

## Final Draft Cover Sheet

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**Title of Report** Impacts of the *Rena* shipwreck on the *mauri* (life-giving force) of Motiti Island, New Zealand

**Class** GEOG 333

**Word count**

**Date turned in** 14 June 2012

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**THE IMPACTS OF THE *RENA* SHIPWRECK ON THE MAURI (LIFE-GIVING  
FORCE) OF MOTITI ISLAND, NEW ZEALAND**

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## THE IMPACTS OF THE *RENA* SHIPWRECK ON THE MAURI (LIFE-GIVING FORCE) OF MOTITI ISLAND, NEW ZEALAND

**Abstract:** On 5 October 2011, container vessel *Rena* grounded on Astrolabe Reef, off the coast of the Bay of Plenty in New Zealand. Fuel oil spilled out of the hull, contaminating beaches, wildlife, and seafood. Shipping containers plummeted off the boat and into the sea, some were salvaged and others washed up onto the shore. The *Rena* spill greatly reduced the mauri (life-giving force) of the area surrounding the wreck. For the Patuwai Māori of Motiti Island, located only 7.4 km from Astrolabe reef, their livelihoods were diminished. Using the Mauri Model developed by Morgan (2006), the author undertook a study to assess the impact on mauri based on four parameters or well-beings; environmental, economic, social and cultural. Upon assessment, the author found that the mauri of Motiti Island was largely degraded. Due to the immense costs of long term clean up and restoration, it is unlikely that the mauri will be restored in the near future.

**Keywords:** Māori, Mauri Model; oil spill; *Rena*; Motiti Island

### Introduction

In the early morning of 5 October 2011, container vessel *Rena* was en route from Napier, New Zealand to Tauranga in the Bay of Plenty when it wrecked on Astrolabe reef. The wrecking of the *Rena* and the subsequent oil spill set forth what the NZ Minister for the Environment has deemed the worst environmental maritime disaster in New Zealand history. Due to New Zealand's rough coastline, it is not uncommon for ships to founder en route to their destinations. According to Maritime New Zealand, the agency safeguarding New Zealand's shores, there have been four major marine oil spills since 1990, excluding the *Rena* spill (Maritime New Zealand 2012). The wrecking of the *Rena* has caused damage on a far greater scale than any previous spill, with thousands of tonnes of fuel oil released into the environment. Comparatively, previous wrecks, such as

the *Jody F Millennium* off Gisborne, New Zealand, released only 25 tonnes of fuel oil into the sea.

Extensive research has been undertaken to study oil spills and their impacts on the marine ecology of coastal areas, for example, Blumer & Sass (1972), Gin et al (2001), Peterson et al (2003). Recent interest in the field has grown since the BP Deepwater Horizon blowout occurred in April 2010 in the Gulf Coast of the United States. Some studies have focused on the impact of the spill on fish life and seafood consumption safety, as in Fodrie et al (2011) and Gohkle et al (2011). Others have focused on environmental and economic damages, as in Smith, Smith & Ashcroft (2010). Research has also been done to measure the impacts on the mental well being of Gulf Coast communities (Grattan et al, 2011). By studying the long-term effects of the Exxon Valdez disaster of 1989, we can gain a better understanding of what the coastal and marine environment may be like in the Bay of Plenty, 20 years after the *Rena* spill. Research on the impacts on the Gulf Coast community from the BP spill will be useful as a basis for measuring the social impacts of the spill on the people of Motiti Island.

This study examines the social, environmental, economic and culture impacts of the *Rena* on the Bay of Plenty in New Zealand, with a focus on Motiti Island. It investigates the impact on the mauri, or life-giving force of Motiti Island, using the Mauri model (Morgan 2006) as a framework. The shipwreck damaged an environment that has significant cultural value to the local New Zealand Māori hapu (families) and iwi (tribes). The *Rena* shipwreck wreaked havoc on the ecology of the area, releasing thousands of tons of fuel

oil into the ocean, which washed up onto the nearby coastline. Oil was found on beaches from Maketu to Mount Maunganui, and on the shores of Motiti Island. The oil poisoned fish and shellfish, and harmed bird life. The Patuwai Māori of Motiti Island live only 7.4 km from the wreck. They depend on subsistence fishing and can no longer fish off their island. This has greatly impacted their livelihoods as self-sustaining people. By gathering research from previous literature and using current information on the *Rena* spill the author measured how the disaster has degraded the mauri of Motiti Island.

The Mauri model is an excellent tool for assessing damage because it's not simply based on a cost-benefit analysis. It integrates and gives weight to aspects of an issue that may be traditionally overlooked, such as cultural impact. Using this model the author came to the conclusion that the mauri of Motiti Island has been largely degraded. Due to the sheer scale of the *Rena* disaster it is unlikely that the mauri will be restored in the near future. The impacts of the *Rena* wreck will linger for many years.

## **Background**

On 5 October 2011, the *Rena* was carrying cargo en route to Tauranga from Napier, New Zealand. On board were 1368 containers of goods and 1733 tonnes of fuel oil. When the captain decided to take a shortcut, the navigators miscalculated and the ship ran aground on Astrolabe reef, approximately 12 nautical miles (22 km) off Tauranga in the Bay of Plenty, and 4 nautical miles (7.4 km) north of Motiti Island. The reef pierced the hull of the *Rena*, leaking fuel oil into the sea. The *Rena* was lodged on the reef, with salvage

crews afraid to move it, fearing that it would cause more oil to leak out of the boat. Some of this oil was contained around the ship, but much of it washed up onto beaches on the nearby coast. In total, approximately 360 tonnes of oil had leaked out of the ship as of December 2011 (Ministry for Environment 2011).

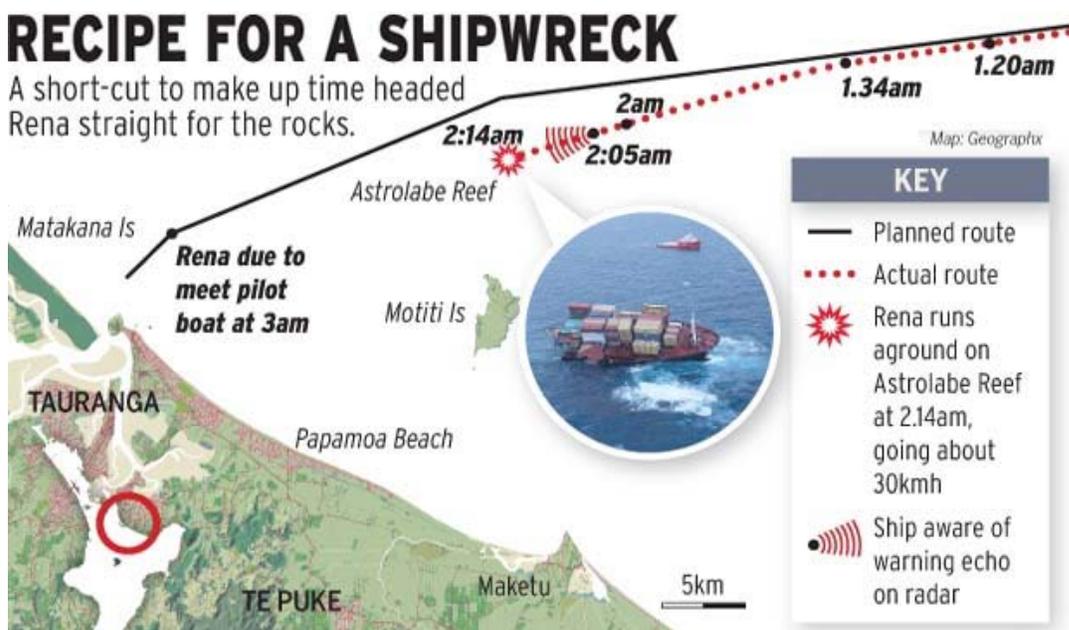


Figure 1. Map of shortcut resulting in the grounding of the Rena.

Image courtesy: <http://www.stuff.co.nz/environment/rena-crisis/6547008/Rena-captain-took-shortcuts>,

Accessed 30 May 2012.

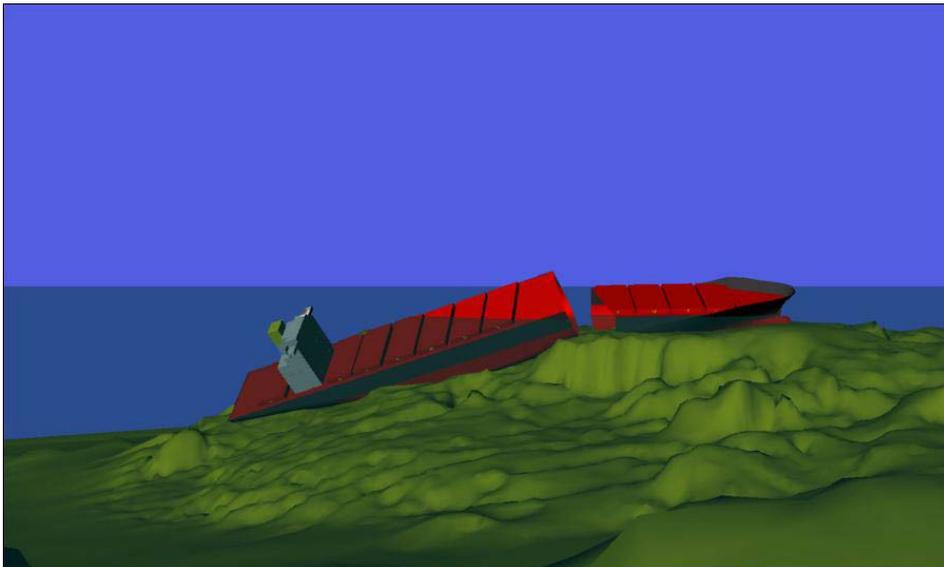
### ***Clean-up Effort in the Bay of Plenty and Motiti Island***

1000 tonnes of waste had been collected from the beaches as of 12 December 2011, with an additional 630 tonnes recovered from the shipping containers. Inside the containers were timber, foodstuffs such as milk powder, noodles, meat, and rice dinners, and small plastic beads known as “nurdles”. Of these materials, the nurdles have been the most harmful- littering beaches and being swallowed by animals that then die of starvation when the nurdles fill their stomachs. Svitzer Salvage, a salvage company hired by Maritime New Zealand to handle salvage operations, had removed 1350 tonnes of oil from *Rena* as of 1 Dec 2011 (Ministry for Environment 2011). Work is still being done to salvage the remains of the *Rena* as well as the shipping containers that tilted off the boat and into the sea. The clean up effort has been headed by Maritime New Zealand in partnership with the Ministry for the Environment and the Department of Conservation. Government agencies, organizations, and community volunteers were hard at work to contain oil around the boat and to remove oil from beaches along the coastline. They used a chemical dispersant to dissolve the oil slick and raked beaches to gather oil to be disposed. Clean up teams from the Te Papa Museum of Wellington and volunteers helped remove oil from birds, seals and blue penguins. When it initially grounded, the *Rena* was lodged on top of Astrolabe reef, until 8 January 2012 when a strong storm brought a sea swell that broke the ship in half. Now both sections of the ship are partially submerged and lie on top of the reef. Salvage teams are now working to remove debris from the reef.



**Figure 2. Map of location of Rena and position on Astrolabe reef as of December 2011**

Image courtesy: Maritime New Zealand, <http://www.bbc.co.uk/news/world-asia-pacific-15268314>, Accessed 30 May 2012



**Figure 3. Current position of Rena on Astrolabe reef as of January 2012**

Image courtesy of Maritime New Zealand: <http://www.scoop.co.nz/stories/HL1201/S00051/3d-modeling-images-of-mv-rena-sunk-on-astrolabe-reef.htm>. Accessed 30 May 2012.

Clean up on the isolated island of Motiti was slow to begin. Due to the close proximity of Motiti Island to the Rena wreck, it has been especially hard hit by the oil spill. The shorelines of Motiti are rocky, allowing oil to collect on and under rocks and in shallow pools. This topography made oil clean up extremely difficult. Clean up on Motiti was spearheaded by individual action from residents and outside volunteers, such as diving company Dive Planet, who organized volunteer trips to the island. Since Motiti has only 30 permanent residents, they greatly needed outside assistance to help with the clean up effort. They have long prided themselves on their self-reliance and independence and to have to ask for aid made the residents feel helpless. The oil spill contaminated fisheries located off Motiti Island. The Island's residents who have long relied on kaimoana (seafood) as their main food source, had to turn to food aid from the mainland. Not being able to provide themselves and guests with kaimoana damaged the mana (prestige) of the people. Therefore, not only did the Rena wreck damage Motiti Island's coastlines, wildlife, and fisheries, it also had deep impacts on the psyches of the island's people.

The people of Motiti, known as the Patuwai, call Astrolabe Reef by its Māori name, Te Tau o Otaiti, or Otaiti for short. Te Tau O Otaiti means the waharoa (gateway) to Motiti. It is believed that Ngatoroirangi, the tohunga (priest) who first set foot in Aotearoa/New Zealand, stopped at Otaiti reef before voyaging on to Motiti Island and beyond. He was travelling from Hawaiki, the mythical Māori ancestral homeland, and stopped at Otaiti reef to perform karakia before travelling on to Motiti Island (Ministry of Environment 2011). Karakia are Māori prayers to wish for a favourable outcome, and are also used as a formal greeting before ceremonies. Ngatoroirangi was praying for safe passage into

Aotearoa New Zealand. Otaiti reef and the surrounding area are significant sacred sites for the Māori of Motiti Island and the Bay of Plenty. The foundering of the *Rena* not only impacted the environment and the livelihoods of the people of Motiti Island, it also desecrated a culturally important place.

The main areas of concern as highlighted by the New Zealand Ministry of Environment are the beaches and shorelines of the Bay of Plenty, benthic habitats, water quality and the water column, kaimoana (fisheries), and wildlife (Ministry of Environment 2011). The poisoning of fish from oil has resulted in inhabitants not being able to eat seafood, forcing them to turn to other food when fish was once the main staple of their diet. No testing of kaimoana has yet been undertaken at Otaiti reef, but people have been advised not to fish or consume shellfish or fish from the surrounding area (Ministry of Environment 2011). It is unclear when residents of Motiti Island will be allowed to fish off their island again, until then they are forced to rely on alternative food sources.

The extent of the oil spill is far reaching, impacting the coastline of the Bay of Plenty and the marine environment. The most heavily affected areas, according to Maritime New Zealand, stretch from Maketu to Mt. Maunganui to Waihi Beach along the coast, and encompass Motiti Island and open water surrounding the site of the wreck on Astrolabe reef. The spill has affected coastal and marine wildlife, as well as has made some beaches unfit for human recreation and seafood unsafe for human consumption. Oil washed up on the coastline poses a risk to wildlife, domestic animals and human health (Ministry of Environment 2011). Besides the environmental impacts, the region near the spill is an

area of high cultural, historical and spiritual significance to the Māori. The shipwreck has damaged legendary sites where the first Māori set foot in Aotearoa from Hawaiki their mythical ancestral homeland. The *Mauri* of these areas may not be restored for a long time, and will never be as it was before the *Rena* disaster.

## **Methods**

The author did not undertake data collection for this study. Instead she based her investigation into the impacts from previous research. She gained much insight from Colin Reeder of the Moana a Toi Iwi Leaders Forum, a group representing iwi (Māori tribes) of the Bay of Plenty who have been affected by the *Rena* spill. The author relied mainly on the Ministry for the Environment's *Long-Term Environmental Recovery Plan*, as well as on current news reports on the state of the disaster. The author also conducted a literature review to have a background of knowledge on oil spills in order to gain a better understanding of the impacts of *Rena* spill.

To measure the impacts of the spill, the author used the Mauri Model, as developed by Morgan (2006). Mauri is an Māori term that means the life-giving force of a living being or place. It is the force that binds the physical with the spiritual. The Mauri model is a good measure of sustainability because when the Mauri is degraded, it can no longer sustain life. The Mauri Model is a simple framework for assessing the impact on Mauri using environmental, social, economic and cultural well-beings. For each well-being

indicators are used to assess the change in Mauri. For example, to assess changes in Mauri in the environment, one can use impacts on wildlife as an indicator. To determine the impact on Mauri for each indicator, the level of Mauri is given a numerical value from +2 (Mauri at full potential/fully restored) to -2 (completely degraded) (Hikuroa, Slade & Gravley 2011). The Mauri model enables indigenous people to grade the impact on Mauri using a simple system, which can be integrated into traditional scientific study. Understanding how the Mauri has been affected enables decision makers and policy makers to take action to restore the Mauri, or life of an area. Understanding how the Rena has degraded the Mauri wreck will serve as a guide for the restoration of the Bay of Plenty.

**Figure 4 Mauri model from Morgan (2006)**

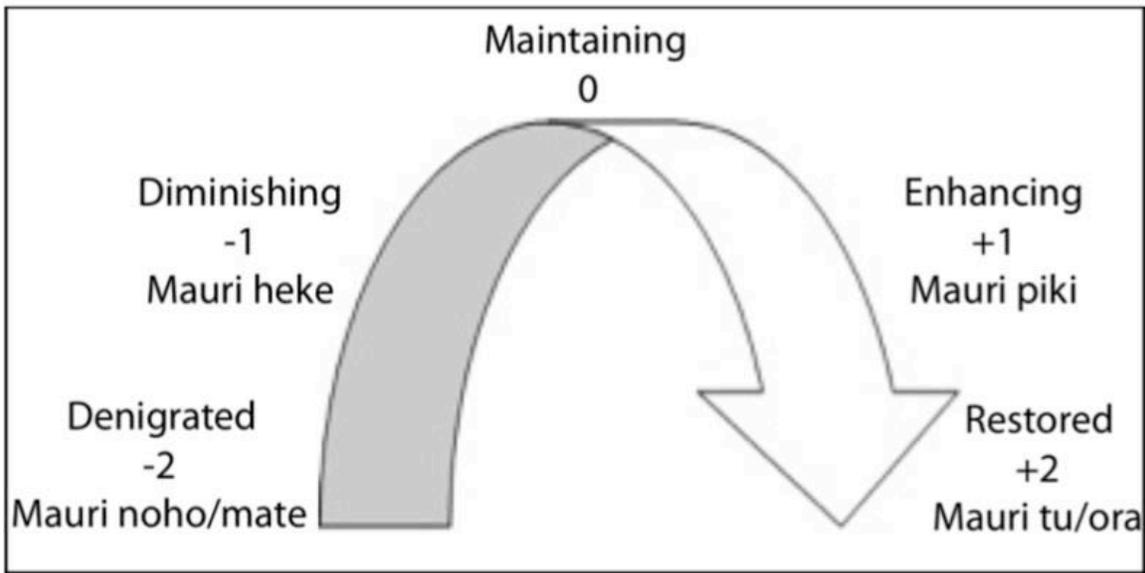


Image courtesy Hikuroa, Slade & Gravley (2011)

## **Results**

The Mauri model is composed of four well-beings- environmental, economic, cultural and social. Below is a list of indicators for each well-being; using these indicators the author estimated the overall change in Mauri from before the Rena wreck and after. See figure 5 for assessment of indicator values.

### ***Environmental Indicators***

- Marine life- death of fish, shellfish, seals and penguins due to being coated in fuel oil, consuming contaminated food, and consuming plastics, chemicals, and other harmful contents from containers
- Bird life- loss of breeding habitats of native New Zealand birds and little penguins, death from oil coating, death from consumption of contaminated prey and harmful contents from containers
- Coastal habitat- oil washing up on beach and coating sand, oil slick on coastal waters and in tide pools- degrading quality of coastal habitat
- Fuel oil contamination- oil washed up on the Motiti shoreline, poisoning marine life and pooling in still water
- Ship debris pollution- components of ship body washing up on beaches, must be removed by salvage crews
- Shipping container contents pollution- shipping containers washing up on beach and spilling contents on shore as well as in the open water. The majority of the

contents have been relatively benign, such as timber and foodstuffs like butter, powdered milk, noodle packets and rice. More recently, small plastic beads known as ‘nurdles’ have been littering beaches as far as the Coromandel. Due to the sheer multitudes and size of the beads they are difficult to remove from beaches. They are difficult to digest and when swallowed by wildlife they block food from entering the stomach, causing birds and other species to starve to death (Crispe 6 April 2012).

### ***Economic Indicators***

- Clean-up costs- As of 7 Feb 2012, the cost of clean-up from the Rena wreck totalled at \$130 million, according to Nick Smith of the Ministry for the Environment (APNZ 7 Feb 2012). The ship’s owner, Greek shipping company Costamare and its insurers are incurring much of the cost. But \$35 million is coming from the pockets of New Zealand taxpayers (Reid 27 May 2012).
- Loss of earnings from fishing- residents who rely on selling fish for a living must look for other means of income.
- Buying food from mainland- includes cost of transport to and from mainland (fuel costs, boat hire etc), and cost of buying food from supermarket

### ***Social Indicators***

- Recreation- can no longer swimming, boating, sitting on beach
- Fishing- no fishing or gathering of shellfish is allowed off the coast of Motiti Island. Unknown how long the ban on shellfish gathering and fishing will last

- Psychological impact- residents must deal with the stress of the destruction of their home and adapt to changes in lifestyle
- Community bond- tragedy has brought Motiti Island community together as neighbours help each other during time of crisis
- Loss of livelihood- Island resident's lives drastically changed after *Rena* wreck, can no longer rely on fishing for income and food

### ***Cultural Indicators***

- Kaimoana (seafood)- Māori term for seafood, Motiti Islanders have caught fish for generations, preserving old traditions. By having to change their diets and acquire food from elsewhere, they are losing a key aspect of their cultural identity
- *Mana* (pride, prestige)- Fishing and gathering of kaimoana and providing seafood at gatherings and for guests is a major source of pride for the *Patuwai*. Not being able to provide seafood for their families is embarrassing and causes loss of *mana*.
- Cultural significance of area- Motiti Island and *Otaiti* reef, where the *Rena* is now submerged are significant sites for the Māori of the area. The shipwreck desecrated the area where Ngatoroirangi first landed in Aotearoa. The *Mauri* will not be restored until all ship debris, containers and their contents, and fuel oil is removed.

**Figure 5. Mauri model indicators and values**

Type	Indicator	Pre-Rena Wreck	Post-Rena wreck
Environmental	Marine life	1	-2
	Bird life	2	-2
	Coastal habitat	2	-2
	Fuel contamination	2	-2
	Ship debris pollution	2	-2
	Shipping container content pollution	2	-2
Economic	Clean-up costs	2	-2
	Loss of earnings from fishing	2	-2
	Buying food from mainland	2	-2
Social	Recreation	2	-2
	Fishing	2	-2
	Psychological impact	2	-2
	Community bond	1	2
	Loss of livelihood	2	-2
Cultural	<i>Kaimoana</i> (seafood)	1	-2
	<i>Mana</i> (pride, prestige)	2	-2
	Cultural significance of area	2	-2
Total		31	-30
Mauri assessment		1.8	-1.8

## **Discussion**

### ***Mauri Model Assessment***

Based on the Mauri model analysis, the state of Mauri before the grounding of the *Rena* was at 1.8. Afterwards, it was at -1.8. This equates with a negative change in Mauri of 3.8. This assessment reveals that the Mauri of Motiti Island and the surrounding area have been greatly degraded.

The mauri of Motiti Island has been impacted environmentally, economically, socially and culturally. The indicator that had the greatest impact on the mauri was loss of marine life due to oil slick on the water. This loss of marine life had environmental, economic, social and cultural impacts. Environmentally speaking, the species richness and diversity off the Island's shores has diminished, going from +1 to -1. It may take years for fish, bird and mammal populations to recover. Economically, Motiti Island residents can no longer fish off their shores and are forced to purchase food from the mainland to supplement their diets. Fishermen are no longer able to sell fish and must look to other sources of income. Socially, people can no longer fish for recreation. They are forced to look to outside aid to help restore their island, which has a deep psychological impact on once self-reliant people. The only indicator that saw a positive increase was community bond, from +1 to +2. The wake of the *Rena* disaster has brought the Patuwai together, united to clean up and restore their island. Culturally, the mauri of Motiti Island has been greatly damaged, going from +2 to -2. Otaiti reef, where Ngatoroirangi first set foot

before entering Aotearoa New Zealand, has been desecrated by oil and debris. Mana (pride, prestige) has diminished because they can no longer fish for kaimoana to feed themselves and their guests. Until fisheries recover and Motiti residents are allowed to fish again off their shores, the mauri of the island will remain diminished for some time.

### ***Further study***

There are limits to this study on the impact on mauri of Motiti Island. The author recommends further study being undertaken in the future to create a more thorough understanding of the issue. Firstly, the author should visit Motiti Island and witness how the *Rena* disaster has impacted the wellbeing of the island and the Patuwai Māori of Motiti first-hand. The author recommends that in future study, water sampling should be undertaken off the shoreline to measure oil and chemical content. A species richness study can be undertaken as well to assess the biodiversity around the Island. To have a more accurate and comprehensive Mauri model assessment, Motiti residents should be invited to devise indicators and do an assessment themselves. Through this, scientists will understand what aspects of the four well-beings are most important to the Patuwai of Motiti. Without direct communication between scientists and the residents of Motiti, there will not be an adequate understanding of the impact of the *Rena* on the Mauri of the area.

## **Conclusion**

The *Rena* shipwreck and oil spill is considered the worst environmental disaster in New Zealand history. Since the wreck occurred relatively recently, much is still uncertain about the environmental and social impacts of the spill. As of now, no formal study has been undertaken to understand how the *Mauri* of the Bay of Plenty has been impacted by the *Rena* spill. Employing the *Mauri* model is crucial to furthering our knowledge of the *Mauri* of the area that has been degraded, and how or if it can be restored. We can integrate the *Mauri* model into our base of scientific knowledge to get a more complete picture of the environmental impacts of the *Rena* disaster. Using this integrated information, scientists, government agencies and local *iwi* can work side by side to clean up the spill and restore the environment, since they will all have the same basic understanding of the importance of *Mauri*. This study is crucial for uniting scientists and local people to respond together to mitigate the impacts of the *Rena* spill.

## **Glossary**

(Te reo Māori to English)

*Aotearoa*- “Land of the long white cloud”, Māori name for New Zealand

*Hapu*- tribe, clan, kinship group

*Hawaiki*- mythical ancestral homeland of Māori

*Iwi*- tribe, people (encompasses more people than a hapu)

*Kaimoana*- seafood, shellfish, fisheries

*Karakia*- prayers for safe passage, formal greeting before ceremonies

*Mana*- pride, prestige

*Maori*- indigenous people of New Zealand and name of their language

*Mauri*- life-giving force, basis of Mauri Model assessment (Morgan 2005)

*Ngatoroirangi*- priest from Hawaiki who was the first Māori to settle in Aotearoa/New Zealand, stopped at Otaiti Reef before travelling on to Motiti Island

*Patuwai*- Māori tribe who resides on Motiti Island

*Te Tau O Otaiti/Otaiti reef*- Māori name for Astrolabe reef, meaning gateway to Motiti

*Tohunga*- priest

*Waharoa*- gateway

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## **Acknowledgements**

The author would like to thank Professor Dan Hikuroa and Professor Jan Lindsey of the University of Auckland for their help and guidance throughout this project. She would also like to thank Colin Reeder of the Moana a Toi Iwi Leaders Forum for his knowledge about the impact of the Rena disaster on the local Māori . She thanks Olivia Platia for providing helpful advice on a previous draft of this paper. Lastly, she would like to thank the Frontiers Abroad program for enabling her to do this project.