

**Before the Decision-Making Committee of the
Environmental Protection Authority**

**Shell Todd Oil Services Limited (STOS) 2017 Applications for
Marine Consent and Marine Discharge Consent**

IN THE MATTER OF

**the Exclusive Economic Zone and
Continental Shelf (Environmental
Effects) Act 2012**

AND

**An application by Shell Todd Oil
Services Limited for a marine consent
to place and remove a jack-up rig
and associated activities to assist its
existing operations in the Maui Gas
Field within the South Taranaki Bight**

AND

**An application by Shell Todd Oil
Services Limited for a discharge
consent to cover any potential
discharge of harmful substances
through deck drains from any
drilling rig**

Submission by Climate Justice Taranaki Incorporated

19 June, 2017

www.climatejusticetaranaki.info

Table of Contents

MIHI	3
INTRODUCTION.....	3
STATUTORY REGIME	5
Exclusive Economic Zone and Continental Shelf Act 2012	5
International Law	5
PROCEDURAL MATTERS	6
Incomplete Application, Disjointed Assessment and Natural Justice	6
Law Change, Regulatory Capture and Loss of Natural Justice	7
THE PROPOSED ACTIVITIES DO NOT MEET THE PURPOSE OF THE EEZ ACT	7
THE IMPACT ASSESSMENT DOES NOT MEET THE EEZ ACT REQUIREMENTS.....	7
UNCERTAINTY WARRANTS CAUTION	8
SAFETY AND INTEGRITY OF THE STRUCTURE	9
A Recipe for Disaster	11
EFFECTS ON EXISTING ENVIRONMENT AND INTERESTS	12
Inadequate assessment of effects	12
Cumulative effects	13
Cumulative impacts on marine mammals.....	13
Disjointed processing of related applications prevents assessment of cumulative effects.....	16
Hydrocarbon and chemical spills.....	17
INTERNATIONAL OBLIGATIONS	18
DECOMMISSIONING.....	19
ECONOMIC ANALYSIS.....	20
Real costs and opportunity loss	22
CLIMATE CHANGE NO LONGER THE ELEPHANT IN THE ROOM	23
DECISION SOUGHT	23
ACKNOWLEDGEMENTS	24
FIGURES.....	25
Figure 1. Frequency of occurrence of sustained casing pressure / SCP (Bruffatto et al. 2003)	25
Figure 2. Cumulative impacts on Maui’s dolphins	25
Figure 3. Marine Mammal Sightings in the greater Taranaki region.....	26
Figure 4. Global marine mammal species richness	26
REFERENCES.....	27

MIHI

1. Ko Rangī

ko Papa
ka puta ko Rongo
ko Tanemahuta
ko Tangaroa,
ko Tumatauenga
ko Haumiatiketike
ko Tawhirimatea.
Tokona ra ko te rangi ki runga
ko Papa ki raro
ka puta te ira tangata
ki te whai ao
ki te ao marama
Tihe, mauri ora!

2. He mihi tenei ki a ratou kua wehe atu ki te po, ki a ratou kua wheturangitia, ki nga kuia, nga koroheke i whawhai ai hei tiaki i te whenua, te moana me te mana motuhake! Haere, haere, haere atu ra. Ko te kupu a Te Whiti: Ko te po te kaihari i te ra, ko te mate te kaihari i te oranga. No reira, kei te tuku mihi te ropu nei ki a koutou, koutou o Te Mana Rauhi Taiao [EPA]. Ko Climate Justice Taranaki te ingoa o te ropu nei, e tuhituhi ana. No Taranaki matou.
3. I nga tau kua hipa, i tae mai tenei kamupene – a, ko STOS – ki roto o Taranaki ki te kerī hinu, mo te kapuni. Kahore matou i te tautoko tera momo mahi. No te mea, kahore he pai mo te moana, nga kararehe, me te ao katoa.
4. No reira, kahore matou e whakaae ki te mahi kino o te kamupene ra. Haere atu!
5. No reira, e te komiti, anei nga korero o tō mātou rōpu CJT. Tena koutou, tena koutou, tena koutou katoa.

INTRODUCTION

6. This submission is made by Climate Justice Taranaki Incorporated (CJT). CJT is a community group of concerned residents and citizens from in and around Taranaki who oppose the further extraction of fossil fuels because of its impacts on climate change and social justice. CJT advocates for a sustainable Aotearoa New Zealand and the urgent phasing out of investments and dependence on all non-renewable energy sources. CJT became an incorporated society on 26 February 2015.
7. CJT submits that the applications should be declined in full for the following reasons:
- The proposed activities do not meet the purpose of the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012 (EEZ).
 - The impact assessment (IA) does not provide sufficient detail to enable the Environmental Protection Authority (EPA) and persons whose existing interests are or may be affected to understand the

nature of the activities and their effects on the environment and existing interests, as required under the EEZ Act 2012 s 39(2)(b).

- c) The effects of undisclosed harmful chemicals to be discharged at sea cannot possibly be assessed. The EPA must therefore refuse the discharge consent application (EEZ s 87F *before it was repealed on 1 June 2017*).
- d) Uncertainties in the applications are unacceptable and contrary to the provisions of the EEZ Act. The EPA must favour caution and environmental protection in the case of uncertainty (EEZ s 61 for marine consent, EEZ s 87E and 87F for the discharge consent *before they were repealed on 1 June 2017*).
- e) The cumulative impacts from this and other industrial activities in the South Taranaki Bight (STB) on marine species have not been properly assessed. The risks to endangered and critically endangered species are unacceptable. NZ has the obligation to protect and enhance the recovery of threatened and endangered species under the Convention on Biological Diversity 1992 (EEZ s 11(b)).
- f) The IA does not provide any thorough assessment or assurance of the integrity of existing and new structures associated with the activity, considering the aging infrastructure and increasing extreme weather events caused by climate change.
- g) This application breaches Te Tiriti o Waitangi and fails to provide active protection of Maori interests and taonga as stipulated in section 12, but also negates Kaitiakitanga by tangata whenua over the environment.
- h) Further exploration, drilling and mining for fossil fuels is irresponsible culturally, socially, environmentally and economically. The economic analysis is not based on best available information. It ignores potential costs and opportunity loss. It also ignores the externalities of water and air pollution.
- i) The application will run contrary to New Zealand's obligations under the various international conventions relating to the marine environment, including the United Nations Convention on the Law of the Sea 1982, the Convention on Biological Diversity 1992, the Noumea Convention 1986 and the London Convention on Dumping. These have not been properly considered in all previous assessments.
- j) New Zealand has the obligation to deliver its commitment to the Paris Agreement under the UNFCCC. The EEZ Act must be amended to include considerations of climate change.

8. CJT further submits that:

- a) Assessing related applications (notably the various discharge consents) separately lacks transparency, and does not allow holistic assessment of cumulative impacts or integrated management of effects. The EEZ Act s42A calls for joint processing and decision making on related applications.
- b) If the decision-making committee (DMC) decides, contrary to all the above cogent reasons, to grant a marine consent, the formulation of an environmentally and culturally acceptable decommissioning plan should be included as a condition and a bond must be required to ensure that there is adequate finance to implement the decommissioning plan (EEZ Act s 11, 64 and 65).

STATUTORY REGIME

Exclusive Economic Zone and Continental Shelf Act 2012

9. The applications do not satisfy the purpose and requirements of the EEZ Act in sections 10, 11 or 12.
10. The purpose of the EEZ Act cannot be met by allowing the proposed activities as they do not contribute to sustainable management.
11. Granting of the marine and marine discharge consents will contravene NZ's international obligations under various international conventions (EEZ s 11).
12. The applications breach Te Tiriti o Waitangi and fails to provide active protection of Maori interests and taonga as afforded in section 12, but also negates kaitiakitanga (or stewardship) by tangata whenua over the environment. The applications therefore do not satisfy the EEZ s 12. Our submission in 2015 on STOS' first marine consent application explained this comprehensively, and we refer the DMC to that submission (CJT, 2015)¹.
13. The EEZ s 39 stipulate the kind of information and level of details that must be included in an impact assessment (IA). STOS' IA provided for the applications do not contain sufficient information and details of information (See para 32-41).

International Law

14. The application neither continues nor enables the implementation of New Zealand's obligations under various international conventions relating to the marine environment, including the United Nations Convention on the Law of the Sea 1982, the Convention on Biological Diversity 1992, the Noumea Convention 1986, the London Convention on Dumping or the Paris Agreement on Climate Change 2015. This is not in accordance with New Zealand's duty to protect and preserve the marine environment. It will not contribute to New Zealand meeting its climate change obligations.
15. A precautionary approach to this proposal is required to ensure the lasting health of the marine environment. New Zealand has repeatedly signed up to the precautionary approach in numerous international instruments and therefore has an obligation to apply it. Its widely accepted formulation is in Principle 15 of the Rio Declaration: *"In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."*
16. The precautionary approach is an essential component and an obligation because of its ability to reduce environmental risk as it involves an anticipatory preventative action in response to uncertainty. We do not have a full understanding of the physical, chemical or biological components or processes, nor the ecosystem functions, nor the life that exists in the area, resident or transient, and how that life interrelates within the surrounding environment. What we do know is that STB is a global marine mammal hotspot, hosting at least 36 species, six of which are globally Endangered and a further 18 of which are so poorly known as to be classified 'Data Deficient'.

17. This application is far from comprehensive. The applicant has not provided a robust application proving that their proposal is safe for the marine environment and poses no threat to future viability. Taking a precautionary approach to major projects of this nature is internationally recognized. The EPA must apply the precautionary approach to this application and apply the provisions of section 10 and section 59(2) EEZ/CS Act to ensure that the marine environment is protected in accordance with that Act, and our international obligations.

PROCEDURAL MATTERS

Incomplete Application, Disjointed Assessment and Natural Justice

18. On 12th June 2017, CJT wrote an official complaint to EPA, expressing its serious concerns over the STOS 2017 applications and the accompanied IA which failed to satisfy the EEZ Act s39(2)(b)–now s 39(3)(b) *following a replacement on 1 June 2017 by section 227 of the Resource Legislation Amendment (RLA) Act on 1 June 2017*. We pointed out the insufficient detail provided in the applications and IA to enable the EPA and persons whose existing interests are or may be affected to understand the nature of the activities, and their effects on the environment and existing interests.
19. CJT strongly requested that the applications be either returned to the applicant as ‘incomplete’ based on EEZ Act s 41, or that the submission process be postponed until adequate information has been provided. Section 41 has also been replaced by section 227 of the RLA Act on 1 June 2017, with the removal of any reference to the DMC’s ability to ‘return’ the application to the applicant.
20. We also requested that full details of all harmful substances proposed for discharge under any non-notified discharge consents (EEZ Discharge and Dumping Regulations 2015 s16(2), 16(3) and s21) be provided in due course so that joint processing and decision making of the related applications could occur as provided for under the EEZ Act s42A. This section s 42A has now been repealed by section 227 of the RLA Act.
21. EPA replied on 14 June 2017, stating that it is “*confident in its decision under section 41 ... not to return ... STOS... 2017 applications for marine consent and marine discharge consent as incomplete. The decision on completeness makes an assessment as to whether the application for that has been submitted meets the criteria under section 39 of the Act*”. In regards to the discharge consent application, “*the DMC will make a decision on the application as submitted by STOS. The DMC may request further information or seek advice, under s 42 and s 44 of the EEZ Act respectively, to inform its decision*”.
22. We do not believe that the EPA has exercised its powers to request information from the applicant, obtain advice, or commission a review (of the IA) to obtain the best possible information, thereby breaching the information principles under s 61.
23. CJT could not ascertain if there is a revised Discharge Management Plan (DMP) since the processing of the STOS 2014/15 consent applications, and if there is, whether EPA has requested a copy from STOS. If such a document exists, surely it should contain important information in respect of the marine discharge consent currently sought by STOS.

24. It is our view that proceeding with the applications without adequate information provided to EPA and to the public increases the likelihood of a favourable decision for STOS. This is not a fair and open process.
25. Dr Geoff Bertram, Senior Associate of Victoria University of Wellington and former Councillor of the International Association for Energy Economics (IAEE), warned that given the experience of Think Big projects, *“policy makers need to tread carefully and the wider public needs to insure that the nation’s policy making and regulatory institutions are not captured and distorted by industry rent-seeking,”* (Bertram, 2012)².
26. We are also disappointed that EPA did not take action upon the complaint from submitter Emily Bailey who pointed out that STOS had used materials in the feedback provided by Te Kāhui o Taranaki Trust and Ngati Tara hapu, despite the authors’ specific instruction for the information not to be included in the IA. This is disrespectful.

Law Change, Regulatory Capture and Loss of Natural Justice

27. A new version of the EEZ Act, with numerous sections being repealed or replaced by the Resource Legislation Amendment Act on 1 June 2017, was uploaded onto the NZ legislation website on Friday 16 June 2017. Many of the changes concern the information principle, especially in relation to the discharge consent application, notably the revised EEZ s 39, 59, 61, 87D, 87E and 87F.
28. The 16 June 2017, the day when the changed EEZ Act was made publicly available online, was barely a full working day before closure of the submission on STOS’ applications (Monday 19 June). There was no public notification as far as we are aware.
29. There is no way that CJT and other submitters on the STOS’ applications could be expected to have the ability – time and other resources – to adequately address the changes within a day. This clearly favours the well-resourced applicant. What recourse is there to provide for fairness and natural justice for all who are involved?
30. We seek clarification as to whether the most recent law changes on 1 June 2017 apply to the current STOS applications?

THE PROPOSED ACTIVITIES DO NOT MEET THE PURPOSE OF THE EEZ ACT

31. The applications fail to satisfy the purpose or requirements of section 10. By allowing the proposed activities, the use, development, and protection of natural resources (fossil fuels in this case) cannot be managed in a way, or at a rate that enables people to provide for their economic well-being while— safeguarding the life-supporting capacity of the environment; and avoiding, remedying, or mitigating any adverse effects of activities on the environment (EEZ s 10(2)(b) and (c)).

THE IMPACT ASSESSMENT DOES NOT MEET THE EEZ ACT REQUIREMENTS

32. The STOS Impact Assessment (IA) does not provide sufficient detail to enable the EPA and persons whose existing interests are or may be affected to understand the nature of the activities, and their effects on the environment and existing interests.

33. The IA states that *“...the specific rig to be utilised for this work has not yet been identified”* (IA s4.7). The different models of jack-up rigs vary in size from hull length 70-95 m, breadth 65-110 m, with varying impacts on the seabed (IA s4.3). The design of the deck drain system also varies depending on the model of the rig (IA s4.7). The mode of operation, whether the jack-up rig will be cantilevered over the platform to drill or operate independently from the platform, is also not clearly specified in the IA (s4.3.2). All of these unknowns could pose significant risks. How are these to be assessed?
34. The number of drilling campaigns and locations are unknown, except that it *“will not necessarily be a “one-off” activity. For example, drilling may be conducted over a number of campaigns at different locations within the Maui permit area, each requiring pre-installation works prior to the campaign. It is [also] possible that multiple rig installation and removal processes may be required within a single campaign...”* (IA s4.1).
35. *“With respect to discharges from jack-up rig deck drains, the exact nature of substances to be discharged and discharge patterns is unknown at this point due to the activities being in early planning stages. STOS will propose a condition to provide this information to the EPA together with chemical specific assessment of the impacts, if any, on the environment, existing interests and on human health associated with the discharge of the harmful substances when it becomes available and before the commencement of discharge.”* (IA Table 2.4)
36. *“Also due to the early planning stages, comprehensive descriptions of the harmful substances cannot be provided at this time as chemical selection will occur closer to the time of the works being commenced. Information that is not currently available includes specific product chemical compositions, hazard classifications, physical properties, maximum volumes discharged, frequency of discharges and behaviour in seawater.”* (IA s4.7)
37. Hundreds of chemicals that are harmful to humans and/or are eco-toxic have been identified from almost a thousand products used in oil/gas drilling and well stimulation (including fracking) in the USA alone³. The list of substances potentially with harmful components where residue may be discharged through deck drainage presented in the IA (Table 4.1) only provides generic categories of chemicals used at different stages of operation.
38. According to the US FracFocus Chemical Disclosure Registry⁴, *“On average, drillers reported using a mix of 14 different chemicals at each well site. At sites where information was withheld, an average of five chemicals were not named.”* When EPA (US) researchers analysed the data on the site, they found that companies were concealing the identity of more than one out of every ten chemicals that were ‘disclosed’, because it was supposedly a trade secret.
39. Many chemicals used in drilling (e.g. Glyoxal), cementing (e.g. defoamer), cleanout (e.g. biocide NALCO EC6388A), completion and well stimulation or fracking (e.g. Hexamethylenetetramine) are ecotoxic, carcinogenic, mutagenic and/or have other harmful health effects. In some cases, radioactive tracers are also used. Without knowing the exact nature, composition and quantity of chemical products to be used in the proposed drilling campaigns and discharge activities, it is simply not possible to properly assess their effects to the environment and existing interest.

UNCERTAINTY WARRANTS CAUTION

40. It is clear that the best available information as defined in EEZ s 34 has not been provided. Based on the information principles under the EEZ s 34 and s 61, a decision must favour caution and environmental protection when the information available is uncertain or inadequate. As STOS has

said repeatedly that the proposed activities are still at the “*early planning stages*”, submitting the applications at a later stage when details on the rig and the chemicals are identified, and best available information is then available for assessment, would not incur unreasonable cost, effort or time.

41. We question why STOS has submitted these applications so prematurely?

SAFETY AND INTEGRITY OF THE STRUCTURE

42. We are gravely concerned about the safety and integrity of the numerous aging STOS infrastructure at Maui, and the risks of drilling side-tracks from the old wells. The Impact Assessment (IA) does not provide any thorough assessment or assurance of the integrity of structures associated with the activity, especially considering the increasing extreme weather events (IPCC report, 2014)⁵. We have seen no evidence that this has been addressed since we first raised it in the STOS marine consent application in 2014/15.

43. The only two references to asset integrity seems to be this broad statement: “*In keeping with the Business Principles, STOS assets are designed, operated, maintained and decommissioned in a manner that safeguards their integrity and ensures their planned availability throughout their life cycle*” (IA s 1.2.5); and “*Potential scenarios could include a very large storm and scour event that threatened the future integrity of the platform piles or pipeline...*” (IA s 4.6.2).

44. NIWA predicts that extreme wind speeds will have “*Most robust increases ... in southern half of North Island, and throughout the South Island*” (MfE, 2016)⁶. Storm waves will also continue to increase in height.

45. CJT questions whether maintenance of the offshore infrastructure will be sufficient to withstand future extreme events? We raise this point because there have already been significant infrastructure failings. We warn that these inevitable failings will likely be exacerbated by future lack of maintenance resulting from declining profitability of the fossil fuel industry, a 'twilight' industry, as it is replaced by clean renewables. The industry, internationally, is notorious for such failings and short-cuts, with truly disastrous consequences, as so tragically occurred in the Gulf of Mexico some years ago.

46. Of most concern to the future integrity of Taranaki's rapidly aging offshore oil and gas infrastructure are extreme wind and sea-state events, forced by extra-tropical cyclones or deep Tasman Sea low pressure systems. The intensity of these systems, though possibly not their frequency, is predicted to increase in coming decades. Indeed, the past six months saw large areas of NZ battered by such storms, with massive damage to parts of both North and South Islands.

47. In November 2015, a crack was found on the OMV Maari platform off the Taranaki coast, prompting an urgent staff evacuation⁷. The company reported that the damage was caused by “*fatigue*” and “*combined action of wind and wave*”, although it was also unable to reject the possibility of damage from the 7.8 earthquake that hit the country the week before⁸.

48. A CJT member wrote to WorkSafe and Maritime NZ, asking for various information including questions on the cause of the incident and whether an independent investigation has been conducted. WorkSafe replied that it “*has not commenced an investigation... OMV is managing the*

situation and are undertaking an internal investigation. WorkSafe is closely monitoring their ongoing management of the situation and is satisfied that the risks are currently being managed so far as is reasonably practicable... WorkSafe would conduct an investigation... had there been a serious risk to workers health and safety arising from an immediate or imminent exposure as a result of the defect found” (WorkSafe, 16/1/2017 & 7/3/2017)⁹.

49. Likewise, Maritime NZ said it *“has not commenced a formal investigation... Maritime NZ is engaging closely with OMV to ensure that company is fully compliant with their responsibilities around the environment. ... Maritime NZ is satisfied that OMV is acting appropriately. Maritime NZ will continue to actively monitor the situation” (Maritime NZ, 13/12/2016)¹⁰.*
50. So again, no independent investigations have been conducted by either of the key agencies responsible for overseeing safety of offshore petroleum operations.
51. Back on the case of STOS Maui, the IA says: *“Operational safety cases have been prepared by STOS for both MPA and MPB and were approved by WorkSafe New Zealand (High Hazards Unit) on 22nd April 2016 and are therefore valid until April 2021. A safety case specifically relating to the operations of the jack-up rig will be developed and submitted to WorkSafe for approval prior to any jack-up rig operations commencing” (IA s 2.3).* In other words, there is as yet no specific safety case to ensure safety of operations involving the jack-up rig.
52. Moreover, the issues of structural integrity of wells, pipelines and other structures are critical in assessing potential effects on the environment and existing interest of the activity, and NZ’s ability to implement its obligations under various international conventions (e.g. MARPOL). The 2014 MPA and B Discharge Management Plan reported that after 30 years, the MPA J tube pipeline from Aui A itself leaked the diesel that sits as a protective layer between the external and internal pipe and had to be repaired in 2007.
53. Industry studies (e.g. Watson and Bachu, 2009)¹¹ have shown, *“about 5% of all oil and gas wells leak immediately because of integrity issues, with increasing rates of leakage over time.”* In 20 years, over half of the wells will leak (Ingraffea et al. 2012¹² and Figure 1). *“With hundreds of thousands of new wells expected, this problem is neither negligible nor preventable with current technology... Pressures under the earth, temperature changes, ground movement from the drilling of nearby wells and shrinkage crack and damage the thin layer of brittle cement that is supposed to seal the wells... The gas and oil industries have been trying to solve this problem for decades” (Ingraffea, 2013)¹³.* All the above does not take into account high seismicity common in NZ which further compromises well integrity and longevity.
54. Well casing failures have already been documented in Taranaki. In September 2009, Taranaki Regional Council was advised by Austral (operation subsequently taken over by Cheal Petroleum / Tag Oil) that two production wells within the Cheal-A facility had developed leakages, and were discharging fluids to the Urenui Formation at a depth of approximately 1,400 m below ground. *“The discharge to the Urenui Formation was occurring due to integrity issues with casing patch seals within the wells.”* The casing patch seals were installed back in April 2007 and were *“not successful in fully isolating the wellbore, and leakage of power fluids subsequently developed” (TRC 1133945, June 2013)¹⁴.* Repeated non-compliance issues have been reported at this site during 2009-2012 and 2012-2013 monitoring periods, resulting in the Taranaki Regional Council rating the company’s

compliance level as “improvement desirable” (TRC 1245873, Nov 2013)¹⁵. Despite this, council granted a new consent for the company to continue the discharge of produced water to the Urenui Formation, though not through Cheal-A.

55. In October 2013, Tag Oil’s Cardiff-3 well at Cheal-C wellsite encountered a “**well integrity issue**”, as recorded on WorkSafe list of 61 “**petroleum dangerous occurrence notifications**” (8 July 2013 - 7 Feb 2014). In May 2014, Tag Oil’s own news alert reported that at Cardiff-3 well, “*the fracture stimulation [fracking] was affected by a poor cement bond (Tag Oil, 2014)¹⁶ over the interval, or skin damage must exist in the near wellbore area, restricting flow.*” When WorkSafe NZ was asked under an OIA request about the Cardiff-3 well integrity issue, it declined to release any information, citing that it was subject to an on-going investigation. Then in December 2014, WorkSafe revealed that the investigation was concluded and “*did not identify any breaches of the Health and Safety in Employment (Petroleum Exploration and Extraction) Regulations 2013, and that the matter did not require a report.*”
56. There is little, if any, transparency in the investigation process and the public is left in the dark re well safety and environmental impacts the integrity issue might have caused. We think that these and numerous other such examples demonstrate that this industry is largely ‘self-regulated’, in part due to lack of government resources, and in part because of its previous financial power, and often bullying tactics^{17,18}, resulting in business as usual and regulatory capture.
57. International research findings regarding the ‘resource curse’ in countries that place a great reliance in their economic development policy on natural resource extraction typically “*find themselves forced into at best collaborative and at worst coercive relationships with extractive industries, and having to bear the responsibility of managing community relations...*” (Loomis, 2017)¹⁹.
58. Over the last decade, drilling for oil and gas has intensified²⁰, with more wells being drilled, many side-tracked from old wells²¹, some kilometres long, most have been fracked²², water-flooded²³ or injected with waste²⁴. With greater intensity comes greater risks, especially as such infrastructure ages and climate disruption²⁵ escalates.

A Recipe for Disaster

59. Almost 100 ‘dangerous occurrences’ (now renamed ‘notifiable incidents’) associated with petroleum installations were notified to the High Hazards Unit in the 20 months between 17/3/2015 and 28/11/2016 (WorkSafe, 13/1/2017)²⁶. Of the 99 recorded incidents, 28 occurred at STOS Maui A, B or production station; e.g. “*gas detected from the CWI MDL tank degasser. ERP initiated*” at Maui B; “*gas detect module 06 faulty*” and “*firewater pump failure*” at Maui A. More recently in April 2017, a thunderstorm took out the power of the production station, prompting immediate shut down and depressurisation of the facility involving a huge ‘fire-ball’ witnessed by nearby residents²⁷.
60. With aging infrastructure, increasing climate disruptions, and the intensification of activities, including seismic surveys and maritime transport, potential seabed mining and other industries in and around the area, the likelihood of accidents and the resulting adverse effects on the environment and existing interest will escalate and increasingly become unmanageable. The IA does not give thorough analyses or clear indication of how STOS intends to ensure safety and protection of their structures on site, as the level of risk increases with intensification of use, and over time.

EFFECTS ON EXISTING ENVIRONMENT AND INTERESTS

61. In 2015 during the previous STOS marine consent application process under the EEZ Act, we have explained in great detail our concerns over the effects from the disturbance, discharge and noise associated with further drilling and operation at the Maui field (CJT, 2015)²⁸. Our concerns remain valid, and stronger, as the state of our ocean and environment at large has continued to deteriorate, with intensification of petroleum and other extractive industries, climate disruption and change in ocean chemistry – ‘acidification’.

Inadequate assessment of effects

62. The IA lacks some crucial and basic information about the activities involved and the effects that they may have. Without this basic information, it is impossible to properly assess the effects on existing environment and interests. See para. 32-41 above.

63. Embarrassingly, STOS cannot even provide any primary water quality data from the AOI (Area of Interest), after nearly 40 years of operations in the area. STOS uses sampling data undertaken by ERM in the Tui permit area to infer that water quality of the AOI is “*expected to remain high*” (IA s 7.2.6). The latter is also expected due to “*a lack of nearby terrestrial activity and other sources of contamination other than shipping and offshore activities*” and “*given the strong currents and wave action of the sea, any discharges ... will be subject to significant dispersion and the water quality is expected to return to its pre-impact state rapidly*” (IA s 7.2.6).

64. As we emphasized repeatedly in our 2015 submissions on the first STOS application, “*dilution is not the solution to pollution.*” It is simply a way of externalising impacts and evading responsibilities.

65. In addition to containing ecotoxic components as acknowledged by STOS (IA 9.3), the deck drain discharges may also contain endocrine disrupting chemicals that affect reproduction or biological development even at extremely low concentrations, with potential impacts on marine species and kaimoana.

66. In terms of the benthic environment, the STOS IA (2014)²⁹ revealed that within 500m of the platforms, zinc and/or lead were found at levels exceeding ANZECC 2000 guidelines in some samples – both metals are toxic to some marine species. Mercury and cadmium were also found. Barium level is above background levels at all sites. Total petroleum hydrocarbons in the C15-C18 groups were elevated at some stations (IA 2014). Adding more of these, or other, harmful substances to the sea would only add to the negative impacts on health and productivity of the benthic communities, with potentially serious implications on species higher up the food chain. Yet there is no quantitative assessment or monitoring of possible bioaccumulation of contaminants in tissues of marine species such as bivalves, fish, seabirds and marine mammals.

67. The conclusions that “*residual impacts of planned activities on environmental features; marine mammals, fish, benthic communities and water quality are assessed as being negligible to minor*” and the “*residual impacts of unplanned activities are considered to be low*” (IA Table 2.2) appear to be wholly subjective and not well supported by evidence.

68. STOS proposes a condition in the discharge consent which requires the provision to EPA of the details of the hazardous substances only prior to discharging (IA s 9.3). It is unacceptable for STOS to

use a consent condition to get around the lack of adequate information for assessment in the first place. It is like saying, “give me permission to hurt you, as long as I tell you how before I do it”!

69. STOS claims that the discharges will be small in volume and semi-continuous and exposure duration by marine species will be short. However, there are no clear data in the IA that CJT could find, to support these assertions (IA s 9.3.1). The risks on workers handling the chemicals also cannot be known without full disclosure of the chemical products to be used and their hazardous characteristics.
70. We do know that the drilling “will not necessarily be a “one-off” activity” (IA s4.1), and that multiple drilling campaigns have multiple and cumulative impacts. We are unable to locate in the applications or the IA the duration of the consents currently sought. Will they be for 35 years, as with the existing consent EEZ000010?

Cumulative effects

71. The EEZ s 6 includes “any cumulative effect that arises over time or in combination with other effects” as the meaning of effect.
72. The memorandum of counsel (5/5/2015)³⁰ provided to the DMC during the first STOS consent application hearing under the EEZ Act considered, “that section 59(2)(a) requires the EPA to take into account **all** effects on the environment or existing interests of allowing the proposed activity, including the effects of consequential activities that are not regulated by section 20. This interpretation was applied by the EPA in its decision on the marine consent application by Chatham Rock Phosphate Limited.... the effects of ‘non-section 20 activities’ undertaken in the area covered by the application or in its vicinity must be taken into account by the EPA, under section 59(2)(b).” This is a crucial consideration on the present applications, given all the other industrial activities that occur and ought to be assessed.
73. STOS’ attempt to assess cumulative effects in the IA is totally inadequate, considering the lack and insufficient detail of information provided (para. 32-41), particularly of quantitative data.
74. The cumulative impact assessment on sediment quality and benthic communities (IA s 11.1) adds up to just two paragraphs; on underwater noise (IA s 11.2) a single paragraph; on turbidity on water quality (IA s 11.3) two paragraphs; on discharges (IA s 11.4) two paragraphs; on iwi and hapu cultural values (IA s 11.5) just one paragraph.
75. What about the activities that have been undertaken in the last two years since the granting of STOS’s first marine consent EEZ000010? Surely it is reasonable to expect some sort of reporting and assessment of STOS and other operators’ recent activities and their effects on the environment which would form part of the cumulative impact assessment. Yet there is no information as such in the IA.

Cumulative impacts on marine mammals

76. In our 2015 submission, CJT pointed out that with the drilling duration taking 30-150 days per well or longer, drilling 22 side-track wells non-stop could take up to 6 years, on top of other noise associated with the two platforms and various vessel operations, potentially for many years to come. The

additional noise generated by activities that are subject of the current application, albeit “*short in duration*” and apparently not “*expected to occur at the same time as other potentially higher-noise activities*”, would effectively mean that there is never respite for sensitive marine mammals. For a critically endangered species like the Maui’s dolphin, it could be catastrophic. As far as we know, there is no on-going monitoring of underwater noise in the area of interest or the South Taranaki Bight at large, and certainly no assessment of noise impact on local marine mammals or fish.

77. Professor Liz Slooten, in her supplementary evidence provided to the DMC on the Trans-Tasman Resources Ltd. seabed mining application, stated:
78. “... *the amount of research survey effort in the STB [South Taranaki Bight] area is very limited... Until more marine mammal surveys are carried out, it is not possible to estimate the number of marine mammals (individuals, or even species) that would be affected by noise levels expected to cause injury, and the number of species and individuals that would be affected to the point of responding by changing their behaviour (e.g. moving away, not being able to hear other whales in the area). This is a requirement of obtaining similar resource consents in other countries (e.g. USA)..*
79. *Measurements of hearing sensitivity have been made for a very limited number of marine mammal species, often of a small number of captive individuals. This means that noise predictions weighted by the hearing sensitivity of marine mammals are highly uncertain. To find out how marine mammals respond to this kind of noise, in realistic natural conditions, requires field observations... Data gathered in the absence of mining ... would be needed ...*” (Slooten, 2017)³¹.
80. The Scientific Committee of the International Whaling Commission most recently reiterated its continued grave concern over the status of the severely depleted Māui dolphin: “*The Committee notes that no new management action regarding the Māui dolphin has been enacted since 2013... The human-caused death of even one individual would increase the extinction risk... re-emphasises that the critically endangered status of this subspecies and the inherent and irresolvable uncertainty surrounding information on most small populations point to the need for precautionary management... notes that the confirmed current range extends from Maunganui Bluff in the north to Whanganui in the south, offshore to 20 n. miles, and it includes harbours...*” (Scientific Committee, May 2017)³².
81. “*Where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimize such a threat,*” as stated in the preamble of the Convention on Biological Diversity³³
82. In order to honour the government’s obligations to the Convention of Biological Diversity and the Rio Declaration on Environment and Development 1992, EPA needs to adopt the **precautionary approach** (CBD, 2012)³⁴ when assessing this application.
83. According to EEZ s59(2)(b), the EPA must take into account the effects on the environment or existing interests of other activities undertaken in the area, including effects of activities that are not regulated under the EEZ Act.
84. CJT notes that another marine consent application under the EEZ Act is currently being assessed by EPA, for seabed mining by TTRL. If granted, this will add yet more largely unquantified impacts (e.g.

noise) to STB, contributing in a cumulative manner. These various applications need to be considered in a coherent and comprehensive way.

85. We respectfully ask that the EPA and DMC seriously consider the implications of allowing the current applications, especially the cumulative impacts they will have on top of existing impacts of fishing, seismic testing, exploratory drilling and shipping on endangered marine mammals such as the Maui's dolphin and Blue whale (Figures 2).

86. *"Of course, it is not only blue whales and Maui's dolphins that should concern us. According to Kaschner et al. (2011)³⁵, South Taranaki Bight and adjacent waters host the highest cetacean diversity on Earth. ... According to the IUCN, 6 are Endangered... Eighteen species are Data Deficient ... meaning there is not enough known about them by the leading specialists globally... to enable a robust assessment. Surely this is cause for concern,"* (DeVantier, 2017)³⁶. See Figures 3 and 4 and Table 1.

Table 1. Species identified from South Taranaki Bight region on IUCN Red List³⁷. DD: Data Deficient; LC: Least Concern; Vu: Vulnerable; En: Endangered.

Species name	IUCN Red List
Antarctic Minke Whale	DD
Common Minke Whale	LC
Bryde's Whale	DD
Sei Whale	En
Humpback Whale	LC
Fin Whale	En
Blue Whale	En
Pygmy Blue Whale (subspecies)	En
Hector's Dolphin	En
Maui's Dolphin (subspecies)	En
Dusky Dolphin	DD
Pan Tropical spotted Dolphin	LC
Indo-Pacific Bottlenose Dolphin	DD
Common Bottlenose Dolphin	LC
Striped Dolphin	LC
Southern Right Whale Dolphin	DD
Risso's Dolphin	LC
Short-finned Pilot Whale	DD
Long-finned Pilot Whale	DD
Spectacled Porpoise	DD
False Killer Whale	DD
Killer Whale	DD
Pygmy Sperm Whale	DD
Southern Bottlenose Whale	LC
Hector's Beaked Whale	DD
Shepherd's Beaked Whale	DD
Cuvier's Beaked Whale	LC
Ginkgo Toothed Beaked Whale	DD
Gray's Beaked Whale	DD

Arnoux's Beaked Whale	DD
Andrew's Beaked Whale	DD
Strap-toothed Whale	DD
Sperm Whale	Vu

Disjointed processing of related applications prevents assessment of cumulative effects

87. STOS is applying for a single discharge consent for deck drain discharges from any jack-up rig, with full knowledge that it will apply for further discharge consents, mostly non-notified, for other discharges.
88. STOS IA s 4.1 says: *"It is also recognised that some activities associated with drilling are anticipated to trigger the requirement for a consent under the Dumping and Discharge Regulations. Where these discharges are the subject of a notified Marine Discharge Consent process they are included in the current application and are described in detail in this IA. Discharges that meet the requirements for a **non-notified Marine Discharge Consent** process will be the subject of a separate application process and therefore are not described in detail in this application."*
89. *"...a Marine Discharge Consent application is being lodged as part of the current application, and a **future application** will be lodged with the EPA for a range of potential discharges relating to side-track drilling or other activities not covered in the Deemed Discharge Consent."* (IA E2.2)
90. *"Any temporary pipework will be pressure tested using inhibited seawater treated to remove oxygen and inhibit bacterial growth prior to use. This inhibited seawater would be discharged, and will be the subject of a **separate Marine Discharge Consent** application."* (IA s4.3.2)
91. *"Any hazardous substances that could be discarded as part of the cement mixture will be addressed through a **subsequent Marine Discharge Consent** application once the anticipated additives have been determined."* (IA s4.4.1)
92. *"As the potential discharge activity does not meet the criteria for Regulation 16(2) or 16(3) STOS is applying for a notified Marine Discharge Consent under the Discharge and Dumping Regulations. **An additional, non-notified, Marine Discharge Consent** application is also anticipated to be submitted with respect to the proposed activities at a later date once details of the drilling programme and rig selection have been further developed.*
93. *A range of chemicals are anticipated to be used during side-track drilling activities in the Māui field. The current application for a Marine Discharge Consent is sought under Regulation 16(1) for the planned discharge of harmful substances via the hazardous deck drain system on board the drill rig. It is noted that many of the harmful substances potentially discharged via the deck drain system may also be discharged through other routes (i.e. not through the drilling rig deck drains) and will therefore also be included in the **future non-notified Marine Discharge Consent** Application."* (IA s 4.7)
94. EPA has accepted STOS' current discharge consent application and is willing to assess it independently from the other impending applications. Such a disjointed way of processing related applications prevents any possibility of assessing cumulative effects. With future consents being

non-notified, this is contrary to the important principle of natural justice, as public scrutiny will be forbidden.

95. Critically, the other discharges not covered by the current application are expected to have more adverse impacts on the environment because of their toxicity and quantity.
96. *"As a result of many technological operations and procedures, drilling muds and cuttings are saturated with hundreds of very different substances and compounds. It is their discharges into the sea that pose one of the main ecological threats during offshore oil production. In particular, many countries express concern regarding biocides, which are used to suppress microflora in the drilling and other circulating fluids. The list of such compounds includes over one hundred names. The most widespread biocides used in the oil and gas production practice include sodium salts of hypochlorite, formalin releasers, and glutaraldehyde as well as biguanidine and quaternary ammonium, and a number of other compounds. The composition of some compounds is not always known. Some biocides are highly toxic. Many countries either discourage (for example, in case of carbamates and thiocarbamates) or prohibit (for example, in case of dichlorophenols and pentachlorophenates) their use by the offshore oil and gas industry. Drilling discharges also contain many heavy metals (mercury, lead, cadmium, zinc, chromium, copper, and others) that come from components of both drilling fluids and drilling cuttings."* Stanislav Patin, 1999³⁸.
97. Because of concerns over the environmental and health impacts of contaminant discharges at sea, jurisdictions overseas have put in place tight regulations. Norway, for example, requires toxicity, biodegradation and bioaccumulation tests for all components in chemicals used offshore except those on "green" chemicals list³⁹. In Western Australia, legislation requires that all chemicals used down a well are approved, based on toxicity assessment, by the Department of Mines and Petroleum, and this information is made public⁴⁰.
98. Here however, the EEZ (Discharge and Dumping) Regulations 2015 state: *"The discharge of harmful substances described in regulation 4(a) and (b) from offshore processing drainage, displacement water, and production water from an existing structure is classified as a **non-notified** activity under the Act" (s 16(3)) and "The discharge of harmful substances contained in drilling fluids is classified as a **non-notified** activity under the Act" (s 21).*
99. As above, the non-notification classification of consent applications required for such discharges prevents the public from being informed and participating. It should not prevent the EPA and DMC from processing and assessing their effects jointly, so that cumulative effects can be examined, with public input. The EEZ Act s 42A supported joint processing, hearing (if both are to be heard) and decision making on related applications. S 42A was repealed on 1 June 2017 by the RLA Act s227. In our view, this is an affront to participatory democracy and more typical of an oligarchy.
100. CJT strongly reiterates that classifying the discharge of harmful substances into the environment as non-notifiable violates the basic principles of democracy⁴¹, ignores tangata whenua's role as kaitiaki and is disrespectful of cultural values especially mauri of the sea and taonga species.

Hydrocarbon and chemical spills

101. In addition to the as yet unknown or undisclosed harmful substances that may be discharged into the ocean, there are significant risks on the marine environment, biodiversity, ecosystems and threatened species from a major accident such as a hydrocarbon (condensate or vessel fuel) or hazardous or noxious substance spill.

102. Such risks, compounded with aging infrastructure, escalating climate disruptions, and New Zealand's inadequate capacity to deal with the consequences, have been elaborated in detail in our 2015 submissions.

103. There is no clear assurance that STOS has adequate insurance to cover the costs of clean up, compensations and habitat remediation following a major oil spill or other incident.

INTERNATIONAL OBLIGATIONS

104. The UN Convention Law of the Sea (UNCLOS) Article 145 requires authorities to protect the marine environment from harmful effects such as pollution, drilling, disposal of waste, construction and operation of installations, and to protect and conserve natural resources and prevent damage to flora and fauna of the marine environment (UNCLOS, 1982).

105. UNCLOS Article 194 requires states to undertake all measures consistent with the Convention to prevent, reduce and control pollution of the marine environment from any source. The latter includes the release of toxic, harmful or noxious substances by dumping, pollution from installations, etc. The NZ government, being state party to UNCLOS, has the obligation to meet its statutory requirements.

106. The EEZ Act s59(2)(d) requires EPA to consider *“the importance of protecting the biological diversity and integrity of marine species, ecosystems, and processes”*

107. The EEZ Act s59(2)(e) states clearly that the EPA must take into account *“the importance of protecting rare and vulnerable ecosystems and the habitats of threatened species”*.

108. The EEZ Act s11 also says: *“This Act continues or enables the implementation of New Zealand’s obligations under various international conventions relating to the marine environment, including— (a) the United Nations Convention on the Law of the Sea 1982: (b) the Convention on Biological Diversity 1992.”*

109. This requires that measures be taken to avoid, remedy or mitigate effects associated with the Maui facilities on biological diversity and NZ's ability to comply with the Convention on Biological Diversity (CBD).

110. The proposed activities will further threaten the habits and survival of threatened species, notably the globally listed Critically Endangered Maui's dolphin and Endangered Blue whale. The government should apply the precautionary principle to honour New Zealand's international obligations.

111. At present the amount of industrial activities in STB (Figure 2) is more consistent with it being treated as a sacrificial zone⁴² than one of the most diverse marine mammal hotspot on earth.

112. Climate change is an existential risk of global significance that requires local as well as global responses and solutions. Numerous international summits on the subject have been held, for example through the United Nations. In 2015, the NZ government signed onto the UNFCCC COP21⁴³ Paris Agreement, committing itself to reducing greenhouse gas emissions, along with almost 200 other nations. To deliver its commitments, the effects on climate change must be considered when assessing any activities.

113. In respect to further fossil fuel exploration and production, it is important to understand that natural gas is not a transition fuel. Its GHG contributions from fugitive emissions and during processing have been poorly quantified and consistently under-estimated^{44,45,46}. Scientists from the US EPA and Gas Research Institute have long warned: *“For this reason the assertion that global warming could be reduced by replacing coal and oil fuels with natural gas could not be defended”* (Kirchgessner, et al. 1997)⁴⁷. The promotion of natural gas by the increasingly desperate fossil fuel industry and governments serves only to delay the inevitable transition onto renewable energy sources.
114. In terms of methane and other gas emissions, CJT requests further information on the volume, period and composition of gases mentioned in the IA as *“Depressurisation of the pipeline including venting of gas”* (IA 4.2).

DECOMMISSIONING

115. The disposal of waste in New Zealand waters is managed under both domestic legislation and international law. Part 180 of the Maritime Rules brings obligations into New Zealand Law under the Protocol to the London Convention. In principle, this protocol requires that dumping at sea be avoided, except for materials on an approved list.
116. The London Convention incorporates the Polluter Pays principle and the precautionary principle (Article 3.1). There is an expectation in the New Zealand Guidelines that wellheads and platforms will be recovered (MNZ, 1999)⁴⁸.
117. UNCLOS article 60(3) specifically provides for decommissioning, in particular the removal of offshore installations. Article 194 requires that signatory states conduct decommissioning operations in a manner that would not damage the marine environment.
118. The International Maritime Organisation (IMO) Guidelines impose a principle on coastal states that all disused installations and structures, are required to be removed, and that removal should be performed as soon as is reasonable practical.
119. The Parliamentary Commissioner for the Environment said, *“The bigger challenge comes once a well has been abandoned. The likelihood of an abandoned well leaking increases with its age.”* (PCE, 2014: Drilling for Oil and Gas, 2014)⁴⁹. It is critical that abandonment and decommissioning are conducted to high standards to reduce environmental and safety issues later on. Taranaki iwi are seriously concerned with the issues of dumping and the decommissioning process and their impacts. A detailed Decommissioning Plan and assessment of its effects must be assessed before an activity begins.
120. According to the decision on STOS’ first marine consent application, *“it was stated in evidence that the Maui offshore facilities are approaching the end of their economic life, and further, that decommissioning is a significant activity that will take a number of years to plan and execute. Decommissioning is an activity that falls within the jurisdiction of section 20 of the EEZ Act, but it has not been applied for by STOS as part of this marine consent application. We may only consider the activities that have been applied for. There is no ability, therefore, to regulate this activity at this time or to put in place measures that will ensure it will occur.”* (EEZ000010, 2015)⁵⁰

121. Indeed, decommissioning is an expensive activity which needs to take place at the end of the economic life of an extractive venture like fossil fuel mining. CJT raises the question as to why any upstream energy company would actually ask for a consent to do something that is costly and most likely with significant financial loss?
122. In 2015, Dr Wratt (a member of the DMC) asked Mr Jager of Shell: *“What can we take to be assured that in 35 years Shell is still going to be there, is still going to be a responsible company? We can’t impose a bond so do you have any comment on that 35-year timeframe in that context...?”* (EPA Hearing transcript Day 01, 2015)⁵¹
123. Mr Jager replied: *“...I don’t think Shell will walk away from its obligations, either in 5 years or in 35 years... Clearly we look for as much certainty in what is otherwise an extremely uncertain environment in terms of price, in terms of demand, in terms of economically recoverable reserves that we can get to make our investment decisions.”*
124. Within a few months after Mr Jager’s reply, in December 2015, Shell announced that it planned to review its NZ assets⁵². By April 2017, Shell has begun sale of its assets, initially relinquishing its half stake in the onshore Kapuni field to Todd Energy and acquiring all of the Maui asset, thereby *“simplifying the structure for any possible changes to the remaining (production) assets”* (Energy Stream, April 2017)⁵³.
125. CJT is concerned that Shell is preparing to sell additional assets, thereby passing future obligations and liability to other companies or the NZ government and people. Irrespective of the outcome of the potential sale, there will be significant financial cost of decommissioning and remediation. It is imperative that this is not passed onto tax payers, as occurred recently in Auckland when Mobil successfully avoided decontamination costs of \$10 in a supreme court decision⁵⁴.
126. CJT submits that a condition requiring a bond to ensure that there is adequate finance to formulate a decommissioning plan and its implementation in an environmentally and culturally acceptable manner. EEZ s 11, 63 and 65 provide for this.

ECONOMIC ANALYSIS

127. The economic analysis (IA s 7.8) is not based on best available information, including (but not limited to) the recent and impending asset sales (See para. 123-125).
128. As occurred two years ago, STOS either is not able to, or would not, provide concrete economic data specific to the Maui field. CJT finds it absurd that STOS cannot provide specific economic data. Instead of providing concrete data, STOS said it used analysis from one of the joint venture partners and scaled it up to provide estimates. The latter include a revenue of \$8.4 billion from 2015 to 2030, with \$1.2 billion in royalties, levies and taxes for the NZ government.
129. The total tax income and royalties collected from the oil and gas industry as a whole may seem like large sums, but NZ has one of the lowest overall tax takes from the oil industry (46 %) compared with other oil producing countries and the world average of 70 % (WWF, 2013)⁵⁵.
130. The IA grossly overstates the importance of natural gas in NZ’s energy supply, especially into the future (See also para. 113-114). In fact, only 6 percent of NZ’s gas production supplies homes,

schools and hospitals⁵⁶. Almost half of the gas produced is used to manufacture methanol (by Methanex) for export and to make urea for industrial agriculture, mainly intensive dairying. It is common knowledge that urea is harmful to soil health and polluting to waterways. Less known is the resulting off-gassing of nitrous-oxide⁵⁷ being 300 times worse than carbon dioxide as a greenhouse gas. Our waterways are under serious threat from agriculture and principally from fertiliser. The cost of repairing the soil and fixing the environment from fossil fuel based fertilizer is of course not taken into account by the IA. This economic loss/cost should be calculated.

131. Less well known is the chronic environmental impacts of some of these fossil fuel reliant industries. Notably, the Ballance Agri-Nutrient Urea Plant in south Taranaki has contaminated the groundwater over decades of operation, with concentrated plumes of ammonia on site⁵⁸, while the two Methanex sites in north Taranaki continue to discharge contaminants into the Waitara outfall, contributing to the disgraceful state of the river and coastal environment⁵⁹.
132. The risks that the proposed activities pose to the existing regional and national economies through degradation of the marine and coastal environment and further tarnishing New Zealand's trading advantage, our clean green image, are significant.
133. The applications will not enable people to provide for their economic well-being as required in section 10 of the EEZ/CS Act.
134. The University of Otago's research on socioeconomic deprivation indexes⁶⁰ revealed that communities with the most intensive oil and gas activities in Taranaki, such as Waitara, Stratford, Eltham, Kaponga and Patea, are all seriously deprived⁶¹.
135. As Dr Robert Shaw submitted on the TTRL seabed mining application, *"To assess the effects of the current application it is necessary to interrogate the business model of the company. Typically, extractive industries seek to transfer the risks of market downturn to others. For example, they own as little as possible, employ people on short-term contracts and subcontract work. South Taranaki District already suffers from this business model in the oil and gas industry.*
136. *Company shareholder newsletters (for example, from Tag Oil which has extensive holdings in Taranaki) are positive and congratulatory in the current price downturn. In contrast, the information gathered at the hairdressers and op shops in Hawera indicates families suffer as employment dwindles and local business activity declines. In the pubs at Opunake you can learn about the fate of families who lost financial support because of earlier "downturns". The risks described for oil and gas in the main pertain to the present application because they are extractive industries. ... It is most likely that in the long-term, the business model adopted by extractive industries leaves South Taranaki worse off than it would be had they not arrived. There is an urgent need to make a full economic assessment of the context for the present application and any similar proposals" (Shaw, 2017)⁶².*
137. In terms of jobs, Coal Action Network Aotearoa's "Jobs After Coal" report⁶³ offer many thoughtful conclusions equally relevant to the oil and gas industry:
- there are many job options in industries that will replace oil and gas,
 - skills of oil and gas workers are transferable to other industries, and
 - communities can, indeed must, reinvent themselves to regain a new prosperity after oil and gas.

138. The critical thing is to have an effective transition path and a planned community process that is well supported, to enable positive outcomes.

Real costs and opportunity loss

139. The economic benefits analysis (IA s 7.8.1) ignores potential costs and opportunity loss.

140. Notably, it does not take into account potential economic losses from a major hydrocarbon spill including cleanup cost and losses by the fishery and tourism sectors. E.g. The Gulf of Mexico disaster “wreaked billions of dollars’ of damage to tourism and fishing businesses along the Louisiana coastline”. BP was fined \$13.7 billion for negligence under the Clean Water Act, a fraction of the total cost⁶⁴. In NZ, the relatively small Rena disaster cost Maritime NZ \$36.8 million⁶⁵. There are significant risks here.

141. Moreover, there exists: “*Potential conflict between the depletable nature of mining and the sustainable nature of other, potentially competing, commercial activities in the conservation estate such as tourism, which rely upon the preservation of landscapes and ecosystems for non-consumptive use by visitors, and for purposes of national branding in overseas markets. New Zealand’s small geographical extent... makes it relatively difficult to find locations where large-scale extractive activity can proceed with no economically-detrimental environmental spillovers*” (Bertram, 2012)⁶⁶.

142. The IA gives little consideration to the volatility of the market, shifting consumer demands towards renewable energies and strengthened economic measures to cut greenhouse gas emissions.

143. At least 40 countries now put a price on carbon, with over half using some form of Emission Trading Scheme. Within countries, more than 20 states and provinces have implemented or are planning to implement trading and offset crediting programs. “*With the spread of emissions trading more broadly, time is running out for sectors to remain exempt from compulsory actions to cut their emissions...*” (ICAO, 2016)⁶⁷. The International Civil Aviation Organization has affirmed their commitment to “*to achieve carbon neutral growth from 2020 and to reduce its carbon emissions by 50 per cent by 2050 compared to 2005 levels*” (ICAO, 2013)⁶⁸.

144. Since 2014, there has been growing divestment initiatives⁶⁹ across the world, from the Rockefeller Brothers Fund to the Norwegian Sovereign Wealth Fund, World Council of Churches, City of Oslo, universities and councils. Already, Taranaki has seen the ripple effects of worldwide oil price drop⁷⁰ resulting in job losses locally.

145. Power plants fuelled by coal and gas are losing out as they can’t compete with renewable energy, even with perverse subsidies. Since 2015, we have seen two fossil-fuel burning power plants shut down: Contact Energy’s Otahuhu gas-fired power station⁷¹ and Mighty River Power’s Southdown station⁷², while others like Contact’s Stratford station⁷³ and Genesis’ Huntly coal-fired power station⁷⁴ also face a bleak future.

146. Instead of continuing to pour money into a dying industry to achieve “life extension” with uncertain returns, it would be far smarter to transition onto real innovations and energy solutions that are less polluting, more sustainable and socially inclusive.

147. STOS' economic analysis ignores the opportunity loss for not pursuing renewable energy, low-carbon technologies and green economy (Royal Society of NZ, 2014)⁷⁵. Statistics New Zealand has valued NZ's global clean, green brand at over NZ\$13 billion while Investment New Zealand estimated that we can create a NZ\$150 billion high-value, low-carbon export economy by 2025 (Greenpeace, 2013)⁷⁶. Green energy creates four times more jobs than the oil industry globally. In NZ, almost half of all jobs and more than 70 % of our goods and services exports rely on our clean green reputation. There is a lot to gain by building on this reputation and a lot to lose by compromising it, by allowing the fossil fuel and other polluting industries to proliferate, both at sea and on land.

CLIMATE CHANGE NO LONGER THE ELEPHANT IN THE ROOM

148. The OECD Environmental Performance Review on New Zealand 2017⁷⁷ warned, "*...New Zealand's growth model, based largely on exploiting natural resources, is starting to show its environmental limits with increasing greenhouse gas emissions and water pollution... While the country only accounts for a tiny share of global emissions, the OECD's third Environmental Performance Review of New Zealand finds that intensive dairy farming, road transport and industry have pushed up gross GHG emissions by 23% since 1990. Despite generating 80% of its electricity from renewable sources, among the highest in OECD countries, New Zealand has the second-highest level of emissions per GDP unit in the OECD and the fifth-highest emissions per capita.*"

149. Globally, the Stern Review (2006)⁷⁸ predicted that under the business-as-usual scenario: "*climate change will reduce welfare by an amount equivalent to a reduction in consumption per head of between 5 and 20%*". A recent study published in Nature (Burke, et al. 2015)⁷⁹ concluded that: "*If future adaptation mimics past adaptation, unmitigated warming is expected to reshape the global economy by reducing average global incomes roughly 23% by 2100 and widening global income inequality, relative to scenarios without climate change.*"

150. It is both irrational and irresponsible of the NZ government, through the EEZ Act, to preclude EPA from considering the effects of discharging greenhouse gases on climate change when reviewing applications for marine consents and submissions (See also DeVantier, 2012)⁸⁰.

151. CJT in our submission on the Resource Management Amendment Bill⁸¹, asked that a new clause be inserted into the EEZ-CS Act section 59(2) which reads "*the effects on climate change of discharging greenhouse gases into the air*", and another new clause which repeals section 59(5)(b). The two new clauses will enable EPA to consider the effects of the activities on climate change in its decision making. For New Zealand to deliver its commitments made at the UNFCCC COP21⁸² in Paris in 2015, the effects on climate change must be considered when assessing any activities.

152. On a positive note, the French government in 2016 announced that it would use its Energy Transition Act to stop all new hydrocarbon searches⁸³. This reflects the country's desire to meet its target of cutting fossil fuels by 30 percent by 2030, and to redirect investments in clean energy and energy efficiency. Surely New Zealand can do even better.

DECISION SOUGHT

153. CJT urges you to **DECLINE** this application.

154. If the DMC decides, contrary to all the above cogent reasons, to grant a marine consent, we ask that a condition be imposed to require a **BOND** to ensure the formulation and implementation of an environmentally and culturally acceptable decommissioning plan (EEZ Act s 11, 64 and 65).

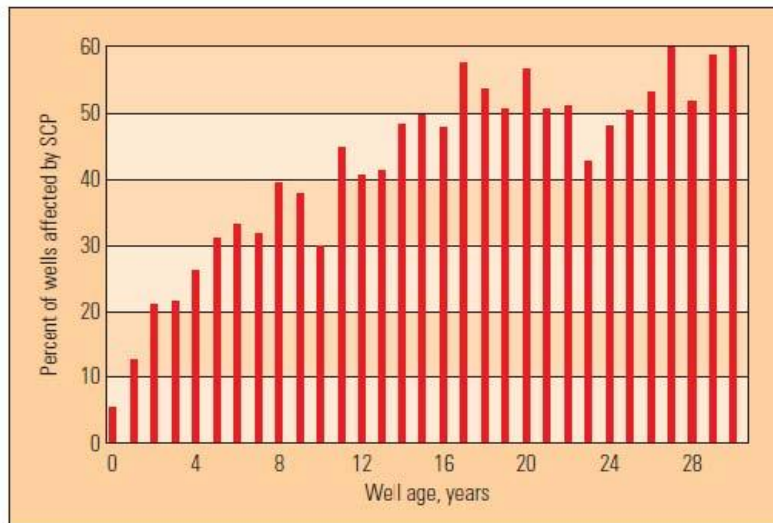
155. CJT requests the right to be heard in support of its submission. We may call expert evidence and also address the DMC in te reo Maori (at times) during the hearing.

ACKNOWLEDGEMENTS

CJT thanks Alice Gavey and Chelsea White for their valuable inputs into this submission.

FIGURES

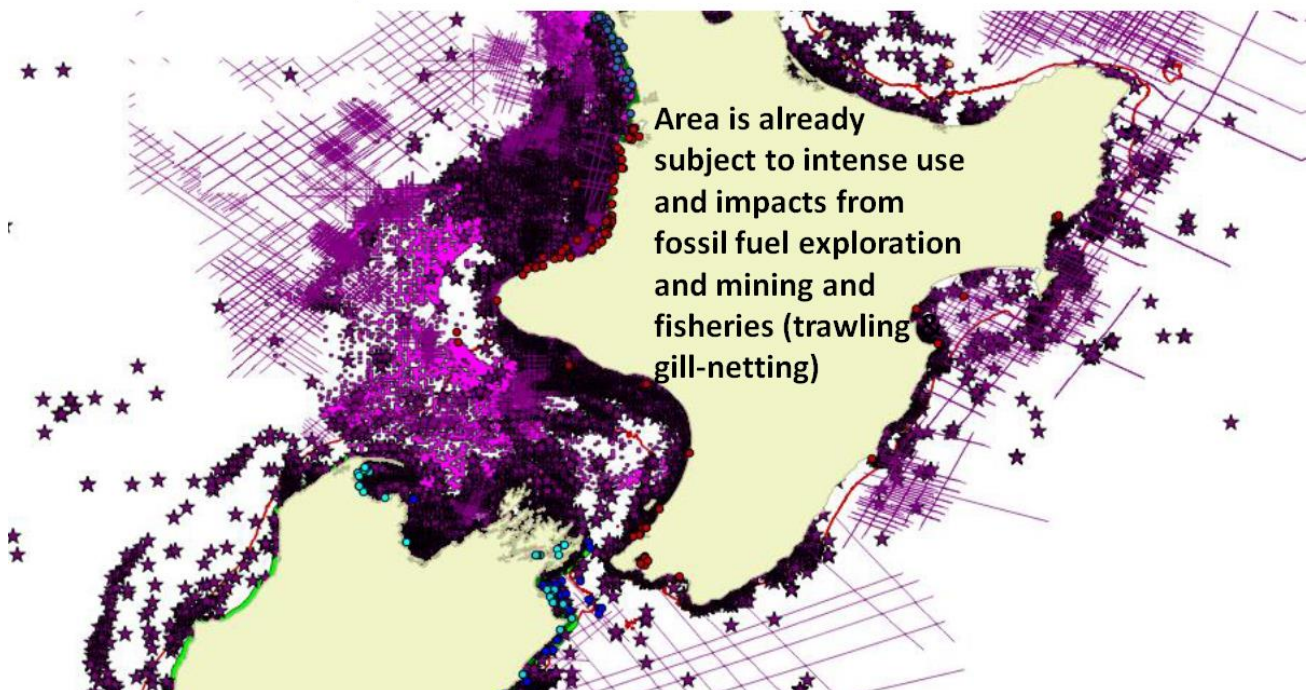
Figure 1. Frequency of occurrence of sustained casing pressure / SCP (Bruffatto et al. 2003)



^ Wells with SCP by age. Statistics from the United States Mineral Management Service (MMS) show the percentage of wells with SCP for wells in the outer continental shelf (OCS) area of the Gulf of Mexico, grouped by age of the wells. These data do not include wells in state waters or land locations.

Figure 2. Cumulative impacts on Maui's dolphins

Graphic from Prof. Liz Slooten: Cumulative Impacts



Lines = Seismic surveys for petroleum; Stars = Gill netting; Purple shading = Trawling; Dots = Sightings

Figure 3. Marine Mammal Sightings in the greater Taranaki region

At least 36 species of cetacean – a diversity ‘hotspot’

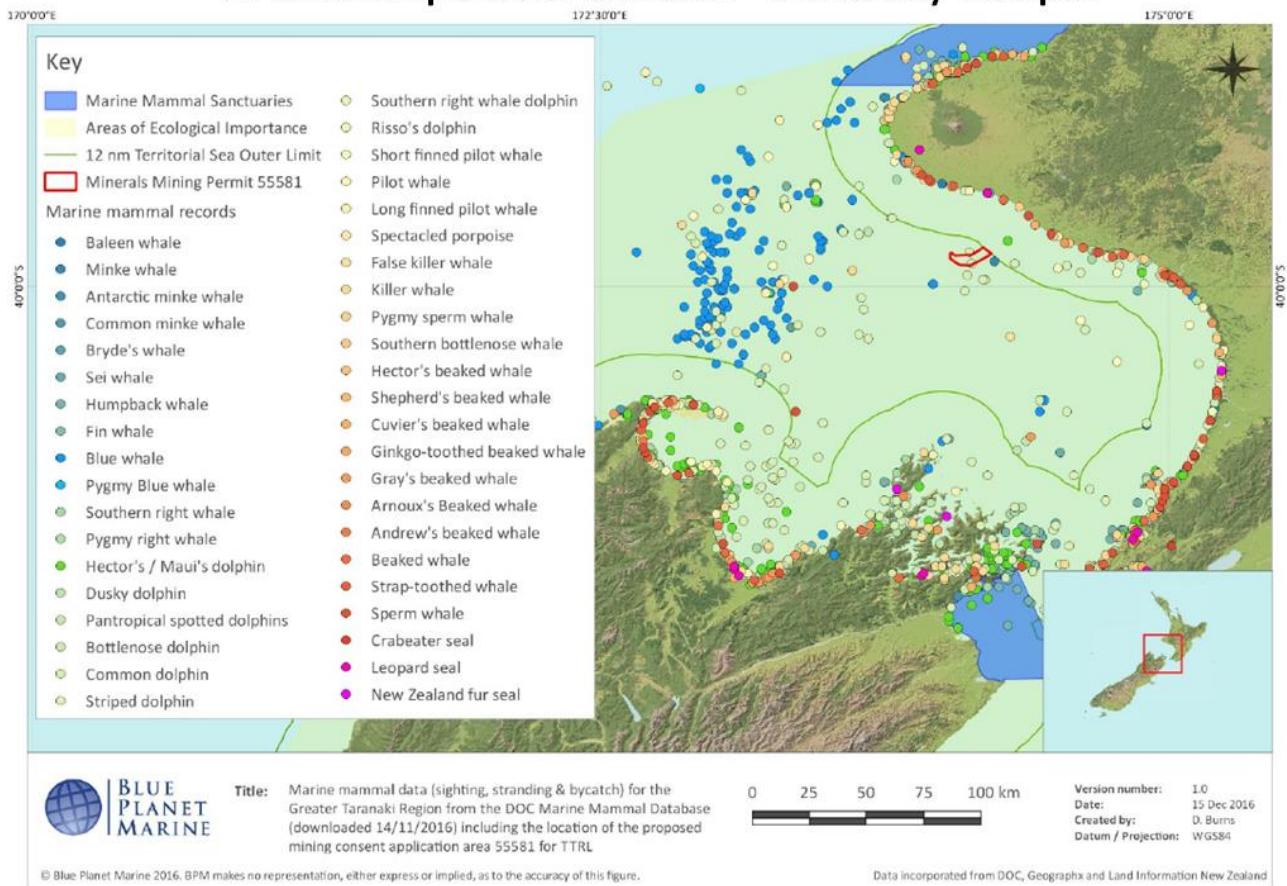
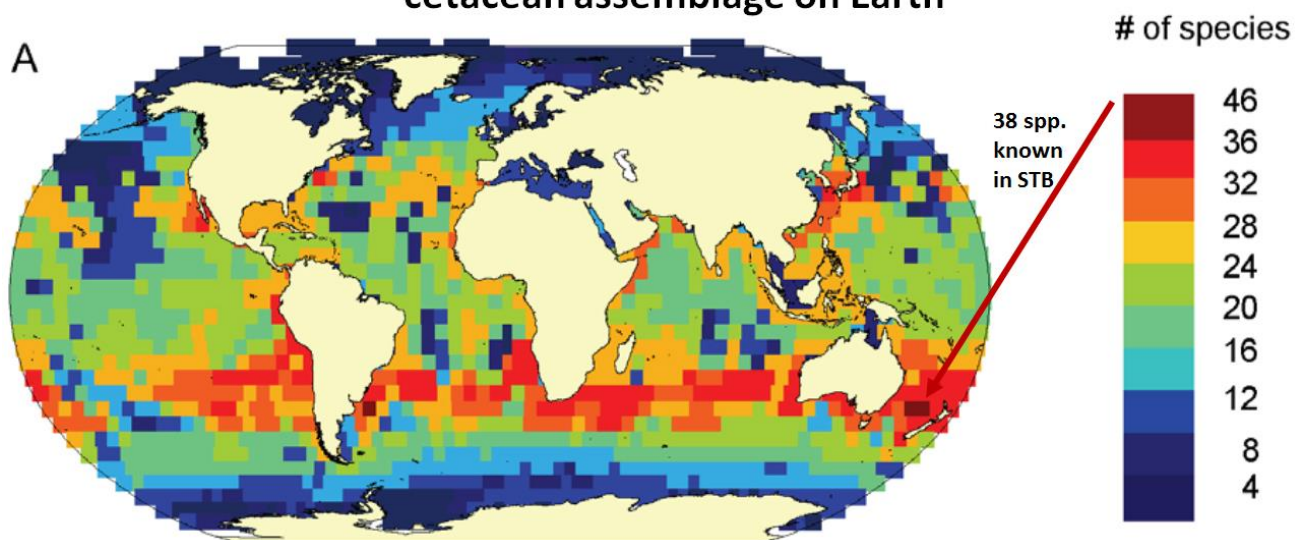


Figure 4. Global marine mammal species richness

South Taranaki Bight and adjacent waters host the most diverse cetacean assemblage on Earth



Kaschner et al. (2011) Figure 4. Validation with empirically observed marine mammal occurrences (56x56 cells, 1990–1999). A. Predicted species richness of all cetaceans.

REFERENCES

- ¹ Climate Justice Taranaki, Feb 2015. Submission to the EPA on STOS marine consent application, Feb 2015. <https://climatejusticetaranaki.files.wordpress.com/2013/03/cjt-submission-on-stos-maui-gas-field-final.pdf>
- ² Bertram, Geoff, 'Lessons from Think Big' 2012. Presentation to the New Zealand Association of Impact Assessment conference on Assessing the Impacts of Petroleum and Mineral Extraction in New Zealand, December 10-11, 2012. <https://www.slideshare.net/manucaddie/lessons-from-think-big>
- ³ The Endocrine Disruption Exchange, accessed on 12/06/2017. Drilling and fracking chemicals spreadsheet. <https://endocrinedisruption.org/audio-and-video/chemical-health-effects-spreadsheets>
- ⁴ FracFocus Chemical Disclosure Registry website, accessed on 18/6/2017. <https://fracfocus.org/>
- ⁵ IPCC, 2014. Climate Change 2014: Impacts, Adaptation, and Vulnerability. <http://ipcc-wg2.gov/AR5/>
- ⁶ Ministry for the Environment, 2016. Climate change projections for New Zealand: Atmosphere projections based on simulations from the IPCC Fifth assessment. Wellington. <http://www.mfe.govt.nz/sites/default/files/media/Climate%20Change/nz-climate-change-projections-final.pdf>
- ⁷ Maari oil field closed after wellhead platform crack discovered, 24/11/2016. Stuff business. <http://www.stuff.co.nz/business/86814391/Maari-oil-field-closed-after-wellhead-platform-crack-discovered>
- ⁸ Taranaki oil platform evacuated after crack found, 24/11/2016. Newshub. <http://www.newshub.co.nz/home/new-zealand/2016/11/taranaki-oil-platform-evacuated-after-crack-found.html>
- ⁹ WorkSafe NZ, 16/1/2017 and 7/3/2017. Letters to C Cheung. File refs: 16/00813 and 17/00012.
- ¹⁰ Maritime NZ, 13/12/2016. Letter to C Cheung re official information act request – OMV Maari oil platform.
- ¹¹ Watson, T. L. and S. Bachu, 2008. Identification of wells with high CO₂-leakage potential in mature oil fields developed for CO₂-enhanced oil recovery. <https://www.onepetro.org/conference-paper/SPE-112924-MS>
- ¹² Ingraffea, Anthony R. 2012. Some scientific failings with the draft supplemental generic environmental statement and proposed regulations: comments and recommendation. Submitted to the NYS Dept. of Environmental Conservation. http://www.concernedcitizensofthetownofchenango.org/uploads/1/1/0/9/11092266/ingraffea_-_dsgeis_comments_-_january_11_2012.pdf
- ¹³ Ingraffea, Anthony R. 2013. Gangplank to a warm future. NY Times, 28 July 2013. <http://www.nytimes.com/2013/07/29/opinion/gangplank-to-a-warm-future.html?hp&r=5&>
- ¹⁴ Taranaki Regional Council, 2013. Cheal Petroleum Ltd. Deep well injection monitoring programme triennial report 2009-2012. Document 1133945w2. (No longer available on council website)
- ¹⁵ Taranaki Regional Council, Nov 2013. Cheal Petroleum Ltd. Deep well injection monitoring programme annual report 2012-2013. Document 1245873. <https://www.trc.govt.nz/assets/Documents/Environment/Monitoring-OGWaste/MR2013-TagDeepwellInjection.pdf>
- ¹⁶ Tag Oil, 7 May 2014. TAG announces FY2015 drilling program and provides operations update. <http://www.tagoil.com/news/tag-announces-fy2015-drilling-program-and-provides-operations-update/>
- ¹⁷ Tikorangi The Jury Garden, accessed on 19/6/2017. <https://jury.co.nz/category/petrochem/>
- ¹⁸ Greenpeace, 15/9/2014. #SafeSource NZ – A secure way to share the truth. <http://www.greenpeace.org/new-zealand/en/blog/safesource-nz-a-secure-way-to-share-the-truth/blog/50595/>
- ¹⁹ Loomis, Terrence, 2017. Petroleum Development and Environmental Conflict in Aotearoa New Zealand: Texas of the South Pacific. Lexington Books, Lanham, MD. <http://www.terrenceloomis.ac.nz/latest-publication.html>
- ²⁰ MBIE, 2016. Energy in New Zealand 2016. <http://www.mbie.govt.nz/info-services/sectors-industries/energy/energy-data-modelling/publications/energy-in-new-zealand>
- ²¹ Marine consent EEZ000010. http://www.epa.govt.nz/eez/EEZ000010/EEZ000010_MOF0144_STOS_Maui_Decision_4_June_2015.pdf
- ²² Climate Justice Taranaki, accessed on 14/6/2017. Taranaki oil and gas sites. <https://www.google.com/maps/d/edit?dg=feature&msa=0&mid=1vumG9QV6mYJ5NHwblt8I9zuYOYk&ll=-39.031068714663206%2C174.29527483712764&z=16>
- ²³ Energy Stream, accessed on 14/6/2017. March NZ O&G Wrap. <http://www.energystream.co.nz/news/2017/mar/16/march-nz-og-wrap>
- ²⁴ Taranaki Regional Council, Oct 2015. Greymouth Petroleum Limited deep well injection monitoring programme annual report 2014-2015. <https://trc.govt.nz/assets/Documents/Environment/Monitoring-OGWaste/MR2015-GreymouthDeepwellInjection.pdf>
- ²⁵ James Hansen: Fossil fuel addiction could trigger runaway global warming. 10/07/2013. <https://www.theguardian.com/environment/earth-insight/2013/jul/10/james-hansen-fossil-fuels-runaway-global-warming>
- ²⁶ WorkSafe NZ, 13/1/2017. Response to official information request by S Roberts (letter and annex).

- ²⁷ Stuff Business, 16/4/2017. 'Flare off' sends fireball into Taranaki sky, prompts fears of oil and gas installation fire. <http://www.stuff.co.nz/business/91620588/Flare-off-sends-fireball-into-Taranaki-skies-prompts-fears-of-oil-and-gas-installation-fire>
- ²⁸ CJT, May 2015. Opening presentation at the EPA STOS marine consent application hearing, 6 May 2015, New Plymouth. <https://climatejusticetaranaki.files.wordpress.com/2013/03/cjt-opening-representation-stos-maui-hearing-6may2015.pdf>
- ²⁹ STOS, 2014. Maui Impact Assessment. http://www.epa.govt.nz/eez/EEZ000010/EEZ000010_MOF0003_Maui_Impact_Assessment_15_Dec_14.pdf
- ³⁰ Memorandum of Counsel in response to questions from the decision-making committee, 5 May 2015. http://www.epa.govt.nz/eez/EEZ000010/EEZ000010_MOF0113_Memorandum_of_Counsel_re_STOS_DMC_Minute_5_Questions.pdf
- ³¹ Slooten, E. 2017. Supplementary evidence of Elisabeth Slooten on behalf of Kiwis Against Seabed Mining Incorporated, 22 May 2017. http://www.epa.govt.nz/EEZ/EEZ000011/Elisabeth_Slooten_Supplementary_Evidence_22_May.pdf
- ³² Scientific Committee, 2017. Report of the Scientific Committee presented as it was at SC/67a to the International Whaling Commission, Bled, Slovenia, 2017. http://awsassets.wfnz.panda.org/downloads/Report_of_the_Scientific_Report,_International_Whaling_Commission_May_2017.pdf
- ³³ Convention of Biological Diversity – Preamble. <https://www.cbd.int/convention/articles/default.shtml?a=cbd-00>
- ³⁴ Convention of Biological Diversity – Precautionary approach, 1992. <https://www.cbd.int/marine/precautionary.shtml>
- ³⁵ Kaschner, K., D.P. Tittensor, J. Ready, T. Gerrodette and B. Worm, 2011. Current and Future Patterns of Global Marine Mammal Biodiversity. PLoS ONE 6(5): e19653. <https://doi.org/10.1371/journal.pone.0019653>
- ³⁶ De Vantier, Lyndon, 2017. Trans-Tasman Resources Ltd 2016 application to extract and process iron sand within the South Taranaki Bight – Hearing statement to the EPA Decision Making Committee, 9 March 2017. <https://climatejusticetaranaki.files.wordpress.com/2013/03/devantier-ttrl-hearing-presentation-9mar17.pdf>
- ³⁷ The IUCN Red List of Threatened Species, accessed 6/3/2017. <http://www.iucnredlist.org/>
- ³⁸ Stanislav Patin, 1999. Environmental Impacts of the Offshore Oil and Gas Industry. Ecomonitor Pub. 448 pages. Translation by Elena Cascio at <http://www.offshore-environment.com/discharges.html>
- ³⁹ US EPA, 2011. Information sheet: Regulating Petroleum Industry Wastewater Discharges in the United States and Norway. <https://nepis.epa.gov/Exe/ZyNET.exe/P100B9AW.TXT?ZyActionD=ZyDocument&Client=EPA&Index=2011+Thru+2015&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5Czyfiles%5CIndex%20Data%5C11thru15%5CTxt%5C00000001%5CP100B9AW.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL>
- ⁴⁰ Government of West Australia, 2016. Shale and tight gas in West Australia: An overview of Western Australia's regulatory framework. http://www.dmp.wa.gov.au/Documents/Petroleum/Shale_and_Tight_Gas_overview.pdf
- ⁴¹ Stuff, 4/9/2013. Deep-sea oil plans anger stars. <http://www.stuff.co.nz/national/politics/9121336/Deep-sea-oil-plans-anger-stars>
- ⁴² Klein, N. 2014. This Changes Everything – Capitalism vs Climate. <https://thischangeseverything.org/book/>
- ⁴³ UNFCCC Conference of the Parties, 2015. Adoption of the Paris Agreement. <https://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf>
- ⁴⁴ Magill, B. 2015. Study sees shortfall in methane emissions estimate. <http://www.climatecentral.org/news/shale-methane-may-exceed-estimates-19538>
- ⁴⁵ Northrup, C. 2015. Methane leaks responsible for 30% + of climate change. <http://www.nofrackingway.us/2015/12/16/methane-leaks-responsible-for-30-of-climate-change/>
- ⁴⁶ Lafleur, D., T.Forcey, H. Saddler and M.Sandiford, 2016. A review of current and future methane emissions from Australian unconventional oil and gas production, Melbourne Energy Institute. http://energy.unimelb.edu.au/_data/assets/pdf_file/0019/2136223/MEI-Review-of-Methane-Emissions-26-October-2016.pdf
- ⁴⁷ Kirchgessner, D.A., R.A. Lott, R.M. Cowgill, M.R. Harrison and T.M. Shires, 1997. Estimate of methane emissions from the U.S. natural gas industry. US Environmental Protection Agency. <https://www3.epa.gov/ttnchie1/ap42/ch14/related/methane.pdf> and <https://www.ncbi.nlm.nih.gov/pubmed/9308164>
- ⁴⁸ Maritime NZ, 1999. Advisory circular – Part 180: Dumping of waste or other matter. Issue No.180-1, 30 June 1999. <https://www.maritimenz.govt.nz/Publications-and-forms/Environmental-protection/Sea-disposal-of-waste.pdf>
- ⁴⁹ Parliamentary Commissioner for the Environment, 2014. Drilling for oil and gas in New Zealand: Environmental oversight and regulation. <http://www.pce.parliament.nz/publications/all-publications/drilling-for-oil-and-gas-in-new-zealand-environmental-oversight-and-regulation>

-
- ⁵⁰ Marine Consent EEZ000010, 4 June 2015. EEZ-CS Act 2012 Maui Offshore Facilities – Shell Todd Oil Services Ltd – Reasons for Decision on Application for Marine Consent. http://www.epa.govt.nz/eez/EEZ000010/EEZ000010_MOF0144_STOS_Maui_Decision_4_June_2015.pdf
- ⁵¹ EPA Transcript of Proceedings – STOS Maui offshore facilities marine consent application, hearing on 29 April 2015 (Day 1). http://www.epa.govt.nz/eez/EEZ000010/EEZ000010_MOF0089_Day_01_STOS%20Maui_Hearing_Proceedings_and_Transcript.pdf
- ⁵² Stuff Business, 10/12/2015. Shell considers selling its NZ assets after more than a century. <http://www.stuff.co.nz/business/74955666/shell-considers-selling-its-nz-assets-after-more-than-a-century>
- ⁵³ Energy Stream, accessed on 15/6/2017. April 2017 O&G Wrap. <http://www.energystream.co.nz/news/2017/apr/20/april-2017-og-wrap>
- ⁵⁴ Radio NZ, 20/7/2016. Mobil dodges \$10m contamination bill. [http://www.radionz.co.nz/news/national/309039/mobil-dodges-\\$10m-contamination-bill](http://www.radionz.co.nz/news/national/309039/mobil-dodges-$10m-contamination-bill)
- ⁵⁵ WWF, 2013. Fossil fuel finance in New Zealand. Part 1: Government support. http://awsassets.wwfnz.panda.org/downloads/wwf_fossil_fuel_finance_nz_subsidies_report.pdf
- ⁵⁶ Gas Industry Company Limited, accessed on 15/6/2017. The Story of Gas in New Zealand. <http://gasindustry.co.nz/about-the-industry/nz-gas-story/>
- ⁵⁷ Fernandez, F.G., R.E. Terry and E.G. Coronel, 2015. Nitrous oxide emissions from anhydrous ammonia, urea, and polymer-coated urea in Illinois cornfields. *Journal of Environmental Quality* 44(2): 415-422. <https://experts.umn.edu/en/publications/nitrous-oxide-emissions-from-anhydrous-ammonia-urea-and-polymer-c>
- ⁵⁸ Taranaki Regional Council, Sep 2014. Ballance Agri-Nutrients (Kapuni) Ltd monitoring programme annual report 2012-2013. <https://trc.govt.nz/assets/Documents/Environment/Monitoring-Industry/MR2013-BallanceAgriNutrientsKapuni.pdf>
- ⁵⁹ Climate Justice Taranaki, 2017. Submission on the Ministry for the Environment Consultation on Clean Water 2017 – 90% rivers & streams swimmable y 2040. <https://climatejusticetaranaki.files.wordpress.com/2013/03/cjt-submission-on-mfe-clean-water-proposals-2017-final.pdf>
- ⁶⁰ Socioeconomic Deprivation Indexes: NZDep and NZiDep, Department of Public Health. <http://www.otago.ac.nz/wellington/departments/publichealth/research/hirp/otago020194.html>
- ⁶¹ NZ Herald, 13 May 2014. Where are New Zealand's most deprived areas? http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=11254032
- ⁶² Shaw, Robert, 2017. Submission to the EPA on the TTRL seabed mining consent application. http://www.epa.govt.nz/EEZ/EEZ000011/Shaw_R_121927.pdf
- ⁶³ Coal Action Network Aotearoa, 2015. Jobs after Coal. <http://coalaction.org.nz/jobs-after-coal>
- ⁶⁴ The Telegraph, 16 Jan 2015. BP Gulf of Mexico oil leak not as bad as US government claimed. <http://www.telegraph.co.uk/finance/newsbysector/energy/oilandgas/11349726/BP-Gulf-of-Mexico-oil-leak-not-as-bad-as-US-government-claimed.html>
- ⁶⁵ The New Zealand Herald, 25 April 2013. Maritime NZ bears brunt of Rena costs. http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=10879646
- ⁶⁶ Bertram, Geoff, 'Lessons from Think Big' 2012. Presentation to the New Zealand Association of Impact Assessment conference on Assessing the Impacts of Petroleum and Mineral Extraction in New Zealand, December 10-11, 2012. <https://www.slideshare.net/manucaddie/lessons-from-think-big>
- ⁶⁷ International Civil Aviation Organization, 2016. On Board A Sustainable Future – ICAO 2016 Environmental Report. <http://www.icao.int/environmental-protection/Documents/ICAO%20Environmental%20Report%202016.pdf#search=Search%2E%2E%2Ecarbon%20neutral>
- ⁶⁸ International Civil Aviation Organization, 2013. Resolution A39-2: Consolidated statement of continuing ICAO policies and practices related to environmental protection – Climate change. http://www.icao.int/environmental-protection/Documents/Resolution_A39_2.pdf#search=Search%2E%2E%2Ecarbon%20neutral
- ⁶⁹ Divestment Commitments, accessed 19/6/2017. <https://gofossilfree.org/commitments/>
- ⁷⁰ Taranaki Daily News, 13 Feb 2015. Industry jobs shrinking with oil price. <http://www.stuff.co.nz/taranaki-daily-news/news/66131327/Industry-jobs-shrinking-with-oil-price>
- ⁷¹ Radio NZ, 17/8/2015. Hot competition hits Contact's profit. <http://www.radionz.co.nz/news/business/281605/hot-competition-hits-contact-s-profit>
- ⁷² Stuff Business, 24/3/2015. Mighty River Power to close Southdown power station. <http://www.stuff.co.nz/business/industries/67487218/mighty-river-power-to-close-southdown-power-station>
- ⁷³ Taranaki Daily News, 19/8/2016. Stratford power station in line for \$45 m refurbishment – or closure. <http://www.stuff.co.nz/taranaki-daily-news/news/83315174/Stratford-power-station-in-line-for-45m-refurbishment-or-closure>

-
- ⁷⁴ Stuff National, 30/4/2016. Residents fear for Huntly's future should power plant ever close. <http://www.stuff.co.nz/national/79401899/residents-fear-for-huntlys-future-should-power-plant-ever-close>
- ⁷⁵ Royal Society of New Zealand, 2014. *Facing the Future: Towards a Green Economy*. <http://royalsociety.org.nz/expert-advice/information-papers/yr2014/greeneconomy/>
- ⁷⁶ Greenpeace, 2013. *The Future is Here: New jobs, new prosperity and a new clean economy*. <http://www.greenpeace.org/new-zealand/en/campaigns/climate-change/The-Future-is-Here/>
- ⁷⁷ OECD Environmental Performance Reviews: New Zealand 2017. <http://www.oecd.org/newzealand/oecd-environmental-performance-reviews-new-zealand-2017-9789264268203-en.htm>
- ⁷⁸ Stern, N. 2006. The Stern Review on The Economics of Climate Change. http://www.uio.no/studier/emner/sv/tik/TIK4011/v16/pensumliste/sternreview_report_complete.pdf
- ⁷⁹ Burke, M., S.M. Hsiang and E. Miguel, 2015. Global non-linear effect of temperature on economic production. *Nature* 527, 235-239. <http://www.nature.com/nature/journal/v527/n7577/abs/nature15725.html>
- ⁸⁰ DeVantier, Lyndon, 2012. Submission on the Review of Crown Minerals Act Regime. <http://www.med.govt.nz/sectors-industries/natural-resources/pdf-docs-library/oil-and-gas/crown-minerals-act-review/crown-minerals-act-regime-submissions/Lyndon%20DeVantier.pdf>
- ⁸¹ Climate Justice Taranaki Inc., March 2016. Submission on the Resource Management Amendment Bill. <https://climatejusticetaranaki.files.wordpress.com/2013/03/cjt-submission-on-resource-legislation-amendment-bill.pdf>
- ⁸² UNFCCC Conference of the Parties, 2015. Adoption of the Paris Agreement. <https://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf>
- ⁸³ France says 'no' to all new oil exploration permits, Inhabitat 14 Jan 2016. <http://inhabitat.com/france-says-no-to-all-new-oil-exploration-permits/>