Ecological Indicators 79 (2017) 228–246

Contents lists available at ScienceDirect

Ecological Indicators

journal homepage: www.elsevier.com/locate/ecolind

Original Articles

Ensuring objectivity by applying the Mauri Model to assess the post-disaster affected environments of the 2011 MV Rena disaster in the Bay of Plenty, New Zealand

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ARTICLE INFO

Keywords:
Objective impact assessment
Oil spill
MV Rena
Mauri
Mauri Model
Indicator sets

ABSTRACT

The 2011 MV Rena grounding on Otāiti (Astrolabe reef) in the Bay of Plenty, New Zealand is considered to be New Zealand's worst maritime environmental disaster and one of the most expensive shipwreck and oil spill salvage and recovery operations ever undertaken, with the clean-up currently costing in excess of $660 million (NZD) (Schiel et al., 2016; Beca, 2014). The resultant environmental impacts due to the fuel oil spilled and flotsam were also experienced anthropocentrically as economic, social and cultural impacts. The presence and consideration of impacts experienced by the indigenous groups of the impacted regions within the on-going recovery process is a major contributing factor to the uniqueness of this scenario internationally. The scale and complexity of impacts from this disaster is without precedent in New Zealand. The consideration of past and potential future impacts is especially significant in present times, with the resource consent application to leave the remnants of the wreck and associated debris in place on the reef and seabed, being granted on February 26 2016.

The assessment builds on the methodology presented by Faaui et al. (2016) which established indicator sets for measuring impacts upon the mauri of the affected environments (post-Rena state) and assessing the state of the environment prior to the grounding (pre-Rena state). Using the sustainability indicator sets compiled previously by Faaui et al. (2016), the Mauri Model Decision Making Framework has been used to present a holistic assessment of the impacts of the disaster on the reef and surrounding ecosystems, from October 2011 (date of the grounding) to October 2015. These indicators have been expanded on, defining the threshold conditions for scoring the indicators within the Mauri Model. The impact assessment methodology has included a process that identifies the indicator scoring thresholds which ensures objectivity in the scoring of indicators, and therefore the impact assessment, allowing for repeatable and robust results.

This assessment is the first use of the Mauri Model Decision Making Framework at this scale, providing a holistic assessment of the impacts experienced within the Rena affected regions in this post-Rena time period. This research leads directly into the post resource consent time period and the associated future impacts as a result of the consent and given consent conditions.

1. Introduction

The MV Rena grounding in the Bay of Plenty, New Zealand, 2011, is considered New Zealand's worst maritime environmental disaster (Sharpe et al., 2011). The container vessel ran aground Otāiti (Astrolabe reef) (Fig. 1), spilling approximately 350 t of heavy fuel oil (of 1730 t on board) and losing shipping containers overboard (361 remain unrecovered, of 1368 on board) as the vessel developed a list due its position on the reef and flooding of its holds. The environmental impacts that accompanied the grounding were noticeable within days, with heavy fuel oil washing ashore the surrounding coastlines (Schiel et al., 2016). Within weeks of the grounding flotsam and the remnants of containers from the vessel were also washing ashore, aggravating the oil pollution impact and early onshore recovery efforts (Transport Accident Investigation Commission, 2014).

The detrimental environmental impacts observed due to the disaster

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http://dx.doi.org/10.1016/j.ecolind.2017.03.055
Received 25 November 2016; Received in revised form 28 March 2017; Accepted 30 March 2017

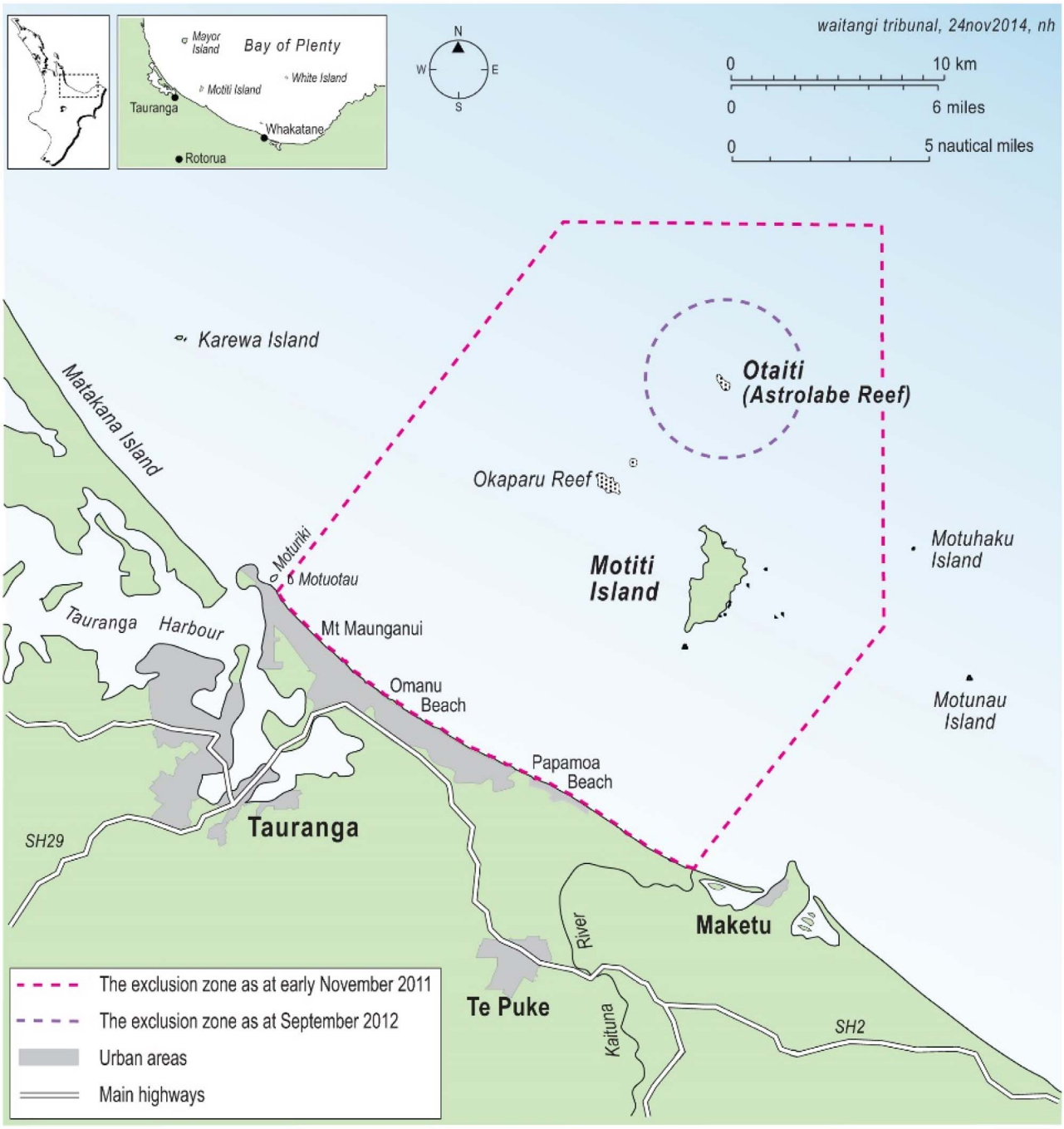

Fig. 1. Location of Astrolabe reef and nautical exclusion zones (Waitangi Tribunal, 2015).

have also had follow on consequences experienced as social, economic and cultural impacts (Fa`aui and Morgan, 2014). In response to the disaster and its associated impacts, the Rena Long Term Environmental Recovery Plan was released in January 2012, including a preliminary desktop study of the potential options for recovery. The recovery plan set the goal to "restore the mauri of the affected environment to its pre-Rena state" (Ministry for the Environment, 2012). The inclusion of an indigenous concept within the plan to represent the target state of recovery acknowledges the presence of meta-physical factors within the recovery context and therefore requires a methodology that can adequately comprehend and realise the full extent of these factors (Morgan et al., 2013).

The recovery process is currently in its fifth year, with a resource consent application being granted to the Rena's owners allowing them permission to leave the remnants of the wrecked vessel on Otāiti, on February 26 2016 (Beca, 2014; Bay of Plenty Regional Council, 2015). The observed complexity of the situation as a whole can be attributed to the interconnectedness of the environmental, political, economic, social and cultural issues that have been caused by the grounding and recovery process (Faaui et al., 2016). The Mauri Model Decision Making Framework (Mauri Model) (Morgan, 2006, 2008) is being used to address the complexities present in this disaster context. The methodology used has been previously outlined, and involved using the Mauri Model to compile an indicator set for use within the impacted communities and regions, whilst retaining relevance to the other key impacted sites also (Fa`aui and Morgan, 2014). Using the compiled indicator sets, a 100 year retrospective analysis was undertaken from 1911 to 2011, showing the changes in the state of mauri of the affected