we find some potential for the protection of starlight. One of the issues stated in the operative *Canterbury Natural Resources Regional Plan* (CNRRP) regarding air is “the visual impacts of contaminants in the air” (Environment Canterbury, 2009:2.10). The outcome sought on this issue is that “culturally important landmarks are not obscured by visual contaminants in the air” (Environment Canterbury, 2009:2.10). Light pollution may be considered a contaminant as it is an undesirable emission into the atmosphere that obscures the visibility of distinctive features and markers in the night sky. Moreover, the features potentially being obscured by light pollution are *culturally important*, and therefore should be protected under Chapter 3 – Objective AQL1 of the CNRRP.

The final level of instruments available under the RMA is *District Plans* which are prepared by District Councils. An interesting note is that the Local Government Act 2002 that defines local government, and provides the framework for their function, uses the same *four well-beings* that underpin the RMA as its underlying principles (Local Government Act 2002, Part 2, s14(1)(h)(i)). The *Mackenzie District Plan* contains a great deal of protection for the night sky due to the Lighting Ordinance that was put in place in the 1980s to protect the astronomical research undertaken by the Mt John University Observatory. The current plan states that “an abundance of outdoor lighting can adversely affect *people’s ability to view the night sky*” (Mackenzie District Council, 2004:12.1 emphasis added). While this does provide a reason *other* than simply the protection of astronomical research, it still does not acknowledge the importance of protecting starlight as a natural resource of cultural significance to Kāi Tahu. The AMIDSR simply provides another reason (largely economic due to the potential of astro-tourism) to protect starlight visibility in the area. This may be due to the limited mention of celestial darkness in iwi plans that inform the *Mackenzie District Plan*. The most recent Kāi Tahu plan, *Mahaanui Iwi Management Plan* (2013) does not cover the Mackenzie District, however it does make an explicit connection between light pollution, tātai aroraki and mahika kai.

Nonetheless, communication is a key component of cooperation and iwi plans are an invaluable tool for communicating iwi environmental values. The RMA requires iwi plans to be considered by both Regional and District Councils during the preparation of their Policy Statements and Plans. So it is imperative that starlight and tātai aroraki are given more detailed mention in future iwi plans in order for Kāi Tahu to protect such a resource in accordance with tikaka Māori.

There is potential to protect starlight at all levels of RMA administration with the instruments currently available. Other legislation supports this also. The bicultural nature of this legislation implies a spirit of partnership between Treaty partners. In practice, the substance of partnership is often as elusive in co-management arrangements as the substance of the Articles of the Treaty are in the principles thereof (Matunga, 2000; Roberts, 2012). If the Treaty of Waitangi were to be considered as a *National Policy Statement* then perhaps it may provide some weight in persuading more local governments to opt for co-management arrangements rather than mere consultation. However, the RMA may be more likely to produce a hybrid form of resource management that evolves out of the cultural conflicts and negotiations inherent within its processes rather than the dual system advocated by Matunga. This concept is elaborated upon below.

Hybrids, Black Boxes, and Assemblages

The RMA itself is a hybrid. More than a mere a piece of legislation, it is a product of the multiple collisions over time between two cultures in a postcolonial setting, and their development and utilisation of what de Certeau (2011) would call various “strategies of power and tactics of resistance”. Bhabha (1994:341) described cultural hybridity as “the creation of new transcultural forms within the contact zone produced by colonisation.” Colonisation in Aotearoa has changed both cultures forever. Evidence of cultural hybridity in Aotearoa can be seen in the adoption of certain words and phrases spoken in te reo by Pākehā, such as *kia ora*, *kia kaha* or *kai*, and in the use of the haka at international sporting events. It can also be seen in the adoption by many (predominantly Pākehā) institutions of the Māori ethic of environmental stewardship: *ki uta ki tai*/from the mountains to the sea. The borrowing from one another’s culture has not occurred evenly, however, as the Pākehā culture and worldview has gained hegemony (Thomas & Nikora, 1992). In the face of institutions supported by strategies of colonial power, throughout this nation’s history, Māori have used tactics of resistance to try to effect change. While protest and activism have achieved much, particularly during the 1970s and 1980s, Māori have had little alternative but to work with the tools of the Pākehā, including the political and legal systems that govern the RMA (Thomas & Nikora, 1992). The inclusion of Māori values in the RMA may therefore be seen as a result of many decades of working both within the system and outside it. As well as being a *product* of cultural hybridity, the RMA has the potential to further this process and *produce* hybrid forms of environmental knowledge. The sections of the RMA that attempt to incorporate the Māori perspective on resource management issues have been discussed above. This

bicultural focus means that two very different worldviews have to be considered in resource management decisions. Outcomes of this process may therefore potentially also reflect the hybridization of environmental values. However, the processes of the RMA often engender power struggles on a variety of scales between affected parties, and these also affect environmental decisions.

Cultural hybridity in Aotearoa occurred not only as a result of colonization, but also as a result of human interaction with nature and landscapes that were foreign to both cultures prior to their arrival (Wai 262, 2011). Pākehā identity developed over time through the interaction of European culture with the rugged wilderness and frontier conditions that early settlers encountered (Wai 262, 2011). Māori culture also changed from its Polynesian origins into something unique to this land as a result of the environmental knowledge gained by negotiating the 'new' environment. In Chapter 4, I thus explained how nature has always been a co-producer of environmental knowledge. Nature has never been passive, and the terrestrial and celestial realms are so interdependent that it makes sense to pay attention to both as parts of an environment whole. As Jones (2009:311) points out:

Nature is not merely a passive stage for human history but rather one of the lead players in the show. Megasystems such as the Sun-Earth-Moon interactions, ocean currents, and exchanges between ocean and atmosphere shape the very conditions within which the human-social exists.

The RMA therefore may be considered both a *product* of and a *producer* of hybrid cultures and environmental knowledge created through *assemblages* of humans, nature and technologies. In ANT terms, it can also be considered a *black box*, due to the fact that the legislation itself conceals competing discourses of nature and development within its words, and circulating power within its processes. These may become unpacked and contested during resource consent hearings. Its vagueness in its mention of the principles of the Treaty of Waitangi, for example, conceals substantial ongoing political contention surrounding their definition and use, and the role and status of the Treaty itself (Matunga, 2000). The *black box* of the RMA has a rich history and as the umbrella legislation for resource and environmental management it also conceals the various statutes it replaced. Moreover, Murray and Swaffield (2000) argue that it conceals certain 'policy myths' regarding the very concepts of resources, sustainable management, integration and rational planning. These concepts are continually being debated and definitions multiply with every new scholarly publication or judicial decision.

But the law itself becomes an *actor* as it directly influences outcomes by restricting or permitting the actions of other *actors*, both human and non-human. This can be demonstrated by describing a mahika kai network or *assemblage* in Canterbury. The law has been established by the central government as an *obligatory passage point* which defines the nature of interactions between other *actors*, both human and non-human, and their roles within the network (Callon, 1986). The NTCSA permits Kāi Tahu *actors* to gather traditional food resources. The RMA obliges local governments to consider the content of iwi plans when making resource management decisions and to also abide by

the NTCSA. If an iwi plan has identified light pollution as an issue affecting the harvesting of tuna/eel from a specific area, for example, such as the *Te Taumutu Rūnanga Natural Resource Management Plan* (2003) does, then a person wishing to develop land in that area may be restricted from acting on the environment without first consulting iwi and Taumutu rūnaka in particular. The actions of each of the human *actors*; the members of council, Kāi Tahu, and the developer, are each influenced by the restrictions or permissions given by law. The environment also acts but is not restricted in its actions by law; however it is acted *upon* according to the law(s) within this network. The celestial darkness needed for harvesting tuna may only be maintained if all of the *actors* are successfully enrolled for this purpose. Iwi plans are one method of achieving this.

However, when the *black box* of the RMA is opened during a resource consent hearing and legal definitions, scientific terms, and the roles and worldviews of *actors* are debated, then outcomes may be influenced by the power-relations circulating within the network. As mentioned earlier, *cultural capital* also plays a role in these processes. The *cultural capital* that RMA processes (such as resource consent or Environment Court hearings) generally reward is based upon the hegemonic Pākehā worldview. But the Act itself can advance the *cultural capital* of Māori when it provides for kaitiakitaka and mahika kai opportunities. Protecting starlight through the RMA will involve human *actors* enrolling others including *intermediaries* such as iwi plans through the phases of *translation*, into a network where light pollution as a threat to mahika kai is *problematized*. This process itself may be described as a group-formation activity whereby mahika kai and kaitiakitaka practitioners *become* Kāi Tahu, and this also positively affects cultural wellbeing.

Conclusion

My discussion of the RMA has generally revolved around the processes of preparing iwi plans or making submissions on local environmental issues. Aside from consultation and the potential for co-management arrangements with councils, these are the processes that Māori and my participants in particular, are most engaged in. What the experiences of my participants, during resource consent or Environment Court hearings have shown, is that relationship-building between individuals on the front line of resource management issues is key to improving Māori participation experiences within the RMA. Capacity-building is also important for improving communication, trust and respect between iwi and councils. Iwi need increased resourcing and training in order to sustain their commitment to local environmental issues, and councils need to educate their members and staff in tikaka Māori in order for the Treaty partners to successfully co-manage the environment – or at the very least find common ground and produce culturally appropriate outcomes.

One of the benefits of iwi plans is that they can be a valuable tool for the preservation and revitalisation of traditional knowledge, including tātai aroraki. Not only are they documents that are officially recognised within the hegemonic Pākehā legal and planning system, and therefore legitimise

indigenous knowledge within that system, but they may prove an invaluable resource to anyone wishing to learn about contemporary Māori culture. Moreover, the process of preparing them may renew interest in old knowledge and practices within Māori communities who have already lost much of their traditional knowledge due to enduring generations of assimilationist policies in Aotearoa. My participants are hopeful that this will be the case. Pākehā too may benefit from the exposure to Māori culture and values that those involved in RMA processes may encounter. Iwi plans localise and situate traditional knowledge and therefore de-homogenise Māori culture in the eyes of Pākehā.

The RMA can be considered a hybrid produced by assemblages of humans and their different worldviews, nature and technologies. It may also produce hybrid environmental knowledge and new cultural forms. RMA processes also add to the many group-formation opportunities for Kāi Tahu which, through the expression of their *cultural capital*, allows them to *become* Kāi Tahu. The iwi plans that mention the celestial realm acknowledge the interdependence of terrestrial and celestial activities. Perhaps the environment (in need of management) that is envisioned within the jurisdiction of the RMA may yet be extended to include the celestial realm in future. I suggest that protecting starlight as a natural and cultural resource important to the cultural wellbeing of Kāi Tahu is fully consistent with the purpose and principles of the RMA and can be achieved with the instruments currently available.

Chapter 6: Conclusion

Introduction

This thesis has argued that starlight is a natural resource of cultural significance to Māori and therefore the RMA may be applied to protect it. The primary threat to starlight visibility is light pollution which happens to be increasing as a result of expanding urban areas. The AMIDSR Working Group recently secured a large area of the Mackenzie District as an international dark sky reserve in order to protect the pristine dark sky conditions there. The cultural values of both Māori and Pākehā were cited as reasons for doing so (Abbari et. al, 2011). As the RMA contains clauses designed to protect the traditional relationship that Māori have with specific environments and resources, it may be used to enrol local governments in support of protecting dark skies.

Interviews conducted with kaumātua from Waihao, Arowhenua and Moeraki rūnaka and a Māori astrophysicist confirmed that despite the loss of much traditional knowledge through colonisation, urbanisation and new technologies, tātai aroraki is being reclaimed and revitalised. For Māori, the celestial realm continues to be an important and inseparable part of the environment. Māori cosmology begins with celestial events and the creation of celestial atua. Whakapapa, the very foundation of the Māori worldview, extend back to these events and atua. Traditional lore relating to elements of the terrestrial environment such as landscape features, wind, flora and fauna, is richly woven with references to celestial atua. Moreover tātai aroraki forms a part of the skills and knowledge associated with mahika kai such as seasonal time-keeping, weather forecasting and navigation. Starlight therefore is an important source of these traditional skills and knowledge.

Cultural capital, in the form of traditional knowledge and practices, is important for the development and maintenance of cultural identity. The expression and performance of cultural capital enables Kāi Tahu to *become* Kāi Tahu. It requires a continual performance of *being*. In turn, a strong cultural identity supported by cultural capital, is an essential element of cultural wellbeing. The RMA defines cultural wellbeing as one of the explicit outcomes of sustainable resource management. Protecting starlight visibility would protect the relationship of Māori with their atua and ancestors, and the source of tātai aroraki knowledge. Preventing or reducing light pollution would ensure that opportunities remain available for those contemporary Kāi Tahu who still possess tātai aroraki to pass on that knowledge by observing the stars together with their children and grandchildren.

The following is a distillation of arguments developed through the triangulation of interview data with textual sources and the conclusions drawn from Chapters 3, 4 and 5.

Land, Sky and Culture

I pointed out in Chapter 3 that the celestial realm provides the basis of both Māori cosmology and the Western-scientific 'big bang theory', the very foundation of Māori and Pākehā worldviews. The stars, recruited as navigational guides by both groups, enabled each to discover Aotearoa and safely return to their homelands to arrange further settler migrations. Kāi Tahu continued to use the celestial realm as seasonal markers to guide daily practices such as fishing and food gathering, weather forecasting and terrestrial navigation whilst viewing the two realms as a connected whole. Western science increasingly separated these realms of knowledge into discrete academic disciplines such as astronomy, climatology and so forth and viewed nature and culture as separate ontological domains. Through the processes of the RMA however, the indigenous and Western-scientific worldviews are increasingly converging as the environmental knowledge produced by each is contested and negotiated and commonalities are exposed. As Don Jellyman and John Wilkie claimed in Chapter 5, science can often validate what has been known to Kāi Tahu for generations.

In Chapters 3 and 4, my participants showed that remnants of tātai aroraki still exist and are practiced today among some contemporary Kāi Tahu. They desire this knowledge to be protected and transmitted to their descendants. If light pollution decreases the number of visible constellations and culturally significant stars then opportunities for intergenerational knowledge transfer will also decrease. A small number of Iwi Natural Resource Management Plans mention the importance of the celestial realm to whakapapa and cosmology, or celestial darkness as an amenity value. But only one Kāi Tahu rūnaka have thus far made an explicit connection between light pollution and mahika kai activities, although their plan does not cover the AMIDSR area. In Chapter 4, Pauline commented that it is not merely the stars that are significant but the dark spaces between them, and these are only distinguishable in pristine dark sky conditions such as those protected by the Aoraki Mackenzie International Dark Sky Reserve (AMIDSR). It is therefore necessary to make the linkages between mahika kai, starlight visibility, light pollution and cultural wellbeing more explicit.

In Chapter 5, I drew from *Ko Aotearoa Tēnei* (Waitangi Tribunal, 2011) to illustrate how both Māori and Pākehā cultural identities had developed over time through interaction with the environment in Aotearoa which had initially been so foreign to them. In this sense, the natural environment was an agent of cultural change as the Polynesians and Europeans slowly emerged as Māori and Pākehā. Conversely, the cultural knowledge and practices of both groups have historically caused extensive environmental change, and attempts at managing that legacy are now being negotiated through legislative instruments such as the RMA. In Chapters 4 and 5, I argued that the unique body of environmental knowledge developed by each group has been co-constructed by the actions of the natural environment and the mediation of technologies. RMA instruments facilitate the expansion of environmental knowledge and the convergence of indigenous and Western-scientific understandings

about particular landscapes and resources.

Furthermore, features of the landscape and skyscape have traditionally been recruited by Kāi Tahu to act as memory banks and teaching aids. In Chapter 4, David told of how traditional knowledge was *spoken into* the constellations during Kāi Tahu Whānui migration voyages in order to aid memorization. This was done through stories that became known as *heavenly stories*. This knowledge was then transferred into the landscape of Te Waipounamu and iwi and hapu identity was thus embedded within mountains, rivers and lakes and *performed* through the cultural practices that take place in these locations. Mahika kai is paramount to the performance of Kāi Tahu Whānui identity and links the celestial bodies to the terrestrial environment through the knowledge and skills provided by tātai aroraki. Rock Art discovered in several limestone caves throughout Canterbury may possibly be linked to tātai aroraki and other traditional knowledge, although this is difficult to ascertain due to the deteriorated state of the artworks and because of the extent of knowledge loss since they were created. Nevertheless it is likely that the drawings were enrolled by the tohuka of the time to help transmit traditional knowledge to new generations. These examples demonstrate that nature and culture have never been separate domains but are intimately part of the ‘collective’ (Latour, 1999).

Moreover, as Jones (2009:311) points out, Sun-Earth-Moon interactions determine ocean currents, and the wind and weather patterns which fundamentally affect all flora and fauna, including humans. The celestial bodies are part of the whole mahika kai resource chain as they are traditionally referred to for guidance in practical aspects such weather forecasting and mark the seasonal availability of specific resources. Furthermore, “intergenerational knowledge transfer” is defined within *The Canterbury Regional Policy Statement* as an inseparable part of mahika kai, and this was confirmed by David, John and Ken who remember their grandfathers’ stories about the stars and are active in passing on those stories to their own children and grandchildren (Environment Canterbury, 2013). The humans (who partake in mahika kai activities), the non-human elements of the natural environment (celestial and terrestrial resources), and the knowledge co-constructed through their interactions, are all essential parts of mahika kai and therefore form part of the performance of Kāi Tahu identity.

Knowledge Performance and Group-Formation

Traditional knowledge and cultural practices are a form of cultural capital that becomes embedded through continued performance which reinforces identity (Latour, 2005; Bourdieu, 1987). This is true for all groups, including Māori and Pākehā. Latour (2005) suggests that performances that reinforce group identity must be repeated often in order to become stable or alternative identities will become possible. In this sense, a group does not really exist as a discrete entity, but is continually being formed and re-formed. For my Kāi Tahu participants, engaging in mahika kai activities has a stabilizing influence on their identity. For some Pākehā, asserting private property rights and presenting scientific evidence

during a resource consent hearing could be considered as an identity performance if it stabilizes their worldview and Pākehā identity. In this way RMA processes afford many different group-formation opportunities.

Rather than consisting of finite definitions, groups are *processes* (Latour, 2005). This becomes obvious when we consider how the Te Rūnanga o Ngāi Tahu Act 1996 defines members of Kāi Tahu as those who can trace their whakapapa back to an 1848 census, or how the legal definition of Māori has changed over time from the use of a specific blood quantum to “any descendant” (Meredith, 2006; McIntosh, 2005). Many Māori prefer to include cultural capital, such as knowledge of tikanga and connection to the marae, as group membership criteria rather than genealogy alone (Coates, 2009). Moreover, group boundaries are seldom fixed, as the concept of whakapapa allows for some contextual fluidity (Anderson, 1982; Beattie, 1939).

The RMA provides group-formation opportunities for both Māori and Pākehā through submissions, hearings, the testimony of experts, and through instruments such as policy statements, regional, district and iwi plans that legitimize worldviews and knowledge, and therefore help stabilize group identity. Ken alluded to this in Chapter 3 when he spoke of the RMA providing opportunities for Waitaha knowledge and identity to be officially recorded as evidence in resource management matters of concern to them. As Stalder (1997: unpaginated) explains, “the promotion of a network is a way to ensure the actor's existence and development. It is, therefore, in the interest of all actors within a particular network to stabilize the network which guarantees their own survival to a higher or lower extent”. Arguably, the books *Song of Waitaha* and *Whispers of Waitaha* have been put into circulation as intermediaries in order to align more actors to the group's interests (Stalder, 1997). Iwi Plans could be considered in much the same way as their explicit purpose is to communicate group values and identity in relation to the environment. Regional and District Plans also act as intermediaries as they guide urban planning and resource management actions in directions compatible with the group's values. John's experience (described in Chapter 5) of giving evidence and having someone refute him before scientist Don Jellyman spoke in his defence, is also an example of the process of group-formation as conflicting worldviews are contested by different actors. In each of the examples above, ‘the group’ consists of those who were involved in the creation of the intermediary and enrolled it to recruit new actors and help stabilize the network (of group identity). Group boundaries are therefore either stable or unstable at any given time as a consequence of group-formation processes which always include alternative possibilities or *anti-groups* (Latour, 2005).

Moreover, the boundaries of the celestial and terrestrial environments are also fluid as energy is transferred from one to another. The Earth's magnetic field holds the moon in its orbit, and the moon in turn draws the Earth's oceans towards its mass, creating tides. Kāi Tahu, Waitaha, Māori, Pākehā, nature, culture, the celestial and terrestrial environments therefore, are not so much fixed entities with discrete boundaries of inclusion and exclusion, but are networks continually being formed

and re-formed through the performance of actors, actants, intermediaries and mediators. The diversity and seasonality of mahika kai provides group-formation opportunities for Kāi Tahu, as does the RMA. The RMA can be further enrolled to protect the group-formation value of mahika kai by protecting *all* of the resources associated with it, including starlight. Applying the RMA to the protection of starlight visibility would protect the taoka of celestial atua and Kāi Tahu's relationship with them, the natural (celestial) resource upon which the taoka of tātai aroraki knowledge and skills are based, and ensure that Kāi Tahu group-formation opportunities continue to exist along with opportunities for intergenerational knowledge transfer. Thus, the RMA would go some way to enabling Kāi Tahu to provide for their cultural wellbeing. Much of this would not have been possible had it not been for the various attempts at preserving Kāi Tahu traditional knowledge that have occurred over past generations.

The RMA and the Knowledge Preservation Relay

As mentioned above and in Chapter 4, Kāi Tahu knowledge is embedded in the natural environment through narratives that link landscape and skyscape features and natural resources together in genealogies that aid the memorization of knowledge and its proper application. Key components in the transmission of cultural knowledge are observation and experience, or the *performance* of knowledge (Moller et al, 2009). Chapter 3 described how the Tohunga Suppression Act 1907 had a devastating effect on the transmission of cultural knowledge as many tohuka either ceased passing on their knowledge or were driven to do so in secret lest they face imprisonment. Around the same time however, Pākehā ethnographers began to collate Māori knowledge and customs for publication out of fear that Māori culture would disappear, and Māori families took to recording their histories and knowledge in manuscript form. Iwi Natural Resource Management Plans are perhaps a contemporary form of similar knowledge preservation efforts, albeit at a different scale. Oral tradition has continued, but has been supplemented by these different technologies.

A consequence of having material records of history and knowledge was that these could be presented as evidence when Kāi Tahu Treaty claims were being considered by the Waitangi Tribunal. Kāi Tahu history as recorded by Stack, Best and Beattie in the late 19th and early 20th centuries then affirmed the oral accounts given by descendants of their informants during the latter part of the 20th century. The passing of the Ngāi Tahu Claims Settlement Act 1998 punctuated much of this knowledge into a black box. The RMA now provides opportunities for it either to be *added to* through the revision of Iwi Plans, or for the black box to be opened and its contents contested. Kāi Tahu knowledge, including tātai aroraki, is now preserved in various intermediary forms, including websites that can be accessed instantly through wireless internet technology transported by the very same electromagnetic spectrum that enabled such patient observation of the stars in the first place.

Technology has translated knowledge into increasingly more durable and mobile forms. Yet, as

a network of people, the natural environment, legislation and technologies, *environmental knowledge* (or any knowledge for that matter) is always in flux with stability only a temporary state. This is just as well or we would be culturally and intellectually stagnant with no possibility for the production of new knowledge. It is in this sense that nature, Māori, Pākehā and various other identities co-construct one another through the use of group-formation opportunities provided by the RMA which has become the obligatory passage point for the management and use of natural resources in Aotearoa. My participants have each been enrolled into this knowledge preservation relay at various points, some acting through the RMA and one through academia and indigenous research groups, but all connected to previous actors such as Stack, Best and Beattie whose influence has endured over time thanks to intermediary technologies. Tātai aroraki can only be protected through the RMA if actors involved in the preparation of Iwi Plans make it a priority to protect starlight visibility.

Summary

This thesis, although primarily focused on Kāi Tahu due to their connection with the AMIDSR, has described the RMA instruments that may be applied to the protection of starlight as a natural resource of cultural significance to Māori in all regions of Aotearoa. Protecting starlight visibility would not only protect the taoka of the celestial bodies themselves, but the taoka of traditional environmental knowledge associated with them. This is consistent with the purpose of the RMA in that it would enable Kāi Tahu to provide for their cultural wellbeing. Sections 5, 6, 7 and 8 of the RMA contain the principles by which starlight can be protected, which are also consistent with the principles of the Treaty of Waitangi. The Canterbury Regional Policy Statement acknowledges that the “whole [mahika kai] resource chain” includes the “intergenerational transfer of knowledge” (Environment Canterbury, 2013:15). Starlight is also a natural resource within the mahika kai resource chain and enabling opportunities for the intergenerational transfer of tātai aroraki knowledge positively affects the cultural wellbeing of those involved, whether it is Māori as a group, iwi such as Kāi Tahu, or individual hapū and whanau such as those mentioned by my participants.

The adversarial nature of RMA processes may cause some to view them as a platform for power struggles, but it is *autonomy* that iwi desire most, not power as Pākehā may conceive it (Matunga, 2000; Jackson, 2004). Some Māori desire the *space to be Māori* and having indigenous environmental values recognised and integrated into resource management policies, statements and plans ensures that activities such as mahika kai continue to provide essential group formation opportunities. RMA processes also afford Pākehā group formation opportunities as the Western-scientific worldview is articulated (and often dominates) in resource consent hearings. By appreciating that there is ‘no group, only group formation’, the binary of Māori and Pākehā is destabilised (Latour, 2005). In this light, Iwi Natural Resource Management Plans, by preserving traditional knowledge, are enrolled as boundary

keepers; “mobilized to make the group boundary hold against the contradictory pressures of all the competing anti-groups that threaten to dissolve it” (Latour, 2005:33). Arguably, the same group formation tools that are mobilised within RMA processes also form cultural and epistemological hybrids as two worldviews increasingly converge.

By tracing attempts to preserve tātai aroraki I have introduced human *actors* from various time periods such as Stack, Best, Beattie, their notable Kāi Tahu informants, the victorious Treaty claims negotiating team, and my participants. These connections also highlighted the importance of non-human *actants*, *mediators* and *intermediaries* such as the Treaty of Waitangi, the Tohunga Suppression Act 1907, Te Rūnanga o Ngāi Tahu Act 1996, the Ngāi Tahu Claims Settlement Act 1998, the Resource Management Act 1991, and Iwi Natural Resource Management Plans, and the many ways in which these either empowered or disempowered the human *actors*’ attempts at group formation through knowledge preservation. The RMA therefore is an *intermediary* acting within a temporally and spatially topological network of environmental knowledge construction, contestation and preservation. Protecting starlight visibility protects knowledge performance opportunities and enables cultural wellbeing.

The stars are traditionally used for navigation, seasonal time-keeping, fishing and weather forecasting in mahika kai and are the tipuna atua of Kāi Tahu. These *assemblages* destabilize the nature-culture binary that underpins the Western-scientific worldview and erases the conceptual boundary between the celestial and terrestrial environments. Applying the RMA to protect starlight visibility from light pollution would enable Kāi Tahu to provide for their cultural wellbeing by;

- a) Maintaining clear visual shafts between them and their atua which is important for maintaining a relationship with those atua,
- b) Ensuring that there are opportunities for tātai aroraki knowledge transmission within mahika kai contexts and,
- c) Maintaining environmental balance and human physical, mental and spiritual wellbeing.

Finally, visibility of the stars is also important to many Pākehā as the predominantly Pākehā AMIDSR Working Group have shown. The designation of the AMIDSR has defined the cultural skyscape of the Mackenzie Basin in terms of the cultural values of both Kāi Tahu and Pākehā. Figure 6.1 below illustrates this hybrid cultural skyscape, the stunning geographical location which anchored and inspired my thesis. When the *Canterbury Regional Policy Statement* is next reviewed, I would hope to see this outstanding skyscape mentioned next to the Mackenzie Basin on its list of “outstanding natural features and landscapes”.



Figure 6.1: "Enjoy the Stars". Source: Maki Yanagimachi, Earth & Sky Ltd.

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