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Exploring Understandings of Different Decommissioning Options for Offshore Oil and Gas

Structures in the South Taranaki Bight of New Zealand

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Abstract

The majority of the world's offshore oil and gas structures will need to be decommissioned in upcoming decades as they near the end of their production phase. Once decommissioned, there are three main options available for the now-obsolete structures: complete removal, partial removal, and re-use. Since New Zealand has yet to decommission any offshore structures, there are no past examples or legislative precedent to guide the process. International case studies indicate that social acceptance is crucial to the successful implementation of these projects, so the aim of this thesis was to examine perceptions of different decommissioning options for offshore oil and gas structures in the South Taranaki Bight of New Zealand. Grounded in agenda-setting theory, Study 1 examined the prominence and portrayal of offshore decommissioning in the media. We found an exceedingly low coverage (N = 13) which indicates that the public are likely unaware of the issue. Within the limited sample, the themes *disregarding decommissioning* and *addressing decommissioning* were identified which, when combined, suggest that New Zealand is in the pre-planning stage of decommissioning and has yet to explore the options available. Using a postal survey (N =154), Study 2 measured how the Taranaki community currently understood different decommissioning options, and explored whether and which familiarity variables, psychological constructs, and demographic variables could predict support for different options. The results confirmed a lack of knowledge and awareness (but high levels of interest) among the sample and revealed heterogeneity in which option was supported. Moreover, path analyses showed that awareness, knowledge, age, individualist worldviews, and egalitarian worldviews were significantly associated with support for different options. As will be discussed, these findings have significant implications for communication, engagement, and policy-making in both New Zealand and the international context.

Introduction

With over 85% of the world's offshore gas and oil platforms becoming obsolete in the next few decades (Fowler, Macreadie, Jones, & Booth, 2014; Parente, Ferreira, Moutinho dos Santos, & Luczynski, 2006), developing an effective plan for decommissioning is now a necessity. The oil and gas industry in New Zealand is not exempt from this, and all five offshore oil and gas structures in the South Taranaki Bight are expected to reach the end of their production phase between 2020 and 2028. What is most controversial about the decommissioning process is what will happen to the structures once they have been decommissioned. The options include complete removal, partial removal, and re-use. Each of these options are associated with extensive environmental, economic, and social consequences, and these consequences are dependent on the unique environmental, economic and social context in which the structures are situated. Because of this, each of these options have been successfully implemented in different areas around the world, and researchers agree that decommissioning decisions need to be made on a case-by-case basis (Jørgensen, 2012; Schroeder & Love, 2004). Since New Zealand has yet to fully decommission any offshore fields, there are no past examples or existing legislative precedent to guide the process. Therefore, to decide on the optimal option, it is important to examine the consequences of various options in the New Zealand context with consideration to international case studies.

Although there has been considerable research on the environmental impacts of different decommissioning options around the world, the role of public perceptions and social acceptance has received far less attention. To close this gap, this two-part project examined how these three decommissioning options are currently perceived and understood by the affected community in New Zealand. Using a mixed-methods approach, Study 1 investigated how decommissioning has been portrayed in the New Zealand media and subsequently, how this coverage might influence public perceptions. Then, to directly examine the beliefs of the Taranaki community, Study 2 explored current understandings and identified predictors of support for each option using a mail-based survey.

Decommissioning Options

Most offshore oil and gas structures are comprised of two sections: the topside (the platform above sea level), and the jacket (a submerged foundation which extends down the water column and into the seafloor). The exception is floating production, storage and offloading vessels (FPSO) which are floating platforms that lack a jacket. All structures, including FPSOs, are accompanied by subsea infrastructure such as cables, wellheads, anchors and pipelines (Meenan, 1998). Once the wells have been depleted and plugged, there are multiple *decommissioning options* available for these structures. The three available options in New Zealand include complete removal, partial removal, and re-use.

Complete removal. Complete removal is when all installations (including all subsea equipment in addition to the structure itself) are detached from the seabed. In New Zealand, the structure would be brought ashore, shipped overseas to specialist facilities, dismantled, and recycled where possible. In the international context, complete removal is generally the default option for decommissioned offshore structures (Schroeder & Love, 2004), and due to the labour and equipment required, it is the most expensive option and can cost hundreds of millions of dollars (Ekins, Vanner, & Firebrace, 2006). This option is also generally supported by environmental groups as it aligns with their philosophy of "leaving the seabed as you found it" (Fowler et al., 2014). Moreover, without complete removal, the structures would corrode over time, releasing contaminants into the surrounding environment and creating pollution. The process of removing the structures, however, would likely disturb the surrounding ecosystem and cause damage to the seabed. There is also the potential of

reducing biodiversity by taking away the habitat of species that have congregated around the structures (Macreadie, Fowler, & Booth, 2011).

Partial removal. The second option is partial (topside) removal, where only the upper part of the platform is removed while the jacket is kept in place. According to the International Maritime Organisation, 55 metres of upper portion of the jacket must also be removed for navigational safety (Ayoade, 2002). Partial removal is relatively less expensive than complete removal (Ekins et al., 2006) and, in the right environment, the submerged infrastructure can continue to act as an artificial reef (a practice called Rigs-to-Reefs). Artificial reefs have been shown to benefit the marine environment by providing habitats and feeding stations to various species, thereby sustaining a thriving ecosystem (e.g., Cripps & Aabel, 2002; Jørgensen, Løkkeborg, & Soldal, 2002; Macreadie et al., 2011; Todd, Pearse, Tregenza, Lepper, & Todd, 2009). The congregation of marine life is also a resource to many stakeholders, including fishers and divers (Milon, Holland, & Whitmarsh, 2000). However, leaving human-made structures in the ocean is perceived as ocean dumping by environmentalists (Jørgensen, 2012), and there is a risk of materials corroding over time and contaminating the marine environment (Ekins et al., 2006).

Re-use. The third option is re-use where the entire infrastructure is left *in-situ*, including the topside which is converted for another purpose. Like partial removal, the lack of onshore disposal means this option would cost less, and the marine ecosystem formed around the structure would not be disturbed. Proposed ideas for re-use include recreational facilities, sea steads, aquaculture farms, and offshore wind farms (Schroeder & Love, 2004; Zawawi, Liew, & Na, 2012). Re-use can therefore enhance the economy by providing tourism and employment opportunities (Schroeder & Love, 2004; Stanley & Wilson, 1989) which, in turn, could bring value to the local community. One notable example is Seaventures, a decommissioned oil rig that has been successfully transformed into a dive

resort in Malaysia. However, structures have rarely been re-used around the world as what projects are possible is highly dependent on the surrounding ocean conditions which would affect safety and accessibility. Moreover, the structures would need to be monitored and maintained on a regular basis to stop contamination which is hugely costly, so the topside would likely need to be converted into a commercial enterprise. Over a long enough time, the total cost of ongoing maintenance could eventually exceed the costs of complete removal (Day, 2008). Ethical concerns have also been raised as leaving the structures *in-situ* can be perceived as ocean dumping (Ekins et al., 2006) and once sold, oil and gas operators are no longer responsible for any ongoing costs or liable for anything that happens to the structures (Parente et al., 2006; Schroeder & Love, 2004).

The New Zealand Context

It is evident from international examples that different decommissioning options can have drastically different consequences on the environment, economy, and society. It is crucial then to examine how these options would fare in the New Zealand context. The nature of the structures, the current legislation on decommissioning in New Zealand, and existing (but limited) environmental and economic research are summarised below.

Structures. Depending on site-specific oceanographic conditions and time of installation, the accompanying infrastructure of each oil or gas field would differ. Although the status quo is complete removal (Schroeder & Love, 2004), the ease of removal ultimately depends on the technical components of the structures involved. Currently, the offshore oil and gas structures in the South Taranaki Bight include two fixed platforms (Māui A and Māui B), two floating platforms (Tui and Maari), and one wellhead platform (Kupe). There is one other offshore platform (Pohokura) in New Zealand that is situated in the North Taranaki

Bight but given that the focus of this thesis is on structures in the South Taranaki Bight, this platform was not included in our study.

Māui A and B, which commenced production in 1979 and 1992, are New Zealand's oldest offshore oil and gas structures. Discovered in 1969, the Māui field was and still is the largest commercially viable oil and gas field in the country. Given the size of the field and the need to withstand a hostile marine environment, these structures are heavy (weighing approximately 21,000 tonnes and 8,300 tonnes respectively), with jackets that extend into the seafloor. Therefore, not only would removing these structures be extremely costly, the process of removing them is risky and potentially dangerous. For this reason, it is becoming increasingly common to consider alternative decommissioning options (such as partial removal or re-use) for these types of structures in the international context.

Due to technological advancements in recent years, the remaining structures in the Taranaki Bight were installed with plans for eventual removal. This includes Kupe, a wellhead platform built in 2008, which consists of a 1,000 tonne topside supported by four legs secured to the seabed, as well as Tui and Maari, floating platforms (FPSOs) which commenced production in 2007 and 2009, respectively. Since they lack a jacket, FPSOs are easily detached from the seabed, towed away to another oil or gas field, and re-used. Although the larger components can be easily removed, there is still controversy over the removal (or lack thereof) of subsea equipment. To date, the only decommissioned offshore structure in New Zealand is Whakaaropai, a FPSO that was installed to manage oil production at the Māui B platform. The platform was removed and sold in 2005 after production ended, but subsea structures (including anchors and steel wires) were left behind. Since these subsea structures cannot be re-used for another purpose, this practice can be constituted as partial removal which has its own environmental, economic, and social implications. For example, despite being granted a dumping permit, Taranaki iwi have

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expressed disapproval and urged removal of this subsea equipment from a cultural standpoint (Taranaki Iwi Trust, 2011).

Legislative framework. There is no specific legislation regarding decommissioning options and since offshore structures have yet to be fully decommissioned in New Zealand, there is no existing legislative precedent. There are however legislative frameworks in place for when decommissioning occurs. All five offshore structures are located within the Exclusive Economic Zone (EEZ) and are governed by the New Zealand Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012 (or the EEZ Act). Section 20 of the EEZ Act 2012 requires parties to apply for a marine consent for the construction, alteration, removal, or abandonment of structure(s) on or under the seabed. In 2017, amendments were made to the EEZ Act (Section 100A-100D of the Resource Legislation Amendment Act 2017) which now requires offshore operators to submit a decommissioning plan to the Environmental Protection Authority (EPA) for approval. This plan needs to identify what structures are decommissioned and how they will be decommissioned, and before accepting the plans, the EPA must hold public hearings and allow for public consultation and feedback. So, although decommissioning will occur in the next few decades, decommissioning plans need to be designed much sooner. This recent development has shortened the timeline for decision-making and highlights the need for New Zealanders to start thinking about decommissioning immediately.

Environmental implications. Research on how different decommissioning options for offshore structures in New Zealand would affect the marine environment has been inconclusive. This research could have significant implications as the Taranaki Bight is home to a diverse range of marine species. Out of the 41 marine mammal species found in New Zealand waters, 20 cetacean species and two pinniped species inhabit the region. Jervis (2017) mapped out all sightings from 1900 to 2016 but, due to biases in the data, cannot

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establish whether or how the marine mammals are affected by the structures. The report does suggest that any removal of the structures would result in sound incursion which could temporarily affect the behaviour (including communication, navigation, and hunting) of mammals in the vicinity. Since complete removal would disrupt the ecosystems on the seafloor, another study examined whether the composition of benthic communities around the structures differed from those at control sites (Guthrie et al., 2017). Although significant differences were found in variation between the structure sites and the control sites, there were also significant differences between each of the platform sites. Further investigation is being conducted on whether this variation is driven by the structures or by other factors, such as water depth. The lack of research and high level of uncertainty around environmental consequences of decommissioning options would likely contribute to how these options are perceived.

Economic implications. There is also high uncertainty associated with the financial costs of each decommissioning option. Although a cost-benefit analysis has been conducted on the different options in New Zealand (B. Rogers, personal communication, July 26, 2017), the data is based on vague estimates from overseas examples. It can only be concluded that complete removal would cost the most, followed by partial removal, then re-use. These costs would be bared by the oil and gas operators that own the structures, and the Crown in the form of tax rebates. The economic implications of re-use are also unclear as it is unknown what the re-used structure(s) would be converted into, what resources and/or profit would result from it, and how they would be allocated.

Social implications. The social context within which the offshore oil and gas structures are located has yet to be explored. Home to an abundance of marine species, the South Taranaki Bight is a valuable resource to divers, fishers, and other marine users. Moreover, the ocean is of high social value, and enjoyed for leisure and recreational use by the residents in the Taranaki region. Given that the oil and gas structures are located in these waters, decommissioning activities would most likely affect these individuals. This thesis is therefore focussed on the perceptions of the local Taranaki community, a heterogeneous group whose attitudes likely encompass a wide range of underlying beliefs. The importance of examining public opinion is outlined below.

Social License to Operate (SLO)

Public approval is often required for many corporate and environmental projects to be implemented successfully. In recent years, Social License to Operate (SLO) has become a concept that is increasingly discussed and practiced by New Zealand industries (Edwards & Trafford, 2016). Although its definition and application are debated, SLO generally refers to the social approval and/or acceptance, granted by local communities and affected stakeholders, of corporate operations (Thomson & Boutilier, 2011). Ongoing SLO is important during decommissioning as it is the community and stakeholders who are subject to the consequences of the final decision. As demonstrated in overseas examples presented below, decommissioning could result in significant public backlash if SLO is not gained and subsequently maintained.

North Sea. Under the OSPAR Commission, Decision 98/3 on the Disposal of Disused Offshore Installations requires the mandatory removal of all, partial or whole, decommissioned offshore structures in the North Sea. In part, this law was adopted in response to the highly controversial case of Brent Spar. In 1995, the British Government permitted the deep-water disposal of Brent Spar, a floating oil facility in the North Sea, with approval from Shell (who operated the structure). However, the decision did not consider public or stakeholder input and was met with substantial opposition. Of note was Greenpeace, an environmental non-governmental organisation, who viewed deep-water disposal as a form of ocean dumping and subsequently conducted a highly-publicised media campaign in protest. This greatly swayed public opinion, leading to a widespread boycott of Shell's services in Northern Europe and immense public pressure to reassess decommissioning options. It is also important to recognise that there was no advocacy for alternative options as they lacked socio-economic benefit in the North Sea. For example, the species of fish that aggregate around the platforms accounted for less than 1% of commercially stocked fish, and recreational fishing near the platforms was generally an uncommon practice (Sayer & Baine, 2002). Given the homogenous disapproval of deep-sea disposal, the Brent Spar platform was ultimately dismantled and recycled onshore, implying that Shell had succumbed to social pressures.

The Gulf of Mexico (United States). In contrast, partial removal is the most common practice in the Gulf of Mexico, which now contains the largest artificial reef complex in the world with over 400 converted platforms (NOAA, n.d.). The United States National Artificial Reef Plan (under The National Fishing Enhancement Act of 1984) allows states to develop their own artificial reef programs (Rigs-to-Reefs) under provided guidelines. These programs were adopted by all Gulf Coast states and most importantly, by Louisiana and Texas, where over 95% of converted platforms are situated. Arguably, the success of these two programs can be attributed to strong support and approval from local communities (Athanassopoulos, Dalton, & Fischer, 1999; Jørgensen, 2009; Schroeder & Love, 2004). This is likely due to their positive perceptions of offshore development, and their association of offshore platforms with socio-economic benefits (Gramling & Freudenburg, 2006; Jørgensen, 2009). Similarly, consensus among Gulf Coast stakeholders (including fishers, tourism operators, state and federal agencies, and oil and gas companies) is also in favour of rig conversion (Athanassopoulos et al., 1999). The Gulf of Mexico demonstrates that, with social license, decommissioning can benefit stakeholders and local communities alike with minimal conflict.

California (United States). Similar to New Zealand, California has had little experience with decommissioning and many offshore oil and gas structures are required to be decommissioned in the next decade (Athanassopoulos et al., 1999; Fowler et al., 2014; Schroeder & Love, 2004). However, despite a comparable marine environment and legislative framework to the Gulf of Mexico (Fowler et al., 2014), the decommissioning of offshore structures in the Southern California Bight is a highly controversial issue. No research yet has been systematically examined the social context of California but it is theorised that a Rigs-to-Reefs program would be extremely difficult to implement due to public opinion. Some researchers believe that the local community in particular, who have long been opposed to oil development, would perceive the complete removal of the structures as a moment of "catharsis" (Schroeder & Love, 2004). Moreover, there is outspoken opposition by environmental groups to any decommissioning options other than complete removal that would be constituted as "ocean dumping" (Athanassopoulos et al., 1999; Schroeder & Love, 2004). Given similarities in environmental and economic implications, it is likely that the communities in California hold a set of beliefs, values, and worldviews that is fundamentally different to those in the Gulf Coast states.

These cases illustrate the influence and importance of public opinion on the final decision. They also demonstrate how drastically public perceptions of a similar issue can differ between and within countries. Therefore, the only way to draw a valid conclusion about perceptions is to study the affected community within its situated context.

The Current Project

The current project examined the social perceptions of complete removal, partial removal, and re-use for offshore oil and gas structures in New Zealand. Study 1 used qualitative and quantitative methods to examine how offshore decommissioning (and associated options) has been covered and portrayed in New Zealand media. Informed by the findings of Study 1, Study 2 used survey methodology to directly measure perceptions of decommissioning options among the Taranaki community. The data was analysed to provide information on current understandings of decommissioning and to identify predictors of support for different decommissioning options. Since no existing research has explored public attitudes towards decommissioning options, both studies were entirely exploratory and were not be guided by any specific hypotheses. Instead, the research process was informed by international case studies and directed by theories and methodology grounded in (environmental) psychology.

This thesis contributes to a larger interdisciplinary project funded by the Sustainable Seas National Science Challenge that also measured the environmental and economic consequences of different decommissioning options in the New Zealand context (B. Rogers, personal communication, July 26, 2017; Guthrie et al., 2017; Jervis, 2017). Rather than focussing on a single aspect of an issue, the project is grounded in ecosystem-based management, a holistic approach that acknowledges and balances environment, social, economic, and legislative factors to achieve sustainability. The findings of the overall research project will be aggregated into a final report which will be sent to relevant governmental agencies to assist with the decision-making process.

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Study 1: Offshore Decommissioning in the New Zealand Media

Given the extensive literature on media effects in the public sphere, the first step to exploring public perceptions begins with examining how different decommissioning options have been portrayed in the New Zealand media. This is particularly important when decommissioning has yet to occur as we can then make inferences about what the public already know about the issue and how they perceive the issue.

Literature Review

Agenda-setting theory. Many studies have robustly shown the influence of news on public opinion (McCombs, 2011). A theory that has greatly contributed to this literature is agenda-setting theory which describes the agenda-setting function of mass media on the public arena (McCombs & Shaw, 1972). Essentially, it is argued that the media agenda, comprised of *what* issues are reported on and *how* they are reported, influences *what* issues the public think about and *how* they think about it. These are respectively known as first- and second-level agenda-setting.

What to think: First-level agenda-setting. First-level agenda-setting, which concerns issue salience, proposes that what is published and how often dictates what readers think about. Elevated levels of exposure increase the salience of an issue and subsequently, the perceived importance of the issue. Indeed, the original study on agenda-setting by McCombs and Shaw (1972) found a high correlation of +.967 between the issues (associated with the 1968 presidential campaign) covered by newspapers and what issues were considered most important by voters. This finding has since spawned a multitude of studies that replicated the agenda-setting effect across a variety of contexts. In addition to politics, media coverage has been found to heighten the public's perceived salience of civil rights (Winter & Eyal, 1981), climate change (Brulle, Carmichael, & Jenkins, 2012), warfare (Iyengar & Simon, 1993), and

immigration reform (Dunaway, Branton, & Abrajano, 2010). Supporting agenda-setting as an ongoing process, longitudinal studies have used time-series analysis to show that level of coverage can explain public concern over extended periods of time (Brulle et al., 2012; Winter & Eyal, 1981). Since correlations have limited explanatory power, Iyengar, Peters, and Kinder (1982) demonstrated the causal effect of agenda-setting by conducting an experiment where participants were exposed to controlled newscasts that emphasised either the lack of defence preparedness, environmental pollution, or inflation. As predicted, postexperiment surveys revealed that perceived issue importance aligned with the issue participants were primarily exposed to, showing that media coverage can rearrange social priorities.

However, agenda-setting effects are not universal, and agenda-setting theory acknowledges that there are individual differences in how susceptible people are to such effects. Studies have suggested that the influence of the media is contingent on one's Need for Orientation, the innate desire to understand how the world works through external cues and other relevant information (McCombs & Weaver, 1973; Weaver, 1980). Agenda-setting effects are strongest in those with a high level of Need for Orientation, which is determined by two aspects: if the issue is of high relevance to the individual, and if the individual is uncertain in their opinion of the issue. It is therefore reasonable to expect media coverage of decommissioning to have the strongest agenda-setting effects on Taranaki residents as they meet the criteria for relevance and uncertainty. The outcome of decommissioning decisions is highly relevant to the population of Taranaki as the project is occurring in their local region, which could then alter the local economic structure and shape the reputation of the area. For example, if the structures are transformed into a recreational facility, they would serve as an additional attraction for tourists. As decommissioning has yet to occur, there is also high uncertainty around what different decommissioning options would entail. This is particularly the case for the general community who do not have vested interests (and therefore a strong preference) in what will happen to the structures.

How to think: Second-level agenda-setting. Agenda-setting theory has since expanded on the basic tenets of issue salience. Second-level agenda-setting is about attribute salience and proposes that which aspects of an issue (attributes) are emphasised or neglected influence how readers subsequently perceive the issue. The first study on second-level agenda-setting effects was conducted by McCombs, Llamas, Lopez-Escobar, and Rey (1997) which examined representations of Spanish political candidates in the media and how participants would describe them. Findings showed that both substantive attributes (candidates' ideologies, experience, and personal characteristics) and affective attributes (positive, negative or neutral portrayal) of candidates were highly correlated with participant descriptions, once again indicating similarities between the media and public agenda. Beyond the political realm, second-level agenda-setting effects have been found to influence perceptions of corporations (Meijer & Kleinnijenhuis, 2006), crime (Ghanem, 1996), and countries in war (Rill & Davis, 2008).

As expected, media portrayals also played a key role in shaping the political climate surrounding decommissioning in the North Sea and the Gulf of Mexico. In the case of Brent Spar, it is possible that second-level agenda-setting effects and framing contributed to the success of Greenpeace's media campaign; specifically, its success in persuading the public to oppose the deep-sea disposal of the platform and turn against Shell. By sending activists to occupy the Spar, Greenpeace transformed decommissioning into a social problem that piqued public interest. To harness media attention, Greenpeace invited reporters to the protest and provided them with extensive footage and images of activists being sprayed by firehoses from Shell's tugboats (Dickson & McCulloch, 1996; Löfstedt & Renn, 1997). As a result, the news presented the issue from Greenpeace's perspective, allowing Greenpeace to define the attributes of the situation in the media. A narrative was essentially constructed where Greenpeace, the determined and brave underdog, is in a battle with Shell, the powerful and threatening villain (Hansen, 2000; Löfstedt & Renn, 1997). Headlines from British newspapers included "Murder at Sea: Scandal of Dumped Rigs that Might Wipe Out Marine Life" and "Greed that's Poisoning Our Seas: Shell's sinking of the Brent Spar Rig" (Hansen, 2000). Journalists would subsequently describe Greenpeace as "daring", "heroic", "homely", and "idealistic", and Shell as "huge", "large", "greedy", "multinational" and "giant" (Hansen, 2000). Since second-level agenda-setting theorises that readers would perceive actors as their media representation, Shell predictably became the target of widespread backlash and anger while Greenpeace garnered sympathy.

On the other hand, the common belief in the Gulf of Mexico is that decommissioned oil and gas structures are beneficial and an integral part of nature. To explore this idea, Jørgensen (2009) analysed how print media naturalised the Rigs-to-Reefs program through discourse, and identified three themes. The first theme, *sought-after species*, refers to how the aggregation of marine species around the platforms provides a valuable resource for fishers and divers. The second theme, *enhancing the Gulf*, is associated with ideas about how the artificial reef created by the platforms is better than a clear sea-bed that is devoid of life. Lastly, the third theme, *endangered ecosystems*, presents the critical need to sustain marine life that has emerged because of the platforms. Potential risks, such as concerns over contamination, were largely absent in the media discourse (Jørgensen, 2009). By portraying a solely positive frame on rig conversion, print media constructed a reality where the platforms exist as irreplaceable and thriving ecosystems. Agenda-setting theory would predict that this reinforces a culture of acceptance of Rigs-to-Reefs by the existing community, as well as future generations. Therefore, examining the portrayal of decommissioning options in New Zealand media can give insight into existing public attitudes towards each option.

The Present Study

To explore public perceptions of decommissioning, the aim of the first study was to examine how decommissioning is constructed in the media. Driven by existing research on agenda-setting theory, we were interested in the prominence and portrayal of different decommissioning options in New Zealand media, as well as *what* perspectives and *whose* perspectives were expressed. Since the study is exploratory in nature, we examined the data in three different ways using both qualitative and quantitative methods to provide a thorough analysis.

Method

Sample. News articles were retrieved from an online media archive, Newztext Newspapers, which specialises in New Zealand newspapers. The database is comprised of articles from provincial and metropolitan newspapers published by Fairfax (New Zealand's leading media company), the New Zealand Herald, and Stuff, an online website that publishes stories from newspapers around New Zealand.

The initial search term (including Boolean operators) was "(oil OR gas) AND (Taranaki OR "New Plymouth") AND (decommissioning OR decommission)", which was used in combination with the following default parameters: the date range from 1st January 1960 to the date of the search (11th April 2017), and sourced from all newspapers (including Stuff) in the database. This returned 55 results. Adjusting the date and source reduced the already small sample size, and removing the "decommissioning/decommission" term drastically altered the focus of the dataset. The use of other terms that were more specific to decommissioning options, such as "re-use" or "disposal" were explored but the results were deemed irrelevant. To ensure the lack of articles published on decommissioning was not due to selective archiving or the search terms used, two prominent oil and gas journalists from the

late 1990s were contacted but neither recalled writing about nor reading about decommissioning during this time (N. Ritchie, personal communication, March 31, 2017; R. Maetzig, personal communication, April 2, 2017). The same search parameters were also entered into other New Zealand media archives (e.g., Australia & New Zealand Newsstream; Factiva) but the quantity of news articles remained similar. We therefore decided to focus on the identified 55 articles for analysis. Among the 55 articles, those unrelated to the topic (e.g. decommissioning of power stations) were excluded, resulting in 31 articles.

These 31 articles were published between 2004 and April 2017, with the majority published between 2011 and 2017. Figure 1 presents the spread of the sample across time of publication, separated into original and duplicate articles. It should be noted that the publication of articles coincided with major events that occurred within the oil and gas industry. These refer to the decommissioning of Whaakaropai in 2004, consent granted for the continued operation of the Māui A gas field (and subsequent protests) in 2015, the sale of shares in the Tui field in 2016, and comments made in association to decommissioning at the national Petroleum Conference in 2017.

The selected 31 articles appeared primarily in local newspapers. Eight (25.8%) were published in *Taranaki Daily News* (formerly *The Daily News*), five (16.1%) on Stuff, three (9.7%) in *The Dominion Post*, two (6.5%) in *The Press*, and solo articles in the following: *The New Zealand Herald, Hawkes Bay Today, The Bay of Plenty Times, The Northern Advocate, Wanganui Chronicle, The Daily Post, The Waikato Times, Marlborough Express, The Timaru Herald, Manawatu Standard* and *Nelson Mail*. The sample also included two opinion pieces (6.5% of the sample), published in *Taranaki Daily News* and *The Dominion Post*. Closer inspection revealed that many articles were duplicated and written by the same author but published in a different newspaper. Although these articles should be and were acknowledged, they were not treated as an additional data item in either the thematic or content analyses. This was to prevent any misleading conclusions; that is, a stakeholder's perspective in a duplicated article does not mean the perspective was twice as prevalent. After excluding the duplicate articles, the final dataset was reduced to 13 articles.



Figure 1. The spread of newspaper articles, both original (n=13) and duplicated (n=18), across time of publication

Procedure. Although the initial aim of the media analysis was to examine decommissioning options, it became apparent from the sample that the media have only just begun discussion on the general decommissioning process and have yet to explore the different options available. As a result, we shifted the focus of the analyses to the decommissioning situation in New Zealand. The data analysis was divided into three main parts, where the results of each part should inform the interpretation of the next.

As knowledge of current events is primarily derived from the news, the first analysis examined the level of media coverage on decommissioning using descriptive statistics. The proportion of the number of articles published on oil and gas industry in Taranaki that contained the words "decommissioning" or "decommission" was calculated. Since our interest is in the offshore industry, the same search was repeated with the word "offshore" to reduce the number of irrelevant articles. Like the sample selection, the search ranged from 1st January 1960 to 11th April 2017, and was sourced from all newspapers in the database.

Following this, a theoretical thematic analysis was used to extract overarching themes ("patterns of meaning") from the text (Braun & Clarke, 2006). We were particularly interested in how decommissioning was portrayed by the media by considering the context in which decommissioning was mentioned. To identify the themes, we followed the six-step guide outlined in Braun and Clarke (2006): 1) familiarising self with data, 2) generating initial codes (features) in the data, 3) searching for broader themes, 4) reviewing themes, 5) defining and naming themes, and 6) producing the report. As we wanted to explore how the concept of decommissioning was constructed by the media, there was a focus on latent (rather than explicit) themes to discern underlying assumptions and ideas that go beyond the text itself. Since a level of interpretation is required for this process, the data was re-coded by an independent coder (who was blind to the project aim) to ensure inter-coder reliability. Between the two coders, there was significant overlap between the identified themes, and through negotiation, a consensus on the final themes and sub-themes was reached.

Lastly, quantitative content analyses were used to examine specific aspects of the text. To do so, parts of the text are assigned to categories (via a pre-specified coding scheme), and these categories are then analysed as frequencies (Riffe, Lacy, & Fico, 2005). As shown in Table 1, we coded for: 1) which decommissioning option is implicitly assumed or explicitly mentioned, 2) the perceived cost(s) and/or benefit(s) of decommissioning 3) the stakeholder(s) mentioned, and 4) the stakeholder(s) whose perspectives were quoted. The categories used for assignment were developed from pre-existing literature, apart from "other" which accounted for additional categories that were not specified beforehand. Descriptive statistics were then used to analyse the categories, and the results were subsequently descriptive in nature.

Table 1

Code	Description	Unit of Analysis	Categories
Decommissioning option	Each article was coded by which option for decommissioned structures was assumed (i.e. inferred by financial cost) or mentioned	Each article was treated as a unit of analysis	None (mentioned) Complete removal Partial removal Re-use
Perceived benefit(s)	Benefits were identified as perceived positive consequences of decommissioning, and were coded by type	Each article was coded by whether positive environmental, economic and/or social consequences were absent or present	None (mentioned) Environmental Economic Social
Perceived cost(s)	Costs were identified as perceived negative consequences of decommissioning, and were coded by type	Each article was coded by whether negative environmental, economic and/or social consequences were absent or present	None (mentioned) Environmental Economic Social
Stakeholder(s) mentioned	Stakeholders mentioned were identified as any person(s), organisations or companies stated in the article, and coded by stakeholder groups	Each article was treated as a unit of analysis where each subcategory was coded by whether they were absent or present	Oil/gas companies Government Environmental groups Iwi Tourism operators Fishers Community
Stakeholder(s) quoted	Stakeholders quoted were identified as any person(s), organisations or companies quoted (or paraphrased) in the article, and coded by stakeholder groups	Each article was treated as a unit of analysis where each subcategory was coded by whether they were quoted or not	Oil/gas companies Government Environmental groups Iwi Tourism operators Fishers Community

Coding Scheme, Including a Description of the Code, the Unit of Analysis and Categories Used for Assignment

Findings

Newspaper coverage. The proportion of articles published on decommissioning are shown in Table 2. Among the 31,657 articles published on the oil and gas industry in Taranaki, only 55 articles (0.17%) mentioned decommissioning. Among the 3,557 articles published on the *offshore* oil and gas industry in Taranaki, 25 articles (0.70%) mentioned decommissioning.

Table 2

The Proportion of NZ Articles, Published between 1960 and 2017, on the (Offshore) Oil and Gas Industry in Taranaki that Contain the Terms "Decommissioning" or "Decommission"

	Number of Articles			
	+"decommissioning"	Total	Proportion on	
	OR "decommission"		decommissioning (%)	
1. (oil OR gas) AND	55 (13*)	31657	0.17 (0.04)	
("New Plymouth" OR				
Taranaki)				
2. +"offshore"	25	3557	0.70	
<i>Note.</i> All searches include duplicates and (potentially) irrelevant articles; *the final sample				

which excludes duplicate and irrelevant articles

Overarching themes. Thematic analysis identified two overarching themes –

disregarding decommissioning and addressing decommissioning. These are displayed in

Figure 2 with their corresponding sub-themes. Both themes were present in seven of the 13

articles, while the remaining six articles were only focussed on addressing decommissioning.

Due to the general lack of coverage on decommissioning, the results of this analysis were

based on a limited sample size and should be interpreted with caution.



Figure 2. Thematic map of decommissioning in New Zealand media, with main themes represented by ovals and sub-themes by rectangles

Disregarding decommissioning. A theme running across many of the articles is the treatment of decommissioning as a low priority, indicating a disregard for decommissioning. This is implied through: the *lack of plans* made, the *lack of obligation to decommission*, and *postponement* of decommissioning.

Lack of plans. Although all articles mention decommissioning, none elaborate on the processes involved or what will happen to the infrastructures once they have been decommissioned. One article explicitly stated that "what will happen to the platforms and pipelines [...] when the gas finally runs out remains uncertain" (Weir, 2015b). Additionally, when the Environmental Protection Authority (EPA), the organisation that regulates activity in New Zealand's Exclusive Economic Zone, granted consent for the continual exploration and drilling of the Māui field for the next 35 years (henceforth known as the Māui consent), opponents of the consent shared concerns about the "lack of plans for decommissioning and remediation of the site" (Weir, 2015a, 2015b). The only article that acknowledges that there

are various options available for decommissioned structures (from complete removal to reuse) states that there is "no clear government rule" about what to do (Weir, 2015b).

Lack of obligation to plan. A potential reason for the lack of planning might be that there is a lack of legal obligation to decommission, as some articles would suggest. This is linked to historically limited regulation around offshore petroleum production in New Zealand. It was only after the establishment of the EEZ Act in 2012 that a full assessment of environmental impacts and considerations of public submissions were required before a mining permit is granted (Adams, 2014). The lengthy period between commercial production from offshore fields in 1979 and the 2012 EEZ Act suggests a history without enforced regulatory practices.

When the articles in our sample were published, amendments to the EEZ Act (specifically to include laws around decommissioning) were proposed but were not in effect. The consequences of this are evident. When the Māui consent was granted in 2015, the EPA was unable to ensure that Shell Todd Oil Services Limited (STOS; Māui's current operator) will decommission the Māui field at the end of its life as it was "effectively outside its brief for consent" (Weir, 2015b). An opinion piece by New Zealand activist Emily Bailey also expressed disapproval at how the Taranaki Regional Council reports do not require decommission plans for oil and gas production facilities (Bailey, 2012).

Postponement. Another reason for the lack of planning is because decommissioning is not yet a priority. Decommissioning was often mentioned in the context of being delayed in favour of extending the life of the oil and gas fields. By continuing to drill, more product can be extracted and sold, resulting in economic benefits to oil and gas operators, the government (via royalties), and the local community. As such, when decommissioning will occur will "[depend] on the international oil price" (Keith, 2017), suggesting that financial benefits are

of high importance. This is apparent in the decommissioning of Whakaaropai where decommissioning occurred when production was regarded as no longer economically viable (Churchouse, 2004).

This is also evident in the Māui consent and the sale of the Tui field assets. Across the sample, economic reasons were provided for the prolonging of Māui's producing phase. An expert witness and an independent economics expert respectively claim that the "total revenue from the Māui field over the next 15 years could top \$8 billion" and "the Government's take from the field [...] would be worth \$1.17b in total by the end of Māui's life" (Weir, 2015a). In addition, New Zealand and international oil and gas companies agreed to sell Tui shares to Tamarind (a Malaysian energy company) because Tamarind's experience in decommissioning can "maximise value from late life assets" ("NZOG mulls Tui share offer," 2016; Smith, 2016; Underhill, 2016). Although what "value" entails is not explained, they affirm that Tamarind has the experience to prolong the life of the Tui field during a time when the price of oil is increasing ("NZOG mulls Tui share offer," 2016; Smith, 2016;

Addressing decommissioning. The second theme is addressing the need to plan for decommissioning. Two aspects of this include: the *urgent need* for decommissioning, and assignment of *responsibility* for decommissioning.

Urgency. Despite the inclination of some to postpone decommissioning, many submit that decommissioning is urgent and should start as soon as possible. In one article, the offshore rigs were described as a "time bomb" and "aging" (Keith, 2017). Various timeframes were also suggested for decommissioning and although there are differences between articles, all are within the next few decades: from 2017, decommissioning of Tui is proposed for the next two ("NZOG mulls Tui share offer," 2016; Smith, 2016; Underhill,

2016) or three years (Keith, 2017), Māui in 13 years (Weir, 2015a) or within the next six to 24 years (Weir, 2015b), Maari in approximately six years (Weir, 2013), and all within the next 25 years (Keith, 2017). Considering that no decommissioning plans are publicised and implementation can take up to 10 years (Weir, 2015b), decommissioning is now a pressing issue that needs to be addressed. It is implied that STOS understands this and will account for the time required for decommissioning, ensuring that it will occur while the Māui consent is still active (Weir, 2015b). This would be within 35 years from 2015.

There are proponents, usually environmental groups, who advocate for immediate decommissioning regardless of whether the fields are depleted. The first reason is that, although the EPA approved the Maui consent on the basis that the environmental effects of exploration are minor at most (Weir, 2015a), there are still concerns about the impact on the marine environment. Specifically, this relates to the potential contaminant build-up and subsequent risks to the marine ecosystem (Weir, 2015b). Secondly, many also noted the ongoing use of fossil fuels, a "twilight industry", and its contribution to climate change (Weir, 2015a, 2015c). They argue for decommissioning and the transition to renewable energy (a "solution") rather than the continued extraction of oil and gas (a "path of destruction") (Weir, 2015a). Relating these two concerns, Oil Free Wellington summates, "you can't live on a dead planet with a dead ocean" (Weir, 2015c). In a way, these proponents support decommissioning because they view it as symbolic of the end of the oil and gas industry, and the delay in decommissioning brought about "disappointment", "concern" and "sad[ness]" (Weir, 2015a, 2015b, 2015c). This contrasts with the perspective of oil and gas companies who view decommissioning as a necessary phase of the rigs' lifespan that is more costly than beneficial.

Responsibility. Since decommissioning requires extensive planning and subsequent implementation, both of which cost time and money, a discussion of responsibility is

pertinent. From the sample, it is apparent that decommissioning is the responsibility of oil and gas companies who have profited the most from operations. Although there does not appear to be a legal requirement for STOS to decommission the Māui platforms, the company has verbally agreed to accept responsibility to decommission the field when required and perceive it to be an "obligation" (Weir, 2015a, 2015b). This includes the maintenance of the platforms prior to decommissioning and "preparations for removal" (Weir, 2015b), which indicates that STOS is planning to remove at least some parts of the structures. This perceived obligation to decommission seems driven in part by the need to maintain both a social license and a reputation. As stated, they view themselves as a "strong globally reputable company [that has] very clear standards about [...] integrity" (Weir, 2015b).

Environmental groups have also placed the responsibility of decommissioning on STOS by outlining the actions the company should be taking. During a protest against the Māui consent, Oil Free Wellington stated that STOS needs to develop a plan for "decommissioning, [...] clean energy alternatives, and a just transition of those who currently work in the industry" (Weir, 2015c). Another example is a list of conditions proposed by Climate Justice Taranaki that they wanted met before they agreed to support the Māui consent, which includes "form[ing] a decommission plan [and] put[ing] money aside for decommission[ing]" (Smith, 2015). None of the articles in the sample indicate whether STOS has responded to these suggestions.

Although oil and gas operators pay for the substantial cost of decommissioning, part of the responsibility is placed on the Government and taxpayers. This is because the oil and gas industry have a claim to tax and royalty rebates of approximately 42-48% of the total decommissioning cost (Keith, 2017) which, varying by article, is put at \$806 million (Weir, 2015b) and between \$800 and \$855 million (Keith, 2017). On a side note, the sale of Tui, thereby transferring responsibility for decommissioning to an international company, should be acknowledged. As a FPSO, Tui is often something of an exception in this case study as decommissioning does not require the same considerations as a fixed platform which is anchored to the seabed. Instead, the platform can be transported and re-used in another field (as is what happened with Whakaaropai, which did not garner much media interest). The sale of Tui is difficult to interpret as it demonstrates both a recognition of upcoming end-of-life requirements but also involves some companies choosing to sell their ongoing interests in the reservoir resources rather than engage directly with the decommissioning process. Regardless, New Zealand Oil and Gas (NZOG; one of Tui's largest shareholders) stated that the decision was made based on "whether our interests are best served by accepting the offer or continuing to participate [...] through the decommissioning phase" (Underhill, 2016).

Quantitative content analyses.

Option(s) assumed for decommissioned structures. Despite mentioning decommissioning, 46.15% (6 out of 13) of articles in our sample did not indicate any preference in the outcome of decommissioned structures (Adams, 2014; Bailey, 2012; Smith, 2015; Weir, 2013, 2015a, 2015c). In 38.46% (5 out of 13) of articles ("Bonanza on cards for Tui owners," 2004; Churchouse, 2004; "NZOG mulls Tui share offer," 2016; Smith, 2016; Underhill, 2016), removal was assumed because the focus was on the FPSO at the Tui field or Whakaaropai, both of which are floating installations that are traditionally removed because they are not permanently fixed to the seabed. This contrasts with one article that assumed complete removal for fixed platforms, as inferred by the estimated cost (Keith, 2017). Lastly, only one article (Weir, 2015b) explicitly acknowledged that there are different options for decommissioned platforms (and the fact that there is no established regulation

around decommissioning in New Zealand). None of the articles in the sample assumed that the structures would be partially removed or re-used.

Perceived benefits associated with decommissioning. Across the sample (n = 13), three articles (23.08%) mentioned the positive environmental consequences of decommissioning (Weir, 2015a, 2015b, 2015c). All claims were made by environmental groups who are opposed to continued exploration and production of oil and gas.

Perceived costs associated with decommissioning. Across the sample (n = 13), five articles (38.46%) mentioned the negative impacts of decommissioning. Among these, three articles (23.08%) acknowledged the financial costs required to decommission the platforms (Keith, 2017; Weir, 2013, 2015b). The remaining two articles (15.38%) recognised the social impact on rig workers who will be unemployed after decommissioning (Churchouse, 2004; Weir, 2015c).

Stakeholders mentioned. A total of 29 stakeholder groups were identified across the sample (n = 13). As shown in Figure 3, oil and gas companies were featured most prominently in articles on decommissioning (38%), followed by the Government and government entities (31%), environmental groups (17%), community members (10%), and iwi (4%). Tourism operators and fishers were not mentioned in the sample.



Figure 3. Pie chart of the proportion of each stakeholder group mentioned across the sample

Perspectives quoted. A total of 17 perspectives were quoted or paraphrased across the sample. As shown in Figure 4, oil and gas companies were quoted most frequently in articles on decommissioning (47%), followed by environmental groups (23%), the Government and government entities (18%), community members (6%), and experts (6%). The perspectives of tourism operators and fishers were not provided.



Figure 4. Pie chart showing the proportion of quotations by each stakeholder group across the sample

Discussion

The present study was the first to examine how the decommissioning of offshore oil and gas structures in Taranaki is portrayed in New Zealand media. To do so, we calculated the level of media coverage using descriptive statistics, identified overarching themes using thematic analysis, and explored what and whose perspectives were communicated using quantitative content analysis. The results of these analyses are discussed below, as well as limitations and implications of this study.

Main findings.

Prominence. Overall, decommissioning has been given an exceedingly low level of media attention in New Zealand, occupying fewer than 1% of news articles published on the offshore oil and gas industry since 1960. Agenda-setting theory would hypothesise that the lack of coverage would mean that the issue is not on the public agenda (McCombs & Shaw, 1972). That is, the public would not deem decommissioning as a critical issue facing the country, or might be unaware of the situation altogether. Awareness is critical given that it is required for knowledge, understanding and the formation of individual opinions. As the outcome of the structures would have direct consequences on the Taranaki community, the wider New Zealand population, and future generations, a lack of public awareness is problematic.

As planning for decommissioning becomes increasingly urgent (and as plans begin to develop), it is possible that decommissioning will become a more prominent topic in the media. Despite installing the first offshore structure in 1979, news articles have only started mentioning decommissioning in 2012 (except for two articles on a decommissioned floating platform in 2004). This suggests that decommissioning had not been on the agenda throughout the exploration and production phases, and is only being discussed as fields near

depletion. The most recent article (Keith, 2017), published 1st April, 2017, was the first to be wholly focussed on decommissioning, potentially signifying an upwards trend in media coverage.

Despite this possibility, it is more likely that decommissioning will not make headlines unless severe conflict occurs. For example, only two articles had been published in British newspapers on the proposed deep-sea disposal of Brent Spar in the months leading up to Greenpeace's protest (Hansen, 2000). This reflects the journalistic norm of reporting on novel and sensationalised topics that evoke reader interest (Boykoff & Boykoff, 2007). A similar trend occurred in our sample, where the largest number of original (n = 4) and duplicate (n = 13) articles were published on the extension of the Māui consent and subsequent opposition by environmental groups. Likewise, decommissioning in the remaining sample was only mentioned when it was associated with a newsworthy event. So, although the lack of media discussion might be concerning because of the urgent need to start planning, it is not surprising. The media do not aim to provide a thorough, objective account of a situation, but a version of the situation that is deemed interesting to readers.

Portrayal. Second-level agenda-setting effects also rely on salience, and the media portrayal of decommissioning would only determine public understandings if specific attributes receive widespread exposure. Since the lack of articles means that the media is unlikely to set the public agenda, how decommissioning is portrayed is unlikely to shape public opinion as well.

However, how decommissioning is contextualised can still provide insight into existing perspectives and underlying assumptions about the process. Thematic analysis revealed two themes in the media portrayal of decommissioning – *disregarding decommissioning* and *addressing decommissioning*. It is important to remember that these
themes are not mutually exclusive and both are often mentioned in the same article. Combined, they construct a narrative on what decommissioning means to New Zealand in the present moment. The current lack of plans made may be attributable to the lack of legal obligation to plan and economic gain from postponing decommissioning. Despite this, decommissioning would have to occur soon which, when the time comes, oil and gas operators have indicated their agreement to oversee the process. Overall, the overarching themes indicate that decommissioning in New Zealand is currently in the pre-planning stage, and no specific actions towards decommissioning have apparently been taken.

Another interpretation of these results is that planning for alternative options is unnecessary if complete removal is already assumed. Complete removal is typically the default option favoured by international law, and the term 'decommissioning' is often used synonymously with removal (Techera & Chandler, 2015). This is evident in our sample where environmental groups advocated for 'decommissioning' but their concerns over contamination and "remediation of the site" (Weir, 2015a, 2015b) indicate that they expect the structures to be removed. It is also implied in the most recent article which reported on the financial costs required for removal (Keith, 2017), and STOS's promise to "maintain [the platforms], so it can be removed" and to "make preparations for removal" (Weir, 2015b). Although one article (Weir, 2015b) recognises the possibility for partial removal and leaving the platform *in-situ*, a source was not provided and there was no further elaboration.

Perspectives. The key actors identified in association with decommissioning gives insight into the decision-making process. Based on our analyses, it can be inferred that there is a top-down approach to decision-making which distances the issue from public concern by eliminating the need for public input. Since opposing interests are identified, this suggests a possibility of future conflict.

Top-down decision-making. A top-down approach refers to the planning and implementation of decisions by upper management who, in this case, are the oil and gas operators and the Government. Across the sample, oil and gas companies and government entities comprise of 69% of all stakeholders featured, and 65% of stakeholders who were quoted or paraphrased. These results imply that industry and government are important actors in oil and gas operations and their perspectives are prioritised as sources of information. Moreover, the sub-theme, *responsibility*, showed that STOS has promised to oversee the entire decommissioning process when the time comes, and environmental groups (who share the same sentiment) have given STOS control over decommissioning by urging them to develop plans rather than insisting on being involved in the process. By presenting decommissioning as a problem that oil and gas operators must resolve, decommissioning is not constructed as a public problem that requires public concern or allows for public input.

This top-down approach is reminiscent of the Brent Spar case where the British government and Shell UK decided to sink the platform in deep waters because they considered it to be the best environmental option. Instead, the lack of public consultation resulted in unforeseen opposition and widespread outrage, which quickly escalated into an international controversy. This highlights the necessity for a bottom-up approach, where stakeholders and community members collaborate on the final decision. This strategy is especially recommended for decommissioning due to the diverse interests of different groups.

Conflicting interests. Some results already indicate conflicting interests between groups. Specifically, the sub-themes, *postponement* and *urgency* (which overlap with perceived costs and benefits of decommissioning) suggest that oil and gas operators prioritise economic profit, whereas environmental groups oppose oil and gas development and prioritise environmental preservation. Although these two perspectives have been identified, it is unclear what community members or other stakeholders think because they were not

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mentioned in our sample. The results of this present study indicate that complete removal is the most publicised option, but we cannot accurately ascertain which option has the highest level of social approval.

Limitations. It is important to highlight limitations of this study. First, our data was analysed with a small sample size due to the lack of articles published on the topic. Because of this, we cannot conclude whether the public are knowledgeable about or even aware of upcoming decommissioning processes. It is also unlikely the themes we identified would have a strong effect on how readers think about and interpret the decommissioning process. Although we cannot accurately discern how decommissioning is being perceived in the public sphere (if at all), analysing how decommissioning is portrayed still gives insight into what ideas and assumptions key individuals and organisations might have.

Alternatives to complete removal were not discussed in any articles in our sample, resulting in a skewed portrayal of decommissioning options and stakeholder coverage. As a result, we cannot draw conclusions on how alternative options are perceived by the public, and it is likely that readers are unaware that there are different options available. Moreover, only the perspectives of stakeholders associated with complete removal were included so the few perspectives identified in our analyses should not be taken as a representation of all perspectives that exist. For example, it is unclear how typical proponents of rig conversion, such as tourism operators and fishers, perceive partial removal or re-use. Although environmental organisations and community members were mentioned, both groups were active in their pursuit of media coverage by staging protests and submitting opinion pieces. This motivation indicates a special interest in the topic and their perspectives cannot be generalised to the wider community. Moreover, given the cultural aspects of decommissioning in New Zealand, coverage of iwi involvement was disproportionately low as they were only mentioned once in an opinion piece by a Māori activist. This aligns with

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the amount of voice afforded to minorities, where Māori are under-represented in mainstream New Zealand media (Barclay & Liu, 2003). This is demonstrated by how iwi opposition to the dumping permit for subsea structures connected to Whakaaropai, a newsworthy event, went unreported despite the journalistic norms of novelty and dramatization. Consequently, future research cannot depend on the results reported here for a full range of perspectives.

Given the tendency to solely report on newsworthy events, we also cannot rely on the media to report on all incidents related to decommissioning. The most recent article in our sample was published in April 2017 and no articles have been published on the topic since then. As a result, our media analysis identified *lack of (legal) obligation to plan* as a subtheme but this no longer applies in the real-world context as amendments made to the EEZ Act in 2017 now require oil and gas operators to submit a plan for decommissioning. So, although the intention was to use this media content to provide insight into the decommissioning situation in New Zealand (which it does), we cannot assume that this information is an accurate representation of reality in the here and now. However, unless readers do their own research, they would not be aware of what is happening beyond what is being reported so analysing the media would allow researchers to know what readers know.

Implications. The present study offers insight into how decommissioning is currently being reported in New Zealand, a country where the decommissioning of fixed offshore structures has yet to occur. Across the sample, it appears that there is an implicit assumption that oil and gas structures will be completely removed after being decommissioned. However, there is a lack of empirical evidence that complete removal is the optimal strategy when environmental, technical, economic and social variables are taken into account. Disregarding alternatives to removal without further research would be premature, especially as there would be lasting implications for policy, future decommissioned structures, and New Zealand

as a whole. Based on the findings presented here, we urge a more rigorous and direct analysis of community and stakeholder perspectives before decommissioning is planned.

Conclusion

In conclusion, the findings of this media analysis show that, in New Zealand, coverage on decommissioning is low, decommissioning has yet to be planned but structures are assumed to be removed, and there is a general lack of community or stakeholder input. Given the Brent Spar controversy and the significance of social license, it is critical to examine community and stakeholder perceptions of all feasible options to ensure the final decision has an adequate level of social acceptance. The findings of this study were used to inform the next part of the project.

Study 2: Understanding Community Perceptions

The acceptance of an environmental project by the local community has significant implications on how successful the project will be. The aim of Study 2 was therefore to directly explore current perceptions of different decommissioning options among the Taranaki community, and examine what factors might underlie support or opposition. By identifying what variables are relevant, we can begin to understand what individuals value and how they allocate support.

Since no research has been conducted on what variables are implicated in support for offshore decommissioning options, the following literature review examined variables that play a role in attitudes toward environmental projects such as hydraulic fracturing and offshore wind farms. We argue that these projects are comparable to offshore decommissioning options as they also involve a trade-off between environmental and economic benefits and/or costs and are similarly controversial in nature. These variables include levels of awareness and knowledge of the issue (e.g., Bidwell, 2016), psychological constructs (e.g., Jones, Orr, & Eiser, 2011), and demographic variables (e.g., Boudet et al., 2014). The theories and mechanisms underlying these variables are reviewed below.

Literature Review

The role of knowledge. Given the role of the media on public knowledge, we will first summarise the literature on the effect of knowledge on attitudes. The information-deficit model, or simply the deficit model, proposes that negative and sceptical attitudes toward science and new technologies is the result of a lack of knowledge or information (e.g., Bauer, Allum, & Miller, 2016). The model therefore implies that information provision would generate support and acceptance of such projects. Indeed, a meta-analysis of 193 studies over 15 years found that a positive (albeit small) relationship between knowledge and favourable attitudes toward science (Allum, Sturgis, Tabourazi, & Brunton-Smith, 2008). Other studies have found a similar relationship between knowledge and acceptance of nanotechnology (Satterfield, Kandlikar, Beaudrie, Conti, & Herr Harthorn, 2009) and food technologies (Teisl, Fein, & Levy, 2009).

Importantly, there is support for the deficit model in perceptions toward environmental projects. Stedman, Evensen, O'Hara, and Humphrey (2016) found that, in the United Kingdom, knowledge was positively correlated with support for hydraulic fracturing. Furthermore, Bush and Hoagland (2016) examined public opinion polls on offshore wind energy over ten years in the community of Cape Cod, where a proposed offshore wind farm has been fraught with debate for the last decade. The study found that, as knowledge about the environmental effects of offshore wind energy increased over time, so did levels of support for the project. Although these studies reveal that a relationship between knowledge and support exists, they cannot determine the direction of causality between the variables. To circumvent this, Bidwell (2016) conducted an information intervention where individuals in the experimental condition attended an information session on the development and consequences of wind farms. Compared to baseline and to those who did not attend an information session, these individuals expressed both higher and stronger support for wind energy, suggesting that knowledge is an important determinant of support for environmental projects.

Despite evidence for the deficit model, there are also a multitude of studies that did not find a relationship, or found a negative relationship, between knowledge and support. For example, in direct contrast to the findings of Stedman et al. (2016) outlined earlier, both Boudet et al. (2014) and Howell (2018) found that knowledge about hydraulic fracturing was associated with higher levels of opposition, and Raimi and Carrico (2016) found that knowledge and exposure to smart meters did not influence acceptance but was instead related to higher levels of scepticism and concerns about negative effects of the technology. Moreover, Hanger et al. (2016) found that low levels of knowledge about solar power was negatively correlated with high acceptance among those in Morocco, and attributed this relationship to high perceived benefits and no perceived risks to the environment. In an experimental study by Lienert, Sütterlin, and Siegrist (2018), information was provided about the consequences of underground high-voltage powerlines to a subset of survey participants and found that, compared to a control group, information provision resulted in lower support, lower perceived benefits, and higher perceived risks with the project. Although some evidence indicates that knowledge plays a role in attitude formation, these studies suggest that knowledge is only one part of a larger picture.

Implications. The deficit model has significant implications on perceptions toward offshore decommissioning. Partial removal and re-use, as 'alternative' decommissioning options, are likely perceived as novel and innovative compared to complete removal, the international default. The deficit model would then argue that individuals who are knowledgeable about decommissioning options are more likely to support partial removal or re-use than those who are less knowledgeable. Since media plays a role in public knowledge (McCombs & Shaw, 1972), the lack of news coverage on decommissioning observed in Study 1 would mean that a large proportion of the Taranaki community lack sufficient knowledge about the process of decommissioning and the options available. As a result, it can be inferred that, when provided with the range of decommissioning options, the majority would choose the default option of complete removal.

However, there is a significant issue with this hypothesis and it should not be assumed that even those who are knowledgeable would necessarily support partial removal or re-use. In some studies described above, it appears that knowledge shapes perceived benefits and risks, and it is the perceived trade-off between these benefits and risks that then affect acceptance. In environmental projects, benefits and risks usually pertain to environmental and economic impacts established from research. Currently, it is unclear how exactly different decommissioning options for offshore structures would affect the New Zealand marine environment or economy. Although environmental research has been conducted based on marine mammal sightings in the Taranaki Bight (Jervis, 2017) and benthic composition around the structures (Guthrie et al., 2017), the findings of both studies were inconclusive. The economic costs are also unclear especially in the scenario of re-use, and international examples can only provide vague and relative estimates between options. When faced with high uncertainty and a lack of expert knowledge, self-identified knowledgeable individuals, similar to less knowledgeable individuals, are likely to rely on other factors to make their decision.

The abundance of studies that reject the deficit model also needs to be recognised. Over the years, the deficit model has garnered extensive criticism for its failure to generate consistent findings, and its inability to look beyond the individual (see, e.g., Bauer et al., 2016; Gross, 1994). Although there is no single competing model against the deficit model, researchers have turned their focus onto the wider context in which attitudes are formed. This includes social, cultural, and institutional factors that might underlie perceptions and behaviours (Owens & Driffill, 2008). Environmental projects often involve both environmental and economic benefits and/or risks, so it is crucial to examine factors that might influence how these consequences are perceived. Since the value assigned to consequences is derived from personal belief systems (Axsen, 2014; Perlaviciute & Steg, 2015), this study, in addition to the role of knowledge, also will also investigate beliefs related to the environment and the economy.

The role of psychological constructs. Psychological constructs, such as value orientations, beliefs and worldviews, refer to how an individual conceives and interprets the

world. These then play an important role in the formation of attitudes. For this study, we were most interested in attitudes that concern the environment and the economy, so we examined environmental attitudes as defined by the New Ecological Paradigm, social dominance orientation (SDO), egalitarian worldviews, and individualistic worldviews. We chose to include SDO and cultural worldviews because, in addition to beliefs about the human-nature relationship, beliefs about intergroup relationships and how larger society should function can have significant implications on decision-making, resource management and thus potentially, support for different decommissioning options. It is noted that there are also innumerable other psychological correlates that could be explored, such as personality and place attachment, but given the scope of this study, only the variables mentioned above were examined.

Environmental attitudes. When investigating perceptions of an environmental project, it is necessary to examine environmental attitudes. In the field of environmental psychology, the scale most commonly used to measure beliefs about the human-nature relationship is one based on the New Ecological Paradigm (Dunlap, 2008). The scale was developed to directly challenge the anthropocentric Dominant Social Paradigm which prevailed during the 1970s, and to reflect society's transition to a more ecological perspective of the environment. The Dominant Social Paradigm is founded on the beliefs that humans are the superior species, that the Earth has unlimited resources for humans to exploit, that progress and prosperity will solve societal issues, and that technology will prevail in the event of an environmental catastrophe (Ehrlich & Pirages, 1974). In 1978, a scale based on the New Environmental Paradigm was developed which, in recognition of global environmental change, consisted of items that reflected the fragility of the balance of nature, that human growth is constrained by nature, and anti-anthropocentrism (Dunlap & Van Liere, 1978). In 2000, the New Environmental Paradigm was revised and rebranded as The New

Ecological Paradigm (NEP) (Dunlap, Van Liere, Mertig, & Jones, 2000). In addition to the original three dimensions, the NEP also contains the rejection that humans are exempt from the laws of nature, and the perceived likelihood of experiencing an ecological catastrophe (Dunlap et al., 2000). Findings indicate that NEP significantly predicts environmental concern (where environmental concern is calculated from the perceived seriousness of eight separate facets of environmental issues), and NEP has a greater explanatory power over and above that of demographic variables (Liu, Vedlitz, & Shi, 2014). As a reliable indicator of pro-environmental attitudes, NEP can also significantly predict pro-environmental behavioural intentions (e.g., Cordano, Welcomer, & Scherer, 2003) and pro-environmental behaviour (e.g., Davis, Green, & Reed, 2009).

As expected, NEP plays a significant role in the support of environmental projects, and the direction of the relationship depends on whether the project is perceived as environmentally sustainable. For example, renewable sources of energy are often perceived as beneficial to the environment (Hanger et al., 2016; Perlaviciute & Steg, 2015). Therefore, it makes sense that studies have found that NEP is positively associated with support for wind farms and wind energy (Bidwell, 2013), the number of wind projects their local region can support (Jones et al., 2011), and support for policies in favour of renewable energy (Steel, Pierce, Warner, & Lovrich, 2015). In contrast, the use of fossil fuels is often seen as highly detrimental to the environment (Boudet et al., 2014). As a result, Jacquet (2012) found that higher NEP was more strongly associated with negative attitudes toward natural gas extraction, and Brasier et al. (2013) found that higher NEP was associated with more perceived risks with natural gas development.

Implications. It is expected that those with higher NEP scores would support the decommissioning option that will incur the most environmental benefits and is the most environmentally sustainable. Since it is unclear which option this is, a hypothesis cannot be

confidently made. However, individuals from environmental organisations have consistently scored higher on NEP compared to the general public (Dunlap & Van Liere, 1978), and environmentalists have traditionally supported complete removal. It is therefore conceivable that higher NEP would be associated with higher support for complete removal.

Social Dominance Orientation (SDO). Another factor worth considering is Social Dominance Orientation (SDO), or the extent to which one endorses group-based social hierarchies (Pratto, Sidanius, Stallworth, & Malle, 1994; Stewart & Pratto, 2015). These groups relate to social structure and are categorised by, for example, gender, ethnicity, and sexual orientation. Given the desire to maintain the hierarchical system, it is more likely for individuals in a position of power (i.e., the dominant social group) to exhibit a higher SDO than individuals in the subordinate group (Pratto & Stewart, 2012). To date, research has mostly focussed on the role of SDO in intergroup relations, prejudice, and personality dimensions (Stewart & Pratto, 2015), and it is only in recent years that social scientists have begun to explore the relationship between SDO and environmentalism. It is argued that the desire to dominate subordinate groups is comparable to the desire to dominate nature so SDO should play a role in shaping environmental attitudes. Indeed, Milfont, Richter, Sibley, Wilson, and Fischer (2013) found that SDO is negatively associated with environmental concern and positively associated with utilisation attitudes related to the exploitation of natural resources. These relationships persist in the cross-cultural context (Milfont et al., 2017).

Given that research on the SDO-environmentalism relationship is relatively recent, no studies have been conducted on whether SDO can predict how affected communities perceive various environmental projects. However, Milfont and Sibley (2014) conducted a study that resembled such a situation by providing vignettes about a new mining project that was either privately owned and only generated profit for the mining company and its investors (hierarchy-enhancing) or was publicly owned and the profit was given back to the local community (hierarchy-attenuating). They found that SDO significantly predicted support for the project among those that read the first hierarchy-enhancing vignette, but this relationship was non-significant among those who read the second hierarchy-attenuating vignette. The authors concluded that individuals with high SDO will support enterprises that enforce social hierarchies through a disproportionate distribution of resources and profit. Since environmental policies minimise environmental exploitation and often involve a reduction in inequality among social groups (as more costs are imposed on groups in power), it makes sense then that SDO is negatively correlated with support for environmental protection policies (Pratto et al., 1994).

Implications. Similar to NEP, the negative association between SDO and environmental concern would predict that those who are low in SDO would support the most environmentally sustainable decommissioning option. However, the influence of SDO in how environmental projects are perceived has the added dimension of social equality and resource distribution, aspects which can vary with different decommissioning options. Given the removal of resources and the direct costs to the Crown, complete removal (and perhaps partial removal) would result in an equal distribution of benefits and costs. It is therefore hypothesised that, similar to the hierarchy-attenuating vignette in Milfont and Sibley (2014), SDO would be unrelated to support for these options. The relationship between SDO and support for re-use is less clear due to a high degree of uncertainty around the nature of the project. It is possible that high SDO is associated with support as re-use would coincide with utilisation attitudes of nature. But, as Milfont and Sibley (2014) illustrated, the same project can be supported or rejected based on who manages the resource and how profit is divided. If the structures are re-used, ownership of the structure(s) could go to either a public or privateowned company. Moreover, what resources and/or profits are available and how they would be allocated would depend entirely on management and the structure's new purpose. There is therefore a probability that SDO will positively predict support for re-use, but this would rely on assumptions about the nature of management, what the structure would be re-purposed into, and what benefits would result from this conversion.

Worldviews. Worldviews, or how one makes sense of the world, play an important role in beliefs about the environment. A popular framework used to explain environmental risk perception is Cultural Theory, first proposed by Douglas (1970) and later revised and elaborated by various colleagues (e.g., Douglas, 1999; Thompson, Ellis, & Wildavsky, 1990; Wildavsky, 1987). Cultural Theory posits that social life can be defined along two spectrums of sociality, resulting in four possible cultural orientations or filters through which individuals use to interpret and understand the world. The two measures of sociality are: 1) grid, which refers to the extent that rules and regulations are imposed on people's interactions and behaviours, and 2) group, which refers to the extent to which individuals are bonded and connected with each other. High-grid communities are those where there are strict regulations on behaviour, and high-group communities are those where individuals are strongly bonded with each other. The four resulting orientations are individualistic, egalitarian, hierarchical, and fatalistic, each of which has significant implications on perceptions of nature, preferred policies, and ways of life (see Figure 5). Since these worldviews represent extreme ends of the spectrum and are not mutually exclusive (Lachapelle & Montpetit, 2014; Marris, Langford, & O'Riordan, 1998), research tends to measure the extent to which individuals adhere to each worldview instead of assigning individuals to categories.

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(Few Regulations)

Figure 5. Cultural orientations (based on Cultural Theory) and subsequent worldviews. Adapted from Price, Walker, and Boschetti (2014).

Since the present study is interested in perceptions of the environment, we will only focus on the low grid groups (individualism and egalitarianism). This is because studies have mostly found weak and inconsistent relationships between a hierarchical worldview and environmental attitudes (Carlisle & Smith, 2005; Ellis & Thompson, 1997; Marris et al., 1998), and no relationship between a fatalist worldview and environmental attitudes (Lachapelle & Montpetit, 2014; Xue, Hine, Loi, Thorsteinsson, & Phillips, 2014). As a result, most environmental research (e.g., Boudet et al., 2014) focus solely on how perceptions of nature might differ between individualist and egalitarian worldviews.

Those with an individualist worldview prioritise independence and individual freedoms, value free market capitalism, and enjoy minimal government intervention

(Wildavsky, 1987). Coinciding with a "nature benign" view, they believe the Earth has unlimited resources for exploitation, and that nature is resilient and robust against human activity (Schwarz & Thompson, 1990; Steg & Sievers, 2000). They therefore perceive lower risks associated with environmental issues and are more willing to accept risks in return for economic profit (Douglas & Wildavsky, 1982). In contrast, those with an egalitarian worldview emphasise solidarity, are interested in democratic participatory processes, and hope to foster social equality (Wildavsky, 1987). Coinciding with a "nature ephemeral" view, they believe that nature is fragile, resources are limited, and harm to the system can result in ecological disaster (Schwarz & Thompson, 1990). These individuals tend to perceive high risks with environmental issues and will support policies that reduce these risks even if they are financially costly (Douglas & Wildavsky, 1982). Moreover, in line with social equality, they are likely to advocate for environmental protection as the outcome would benefit all, whereas environmental exploitation only benefits a few. To summarise, the egalitarian worldview of nature is (predictably) negatively correlated with the individualist worldview of nature (Lima & Castro, 2005).

The influence of these worldviews on environmental perceptions are supported by empirical studies. It has been shown that an egalitarian worldview is positively associated (and an individualist worldview is negatively associated) with environmental concern (Ellis & Thompson, 1997), number of perceived environmental risks (Xue et al., 2014), perceived seriousness of environmental consequences to the self, others, and the Earth (Price et al., 2014), and awareness of own environmentally-unfriendly behaviour (Steg & Sievers, 2000). Compared to individualists, egalitarians also exhibit higher levels of concern for ozone depletion and nuclear power (Marris et al., 1998), and higher support for government spending on the environmental projects. Those with an egalitarian worldview show higher support for renewable energy, higher support for policies encouraging renewable energy, and believe that a transition away from fossil fuels is necessary for the environment, whereas those who endorse an individualist worldview exhibit lower support for renewable energy and its related policies (Tumlison, Button, & Song, 2017; West, Bailey, & Winter, 2010). Furthermore, compared to an individualist worldview, those with an egalitarian worldview perceive higher risks associated with hydraulic fracturing and oil and gas development, and are less likely to support projects of this nature (Boudet et al., 2014; Lachapelle & Montpetit, 2014; McEvoy, Gilbertz, Anderson, Ormerod, & Bergmann, 2017).

Implications. Based on their view of nature, one would predict that an egalitarian worldview would be associated with support for the most environmentally sustainable option. Comparable to social (in)equality aspect of SDO, it can be hypothesised that an egalitarian worldview is associated with support for complete removal (or partial removal) due to an equal distribution of benefits and costs. An individualist worldview might lend support to reuse instead as there is potential to convert the structures into a privately-owned venture. The component that differentiates these worldviews from SDO is the perception of environmental risk. Based on the media analysis in Study 1, environmentalists appear most concerned about leaching from the structures into the marine environment over time, resulting in contamination. However, any removal (complete or partial) of the structures would create significant sound incursion which could affect the behaviour of marine mammals in the area (Jervis, 2017). So, depending on which risk is perceived to be more severe, those with an egalitarian worldview would support the option that results in the least risk to the environment. Those with an individualist worldview would place less importance on environmental risks so their preference would depend on which option would generate the most economic profit and/or resources. Again, depending on what the structure is converted into, re-use has the most potential to generate profit.

The role of social structure. In the literature, it is largely accepted that concern for the environment is systematically related to particular social structural variables (or demographic variables). Demographics define identities and the position of groups within the social system. Since these groups have patterned dynamics and interactions with each other, different groups have different socialisation experiences which then influence how each group tends to perceive and think about the world (including the natural environment). To compare the relative explanatory power of demographic variables and psychological constructs, Dietz, Stern, and Guagnano (1998) combined both in a model to predict environmental concern. They found that, although psychological constructs (such as environmental attitudes and post-materialism) were able to explain significantly more variance in environmental concern, demographic variables were still reliable predictors and the effect of demographics could not be explained by psychological constructs. This suggests that they both play independent roles in the formation of environmental attitudes and both should be examined in relevant studies.

By conducting a meta-analysis on the social correlates of environmental concern, Van Liere and Dunlap (1980) established age, education, and political ideology to be reliable predictors. Although the authors found mixed evidence for the effect of gender, a lack of studies was conducted at the time of analysis and many studies published since have found a relationship between gender and environmental attitudes (e.g., Liu et al., 2014; Milfont & Sibley, 2016; Zelezny, Chua, & Aldrich, 2000). These effects also appear to have remained relatively stable over time (Jones & Dunlap, 1992). Based on this evidence, this section will outline the influence of these four factors (age, gender, education, and political ideology) on environmental concern and subsequently, perceptions of environmental projects.

Age. In general, studies have found that age is negatively correlated with environmental concern (e.g., Buttel, 1979; Mohai & Twight, 1987; Van Liere & Dunlap,

1980) that is, younger individuals tend to be more concerned about the environment than older individuals. Out of all the demographic variables, age is argued to be the strongest and most robust predictor of environmental concern (Buttel, 1979; Mohai & Twight, 1987). Two explanations for this relationship have been put forward: cohort effects and aging effects. Cohort effects refer to attitude differences between groups due to events that occurred during critical periods of development. For example, Hallin (1995) found that individuals from the Depression generation (including their children) and the Vietnam generation exhibited more pro-environmental behaviours, such as re-using and recycling, presumably due to limited resources growing up. Aging effects refer to attitude changes due to the process of aging (Buttel, 1979), and it is proposed that older individuals are more integrated into the social system and therefore more committed to the status quo. They are therefore more likely to vote for right-leaning parties (Tilley & Evans, 2014) and less likely to support progressive movements such as environmentalism (Buttel, 1979). Using both cross-sectional and longitudinal methods, Honnold (2010) distinguished these effects and found that the relationship between age and environmental concern is most likely due to cohort effects, but aging effects can be seen in the sample of young adults. Nowadays, studies typically include age as a predictor variable when examining environmental attitudes and behaviours (e.g., Firestone & Kempton, 2007; Ladenburg, 2008).

Gender. Females tend to express higher levels of environmental concern than males (e.g., Blocker & Eckberg, 1997; Liu et al., 2014; Milfont & Sibley, 2016; Stern, Dietz, & Kalof, 1993; Strapko, Hempel, MacIlroy, & Smith, 2016), and this relationship has been found cross-culturally and across different age groups (Zelezny et al., 2000). The primary explanation for this relationship rests on gender roles and differences in socialisation. Gender socialisation, beginning at birth, is the process where males and females learn and adopt attitudes and behaviours that are considered appropriate for their gender. Theoretically,

females tend to be socialised to be nurturing and empathetic while males are socialised to be independent and competitive. As a result, females exhibit higher levels of compassion and care for the wellbeing of others, whereas males place a higher value on competition against other individuals (Beutel & Marini, 1995). This 'ethics of care' may be generalised to ecological value orientations which refer to the type of consequences of an environmental issue that one is most concerned about. These orientations include egoistic (consequences to the self), social-altruistic (consequences to others), and biospheric (consequences to the environment). Stern et al. (1993) found that females scored higher on all three orientations, resulting in higher levels of environmental concern.

Education. Research generally indicates that higher education levels are associated with higher levels of environmental concern (Chanda, 1999; Dietz et al., 1998; Howell & Laska, 1992; Van Liere & Dunlap, 1980). In many studies, education level (in addition to income and occupational prestige) serves as a proxy for social class (Van Liere & Dunlap, 1980). Building upon Maslow's (1970) hierarchy of needs, it has been argued that those in the middle and upper class have met their basic survival needs, and have the time and resources to be concerned about the natural environment (Van Liere & Dunlap, 1980). The direct relationship between education and environmental concern is less clear. It has been suggested that education exposes individuals to more sources of information about environmental issues (Chanda, 1999), and education allows individuals to fully understand the complexities of these issues (Liu et al., 2014). However, these studies were conducted in the 1990s, and a more recent paper was unable to find a relationship between education and environmental attitudes in any of their 24 regressions (Liu et al., 2014), suggesting that this association needs to be re-examined in today's context. Other research also found that levels of environmental concern is further differentiated by whether one attends a private or public school (Tuncer, Ertepinar, Tekkaya, & Sungur, 2005) and by the type of college major one

studies (Ridener, 1999; Synadinos, 1990). This suggests that variability in education needs to be considered, and the general association between education and environmental concern is not as robust as once thought.

Political ideology. Existing research shows that those who are more politically liberal express higher levels of environmental concern compared to those who are more politically conservative (e.g., Cruz, 2017; Dunlap, 1975; Liu et al., 2014; Van Liere & Dunlap, 1980). Dunlap (1975) theorised that this is because conservative parties place a stronger emphasis on business and the economy while liberal parties advocate for socio-economic equality. These principles differentially affect support for and adoption of pro-environmental policies which often require costs imposed on businesses, stricter governmental regulation, and innovative action that affects the status quo. A meta-analysis by Cruz (2017) confirmed that almost all studies conducted on political ideology and environmental concern found a statistically significant relationship which was not moderated by other factors examined in the literature. However, most of these studies analysed were conducted with samples from the United States where there is a clear partisan divide on environmental issues (Dunlap & McCright, 2008), and research indicates that this association is comparatively weaker in other countries (Ziegler, 2017). Despite this, studies conducted with New Zealanders do indicate that, compared to political conservatives, politically liberal individuals exhibit more proenvironmental attitudes (Milfont, 2012) and higher levels of climate change beliefs (Milfont, Milojev, Greaves, & Sibley, 2015). This direction of this relationship can therefore be generalised to the New Zealand context.

Implications. Because of the association between demographics and environmental concern, researchers often examine these variables when studying attitudes toward environmental projects. From the findings, it is clear that the direction of the relationship between demographic variables and support for projects is entirely dependent on whether the

project is perceived as beneficial or harmful to the environment (similar to NEP). Studies on perceptions of offshore wind power found that individuals who are younger (Firestone & Kempton, 2007; Ladenburg, 2008, 2010), female (Ladenburg, 2010), more educated (Firestone & Kempton, 2007; Ladenburg, 2010), and politically liberal (Sokoloski, Markowitz, & Bidwell, 2018) are more likely to support the project than those who are older, male, less educated, and politically conservative. A similar trend was found in support for government policies on renewable energy (Steel et al., 2015). In direct contrast, studies on perceptions of hydraulic fracturing have consistently found that individuals who are older (Boudet et al., 2014), male (Andersson-Hudson, Knight, Humphrey, & O'Hara, 2016; Boudet et al., 2014; Whitmarsh et al., 2015), less educated (Boudet et al., 2014), and politically conservative (Andersson-Hudson et al., 2016; Boudet et al., 2014; Choma, Hanoch, & Currie, 2016; Whitmarsh et al., 2015) are more likely to support the project than those who are younger, female, more educated, and politically liberal.

Since it appears that demographic variables play a role in attitudes toward projects that involve the environment, it is hypothesised that these variables would also influence support for different decommissioning options for offshore oil and gas structures. Similar to the role of knowledge, it is unclear which decommissioning option is the most environmentally friendly in the New Zealand marine environment. However, we would expect that the option that produces the most environmental benefit would be supported by those who express a higher level of environmental concern. It should be acknowledged too that environmental groups and environmentalists, who exhibit higher levels of environmental concern, tend to support complete removal in the international context. It is likely then that the demographic correlates of environmental concern (younger, female, more educated, and politically liberal) would be associated with support for complete removal over alternative options.

The Present Study

It is currently unclear how the Taranaki community currently understands the issue, so the aim of the present study was to summarise levels of familiarity about decommissioning options, levels of support, impacts the community believes that each decommissioning option would have, and what impacts are considered important. This study also explored potential predictors of support for different decommissioning options for offshore oil and gas structures. Specifically, we examined if and how levels of familiarity with the issue, psychological constructs, and demographic variables are associated with support for different decommissioning options. Although we acknowledged how each variable might influence support, there is a high uncertainty around what consequences each option entail so we cannot be confident in our hypotheses. The present study was therefore exploratory, and unguided by any specific hypotheses. The only parameter specified in these analyses is the theorised causal relationship of variables on levels of support for different options.

Method

To obtain data about perceptions, a mail-based survey was posted to a probability sample of the Taranaki residential population. To maximise response rate (Dillman, Smyth, & Christian, 2009), a one-page pre-notice letter (see Appendix A) was sent to the sample to briefly introduce the study and to inform them that they have been chosen to participate in a survey that they will receive within the next week. Five days later, the survey packet was sent which contained a cover letter (Appendix B), a participant information sheet (Appendix C), the survey (Appendix D), and a return envelope. Four weeks later, a one-page reminder letter (Appendix F) was sent to individuals who have yet to respond. Data collection closed ten weeks after the survey was posted. All correspondence was sent with the Victoria University of Wellington logo in the letterhead. The study was approved by the School of Psychology Human Ethics Committee under delegated authority of the Human Ethics Committee of the Victoria University of Wellington (reference number: 25094).

It should be noted that data collection was conducted between September and October 2017, which coincided with two major events that could have influenced perceptions about decommissioning options in different ways. The first was the New Zealand general election. After months of campaigning, polling took place on the 23rd of September and official results (excluding special votes) were announced on the 7th of October. The two main parties were the National Party, a centre-right party, and the Labour Party, a centre-left party. During their campaigns, the National Party proposed to balance environmental sustainability with economic profit by increasing the use of renewable energy but continuing development of the oil and gas sector in New Zealand (due to the country's high potential for oil and gas exploration). In contrast, the Labour Party emphasised their goal for New Zealand to rapidly transition to a low carbon economy by replacing the use of fossil fuels with renewable energy. The election revealed that the National party received the popular vote in all three electorates that encompass the Taranaki region. This is important as campaigning likely made each party's stance on energy more salient, and studies have shown that party affiliation can influence attitudes towards different issues (Jacoby, 1988) and policy preferences (Carsey & Layman, 2006). It is possible then that the Taranaki community, similar to the National party, would place a higher priority on economic prospects rather than environmental aspects when considering decommissioning options. The second event that occurred was the approval of seabed mining in the South Taranaki Bight by the EPA on the 10th of August, 2017. Prior to approval, the EPA received over 13,000 public submissions in opposition to the project. Unsurprisingly, its approval caused controversy and outrage in the community, and the decision is set to be legally appealed in High Court in 2018. It is possible that anger towards the seabed mining proposal would then affect perceptions toward different decommissioning

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options, leading to rejection of any project that is perceived to cause further damage to the marine environment. Either or both events could also have affected the response rate.

Participants. Based on the population size of Taranaki (N = 116,600) and a confidence level of 95% (Dillman et al., 2009), the completed sample size required to be able to generalise the results to the wider population is 383 participants. Assuming a response rate of approximately 50%, 774 individuals were sent the full survey. To control for the influence of background information provided, an additional set of participants (n = 76) was sent a shortened survey (more information below). These 850 participants were randomly selected from the public electoral roll in the local library. As they are enrolled to vote, all selected individuals were aged 18 or over. Since the Taranaki region is comprised of three electorates (New Plymouth, Taranaki-King Country, Whanganui), a stratified random sampling method was used where the number of individuals collected from each electorate is proportional to the population of each region. This resulted in 520 individuals from the New Plymouth electorate, 100 from Taranaki-King Country (North Taranaki region), and 230 from Whanganui (South Taranaki region).

Out of 850 surveys sent, 67 (seven shortened) were returned to sender and 14 individuals (all sent a full survey) were unavailable, reducing the initial sample to 769 participants. After ten weeks, a total of 168 participants completed and returned the survey. Within these, 154 completed the full survey and 14 completed the shortened survey. Based on the number of valid addresses and available participants, the overall response rate was 21.8%. The response rate for the full survey was 22.0%.

Across the sample, 57.1% of respondents were from the New Plymouth electorate (n = 96), 17.3% were from the Taranaki-King Country electorate (n = 29), and 25.6% were from the Whanganui electorate (n = 43). The respondents' age ranged from 21 to 92 years old (M =

58.59, SD = 14.31), and were comprised of 53.6% males (n = 90) and 45.8% females (n = 76). Moreover, 87.5% identified as New Zealand European or Pakeha (n = 147), 3.6% as Maori (n = 6), 0.6% as Pacific Islander (n = 1), 1.2% as Middle Eastern, Latin American, or African (n = 2), 1.8% as Asian (n = 3), and 3.6% as "other" (n = 3). In accordance with the high mean age, 32.7% (n = 55) of the sample were retired. Compared to the 2013 census data (Statistics New Zealand, 2013), our study sample overrepresented older individuals and underrepresented minority groups, a skew in demographics that often occurs in survey research (Kellstedt, Zahran & Vedlitz, 2008; Malka, Krosnick & Langer, 2009; Milfont, 2012). Therefore, some results (particularly perceived impacts and overall levels of support) should be interpreted with caution as they are not a true representation of the perspectives in the Taranaki region.

Measures. The full survey instrument (see Appendix D) measured (in chronological order): 1) levels of familiarity with decommissioning and decommissioning options, 2) perceived impacts and levels of support for different options, 3) psychological constructs, and 4) socio-demographic information. All measures were based on self-report. Since no expertise was assumed on the participants' behalf, a brief description of decommissioning and the structures was provided after questions on familiarity so individuals have enough background information to answer the rest of the survey. In the description, participants were given an explanation that Taranaki's offshore oil and gas fields are nearing the end of their production life and the accompanying infrastructure will need to be decommissioned. A basic diagram of the topside and jacket of an offshore fixed platform was then presented, with a simple description of what happens to the structure during complete removal, partial removal, and re-use. Due to the lack of research and high level of uncertainty around the environmental and economic impacts of each option, no information about the consequences of each option was given.

Familiarity. The first section examined familiarity using five questions on a 5-point Likert scale, ranging from 1 (*not at all*) to 5 (*very/a lot*). These questions measured how aware participants are of the upcoming need to decommission structures, how much they have read or heard about decommissioning, and how aware, knowledgeable, and interested they are in different decommissioning options. Participants were instructed to complete this section before continuing the survey to ensure that their responses to these questions would not be influenced by the background information provided on the next page.

Support and perceived impacts of decommissioning options. Participants were asked to rate whether they think each decommissioning option would have a positive impact on the following 13 areas: community harmony, Taranaki's reputation, Māori values, employment, aesthetics of the ocean view, marine life, air quality, ocean water quality, local economy, New Zealand's economy, the commercial fishing industry, tourism, and recreation (e.g., diving, fishing). The scale ranged from 1 (*strongly disagree/negative impact*) to 3 (*no impact*) to 5 (*strongly agree/positive impact*). Afterwards, participants rated their levels of support for each decommissioning option on a scale from 1 (*strongly oppose*) to 5 (*strongly support*), before selecting the option they preferred the most. They were then asked to rank the top three areas of potential impact that they considered to be the most important when deciding to support or oppose each option.

Psychological constructs. Since worldviews and attitudes can influence risk perceptions and decision-making associated with environmental projects, the survey included established scales widely used in environmental psychology.

Environmental attitudes. To measure environmental attitudes, we used the 15-item Revised New Ecological Paradigm (NEP) scale (Dunlap et al., 2000). Examples of items include "We are approaching the limit of the number of people the earth can support" and "Humans have the right to modify the natural environment to suit their needs", all rated on a 5-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Seven of the items were reverse-coded, and the respondents' NEP was represented by their mean response to these items. Higher scores reflected a more pro-NEP and ecological worldview (Cronbach's alpha = .855).

Social Dominance Orientation. Participants' social dominance orientation was measured using a shortened version of the Social Dominance Scale (Pratto et al., 2012). This scale contained four items which included "In setting priorities, we must consider all groups", "We should not push for group equality", "Group equality should be our ideal", and "Superior groups should dominate inferior groups", rated on a 10-point Likert Scale from 1 (*extremely oppose*) to 10 (*extremely support*). The first and third item were reverse coded, and the respondent's SDO was calculated by averaging their responses. Those with higher scores had a higher SDO and favoured social hierarchies more than those with lower scores (Cronbach's alpha = .703). This scale has been proven to have both internal reliability and predictive validity in cross-cultural context (Milfont et al., 2017; Pratto et al., 2012).

Individualist and egalitarian worldviews. Individualist and egalitarian worldviews was measured using an eight-item scale constructed by Boudet et al. (2014). All items were measured on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Since they all pertain to a similar subject matter, the items were presented together under the same section but since they do not reflect the same concept, individualist and egalitarian worldviews were treated as separate constructs in subsequent analyses. The measure for egalitarian worldviews (Cronbach's alpha = .645) was measured using the average response to three items which included, for example, "The world would be a more peaceful place if its wealth were divided more equally among nations". The measure for individualist worldviews (Cronbach's alpha = .748) was measured using the average response to five items which

included, for example, "If the government spent less time trying to fix everyone's problems, we'd all be a lot better off".

Socio-demographics. To understand the range of participating individuals, the last part of the survey asked for general socio-demographic information. Participants filled out their age, gender, ethnicity, annual income, industry of employment and occupation, education, support for various New Zealand political parties, political orientation in regard to social and economic issues (Talhelm et al., 2015), and length of residence in the Taranaki region.

Shortened survey. Since a physical survey was used, we cannot control for the order that the participants completed the survey questions. As the brief description of the decommissioning options could influence the responses to how questions about familiarity are answered, we also sent a shortened survey to a smaller and randomly-selected sample of individuals for a direct measure of familiarity. The shortened survey (see Appendix E) contained all the elements of the full survey, except for the description of decommissioning and the various options, and subsequent questions on perceived impacts and levels of support for different decommissioning options. If there are no significant differences between selfreported knowledge and awareness, responses to the shortened survey would be excluded.

Results

Community perceptions in Taranaki. To provide some context on how decommissioning options are currently understood by the Taranaki community, descriptive statistics were summarised for levels of familiarity with the topic, levels of support for different decommissioning options, the perceived impact of different options on different areas, and the areas of most importance to respondents when deciding their support or opposition. *Familiarity*. A one-sample *t*-test was conducted with each of the five variables measuring familiarity (awareness and exposure to decommissioning, and awareness, knowledge and interest in decommissioning options) to examine whether the values significantly differed from a midpoint of three on a scale from 1 (*not at all*) to 5 (*very/a lot*). The results indicate that, compared to the midpoint, the overall sample showed a significantly lower level of awareness of decommissioning (M = 2.70, SD = 1.34, t(166) = -2.88, p = .004, d = 0.22), and had not read or hear much about decommissioning (M = 1.73, SD = 0.95, t(164) = -17.28, p < .001, d = 1.34). Furthermore, compared to the midpoint, the respondents expressed significantly lower levels of awareness (M = 1.63, SD = 0.94, t(166) = -18.83, p < .001, d = 1.46) and knowledge (M = 1.59, SD = 0.90, t(166) = -20.29, p < .001, d = 1.57) of decommissioning options, but express a significantly higher level of interest in them (M = 3.42, SD = 1.13, t(167) = 4.85, p < .001, d = 0.37). Responses to the full and the shortened survey are comparable when separately examined (see Table 3).

Table 3

Survey		
3) of Familiarity Variables Between Respondents of the Full Survey and the Sho	ortened	
Descriptive Statistics, 1-statistics, and Effect Sizes (from One-Sample 1-Test wi	ith Midp	point of

	Full survey				Shortened survey			
Familiarity	М	SD	t-statistic	d	М	SD	t-statistic	d
1 Awareness of	2.69	1.35	-2.89*	0.23	2.86	1.35	-0.40	0.10
decommissioning								
2 Read or heard about	1.70	0.92	-17.38**	1.41	2.11	1.23	-2.94*	0.72
decommissioning								
3 Awareness of options	1.62	0.93	-18.30**	1.48	1.71	1.07	-4.50*	1.21
4 Knowledge of options	1.58	0.89	-19.81**	1.60	1.64	1.08	-4.69**	1.30
5 Interest in options	3.43	1.14	4.68**	0.38	3.36	1.08	1.24	0.33
$N_{a4a} * m < 05 * * m < 001$								

Note. **p* < .05; ***p* < .001

As the purpose of the shortened survey was to ensure that self-reported knowledge and awareness were not influenced by the presentation of background information, an independent-samples *t*-test was conducted to assess whether levels of familiarity differed between respondents of the shortened survey and the full survey. The results showed that there was no significant difference in awareness of (t(165) = -0.46, p = .650, d = 0.13) or amount heard or read about (t(163) = -1.08, p = .280, d = 0.28) decommissioning, nor was there a significant difference in awareness (t(165) = -0.24, p = .723, d = 0.09), knowledge (t(165) = -0.48, p = .809, d = 0.06), or interest (t(166) = -0.23, p = .822, d = 0.06) in decommissioning options. Since these levels were matched, responses to the shortened survey were excluded from subsequent analyses due to missing data. This resulted in a final sample of 154 individuals.

Support for different decommissioning options. When respondents were asked to choose the decommissioning option they preferred the most, 57.3% (n = 86) of the sample selected complete removal, 15.3% (n = 23) selected partial removal, and 27.3% (n = 41) selected re-use.

Respondents were also asked to rate their level of support or opposition for each of the options using a 5-point Likert scale from 1 (*strongly oppose*) to 5 (*strongly support*). The results show that complete removal received the highest level of support (M = 3.95, SD = 1.29), followed by re-use (M = 3.15, SD = 1.37), and partial removal (M = 2.88, SD = 1.39). A distribution of these responses is displayed in Table 4. A one-sample *t*-test with a test value of three was conducted to examine whether levels of support for each option differed significantly from the midpoint. The results show that, on average, only complete removal had a significantly higher level of support (t(145) = 8.89, p < .001, d = 0.74), whereas levels of support for partial removal (t(143) = -1.02, p = .310, d = 0.0009) and re-use (t(144) = 1.33, p = .185, d = 0.11) did not significantly differ from the midpoint.

Table 4

Percentage of Respondents Who Support, Neither Support Nor Oppose, and Oppose each Decommissioning Option

	Support (%)	Neither support	Oppose (%)
Decommissioning option		nor oppose (%)	
Complete removal	66.5	19.9	13.7
Partial removal	39.6	18.8	41.7
Re-use	45.5	22.8	31.7

Note. Respondents who are considered supporters include individuals who selected "strongly support" and "somewhat support", and respondents who oppose include those who selected "strongly oppose" and "somewhat oppose"

Perceived impacts. The perceived impact of each decommissioning option (sorted by the percentage of individuals who perceive that the option will have a positive, negative or negligible impact) on a range of areas is displayed in Figure 6.

Overall, the sample reported more positive and negligible impacts than negative impacts for all decommissioning options. There appears to be a consensus that complete removal will be the most beneficial, with 40 to 70% of the sample believing that complete removal will have a positive impact on nine out of 13 areas. In contrast, between 40 to 55%

of respondents think that partial removal will have a negligible impact on eight areas. Perceived impacts for re-use were more divided. Between 40 to 55% believe that re-use will have a positive impact on employment, the local economy, and the New Zealand economy, but approximately 50% of respondents believe that re-use will have a negative impact on Māori values and the aesthetics of the ocean view. Furthermore, more individuals believe that re-use will have negative environmental impacts (on marine life, ocean water quality, and air quality) compared to complete removal and partial removal.

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Areas of Impact



Figure 6. Perceived Impacts (Positive, None, Negative) of Decommissioning Options, Complete Removal (CR), Partial Removal (PR), and Re-use (R), On Various Areas by Proportion of Respondents (%)

66

Impacts of highest importance. We also measured which areas were deemed the most important by supporters of different decommissioning options. The percentage of supporters within each decommissioning option who regarded an area to be important (ranked as Top 3) are displayed in Table 7. It should be noted that, since there is a wide variation in the number of supporters for each decommissioning option, the percentages should be interpreted with caution.

As can be seen, the majority of those who support complete removal (71.2%) regarded marine life as one of the top three areas they considered most important when deciding their support. This was followed by ocean water quality (53.0%) and Taranaki's reputation (27.3%). Similarly, a large proportion of those who support partial removal considered marine life (77.3%) and ocean water quality (45.5%) to be important, but also valued the local economy (31.8%). In contrast, the majority of those who support re-use (71.9%) considered the local economy to be important, which was followed by marine life (37.5%) and ocean water quality (28.1%).

These results appear to coincide with the data on perceived impacts, where a substantial portion of respondents believe that complete removal and partial removal will have a positive impact on marine life, and re-use will have a positive impact on the local (and New Zealand) economy. It is understandable then that individuals will support the option they believe will be the most beneficial to the area they consider to be important.

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Figure 7. Areas considered important by supporters of complete removal (left; n = 62), supporters of partial removal (middle; n = 22), and supporters of re-use (right; n = 32)
Predictors of support. Path analysis was used to explore the relationships between potential predictor variables (based on the theoretical foundations outlined in the literature review) and levels of support for complete removal, partial removal, and re-use. These analyses were conducted using the Mplus statistical program, and statistical significance was based on an alpha level of .05. Since three broad theories were discussed, separate path models were calculated for three sets of independent variables:

- Familiarity: awareness of decommissioning options, knowledge of decommissioning options, and interest in decommissioning options
- 2. Psychological constructs: environmental attitudes (NEP), SDO, individualist worldviews, and egalitarian worldviews
- Demographics: age, gender, education, social political orientation, and economic political orientation

After calculating the three separate path models, the significant predictors identified were regressed onto the three support variables to produce a final model.

Descriptive statistics and bivariate correlations between all predictor and outcome variables are displayed in Table 5. Apart from gender and education, all variables were measured on Likert scales and were treated as continuous variables. Gender identification was coded by 1 = "male" and 2 = "female", and education was coded by 0 = "low" (secondary school incomplete, NCEA or equivalent, polytechnic qualification, or trade certificate) and 1 = "high" (undergraduate degree, postgraduate degree, masters degree, doctorate).

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Table 5

Descriptive Statistics and Bivariate Correlations Between All Predictor and Outcome Variables

	Variables	М	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Awareness	1.63	0.94														
2	Knowledge	1.59	0.90	.74**													
3	Interest	3.42	1.13	.31**	.27**												
4	NEP	3.63	0.61	16*	.13	.21**	(.855)										
5	SDO	3.52	1.81	.12	10	16*	24**	(.703)									
6	Individualism	2.76	0.82	.04	.05	27**	29**	.38**	(.748)								
7	Egalitarianism	3.68	0.85	15*	.19*	.19*	.32**	34**	35**	(.645)							
8	Age	58.59	14.31	.001	03	.09	08	.01	.32**	28**							
9	Gender	1.46	0.50	13	20*	19*	05	17*	08	$.20^{*}$	09						
10	Education	2.85	1.33	.02	.01	.14	.03	-1.12	24**	.37**	36**	.09					
11	Social PO	3.80	1.37	.01	.05	19*	02	.14	.15	39**	.11	14	26**				
12	Economic PO	4.23	1.33	02	01	-0.14	20*	$.18^{*}$.35**	35**	.03	10	16	.62**			
13	Support for CR	3.95	1.29	06	.06	.009	$.20^{*}$	23**	22**	.21*	.01	.07	.18*	10	07		
14	Support for PR	2.88	1.39	.17*	.13	0.06	.004	.04	.13	.10	06	10	.12	08	.05	10	
15	Support for R	3.15	1.37	.09	.05	-0.10	16	.11	.09	09	23**	.03	04	.06	.08	48**	.01

Note. Abbreviations used include PO = political orientation, CR = complete removal, PR = partial removal, and R = re-use Political orientation scales range from 1 = "extremely liberal" to 7 = "extremely conservative"

p* < .05; *p* < .01

Model 1: Familiarity. The results showed that awareness, knowledge, and interest in decommissioning options accounted for 2.3% of the variance in support for complete removal ($R^2 = .02$, p = .218), 2.9% of the variance in support for partial removal ($R^2 = .03$, p = .306), and 2.7% of the variance in support for re-use ($R^2 = .03$, p = .355). However, none of the variance explained by the models were statistically significant.

The standardised beta estimates between all familiarity variables and support for each decommissioning option are displayed in Figure 8. Path analysis revealed that awareness of decommissioning options was negatively associated with support for complete removal ($\beta = -.208, p = .027$, CI [-0.393, -0.023]), while knowledge of decommissioning options was positively associated with support for complete removal ($\beta = 0.188, p = .035$, CI [-0.013, -0.363]. No other familiarity variable was significantly associated with support for any of the decommissioning options (ps > .05). Moreover, support for complete removal was negatively correlated with support for re-use ($\beta = -.480, p < .001$, CI [-0.603, -0.356]).



Figure 8. Path diagram showing standardised beta estimates between familiarity variables and support for different decommissioning options. *p < .05. **p < .001.

Model 2: Psychological constructs. The results showed that NEP, SDO, individualist worldviews, and egalitarian worldviews accounted for 9.4% of the variance in support for complete removal ($R^2 = .09$, p = .057), 4.2% of the variance in support for partial removal ($R^2 = .04$, p = .196), and 2.9% of the variance in support for re-use ($R^2 = .03$, p = .315). Only the variance explained for support for complete removal was marginally significant.

The standardised beta estimates between all psychological constructs and support for each decommissioning option are displayed in Figure 9. Path analysis revealed that individualist worldviews were positively associated with support for partial removal ($\beta = 0.188, p = .046, CI [0.001, 0.617]$). Additionally, egalitarian worldviews were marginally and positively associated with support for partial removal ($\beta = 0.167, p = .069, CI [-0.021, 0.563]$. No other psychological variable was significantly associated with support for any of the decommissioning options (ps > .05). As in Model 1, support for complete removal was negatively correlated with support for re-use ($\beta = -.464, p < .001, CI [-1.036, -0.497]$).



Figure 9. Path diagram showing standardised beta estimates between psychological constructs and support for different decommissioning options. $^{\dagger}p = .069$. *p < .05. **p < .001.

Model 3: Demographics. The results showed that age, gender, education, social political orientation, and economic political orientation accounted for 2.2% of the variance in support for complete removal ($R^2 = .02$, p = .320), 4.7% of the variance in support for partial removal ($R^2 = .05$, p = .193), and 6.1% of the variance in support for re-use ($R^2 = .06$, p = .112). Again, none of the variance explained by the model were statistically significant.

The standardised beta estimates between all demographic variables and support for each decommissioning option are displayed in Figure 10. Path analysis revealed that age was negatively associated with support for re-use ($\beta = -.230$, p = .005, CI [-0.392, -0.068]). No other demographic variable was significantly associated with support for any of the

decommissioning options (ps > .05). As in Models 1 and 2, support for complete removal was negatively correlated with support for re-use ($\beta = -.499$, p < .001, CI [-0.627, -0.371]).



Figure 10. Path diagram showing standardised beta estimates between demographic variables and support for different decommissioning options. p < .05. p < .001.

Final model. Modelling predictors that can explain a statistically significant amount of variance in support would provide a framework that can be used in future studies on perceptions of decommissioning options. For the final model, we conducted a path analysis using the significant predictors identified in Models 1, 2, and 3. Egalitarian worldviews, as a marginally significant predictor, was also included. The results showed that awareness and knowledge of decommissioning options, individualist worldviews, egalitarian worldviews, and age accounted for 10.3% of the variance in support for complete removal ($R^2 = .10$, p = .03), 7.6% of the variance in support for partial removal ($R^2 = .08$, p = .064), and 7.7% of the variance in support for re-use ($R^2 = .08$, p = .064). The explained variance in this full model was statistically significant for support for complete removal, and marginally significant for both support for partial removal and re-use.

The standardised beta estimates between all significant variables and support for each decommissioning option are displayed in Figure 11. Support for complete removal was associated with awareness of decommissioning options ($\beta = -0.199$, p = .021, CI [-0.531, - 0.024]), knowledge of decommissioning options ($\beta = 0.226$, p = .006, CI [0.095, 0.567]), and egalitarian worldviews ($\beta = 0.169$, p = .037, CI [0.021, 0.492]). The association between individualist worldviews and support for complete removal was also marginally significant ($\beta = -0.178$, p = .059, CI [-0.567, 0.020]). Support for partial removal was associated with individualist worldviews ($\beta = 0.189$, p = .032, CI [0.021, 0.600]) and egalitarian worldviews ($\beta = 0.183$, p = .027, CI [0.032, 0.563]). Support for re-use was negatively associated with age ($\beta = -0.239$, p = .002, CI [-0.038, -0.009]). All significant associations in Models 1, 2, and 3 remained significant after being combined in the final model. Additionally, the association between egalitarian worldviews and support for both complete and partial removal became significant (ps < .05), and the negative association between individualist worldviews and support for complete removal became marginally significant (p = .059).

The findings indicate that individuals who adhere to an egalitarian worldview and are less aware or more knowledgeable of decommissioning options are more likely to support complete removal. Individuals who score higher on both measures for individualist and egalitarian worldviews are more likely to support partial removal. Lastly, older individuals are less likely to support re-use. Some of these findings appear inconsistent and will be elaborated in the Discussion section. Importantly, all identified predictors in Models 1 to 3 remained significant after being combined into this final model, suggesting that each variable is asserting an independent effect on levels of support.



Figure 11. Combined path diagram showing standardised beta estimates between statistically significant variables (identified in Figures 8, 9, and 10) and support for different decommissioning options. $^{\dagger}p = .059$. $^{*}p < .05$. $^{**}p < .001$.

Discussion

Using a mail-based community survey, we summarised current understandings of decommissioning options for offshore structures among the Taranaki community, including perceived impacts of each option, which impacts are considered personally important, and subsequent levels of support. The current study also investigated potential predictors of support for each decommissioning option by drawing upon a range of existing theories to identify which variables are relevant for this particular environmental project. These included familiarity variables, psychological constructs, and demographic variables. The findings, implications, and limitations of this study, as well as suggestions for applications, are discussed below.

Main findings.

Awareness and knowledge. Analyses revealed that support for complete removal was negatively associated with awareness of decommissioning options, but positively associated with knowledge. This finding is interesting as awareness and knowledge are often used interchangeably (Trevethan, 2017) so differential effects are not typically expected. However, we decided to assess awareness and knowledge separately as awareness is required for knowledge but does not always imply knowledge. Awareness, in this case, refers to recognising that multiple decommissioning options exist, whereas knowledge involves a more factual understanding of what the options are (and potentially their risks and benefits). As a result, awareness levels are generally higher than knowledge levels (Hausbeck, Milbrath, & Enright, 1992; Yacobi, Tennant, Ferrante, Pal, & Roetzheim, 1999), as found in our sample. It is expected that they are also highly and significantly correlated (r = .74, p < .01).

Given this correlation, the differential effects of awareness and knowledge on support for complete removal appear contradictory. Neither awareness nor knowledge were correlated with support for complete removal (see Table 5), but both were significant predictors of support when included in the same path model. We believe that this is due to a suppression effect (Horst, 1941). By including both variables (in addition to interest, which was significantly and positively correlated with both awareness and knowledge), they control for or "suppress" the variance shared with the other predictors that is irrelevant to their association with the outcome variable. We therefore assert that knowledge and awareness are showing independent effects on support.

Our data shows that lower awareness (controlling for knowledge) was associated with higher support for complete removal. The most plausible explanation is that those who are unaware of the existence of alternative decommissioning options would intuitively support the default option. In the New Zealand context, the results of the familiarity measures in this study confirmed that there is low public awareness of different decommissioning options in the Taranaki community (as suggested by the low media coverage). This could explain the overall high levels of support for complete removal in the sample. In contrast to the deficit model, we also found that knowledge is associated with higher support for complete removal and not novel technologies (i.e., partial removal or re-use). This reverse relationship is consistent with many studies that found that knowledge can influence perceived benefits and risks (Boudet et al., 2014; Howell, 2018; Lienert et al., 2018). It is possible that knowledge of the benefits associated with a clean seabed and risks involved in leaving the structures in place generated support for complete removal.

Individualist worldviews. Our data analyses showed that individualist worldviews were (marginally) negatively associated with support for complete removal, and positively associated with support for partial removal. Since an individualist worldview prioritises economic benefit, it is reasonable that they would be less likely to support complete removal which lacks any prospects for economic development. Moreover, an individualist worldview was measured using items associated with government regulation, so it is also possible that those with an individualist worldview oppose the governmental intervention required by complete removal. Unexpectedly, an individualist worldview was positively associated with support for partial removal. The exact reasons for this is unclear. It is plausible that partial removal requires less governmental oversight than complete removal or re-use. Additionally,

since partial removal is perceived to have negligible impacts on the most areas (see Figure 6), it is also possible that partial removal is seen as the least intrusive option and would be the least likely to impede on individual freedoms.

Egalitarian worldviews. We found that egalitarian worldviews were positively associated with support for both complete removal and partial removal. This was expected because complete and partial removal both result in socially equal outcomes; i.e., an equal distribution of benefits and costs. Furthermore, although these options were relatively costly, they were likely favoured due to perceived benefits to the environment (see Figure 6).

Age. Lastly, our findings indicate that age is negatively associated with support for reuse; that is, older individuals are less likely to support the conversion and re-use of the structures. Since age is a social correlate of environmental concern and older individuals tend to express less environmental concern, it is possible that re-use is seen as the most environmentally sustainable option. However, this explanation is unsupported by perceived impacts (see Figure 6), where a higher proportion of individuals believe that re-use would have a negative impact on marine life, air quality, and ocean water quality compared to the other options.

Instead, aging effects make the most sense in this scenario. Depending on the nature of the conversion, re-using the structures could bring about drastic changes to the economy, the community, and the larger functioning of society. Older individuals, who have likely lived in the Taranaki region for longer and have become more integrated into the social system, are presumably less favourable towards changes to their lifestyle. Likewise, it is possible that younger individuals are more likely to support re-use because they are more likely to consider alternatives. A large proportion of individuals also see re-use as having a positive impact on employment, the local economy, and the New Zealand economy (see Figure 6). Considering most of the older individuals in our sample are retired, it is possible that younger working individuals support re-use due to these benefits.

Implications. It is clear from our results that support for different decommissioning options are not mutually exclusive; that is, determinants of support for one option does not necessarily predict opposition of other options. Each decommissioning option can then be thought of as separate projects which can gather either support or opposition. This is different from other environmental projects where individuals only have limited options: support, opposition, or indifference towards that project. Despite this, support for complete removal and re-use are negatively correlated across all models, suggesting that support for one option is associated with less support for the other. As there is no relationship between support for partial removal with support for other options, each option appears to vary on multiple dimensions and cannot be easily placed on a spectrum.

Some significant correlations suggest that complete removal is potentially perceived as the most environmentally sustainable option. As seen in Table 5, support for complete removal was positively correlated with NEP (r = .20, p = .014) and egalitarian worldviews (r= .21, p = .011), and negatively correlated with SDO (r = -.23, p = .005) and individualist worldviews (r = -.22, p = .008). None of these psychological constructs were significantly correlated with support for partial removal or re-use. However, since neither NEP nor most of the social correlates of environmental concern emerged as a significant predictor in the path models, a further assessment of these results is recommended.

The lack of a relationship between NEP and support from the path analyses is surprising given that every decommissioning option will result in extensive consequences to the marine environment, and a thorough environmental impact assessment is required for the approval of the final project. It is possible that environmental consequences are not as important as assumed but this is unsubstantiated given that the majority of supporters of complete and partial removal consider marine life and ocean water quality to be one of their top three areas of concern (see Figure 7). It is more likely that environmental attitudes did not predict support because there is a lack of knowledge about the environmental consequences of each option. This is due to absence of conclusive environmental research in the New Zealand context and based on international examples, environmental benefits can drastically differ according to the marine environment in which the structures are situated. It is therefore premature to conclude that environmental attitudes do not play an important role in support for decommissioning options before any conclusive environmental research is published.

Our results demonstrate that many other factors are considered in the perception of decommissioning options, such as social equality and resource allocation. A significant effect of SDO was not found but this was expected as SDO is not a predictor of attitudes toward hierarchy-attenuating projects such as complete and partial removal (Milfont & Sibley, 2014). It was surprising that SDO did not predict support for re-use which is what we believed to be a potentially hierarchy-enhancing project. However, similar to the non-significant associations between worldviews and re-use, it is possible that there is too much uncertainty associated with who will manage the structures and how the resource and profits will be distributed. If the nature of conversion and ownership were clarified, it is possible that these associations would become significant.

Limitations. Although we had a decent response rate for postal surveys (22%), the number of initial surveys sent was constrained by resources and funding. As a result, the analyses were conducted with a relatively small sample size (n = 154). The lack of statistical power meant that we were limited in how many variables could be included in our model, so we had to conduct multiple path analyses with separate groups of variables. It is also likely that some effects of variables were too small to be detected and would otherwise be

significant with a sufficient sample size. Despite this, we were still able to identify predictors and demonstrate some important relationships between variables, satisfying the objective of this study.

We also cannot confidently argue that our sample is representative of the larger Taranaki population. Despite using a randomised probability sampling method and taking necessary precautions to maximise the response rate (e.g., pre-notice letter, reminder letter), we did not reach the sample size required for generalisability (n = 383), and our sample was skewed towards individuals who are older and New Zealand European. This will mostly affect the findings that provide insight into current understandings among the Taranaki population. Specifically, we cannot assume that the levels of support for different options and their perceived impacts represent the perspectives of the community at large. The heterogeneity in these results, however, indicate that we were still able to capture a wide range of beliefs.

To maximise convenience and minimise non-response, we tried to keep our survey short. This meant we had to use the shortened SDO scale, and shorter scales for individualist and egalitarian worldviews. Due to a relatively small number of items, these measures had a Cronbach's alpha of between .645 and .748 which is considered acceptable for the purposes of research but is not strong. However, we still found a significant positive correlation between SDO and individualist worldviews, and significant negative correlations between SDO and egalitarian worldviews, and individualist and egalitarian worldviews. Since these relationships are supported on theoretical grounds, we argue that our measures are still valid.

It is also necessary to consider the influence of concurrent events (e.g., seabed mining, general election) during the time of the study which could affect the response rate and the type of responses people have. It is possible that the findings of this project were influenced by the changing political climate and environmental landscape, and these perceptions are likely to change over time and be affected by other significant events. However, not only was this unavoidable but attempting to isolate this project from the wider societal context misses the point altogether. Perceptions will always be shaped by exogenous factors beyond the individual, so it is more useful to take these factors into account than to ignore them (see General Discussion).

Applications. This study is the first to investigate what variables can predict support for different decommissioning options for offshore structures. By exploring a range of factors implicated in the acceptance of general environmental projects, we were able to identify what variables are relevant to decommissioning and begin to develop a framework that can be universally applied. This is crucial given that many offshore structures are due to be decommissioned around the world, and decisions around what will happen to the structures post-decommissioning tend to attract controversy. By knowing what variables are influential in support and/or opposition and thus what the public deems important, these findings can assist in the design of effective communication and engagement strategies. This information can also help settle disputes and minimise conflict when it arises.

Moreover, given that this study was conducted with the Taranaki community, the results can be directly applied to the New Zealand context where the complete decommissioning of an offshore structure has yet to occur. By examining current understandings of the Taranaki population, this study identified knowledge gaps which can be addressed in future engagement with the community and affected stakeholders. This engagement will then allow the incorporation of public input into decommissioning decisions by oil and gas operators, ensuring that a social license to operate is secured. This information can also assist with decommissioning plans required by oil and gas operators, as well as

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policy-making as the development of detailed regulations around decommissioning in New Zealand is still ongoing.

Conclusion

Using a postal survey, Study 2 confirmed low awareness and knowledge of decommissioning options among the Taranaki community, and provided insight into current levels of support, perceived impacts, and impacts considered important by the sample. Moreover, we found that knowledge, awareness, individualist worldviews, egalitarian worldviews, and age can significantly predict support for different options. This suggests that individuals consider various non-environmental factors in their decision-making process. Together, these findings have significant implications for future engagement strategies both in New Zealand and around the world.

General Discussion

This two-part project examined social implications of different decommissioning options (complete removal, partial removal, or re-use) for offshore oil and gas structures in the South Taranaki Bight of New Zealand. To explore how these options are conceived in the public sphere, we first examined how offshore decommissioning has been constructed in the media (Study 1). Informed by these findings, we then directly measured community understandings of the different options and identified predictors of support for each option (Study 2). In addition to the two studies conducted, we also planned a series of focus groups with affected stakeholders, including recreational and commercial marine users. This study was approved by the School of Psychology Human Ethics Committee under delegated authority of the Human Ethics Committee of the Victoria University of Wellington (reference number: 25439). Unfortunately, due to time and resource constraints and a lack of interest from potential participants, we only conducted one focus group with recreational users. Since this group discussion provided information that coincided with what we found in Studies 1 and 2, as well as additional insights that have yet to be considered, these findings are acknowledged in the discussion below.

Overall Findings

Since the media agenda sets the public agenda as detailed by agenda-setting theory (McCombs & Shaw, 1972), we analysed the media portrayal of decommissioning options to make inferences on public attitudes. However, given the lack of media coverage on decommissioning options, we shifted the focus of Study 1 to the prominence and portrayal of offshore decommissioning in general. We found that less than 1% of news articles on the offshore oil and gas industry mentioned decommissioning (n = 13) and among these articles, two themes emerged (*disregarding decommissioning* and *addressing decommissioning*)

which helped illustrate the decommissioning situation in New Zealand. In summary, there is a desire to extend the production life of the fields so decommissioning is continuously postponed, and there is a current lack of decommissioning plans made (or at least publicised). However, some environmental groups urge for decommissioning, and oil and gas operators have taken responsibility for overseeing the process when it eventually occurs. There is also an assumption of complete removal, and the media discussion on decommissioning is dominated by oil and gas operators, governmental agencies, and environmental groups. Together, these results suggest that New Zealand is currently in the pre-planning phase for decommissioning, and different decommissioning options have yet to be explored.

Given the low media coverage, it is likely that the Taranaki community are largely unaware of the need to decommission offshore structures, let alone the different options available. Study 2 directly examined community perceptions and understandings of decommissioning options. The findings show that the sample have low levels of awareness and knowledge of decommissioning options but express a high level of interest. Moreover, levels of support are highest for complete removal (which has the most perceived benefits), followed by re-use (which has perceived benefits for the economy but perceived costs to the environment), then partial removal (which has the most perceived negligible impacts). These results support agenda-setting theory and confirm that the Taranaki community are unaware of offshore decommissioning and available decommissioning options, potentially due to the lack of media coverage.

Study 2 also explored what familiarity variables, psychological constructs, and demographic variables can predict support for different options. Path analyses revealed that: 1) low awareness levels, high knowledge levels, and egalitarian worldviews are associated with higher support for complete removal, 2) individualist worldviews and egalitarian worldviews are associated with higher support for partial removal, and 3) lower age is associated with higher support for re-use. Although the variables tested were derived from the existing research in environmental psychology, the number of non-significant associations indicate that offshore decommissioning options are perceived differently from environmental projects such as renewable energy and hydraulic fracturing. Instead, this model suggests that individuals prioritise a range of non-environmental factors, such as social equality and resource allocation, when deciding their support.

Focus group findings. Data from the focus group was grounded in the personal experiences of our participants so although we cannot confidently generalise these findings, they do provide some insight into our existing results. When provided with different decommissioning options, participants in our focus group with recreational users noted that the intuitive response of their associates is to "get rid of it [and] take it back to how it was" (personal communication, November 28, 2017), supporting our finding that low awareness is associated with support for complete removal. However, after providing the context and explaining relevant environmental and economic research, the members of our focus group began to discuss the potential of re-use as an option but reverted back to support for complete removal after realising the safety risks associated with the location of the structures and the financial costs involved with the operation. This might explain why high knowledge levels are also associated with support for complete removal.

Our focus group participants also discussed potential scenarios for re-use with an emphasis on how conversion would benefit recreational users or the community. Given how far offshore the structures are, tide times, and rough sea conditions, they noted that recreational fishers or divers (let alone other community members) would not be able to access them. Additionally, since the maintenance of the structures could cost up to \$1million NZD per year, they proposed that the structures would have to converted into a commercial operation but without liability from oil and gas operators after decommissioning, the community cannot afford to take on this responsibility. They believed that if a scenario has little or no benefit, or potential for substantial risk, to the community then it should not be considered. This discussion supports the role of an egalitarian worldview (particularly social equality) in the support of complete removal.

Limitations

Limitations for individual studies have been discussed. In Study 1, this included a small sample size, the absence of discussion on alternative decommissioning options, skewed coverage of stakeholders due to reporting biases, and the assumption that the media is the sole source of knowledge. In Study 2, this again included a small and demographically skewed sample, having to limit the number of variables entered in models, the use of short scales at the cost of high internal consistency (inferred by Cronbach's alpha), and the influence of concurrent events.

A major limitation (or perhaps a strength) of this project is that offshore decommissioning has yet to be planned, or even thought about, in New Zealand. Because of this, it is unsurprising that decommissioning is not a topic in the media, nor is it an issue that the affected community are aware about. At this stage, we can only explore assumptions about decommissioning options that are based on intuition and/or pre-existing knowledge. This can still be useful as, given the potential for controversy, many researchers urge for early public engagement and consideration of citizen values (Hall & Lazarus, 2015; Klain, Satterfield, MacDonald, Battista, & Chan, 2017). The case of Brent Spar demonstrated the repercussions of decommissioning decisions made without public engagement despite choosing the best practicable environmental option. By studying perceptions and beliefs early, adequate time is afforded to have ongoing conversations and to understand the nuances of individual perspectives. Additionally, this participatory process can help establish trust and foster cooperation (Walker, Devine-Wright, Hunter, High, & Evans, 2010). By examining perceptions before decommissioning is planned, we can now begin to understand what the community values and use this information to design an effective engagement plan.

Since decommissioning has yet to be placed on the agenda, another limitation of this project is that there is a lack of conclusive environment research on the consequences of decommissioning options in New Zealand. Findings from international studies cannot be generalised due to differences in ocean conditions, biodiversity, and sediment composition. We believe that the effects of NEP and demographic variables on support for different decommissioning options were not detected in the path analyses conducted in Study 2 due to uncertainty around environmental impacts. Since the marine environment is highly valued by the Taranaki community (see Figure 7), this information would likely be requested during consultations and prioritised during decision-making processes. Therefore, environmental research needs to be conducted to address this knowledge gap before effective engagement can ensue.

The exact nature of re-use is also unknown, making it difficult for individuals to form a strong opinion. Levels of support or opposition could drastically differ depending on what the structures are re-purposed into and who will own and manage them. This is because the operational nature and management of the structures can alter perceived benefits and costs, accessibility, opportunities, and available resources. This would then have widespread effects on community harmony, the reputation of the region, and the local economy. Without this information, individuals can only form opinions based on limited facts that persist over all reuse scenarios (i.e., whether they support the structures being left in the marine environment). These opinions would likely change depending on what projects are proposed if structures are re-used. This uncertainty can possibly explain why we did not find a significant association between SDO and support.

Consideration of the Wider Context

Decommissioning needs to be considered in conjunction with the broader social and environmental landscape. We attempted to do this by considering exogenous influences, such as the role of the media and concurrent events (i.e., general election and approval of seabed mining), on the formation of perceptions. However, although we take a holistic approach by examining environmental, economic, and social consequences, our focus remained solely on the decommissioning project. In the focus group, the issue of seabed mining (which is in the same vicinity of the structures) and the importance of studying cumulative impacts was raised (personal communication, November 28, 2017). Participants noted that, although removal of the structures might cause noise intrusion and potential pollution, seabed mining would already be operating at the decibel range that blue whales communicate while incurring extensive air and water pollution. Moreover, while the decommissioning process would take place in the summer over two to three years in the next few decades, seabed mining has been granted consent for 35 years and is due to start soon. To members of the Taranaki community, the seabed mining project is seen as much more urgent and detrimental to the environment compared to decommissioning, a project that does not currently require immediate attention. So, while the focus of this project is on how different decommissioning options compare, decommissioning cannot be studied as an isolated project from other activities conducted in the Bight. To fully understand perceptions, researchers need to directly study the lived experiences of individuals.

This lack of concern for decommissioning can be explained by both spatial and temporal psychological distance. Proposed in construal-level theory, psychological distance refers to the perceived distance between the geographical location and time of an event to the self in the here and now (Trope & Liberman, 2010). As psychological distance increases, the event is construed as more abstract and less relevant. Compared to seabed mining, oil and gas structures cannot be seen from shore and decommissioning is occurring in the relatively far future. It is therefore possible that non-response from the survey and stakeholders for focus groups is because decommissioning is not perceived as an urgent matter, nor is it a matter that directly affects them. Closing this psychological distance would likely increase public engagement (Jones, Hine, & Marks, 2017). It is therefore recommended that communication efforts should emphasise the effects of decommissioning options on the local region and its effects on the local community (Milfont, Evans, Sibley, Ries, & Cunningham, 2014; van der Linden, Maibach, & Leiserowitz, 2015).

Recommendations for Communication and Engagement

Overall, our findings indicate that the Taranaki community are largely unaware of decommissioning options but express a high level of interest in the topic. In addition to fulfilling these interests, members of the local community are entitled to information that would help them understand what is occurring in their environment. Before information can be distributed, this information needs to be gathered. The predictors identified in Study 2 provide insight into what community members value and what would be influential in their support for different options. In addition to knowledge and awareness, this includes individualist and egalitarian worldviews. Therefore, information that is considered relevant would include environmental risks and benefits associated with different options, as well as the distribution of liability and economic prospects associated with re-use. Supplying this information would ensure that the public have what they need to make well-informed decisions (McNie, 2007). Therefore, we recommend conducting additional research to quantify the environment impacts of removing the structures and leaving them *in-situ*. Since it is difficult to know what will happen to the structures during re-use, we also recommend designing a series of hypothetical scenarios, so individuals can think about what aspects they might find acceptable, unacceptable, and non-negotiable.

Once there is sufficient research, this information should then be distributed to the public as an educational campaign (Bush, Moffatt, & Dunn, 2001). As noted in the focus group, education is "needed as a community service because you can't expect people to make informed decisions running blank" (personal communication, November 28, 2017). Since knowledge of current events is largely derived from the media (Hambrick, Pink, Meinz, Pettibone, & Oswald, 2008; Vincent & Basil, 1997), we propose that the media would be a useful tool for this information to gain fast and widespread exposure. Based on first-level agenda-setting theory, reporting on decommissioning options would place the issue as a priority on the public agenda, increasing the perceived urgency of decommissioning (McCombs & Shaw, 1972) and possibly mitigating the effects of psychological distance (van der Linden et al., 2015). This should also stimulate conversations about decommissioning among community members. However, the media has a tendency for sensationalism and exaggeration so research might not always be accurately portrayed (Nelkin, 1995). Additionally, the media is also inclined to simplify scientific information so that it is accessible to a lay audience (Brechman, Lee, & Cappella, 2009; Nelkin, 1995). It is likely then that the more complex and nuanced aspects of decommissioning are overlooked, increasing the risk for misinterpretation. It would be beneficial then for researchers to directly communicate with journalists to ensure the portraval of the situation is accurate and unbiased.

It also should not be assumed that information provision would immediately result in informed decision-making. In addition to publicising information in the media, community members should be invited to attend educational workshops. Workshops would allow individuals to provide their input, as well as ask questions or for clarification. Decisionmaking is also a process that unfolds. As seen in the focus group, the opinions of the participants changed throughout the discussion as they deliberated and provided feedback on one another's ideas. They agreed that workshops would be useful as, similar to focus group, they would provide a forum to brainstorm and explore opportunities, as well as allow for discussion among community members who come from a wide range of backgrounds and skillsets. It is this collaborative discussion that would allow a diverse group to compromise and eventually reach a consensus (Hall & Lazarus, 2015; Klain et al., 2017).

Future Directions

Since the current project is focussed on community perceptions, it is important to ensure that future studies thoroughly examine other relevant perspectives. However, this proved to be difficult as we contacted two community clubs, five commercial marine operators, and six recreational marine clubs and, aside from one group, the rest declined our invitation or did not respond. Since stakeholder groups (e.g., fishers, divers) have vested interests in what occurs in the marine environment, their priorities and perceived benefits are likely to differ from those of general community members (Fowler et al., 2014; Klain et al., 2017). Researchers should therefore continue studying perceptions of relevant stakeholder groups, or investigate why there is a barrier to engagement.

The current project did not specifically examine the unique cultural context of New Zealand or iwi as an important stakeholder. To meet their obligations as kaitiaki (guardians), the eight Taranaki iwi are entitled to input on all matters related to their rohe (territory; the Taranaki Bight). Moreover, working with Māori and recognising the Māori worldview is required under the principles of The Treaty of Waitangi, the Resource Management Act 1991 (s6e, s7a, s8), and the Local Government Act 2002 (s8). Although not examined in this thesis, other members of the research team have consulted with the Taranaki iwi so their perspectives have been accounted for in the overall project. The meetings have been informal and the goal was just to introduce the project to gather initial thoughts, but it is expected that these conversations will ongoing until decommissioning is complete. As this process unfolds,

the perspectives of iwi would need to be combined with the perspectives of community members and other stakeholders to accurately discern the social impact of each decommissioning option

Beyond the specific New Zealand context, this project also identified variables that can predict support for different decommissioning options. Since knowledge, NEP (Dunlap, 2008), SDO (Pratto et al., 2012), individualist and egalitarian worldviews (Douglas, 1970), and demographic variables are found cross-culturally and considered universal, and the selected decommissioning options can be applied to all offshore structures, we argue that the associations we found are generalisable. However, due to limitations in our sample, future research should replicate this study to confirm these associations. Furthermore, we had to be selective about the variables we included in our analyses to keep this study feasible. There are innumerable other factors that could be explored in future studies, including perceived risks and benefits (Bidwell, 2017), place attachment (Haggett, 2011; Lombard & Ferreira, 2014), beliefs about the ocean (Bidwell, 2017), and relationships with operators (Haggett, 2011; Soma & Haggett, 2015). Replicating and expanding this research would build towards a thorough and cohesive framework of variables that can reliability predict support for different decommissioning options for offshore oil and gas structures.

Furthermore, we found (and provided theoretical explanations for) associations between variables but ultimately cannot confirm the mechanisms behind these associations. To do so, interviews or focus groups should be conducted to explore how individuals rationalise their support for different options. As seen in our focus group, discussion can provide rich data and novel insights that would not have emerged from a literature review of existing studies. This is particularly important for a complex and multifaceted issue like decommissioning where perceptions are not straightforward and can change when faced with new information.

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Final Conclusion

Since public opinion and social acceptance play a significant role in the success of decommissioning projects, this project examined how offshore decommissioning has been constructed in the New Zealand media, the current perceptions of the community, and predictors of support for different options. The next step is to directly apply these findings to engagement with the Taranaki community to ensure that eventual decommissioning decisions in New Zealand would provide a socially acceptable outcome. This is crucial as the decision would set the legislative precedent for future decommissioning scenarios in our country. Moreover, this is the first study to apply existing research on public perceptions to a new domain by investigating factors that underlie support for different decommissioning options. This allows us and future researchers to understand the nature of support associated with this type of environmental project, advancing our understanding of factors that can shape and influence attitudes. This opens a new avenue for research, an area that is becoming increasingly important as growing numbers of offshore oil and gas structures around the world are decommissioned in the near future.

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Appendix A: Pre-notice Letter



August 21, 2017

[Address]

Dear [Recipient],

We are writing to you to inform you of an important study conducted at Victoria University of Wellington. The purpose of the study is to investigate what residents in the Taranaki region think should happen to the offshore oil and gas structures once they are no longer in use. The results could then assist in deciding what will happen to these structures once they stop producing. To examine these perceptions, we will be gathering data using mail-based surveys.

As you are a member of the Taranaki community, it would be great if you could spare some time to participate in our research. Within the next week, you will receive another envelope containing further information about the study, the survey, and a pre-paid return envelope. The survey should take no more than 20 minutes to complete. You do not need to be knowledgeable about the topic to complete the survey; we are only interested in your honest opinion.

We hope you consider taking part in our study. Your contribution will be invaluable to our research, and your response could potentially assist in future decision-making processes and policy design.

Thank you for your time and consideration. If you have any questions, please don't hesitate to email Carmen at carmen.lau@vuw.ac.nz

Kind regards,

Carmen Lau Master's Student by Thesis Email: carmen.lau@vuw.ac.nz Dr. Taciano Milfont Senior Lecturer Email: *taciano.milfont@vuw.ac.nz*

Appendix B: Cover Letter



August 28, 2017

[Address]

Dear [Recipient],

Earlier this week, you would have received a letter outlining our research project. To reiterate, an important study is being conducted at Victoria University of Wellington to investigate how residents of the Taranaki region perceive different decommissioning options for offshore oil and gas structures. As you are a part of the Taranaki population, you have been randomly selected from your local electoral roll to participate.

We hope you consider participating in the study by completing the enclosed survey. The questions will measure your perceptions of decommissioning, different decommissioning options, beliefs about other issues and your demographic information. Your response will contribute to a larger research project on the environmental, economic and social impacts of different outcomes for oil and gas structures. The final results could assist policy-makers in deciding what should happen to these structures once they reach the end of their production life. Even if you have no opinion, your honest response is important to us.

If you choose to participate, please complete the enclosed survey and return the entire survey to us using the pre-paid envelope. Your answers will be completely confidential and will only be included as part of a summary of everyone's responses. When the data is being entered and analysed, they will be coded using a number (ID: [XXXX]). The final results will not contain any identifying or personal information. Please read the attached Participant Information Sheet for more information.

We hope you decide to take part by completing the survey. If you have any questions, please don't hesitate to email Carmen at carmen.lau@vuw.ac.nz

Sincerely,

Carmen Lau Master's Student by Thesis Email: carmen.lau@vuw.ac.nz Dr. Taciano Milfont Senior Lecturer Email: *taciano.milfont@vuw.ac.nz*

Appendix C: Participant Information Sheet



Participant Information Sheet

Title: Community Perceptions of Decommissioning Options for Offshore Oil and Gas Structures in Taranaki, New Zealand

Application ID number: 0000025094

Researchers:

Carmen Lau Master's Student by Thesis Email: carmen.lau@vuw.ac.nz Dr. Taciano Milfont Senior Lecturer Email: *taciano.milfont@vuw.ac.nz*

What is the purpose of this research?

This research will allow us to understand community perceptions of different decommissioning options for offshore oil and gas structures in Taranaki. It will also allow us to investigate underlying factors that contribute to the support or opposition of each option.

Who is conducting the research?

We are researchers from the School of Psychology at Victoria University of Wellington. Carmen Lau, a master's student, is conducting this study under the supervision of Dr Taciano Milfont. This study is part of a larger research project funded by the Sustainable Seas National Science Challenge and managed by Elemental Environment. This research has been approved by the School of Psychology Human Ethics Committee under delegated authority of Victoria University of Wellington's Human Ethics Committee. If you have any queries about ethics, please contact Associate Professor Susan Corbett by email: <u>susan.corbett@vuw.ac.nz</u> or telephone: +64-4-463 5480.

What is involved if you agree to participate?

If you agree to participate, you will complete the enclosed survey and then mail the survey back to us in the pre-paid envelope provided. By returning your completed survey to us, your voluntary consent is implied. The survey should take no more than 20 minutes of your time.

Privacy and Confidentiality

- This survey is completely anonymous. Please do not put your name on it anywhere.
- It will be necessary to record your name and postal address to allow us to keep track of those who have already completed the survey. However, this information will remain separate from your survey at all times, and your survey responses will be coded by number only.
- Your personal information (name, postal address) will be stored separately in an encrypted electronic database in a secure room in the School of Psychology, and will be destroyed after the data has been analysed.
- We will keep your survey and coded data for at least five years after publication.

- In accordance with the requirements of some scientific journals and organisations, your coded, anonymous data may be shared with other competent researchers. Your coded data may be used in other, related studies.
- You will never be identified in the research project or in any other presentation or publication.
- The surveys and a copy of the coded data will remain in the custody of Dr. Milfont in Room 502, Easterfield Building, Kelburn Campus, Victoria University of Wellington.

What happens to the information that you provide?

The results of this study will form part of a Master of Science thesis that will be submitted for assessment and stored at the University's library. The findings may also be submitted for publication in an academic journal and/or presented at scientific conferences.

A summary of the results for this study will be available on <u>https://vuwenvironmentallab.wordpress.com/</u> in approximately November, 2017.

Thank you for considering participation in this research If you have any other questions, please email Carmen at <u>carmen.lau@vuw.ac.nz</u> Appendix D: Full Survey



SOCIAL ATTITUDES SURVEY

Instructions

PLEASE COMPLETE THE QUESTIONS ON THIS PAGE BEFORE YOU LOOK THROUGH THE SURVEY

The following questions will measure how you understand different options for offshore oil and gas structures once they stop production, as well as your opinion regarding some other issues. You will also be asked to provide some basic demographic information. There are no right or wrong answers; we are only interested in what you think. Please answer honestly.

To answer the questions:

- When a scale is provided, please indicate your response by circling the number that best corresponds with your answer
- When a list is provided, please indicate your response by ticking the box that best corresponds with your answer
- If you wish to change your answer, simply draw a cross over your initial answer
- Write out your answer if lines are provided or a response needs to be specified

PART 1. Pre-existing Knowledge

Below are questions about your awareness of decommissioning and decommissioning options. Please answer them honestly using the scale below.

	1 Not at All	2 A Little	Very	5 Very/A Lot							
				-	•						
	Questions about decommissioning:										
1.	How <u>aware</u> ar need to be dec	1 2	3	4	5						
2.	How much ha Taranaki's of	1 2	3	4	5						
		Questions al	bout decommission	ing options:							
3.	How <u>aware</u> ar structures?	re you of the differe	ent options for deco	ommissioning	1 2	3	4	5			
4.	4. How <u>knowledgeable</u> are you of the different options for decommissioning structures?							5			
5.	How <u>intereste</u> structures?	1 2	3	4	5						

Background Information

Here is some background information about decommissioning and decommissioning options. This will help you with answering some questions moving forward. Please read this carefully.

Taranaki's offshore oil and gas fields are nearing the end of their production life and their accompanying structures may need to be decommissioned in the future. Below is a diagram of a typical structure:

[DIAGRAM OF FIXED OFFSHORE STRUCTURE WITH TOPSIDE AND JACKET LABELLED]

There are three potential options for these structures once they have been decommissioned. These are known as 'decommissioning options' and they are:

- **Complete removal**: the entire structure is removed from the ocean
- **Partial removal:** the topside and some of the jacket is removed while deeper sections of the jacket remains in the ocean
- **Re-use**: the entire oil and gas structure is left in place, and the topside is converted for another purpose

PART 2. Perceived Impacts of Decommissioning Options

Below is a list of different areas that each decommissioning option may affect. For each option, please indicate the extent to which you think the option will have a **positive impact** on the following areas.

1	2	3	4	5
Strongly	Disagree	No Impact	Agree	Strongly Agree
Disagree	_		_	(Positive
(Negative				Impact)
Impact)				_

1. Please rate the extent you agree or disagree that <u>complete removal</u> will have a positive impact on the following areas:

Community harmony	1	2	3	4	5	
Taranaki's reputation	1	2	3	4	5	
Māori values	1	2	3	4	5	
Employment	1	2	3	4	5	
Aesthetics of the ocean view	1	2	3	4	5	
Marine life	1	2	3	4	5	
Air quality	1	2	3	4	5	
Ocean water quality	1	2	3	4	5	
Local economy	1	2	3	4	5	
New Zealand's economy	1	2	3	4	5	
Commercial fishing industry	1	2	3	4	5	
Tourism	1	2	3	4	5	
Recreation (e.g. diving, fishing)	1	2	3	4	5	

2. Please rate the extent you agree or disagree that <u>partial removal</u> will have a positive impact on the following areas:

Community harmony	1	2	3	4	5	
Taranaki's reputation	1	2	3	4	5	
Māori values	1	2	3	4	5	
Employment	1	2	3	4	5	
Aesthetics of the ocean view	1	2	3	4	5	
Marine life	1	2	3	4	5	
Air quality	1	2	3	4	5	
Ocean water quality	1	2	3	4	5	
Local economy	1	2	3	4	5	
New Zealand's economy	1	2	3	4	5	
Commercial fishing industry	1	2	3	4	5	
Tourism	1	2	3	4	5	
Recreation (e.g. diving, fishing)	1	2	3	4	5	

3. Please rate the extent you agree or disagree that <u>re-use</u> will have a positive impact on the following areas:

Community harmony	1	2	3	4	5	
Taranaki's reputation	1	2	3	4	5	

OFFSHORE DECOMMISSIONING OPTIONS IN NZ

Māori values	1	2	3	4	5	
Employment	1	2	3	4	5	
Aesthetics of the ocean view	1	2	3	4	5	
Marine life	1	2	3	4	5	
Air quality	1	2	3	4	5	
Ocean water quality	1	2	3	4	5	
Local economy	1	2	3	4	5	
New Zealand's economy	1	2	3	4	5	
Commercial fishing industry	1	2	3	4	5	
Tourism	1	2	3	4	5	
Recreation (e.g. diving, fishing)	1	2	3	4	5	

PART 3. Levels of Support

1. To what extent do you support or oppose each decommissioning option for offshore structures?

1 Strongly Oppose	2 Somewhat Oppose	3 Neither Support Nor Oppose	4 Somev Supp	4 Somewhat Support			5 Strongly Support		
Complete remova	1			1 2	2	3	4	5	
Partial removal		1 2	2	3	4	5			
Re-use				1 2	2	3	4	5	

2. If you had to choose one option, which would be your strongest preference? □ Partial removal □ Re-use

□ Complete removal

3. In deciding whether to support or oppose each option, which three areas do you consider to be the most important? Rank these three areas from 1 (most important) to 3 (third most important).

Community harmony	Aesthetics of the ocean	Local economy								
Taranaki's reputation	Marine life	NZ economy								
Māori values	Air quality	Commercial fisheries								
Employment	Ocean water quality	Tourism								
Recreation										
4. To what extent do you support or oppose oil and gas development?										

□ Strongly	□ Somewhat	□ Neither	□ Somewhat	□ Strongly							
oppose	oppose	support nor	support	support							
oppose											
PART 4. Social Networks											

1. Listed below are some types of groups and organisations. Please select all the groups you actively participate in.

□ Charitable or volunteer organisations

□ Environmental groups

PLEASE CONTINUE ONTO THE NEXT PAGE

□ Community groups or neighbour associations

□ Church groups or other religious/spiritual organisations

□ Marine-related hobby groups/clubs (e.g. diving, fishing)

□ Other hobby groups/clubs

□ Fitness groups □ Social clubs

□ Sports leagues

□ Youth groups

□ Other (please specify): _

 \Box I am not an active participant in any of the groups listed above

2. If you selected any of the groups above, please specify the group(s) and/or organisation(s) in the space below. If you didn't select any, leave this question blank.

3. Do you know anyone who currently works in the oil and gas industry? If so, indicate the number of people you know.

 \Box No \Box Yes, I know ____ person(s)

PART 5. Beliefs

1. There are many kinds of groups in the world: men and women, ethnic and religious groups, nationalities, political factions. How much do you support or oppose these ideas about groups?

Extremely oppose 1	2	3	4	5	6	7	7	8	9	Extremely support 10					
In setting priorities, we must consider all groups.						2	3	4	5	6	7	8	9	10	
We should not push	for gro	up equ	uality.		1	2	3	4	5	6	7	8	9	10	
Group equality shou	ld be o	ur idea	ıl.		1	2	3	4	5	6	7	8	9	10	
Superior groups sho groups.	uld don	ninate	inferio	r	1	2	3	4	5	6	7	8	9	10	

2. Listed below are <u>views about the government</u>. For each one, please rate how strongly you agree or disagree with each statement.

1 Strongly Disagree	1234StronglyDisagreeUnsureAgreeDisagree						y Agı	ree
If the government we'd all be a lot b	1	2	3	4	5			
Our government to should just let peo	1	2	3	4	5			

The world would be a more peaceful place if its wealth were divided more equally among nations.	1	2	3	4	5
In my ideal society, all basic needs (food, housing, healthcare, education) would be guaranteed by the government for everyone.	1	2	3	4	5
The government interferes too much in our everyday lives.	1	2	3	4	5
I support government programs to get rid of poverty.	1	2	3	4	5
Government regulation of business usually does more harm than good.	1	2	3	4	5
People should be allowed to make as much money as they can, even if it means some make millions while others live in poverty.	1	2	3	4	5

3. Listed below are statements about the relationship between <u>humans and the</u> <u>environment</u>. For each one, please indicate the extent to which you agree or disagree with it.

1 Strongly Disagree	2 Disagree	3 Unsure		Stro	5 ongly	Agree		
We are approachin support.	ng the limit of the n	umber of people the	e earth can	1	2	3	4	5
Humans have the meeds.	1	2	3	4	5			
When humans inte consequences.	erfere with nature it	often produces disa	astrous	1	2	3	4	5
Human ingenuity	will ensure that we	do not make the ear	rth unliveable.	1	2	3	4	5
Humans are severed	ely abusing the env	ironment.		1	2	3	4	5
The earth has plen develop them.	ty of natural resour	ces if we just learn	how to	1	2	3	4	5
Plants and animals	s have as much righ	t as humans to exis	t.	1	2	3	4	5
The balance of nat modern industrial	ture is strong enoug nations.	to cope with the i	mpacts of	1	2	3	4	5
Despite our specia nature.	al abilities humans a	are still subject to th	e laws of	1	2	3	4	5
The so-called "ecc exaggerated.	ological crisis" facin	ng humankind has b	been greatly	1	2	3	4	5
The earth is like a	spaceship with ver	y limited room and	resources.	1	2	3	4	5
Humans were mea		1	2	3	4	5		
The balance of nat	ture is very delicate	and easily upset.		1	2	3	4	5
Humans will even able to control it.	tually learn enough	about how nature v	works to be	1	2	3	4	5

If things continue on their present course, we will soon experience a	1	2	3	4	5
major ecological catastrophe.					

		PART 6. Demographic	S
1. How old are you (i	n years)?		
2. What gender do yo	ou identif	y as?	
\Box Male \Box Fe	emale	□ Other (please specif	y):
3. What best describe	es your et	hnic background? Please	select all that apply:
 NZ European/Pākel Māori, please specir Pacific Nations Middle Eastern/Lat Asian Other (please specir) 	hā fy your iv in Americ fy):	vi affiliation(s):	
4. What is your annu	al incom	e band before taxes (NZD)?
□ Below \$20,000 □ \$20,000 - \$29,999 □ \$30,000 - \$39,999 □ \$40,000 - \$49,999		□ \$50,000 - \$59,999 □ \$60,000 - \$69,999 □ \$70,000 - \$79,999 □ \$80,000 - \$89,999	□ \$90,000 - \$99,999 □ \$100,000+
5. In which of the foll the options below:	lowing in	dustries are you currently	employed? Please select one of
 ☐ Agriculture ☐ Forestry ☐ Manufacturing ☐ Public Admin ☐ Science/Research ☐ I am a student ☐ I am not currently v ☐ Other (please specified) 	□ Whol □ Accor □ Trans □ Finan □ Engin working fy):	esale/Retail nmodation/Food Services port/Warehousing cial/Insurance eering/Design	 Education/Training Mining/Extraction Healthcare/Social Assistance Utilities/Construction
6. What is your occu	pation? _		
 7. What is the highest have received? Please Secondary School I NCEA, School Cert Polytechnic qualified 	t level of e select fr Incomplet tificate, or cation or 7	education you have comp om one of the options bel e other secondary school qu Frade Certificate	leted or the highest degree you ow: nalification

□ Undergraduate degree □ Postgraduate degree □ Masters degree □ Doctorate

PLEASE CONTINUE ONTO THE NEXT PAGE

3	4	5			6		Str suj	ongly pport 7
		1	2	3	4	5	6	7
		1	2	3	4	5	6	7
		1	2	3	4	5	6	7
		1	2	3	4	5	6	7
		1	2	3	4	5	6	7
		1	2	3	4	5	6	7
			3 4 5	3 4 3 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2	3 4 3 1 2 3 1 2 3 1 2 3 1 2 3 1 2 3 1 2 3 1 2 3 1 2 3 1 2 3 1 2 3 1 2 3 1 2 3 1 2 3	3 4 5 6 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	3 4 5 6 sup 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6

8. Please indicate how strongly you support or oppose each of the following political parties in the upcoming New Zealand election:

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						••••			
0	0	Ō	0	0	0	0			
Extremely liberal	Liberal	Slightly liberal	Moderate	Slightly conservative	Conservative	Extremely conservative			
9. How wou	ld you des	cribe your	political out	ook with rega	rd to <u>economic</u>	issues?			
0	0	0	0	0	0	0			
Extremely liberal	Liberal	Slightly liberal	Moderate	Slightly conservative	Conservative	Extremely conservative			
10. How long have you lived in the Taranaki region? years and months									

THANK YOU FOR YOUR TIME AND PARTICIPATION! Please send back your completed survey using the enclosed pre-paid envelope.

Appendix E: Shortened Survey



SOCIAL ATTITUDES SURVEY

Instructions

The following questions will measure how you understand different options for offshore oil and gas structures once they stop production, as well as your opinion regarding some other issues. You will also be asked to provide some basic demographic information. There are no right or wrong answers; we are only interested in what you think. Please answer honestly.

To answer the questions:

- When a scale is provided, please indicate your response by circling the number that best corresponds with your answer
- When a list is provided, please indicate your response by ticking the box that best corresponds with your answer
- If you wish to change your answer, simply draw a cross over your initial answer
- Write out your answer if lines are provided or a response needs to be specified

PART 1. Pre-existing Knowledge

Below are questions about your awareness of decommissioning and decommissioning options. Please answer them honestly using the scale below.

1	2	3	4	5								
Not at All	A Little	Somewhat	Quite	Very/A Lot	t							
Questions about decommissioning:												
6. How <u>aware</u> are you that Taranaki's offshore oil and gas structures need to be decommissioned in the next few decades?												
7. How much ha Taranaki's off	7. How much have you <u>heard or read</u> about the decommissioning of Taranaki's offshore structures?											
	Questions al	bout decommission	ing options:									
8. How <u>aware</u> ar structures?	 How <u>aware</u> are you of the different options for decommissioning structures? 											
9. How <u>knowled</u> decommission	9. How <u>knowledgeable</u> are you of the different options for decommissioning structures?											
10. How <u>intereste</u> structures?	<u>d</u> are you in the dif	fferent options for c	lecommissioning	1 2 3 4	5							

PLEASE CONTINUE ONTO THE NEXT PAGE

6.	Specify	and	describe	what you	think	each o	of the	decomm	nissioni	ng c	options	are
				•						0	1	

PART 2. Social Networks	

1. Listed below are some types of groups and organisations. Please select all the groups

you actively participate in.

□ Charitable or volunteer organisations

Community groups or neighbour associations

 \Box Church groups or other religious/spiritual organisations

□ Marine-related hobby groups/clubs (e.g. diving, fishing)

 \Box Other hobby groups/clubs

□ Fitness groups

□ Environmental groups

□ Social clubs

□ Sports leagues

□ Youth groups

□ Other (please specify): _

□ I am not an active participant in any of the groups listed above

2. If you selected any of the groups above, please specify the group(s) and/or organisation(s) in the space below. If you didn't select any, leave this question blank.

3. Do you know anyone who currently works in the oil and gas industry? If so, indicate the number of people you know.

🗆 No

□ Yes, I know	person(s)
---------------	-----------

PART 3. Beliefs

1. There are many kinds of groups in the world: men and women, ethnic and religious groups, nationalities, political factions. How much do you support or oppose these ideas about groups?

Extremely oppose							E	Extre	mely	sup	port			
1	2	3	4	5	6		7	8	9			10)	
In setting priorities, v groups.	we mu	st cons	sider all		1	2	3	4	5	6	7	8	9	10

We should not push for group equality.	1	2	3	4	5	6	7	8	9	10
Group equality should be our ideal.	1	2	3	4	5	6	7	8	9	10
Superior groups should dominate inferior groups.	1	2	3	4	5	6	7	8	9	10

2. Listed below are <u>views about the government</u>. For each one, please rate how strongly you agree or disagree with each statement.

1	2	3	4		5					
Strongly	Disagree	Unsure	Agree		Stro	Agr	ee			
Disagree										
If the government we'd all be a lot b	s problems,	1	2	3	4	5				
Our government the should just let peo	y people. We	1	2	3	4	5				
The world would more equally amo	vere divided	1	2	3	4	5				
In my ideal societ education) would	y, all basic needs (for be guaranteed by the gua	ood, housing, health a government for e	ncare, veryone.	1	2	3	4	5		
The government in	nterferes too much	in our everyday live	es.	1	2	3	4	5		
I support governm	nent programs to get	t rid of poverty.		1	2	3	4	5		
Government regul	rm than good.	1	2	3	4	5				
People should be a it means some ma	allowed to make as ke millions while o	much money as the thers live in poverty	ey can, even if 7.	1	2	3	4	5		

3. Listed below are statements about the relationship between <u>humans and the</u> <u>environment</u>. For each one, please indicate the extent to which you agree or disagree with it.

1						5				
Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree						
We are approachin support.	ng the limit of the n	umber of people the	e earth can	1	2	3	4	5		
Humans have the right to modify the natural environment to suit their needs.						3	4	5		
When humans interconsequences.	erfere with nature it	often produces dis	astrous	1	2	3	4	5		
Human ingenuity	will ensure that we	do not make the ea	rth unliveable.	1	2	3	4	5		
Humans are sever	ely abusing the env	ironment.		1	2	3	4	5		
The earth has plenty of natural resources if we just learn how to develop them						3	4	5		

PLEASE CONTINUE ONTO THE NEXT PAGE

PART 4. Demographics								
If things continue on their present course, we will soon experience a major ecological catastrophe.	1	2	3	4	5			
Humans will eventually learn enough about how nature works to be able to control it.	1	2	3	4	5			
The balance of nature is very delicate and easily upset.	1	2	3	4	5			
Humans were meant to rule over the rest of nature.	1	2	3	4	5			
The earth is like a spaceship with very limited room and resources.	1	2	3	4	5			
The so-called "ecological crisis" facing humankind has been greatly exaggerated.	1	2	3	4	5			
Despite our special abilities humans are still subject to the laws of nature.	1	2	3	4	5			
The balance of nature is strong enough to cope with the impacts of modern industrial nations.	1	2	3	4	5			
Plants and animals have as much right as humans to exist.	1	2	3	4	5			

1. How old are you (in years)? _____

2. what gender do you identify as	2.	What	gender	do	you	ident	ify	as	?
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□ Male □ Female \Box Other (please specify): ____

- 3. What best describes your ethnic background? Please select all that apply:
- □ NZ European/Pākehā
- □ Māori, please specify your iwi affiliation(s): _____
- □ Pacific Nations
- □ Middle Eastern/Latin American/African
- \Box Asian
- □ Other (please specify): _____

4. What is your annual income band before taxes (NZD)?

□ Below \$20,000	□ \$50,000 - \$59,999	□ \$90,000 - \$99,999
□ \$20,000 - \$29,999	□ \$60,000 - \$69,999	□ \$100,000+
□ \$30,000 - \$39,999	□ \$70,000 - \$79,999	
□ \$40,000 - \$49,999	□ \$80,000 - \$89,999	

5. In which of the following industries are you currently employed? Please select one of

the options below:

- □ Agriculture □ Wholesale/Retail □ Accommodation/Food Services □ Mining/Extraction
- □ Forestry
- □ Manufacturing
- □ Public Admin □ Financial/Insurance

□ Transport/Warehousing

- □ Science/Research □ Engineering/Design
- \Box I am a student
- □ I am not currently working

□ Other (please specify): _____

□ Education/Training

□ Utilities/Construction

□ Healthcare/Social Assistance

6. What is your occupation? _____

7. What is the highest level of education you have completed or the highest degree you have received? Please select from one of the options below:

□ Secondary School Incomplete

□ NCEA, School Certificate, or other secondary school qualification

Delytechnic qualification or Trade Certificate

□ Undergraduate degree	Postgraduate degree	□ Masters degree	Doctorate
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8. Please indicate how strongly you support or oppose each of the following political parties in the upcoming New Zealand election:

Strongly oppose 1	2	3	4	-	5		6		Str suj	ongly oport 7	
The Green Party				1	2	3	4	5	6	7	
The Labour Party				1	2	3	4	5	6	7	
The Māori Party				1	2	3	4	5	6	7	
The National Party	y			1	2	3	4	5	6	7	
The NZ First Party	/			1	2	3	4	5	6	7	
Other (specify):				1	2	3	4	5	6	7	

8. How would you describe your political outlook with regard to social issues?

0	0	0	0	0	0		
Liberal	Slightly	Moderate	Slightly	Conservative	Extremely		
	liberal		conservative		conservative		
ld you des	cribe your j	political outl	look with rega	rd to <u>economic</u>	issues?		
0	0	0	0	0	0		
Liberal	Slightly	Moderate	Slightly	Conservative	Extremely		
	liberal		conservative		conservative		
10. How long have you lived in the Taranaki region? years and months							
	O Liberal Id you deso O Liberal g have you	O O Liberal Slightly liberal Id you describe your p O O Liberal Slightly liberal g have you lived in th	 O O O Liberal Slightly Moderate liberal Id you describe your political outlog O O O Liberal Slightly Moderate liberal g have you lived in the Taranaki political 	O O O Liberal Slightly Moderate Slightly liberal conservative Id you describe your political outlook with regate O O Liberal Slightly Moderate Slightly Liberal Slightly Iberal Conservative g have you lived in the Taranaki region? y	O O O O O Liberal Slightly Moderate Slightly Conservative Id you describe your political outlook with regard to economic O O O Id you describe your political outlook with regard to economic O O O Liberal Slightly Moderate Slightly Conservative Liberal Slightly Moderate Slightly Conservative g have you lived in the Taranaki region? years and m		

THANK YOU FOR YOUR TIME AND PARTICIPATION! Please send back your completed survey using the enclosed pre-paid envelope.

Appendix F: Reminder Letter



6 October, 2017

[Address]

Dear [Recipient],

A few weeks ago, a survey was mailed to you because you were chosen to participate in a study conducted by Victoria University of Wellington. The specific study is on what Taranaki residents think should happen to the oil and gas structures in the ocean once they are no longer in use. As the outcome can affect you and your wider community, your opinion on this topic is crucial for evaluating the different options. Your input will also assist policy-makers in making an informed decision about the outcome of the structures.

If you have already completed and returned the survey, please accept our sincere thanks. If not, and you are interested and willing to help us out, please complete the survey and mail it back to us as soon as possible. We greatly appreciate your valuable input.

If you did not receive a questionnaire, or if it was misplaced, please email me at <u>carmen.lau@vuw.ac.nz</u>, and I will get another one in the mail for you.

Once again, thank you for your time and consideration.

Kind regards,

Carmen Lau Master's Student by Thesis Email: carmen.lau@vuw.ac.nz Dr. Taciano Milfont Senior Lecturer Email: taciano.milfont@vuw.ac.nz