

**BEFORE THE BOARD OF INQUIRY
TAMARIND DEVELOPMENT DRILLING APPLICATIONS**

EEZ100016

IN THE MATTER

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

AND

IN THE MATTER

of a Board of Inquiry appointed under
s52 of the Exclusive Economic Zone
and Continental Shelf (Environmental
Effects) Act 2012 to decide on
Tamarind Taranaki Limited's marine
consent and marine discharge consent
applications

**STATEMENT OF EXPERT EVIDENCE OF NICOLA GAY GIBBS
FOR TAMARIND TARANAKI LIMITED**

Dated: 20 July 2018

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MAY IT PLEASE THE BOARD

1. Executive Summary

- 1.1 My evidence describes the commercial fisheries in and around the Tui Field. I examine the effects on commercial fishing of activities associated with Tamarind's applications for a marine consent and a marine discharge consent.
- 1.2 A fleet of eight factory trawlers targeting jack mackerel is the only commercial fishery regularly operating in the vicinity of Tamarind's wells in the Tui Field. Although jack mackerel is a relatively low-value species, it is a high-volume fishery that can be fished in the "off-seasons" of other deepwater fisheries and is therefore of economic and strategic significance for New Zealand's seafood industry.
- 1.3 Tamarind's proposed activities will result in temporary spatial displacement of fishing activity from a small area around the rig anchors, with a negligible impact on commercial fishing. There may also be some short-term, localised changes to the distribution of commercially harvested fish species. However jack mackerel and associated species are highly mobile and the scale and duration of any changes are such that in my opinion adverse effects on commercial fishing will be negligible.
- 1.4 A worst case oil spill arising from a loss of well control could result in impacts on commercial fishing extending across several regions and disrupting a range of inshore and deeper-water fisheries for a period of weeks or months. Quota owners, fishers and downstream businesses could experience moderate to significant economic loss. However, a hydrocarbon release from a loss of well control is considered to be an "extremely unlikely" event.
- 1.5 Any adverse effects from offshore processing drainage on jack mackerels or other commercially harvested fish species will be negligible.

2. Introduction

2.1 My full name is Nicola Gay Gibbs.

2.2 I hold the following qualifications:

2.2.1 Master of Science (Hons) in Resource Management from the University of Canterbury and Lincoln College; and

2.2.2 Bachelor of Science (Zoology and Botany) from Victoria University of Wellington.

2.3 I currently own and operate Fathom Consulting Limited (**Fathom Consulting**), and have held this position since the beginning of 2012. Fathom Consulting specialises in strategic policy, industry development, environmental policy, and natural resource management, with a strong focus on the marine environment. Fathom Consulting has a core client base within the New Zealand commercial fishing sector, and also has minerals sector, iwi, and international clients.

2.4 Prior to establishing Fathom Consulting, I was the Policy Manager for the New Zealand Seafood Industry Council (**SeaFIC**), an industry-owned company representing the interests of the commercial fishing and aquaculture sectors. For 13 years I led the seafood industry's input on all aspects of fisheries and aquaculture policy and legislation. I assessed the impacts of numerous proposed activities on the operations of the fishing industry, including marine farms, submarine cables, marine dredging, and offshore waste disposal.

2.5 I have also held government policy advisory positions in the Ministry for the Environment, the Ministry of Māori Development, and the Department of Conservation's Coastal Policy section. For several years I was a senior planner with the Wellington Regional Council. Together, these positions have provided me with more than 30 years of experience in my field.

2.6 I have read the following information in preparation of my evidence:

2.6.1 The Marine Consent Application and Marine Discharge Consent Application (the “**Applications**”) and the Impact Assessment and Annexures, which accompanied the Applications (the “**IA**”), and in particular the aspects which relate to commercial fisheries.

2.6.2 The statements of evidence by:

- a) Mr Jason Peacock;
- b) Mr Iain McCallum;
- c) Dr Brian King;
- d) Dr. Sharon de Luca;
- e) Dr. Simon Childerhouse;
- f) Dr David Thompson;
- g) Dr. Alison Lane;
- h) Dr Alison MacDiarmid; and
- i) Mr Fraser Colegrave.

2.6.3 Submissions.

2.6.4 Proposed consent conditions.

2.6.5 EPA Key Issues Report, dated July 2018.

2.6.6 The following independent reviews commissioned by the EPA (the “technical reviews”):

- a) *Technical Review of Oil Spill Modelling*, prepared by Coffey Services (NZ) Limited, dated June 2018;
- b) *Technical Review and Analysis of Operational Activities associated with Sidetrack Development Drilling and Marine Discharge Consent - Assessment Report*, prepared by Oil and Gas Solutions Pty Limited, dated 22 May 2018; and
- c) *Review of Marine Environmental Impact Assessment*, prepared by SEAPEN Marine Environmental Services, dated 26 May 2018.

2.6.7 Tamarind's *'Response to the Board's Request for Further Information under section 54 EEZ Act and Other Further Information Report'*, dated July 2018 ("RFI Response").

2.7 My role in relation to Tamarind's applications has been to undertake an independent review of the parts of the IA that relate to commercial fisheries and to consider and assess any potential impacts of the proposed activities on fisheries, to prepare expert evidence and to respond to any questions raised by the Board, EPA and/or submitters on this topic.

Code of conduct

2.8 I confirm that I have read the Code of Conduct for expert witnesses contained in the Environment Court of New Zealand Practice Note 2014 and that I have complied with it when preparing my evidence. Other than when I state I am relying on the advice of another person, this evidence is entirely within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

2.9 My qualifications as an expert witness are set out above. The issues addressed in this brief relate to the application for a marine consent and marine discharge consent and are matters within my area of expertise.

Scope of evidence

2.10 In this evidence, I will discuss the following:

2.10.1 Existing interests - Commercial fishing in the vicinity of the Tui Field;

2.10.2 Effects of the planned drilling activities on commercial fishing;

2.10.3 Effects of unplanned events associated with drilling activities on commercial fishing;

2.10.4 Effects from deck drain discharges on commercial fishing;

2.10.5 Response to issues raised by the EPA Key Issues Report and technical reviews, where these are relevant to my evidence; and

2.10.6 Response to issues raised by submitters where these are relevant to my evidence.

3. EXISTING INTERESTS – FISHERIES IN AND AROUND THE TUI FIELD

3.1 Commercial fishing, customary fishing and recreational fishing are all potentially “existing interests” under the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012 (**EEZ Act**).¹ My evidence focuses on commercial fishing. The impacts on commercial fishing that I describe are applicable to existing interests in the commercial fishing sector as a whole, including Māori commercial fishing interests.

3.2 In terms of direct impacts on fishing and fishing rights, Māori interests in commercial fishing arising from the Māori Fisheries Settlement² will be affected in the same way as other commercial fishing sector interests. However, the Māori Fisheries Settlement is identified as a distinct existing interest under the EEZ Act³ and any adverse effect on the exercise of Māori commercial fishing rights would also be an adverse effect on rights that are recognised and protected under a Treaty settlement.

3.3 My evidence does not address recreational or customary (non-commercial) fishing directly. However, I note that:

3.3.1 Although several recreational fishing charters operate out of New Plymouth, as far as I am aware, no specific recreational fishing interests have been identified in the Tui Field;⁴ and

3.3.2 Māori customary fishing interests are sometimes exercised using commercial fishing vessels. If this occurs in the Tui Field, Māori

¹ See paragraph (a) of the definition of “existing interests”, EEZ Act section 4.

² Treaty of Waitangi (Fisheries Claims) Settlement Act 1992.

³ Paragraph e) of the EEZ Act definition of “existing interests” is *the settlement of a contemporary claim under the Treaty of Waitangi as provided for in an Act, including the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992*.

⁴ No submissions were received from recreational fishing interests in response Tamarind’s marine consent application.

customary fishing interests would be directly affected in the same way as commercial fishing interests (as described in my evidence). In addition, cultural values associated with customary fishing may be affected, but these impacts are beyond the scope of my evidence.

Commercial Fishing in and around the Tui Field

- 3.4 I identified the main commercial fisheries in the vicinity of the Tui Field using a data extract provided by Fisheries New Zealand (formerly the Ministry for Primary Industries (MPI)) in July 2018.⁵ The data extract applies to an area 10km in each direction from a straight line joining the Pateke-4H well and the Tui-3H well. I will refer to this area as the “**10km buffer zone**”. The data extract covers the last ten complete fishing years (i.e., from 2007/08 to 2016/17).
- 3.5 From these data I determined that the only commercial fishery regularly operating in the Exclusive Economic Zone (**EEZ**) in and around the Tui Field is a mid-water trawl fishery targeting jack mackerel.⁶
- 3.6 Other commercial fishing activities take place outside the Tui Field in the broader marine area off the west coast of the North Island in fisheries management areas (**FMA**s) 7, 8 and 9, including:
- 3.6.1 Inshore mixed trawl fisheries targeting a range of species such as snapper, gurnard, trevally, barracouta, leatherjacket, tarakihi, and john dory;
 - 3.6.2 Inshore set net fisheries, primarily targeting school shark and rig;
 - 3.6.3 A coastal rock lobster fishery;
 - 3.6.4 Smaller seasonal fisheries using methods such as line fishing (for school shark, hapuku, bluenose and snapper), purse seining (for skipjack tuna), and trolling (for albacore); and

⁵ Fisheries New Zealand. Official Information Act Request provided to Nici Gibbs (9 July 2018).

⁶ A single bottom-trawling event targeting tarakihi was recorded in the 10km buffer zone in 2013/14, resulting in a catch of 50kg.

- 3.6.5 Coastal fisheries for paddle crabs and surf clams, both of which are based on potentially significant resources but with only limited commercial utilisation to date.
- 3.7 While these more distant fisheries will not be affected by planned activities at the Tui Field, they may be affected in the event of a worst-case oil spill resulting from loss of well control.

The jack mackerel fishery

- 3.8 The jack mackerel fishery catches three species – New Zealand species *Trachurus novaezelandiae* (known as yellowtail horse mackerel or golden mackerel) and *T. declivis* (greenback or greentail horse mackerel) and Chilean species *T. murphyi* (Murphy’s mackerel, “Chilean” or redbtail jack mackerel). The three species, which are of similar appearance, are managed in the Quota Management System as if they were a single species, “jack mackerel”, with the species code JMA.
- 3.9 The jack mackerel stock in the vicinity of the Tui Field is referred to as JMA 7. The JMA 7 management area covers the entire west coast of the North Island and the South Island down to Jackson’s Bay (**Figure 1**). JMA 7 is New Zealand’s largest jack mackerel fishery, producing more than 70% of the total catch annually (72% in the most recent complete fishing year, 2016/17).⁷
- 3.10 The Total Allowable Commercial Catch (TACC) for JMA 7 is 32,537 tonnes. In most years since 2003, the TACC has been fully or nearly fully caught, and occasionally over-caught (**Figure 2**). The status of the JMA 7 stock in relation to sustainability reference points is not known but Fisheries New Zealand considers it unlikely that overfishing is occurring.⁸

⁷ Calculated from catch data in NABIS <http://www.nabis.govt.nz/>

⁸ Fisheries New Zealand (2018). Fisheries Assessment Plenary May 2018: stock assessments and stock status. Compiled by the Fisheries Science Group, Fisheries New Zealand. Page 599.

- 3.11 Allowances for recreational and customary fishing have not been set for JMA 7.⁹ In 2011/12, researchers estimated that recreational fishers caught 11,994 jack mackerels from JMA 7 with an estimated total weight of 10.2 tonnes.¹⁰ Information on the level of Maori customary non-commercial catch (if any) of jack mackerels is not available from published sources.
- 3.12 Within JMA 7, jack mackerels are caught offshore from the Kaipara Harbour entrance in the north, down to Hokitika in the south (**Figure 3**). Although commercial fishing activity is relatively widely spread in JMA 7, the location of trawl tows varies significantly in response to weather conditions and jack mackerel behaviour. Jack mackerel is a very mobile species and the fish tend to aggregate around their food sources – small crustaceans and fish – which are also mobile. The availability of Annual Catch Entitlement (ACE) for some bycatch species can also influence where fishing takes place. For example, skippers avoid known hotspots for kingfish and snapper if they do not have sufficient ACE to cover their catches of these species when targeting jack mackerel.¹¹
- 3.13 Fishing occurs all year round, although most of the catch is taken in two distinct periods during October-January and April-July. In these peak times, the daily catch can be up to 600 tonnes across the JMA 7 fleet.¹² The large trawlers that fish in JMA 7 also fish elsewhere in the EEZ in the southern blue whiting, squid and hoki fisheries. The strong seasonality of these other fisheries determines the availability of the fleet for the JMA 7 fishery and it is this, rather than the availability of jack mackerel, which gives the fishery its seasonal character.
- 3.14 Jack mackerels typically make up about 79% of the catch in trawls targeting jack mackerel in JMA 7. The remainder of the catch consists of barracouta

⁹ This is not because there is no recreational or customary fishing for JMA 7. Rather, it is because when the JMA 7 TACC was last adjusted (in 1991) there was no statutory requirement to set a Total Allowable Catch (TAC) or allowances for recreational and customary fishing.

¹⁰ Fisheries New Zealand (2018). Fisheries Assessment Plenary May 2018: stock assessments and stock status. Compiled by the Fisheries Science Group, Fisheries New Zealand. Page 581.

¹¹ Fisheries New Zealand (2018). Fisheries Assessment Plenary May 2018: stock assessments and stock status. Compiled by the Fisheries Science Group, Fisheries New Zealand. Page 579.

¹² Ministry for Primary Industries (2013). National Deepwater Fisheries Plan. Jack Mackerel Chapter. July 2013.

(BAR 7) at 10.5% of the catch, blue mackerel (EMA 7) at 4.3%, frostfish (FRO 7 or FRO 8) at 4.1%, and smaller amounts of other species.¹³

Catch taken in and around the Tui Field

- 3.15 The Tui Field is a small part of fisheries statistical area 040 (see **Figure 4**). Over the last ten complete fishing years, fisheries statistical area 040 has produced nearly 18% of JMA 7 catch, making it the third most productive area after adjacent areas 041 (which produced 30% of JMA 7 catch) and 037 (21%). Together these three statistical areas generate 69% of the JMA 7 catch.¹⁴
- 3.16 In each of the last ten fishing years, catches of jack mackerel taken in the 10km buffer zone amounted to less than 1% of the total JMA 7 catch.¹⁵ Annual catches ranged from a low of 21 tonnes to a high of 278 tonnes.¹⁶ The number of fishing events (i.e., individual tows of trawl gear) ranged from 1 in 2015/16 to 18 in 2012/13. This pattern of inter-annual variability is typical of JMA 7 and reflects the skippers' understanding of where the jack mackerel are aggregating in that particular year.¹⁷
- 3.17 The species taken in the 10km buffer zone in association with jack mackerel included small amounts of barracouta (BAR 7), frostfish (FRO 8), redbait (RBT 7), spiny dogfish (SPD 8), and blue mackerel (EMA 7).

Fishing vessels

- 3.18 Jack mackerels are pelagic fish – i.e., they live in the water column of oceanic waters. Their vertical movement patterns in the water are poorly understood, but the fish are presumed to be generally off the bottom at

¹³ Ministry for Primary Industries (2013). National Deepwater Fisheries Plan. Jack Mackerel Chapter. July 2013.

¹⁴ Catch proportions calculated from commercial catch records on MPI's NABIS database for the ten fishing years 2007/08 to 2016/17, <http://www.nabis.govt.nz/>

¹⁵ Fisheries New Zealand. Official Information Act Request provided to Nici Gibbs (9 July 2018).

¹⁶ For the years for which catch data has been provided. In order to protect confidentiality, Fisheries New Zealand provided aggregated catch data for 2010/11, 2011/12, 2014/15, 2015/16 and 2016/17 because there were three or less vessels operating in the area.

¹⁷ Valeri Bevlov, Fleet Harvest Manager, Sealord, (pers. comm.) as recorded in Statement of Evidence of Nicola Gay Gibbs for Shell Todd Oil Services. 17 March 2015.

night and surface schools can be common during the day.¹⁸ The species are therefore targeted using a range of fishing methods including mid-water trawling, bottom trawling and Danish seining.

3.19 JMA 7 is fished primarily with mid-water trawl gear which is deployed on or near the seabed.¹⁹ Mid-water trawl gear is lighter than bottom-trawl gear but can nevertheless be fished on or near the bottom (with the headline rope higher in the water column in order to harvest pelagic species).

3.20 The JMA 7 fishery is fished by large factory trawlers. Until recently, the majority of vessels in the fishery were foreign charter vessels fishing on behalf of New Zealand quota owners. Since 2016, all vessels fishing for jack mackerel are flagged to New Zealand.²⁰ Eight vessels regularly operate in the JMA 7 fishery.²¹ In the last ten years, the number of fishing vessels reporting tows starting in the 10km buffer zone ranged from 1 to 7 per year, indicating that most of the JMA 7 fleet have at some stage fished in the waters surrounding the Tui Field.²² The main fishing companies are the major New Zealand seafood companies Sealord, Independent Fisheries, and Amaltal (part of Talley's Fisheries).

Quota ownership

3.21 The ownership of JMA 7 quota is relatively concentrated. Although there are 102 JMA 7 quota owners, more than half the quota is owned by two companies. Sanford Limited owns 37.63% of JMA 7 quota shares and Pupuri Taonga, the quota-owning entity for Sealord, owns 16.95%. Other significant quota owners are Independent Fisheries (12.92%), Vela Fishing (7.82%), Talley's Fisheries (5.73%) and Solander Developments (5.21%).²³

¹⁸ Fisheries New Zealand (2018). Fisheries Assessment Plenary May 2018: stock assessments and stock status. Compiled by the Fisheries Science Group, Fisheries New Zealand.

¹⁹ Ministry for Primary Industries (2013). National Deepwater Fisheries Plan. Jack Mackerel Chapter. July 2013.

²⁰ Since 1 May 2016 only New Zealand flagged vessels may fish in New Zealand waters (Fisheries Act 1996, section 103, as amended by the Fisheries (Foreign Charter Vessels and Other Matters) Bill 2014).

²¹ Andy Smith, Operations Manager for Talley's Fisheries (pers. comm, 13 June 2017).

²² Fisheries New Zealand. Official Information Act Request provided to Nici Gibbs (9 July 2018).

²³ Quota share register for JMA 7. 28 June 2018.

- 3.22 Quota allocated under the Māori Fisheries Settlement (referred to as Settlement Quota) comprises 9.99% of JMA 7 quota shares. JMA 7 is classified as “deepwater quota” under the Māori Fisheries Act 2004 and, as such, was allocated to all iwi on the basis of 75% population size and 25% relative length of coastline.²⁴ Each of the 57 iwi recognised under the Māori Fisheries Act owns or is entitled to own JMA 7 quota.²⁵ Therefore, while iwi and hapū in Taranaki have particular customary and commercial fisheries interests in the coastal waters around Taranaki, a much wider group (all iwi) have commercial fishing interests in the deeper waters in and around the Tui Field.
- 3.23 Two local iwi provided submissions on Tamarind’s application, Te Kāhui O Taranaki and Te Korowai O Ngāruahine Trust. The Asset Holding Companies of these iwi are Taranaki Iwi Fisheries Limited, which owns 0.14% of JMA 7, and Ngāruahine Fisheries Limited, which owns 0.069%.
- 3.24 Quota owners and quota ownership patterns for stocks taken in association with JMA 7 (e.g., BAR 7, EMA 7) are similar to those of JMA 7.

Economic value

- 3.25 Jack mackerel is a relatively low-value species but it is caught in high volumes, making it an economically important fishery for New Zealand. The fishery also plays an important strategic role in the catch plans of large trawlers because it is able to be fished in the “off-seasons” when the hoki, squid and southern blue whiting fisheries are not available.
- 3.26 The total export value of jack mackerel fluctuates with market conditions, but the general trend has been a steady increase in unit value over the last 10 years. Since 2012, the species has been regularly among the top five most valuable wild-caught species. New Zealand exported \$70,436,000 of jack mackerel in 2015 and \$46,269,000 in 2016.²⁶ Most jack mackerel is

²⁴ The Maori Fisheries Act specifies different allocation mechanisms for deepwater and inshore quota. Inshore quota was allocated only to iwi with coastline in the management area of the stock.

²⁵ Te Ohu Kaimoana holds 0.55% of JMA 7 quota shares on behalf of the small number of iwi who have yet to meet the requirements for allocation under the Maori Fisheries Act.

²⁶ Statistics NZ Fish Monetary Stock Account. <https://www.stats.govt.nz/reports/environmental-economic-accounts-2018>

exported as frozen product, either whole or dressed, to Asian, African, and eastern European countries.²⁷

- 3.27 The current (2016) value of jack mackerel quota for all stocks is \$123.4 million, reflecting a significant ten-year increase from the 2006 asset value of \$30.9 million.²⁸

Customary (non-commercial) fishing using commercial vessels

- 3.28 Taranaki iwi operate a pātaka system for customary fishing using commercial fishing vessels. Under this system, a local commercial operator is issued with a customary permit to harvest fish. The fish are kept separate from the commercial harvest and are processed and stored in a factory. Iwi or hapū manage a process for issuing the permits and tracking the amount of fish that is put into the store, and then distributed to marae to provide seafood for tangi.²⁹

- 3.29 To date, pātaka have operated using inshore commercial fishing vessels. However, I am aware that Fisheries New Zealand is currently assessing an application from iwi who have coastline interests in JMA 7 for a pātaka system for deepwater species, including jack mackerel, which would be harvested using a deepwater commercial fishing vessel. At the time of writing, the deepwater pātaka is not yet operational.³⁰

4. POTENTIAL IMPACTS ON COMMERCIAL FISHING FROM PROPOSED ACTIVITIES

A. Potential Impacts from Planned Activities

- 4.1 The use of a semi-submersible drilling rig to drill side-track development wells has potential impacts on commercial fishing arising from:

²⁷ Ministry for Primary Industries (2013). National Deepwater Fisheries Plan. Jack Mackerel Chapter. July 2013.

²⁸ Statistics NZ Fish Monetary Stock Account - <https://www.stats.govt.nz/reports/environmental-economic-accounts-2018>

²⁹ Kirsty Woods, Te Ohu Kaimoana Trustee Ltd. Submission on Trans-Tasman Resources Limited iron sand extraction and processing application. December 2016.

³⁰ Kirsty Woods, Te Ohu Kaimoana, pers. comm. (3 July 2018).

- 4.1.1 Spatial displacement of fishing activity;
- 4.1.2 Environmental changes affecting the distribution or abundance of commercially-harvested fish;
- 4.1.3 Other impacts on fishing operations; and
- 4.1.4 Impacts on commercial fishing rights.

Spatial displacement of commercial fishing

4.2 Commercial fishing vessels (along with most other ships) are currently prohibited from:

4.2.1 Entering a Safety Zone extending 500m from the outer extent of movement around the mooring system of the FPSO Umuroa;³¹ and

4.2.2 Deploying fishing equipment or anchoring in a 22.33km² Protection Area incorporating the Safety Zone and the five wells (Tui-3H, Tui-2H, Amokura-2H, Pateke-3H and Pateke-4H).³²

4.3 These restrictions have been in place for over ten years. Other spatial restrictions on commercial fishing for jack mackerel in the vicinity of the Tui Field include:

4.3.1 A prohibition, under commercial fishing regulations, on trawlers longer than 46m operating within 20 nautical miles (approximately 37km) of most of the west coast of the North Island;³³ and

4.3.2 Petroleum industry exclusion zones established under the Submarine Cables and Pipelines Protection Act 1996 associated with the Māui A and B facilities, the Maari Development and the Kupe Gas Project.

³¹ Continental Shelf (Umuroa Installation Safety Zone) Regulations 2008.

³² Submarine Cables and Pipelines Protection (Tui Area Development) Order 2007, made under the Submarine Cables and Pipelines Protection Act 1996.

³³ Fisheries (Central Area Commercial Fishing) Regulations 1986, regulation 6A.

- 4.4 Aside from when it is being moved into position, Tamarind's drilling rig will be located at all times within the Protection Area where commercial fishing is already prohibited. However, the rig anchors extend approximately 800m beyond the boundary of the Protection Area.³⁴ Tamarind intends to apply for a temporary "non-interference zone" for each well site.³⁵ Under the Crown Minerals Act 1991, non-interference zones may extend up to 500m from the outer edge of equipment associated with drilling activities (e.g., rig anchors) and may be in place for up to three months.³⁶ Fishing vessels would be prohibited from entering the zone. Fishers would be notified of the non-interference zone through a Notice to Mariners.
- 4.5 Together, the non-interference zone, petroleum industry areas and commercial fishing regulations have a cumulative effect on the areas in which commercial fishing for jack mackerel may take place. Cumulative spatial restriction is a relevant consideration when assessing any additional exclusion as a result of Tamarind's application.
- 4.6 However, I consider that any additional spatial displacement will have negligible impacts on commercial fishing because the non-interference zone would be small in relation to the widely-dispersed jack mackerel fishery and any displacement would be short-term (i.e., limited to the duration of drilling at each well site).

Changes in the distribution and abundance of fish

- 4.7 Changes in the distribution or abundance of fish can affect the fishing industry by reducing catch levels, making fish harder to find or harder to catch, increasing the cost of fishing, and reducing profitability.
- 4.8 I have reviewed the IA and the evidence of Dr Alison MacDiarmid on behalf of Tamarind to identify the main environmental effects resulting from the proposed activities that could affect the distribution or abundance of commercially harvested fish. I focused on jack mackerel, but similar types

³⁴ Refer to Evidence of Ian McCallum, and RFI Response

³⁵ Ian McCallum, Tamarind. Pers. comm. 16 July 2018.

³⁶ Crown Minerals Act 1991, section 101B.

of impacts could be expected for other species harvested commercially near the Tui Field, such as blue mackerel and barracouta.

- 4.9 Dr MacDiarmid considers that the effects of Tamarind's proposed activities on fish populations will be negligible and that, at most, there may be some very localised effects causing individual fish to move away from the area immediately around the anchors, mooring lines and drilling operations.³⁷ I note that jack mackerels are highly mobile and are not 'resident' at the Tui well sites. Any changes in the distribution of jack mackerels are therefore likely to be localised and temporary. As commercial fishing does not take place in the immediate vicinity of the planned activities (due to the Protection Zone and proposed non-interference zones), I consider that the impacts on commercial fishing of any localised, temporary changes in the distribution of jack mackerels and associated species will be negligible.
- 4.10 I also considered whether Tamarind's planned activities could disrupt fish life-cycle features or other components of the marine ecosystem in a manner that may result in changes to jack mackerel distribution or abundance. All jack mackerel life-cycle stages are pelagic.³⁸ Eggs, larvae and juveniles may therefore be affected by environmental changes on the surface of the water or in the water column, but are unlikely to be affected by disruption (e.g., placement of anchors) at or near the seafloor. Jack mackerels are relatively robust to disruption of spawning activity. The two New Zealand jack mackerel species are serial spawners that spawn several batches of eggs at intervals of a month or more, giving them a protracted spawning season.³⁹ Both species are known to spawn off Taranaki and are likely to spawn at many other sites around New Zealand as well.⁴⁰

³⁷ Evidence of Alison MacDiarmid at paragraph 9.1.

³⁸ Hurst, RJ et al (2000). Areas of importance for spawning, pupping or egg-laying, and juveniles of New Zealand coastal fish. NIWA Final Research Report for Ministry of Fisheries Research Project ENV 1999/03.

³⁹ Hurst, RJ et al (2000). Areas of importance for spawning, pupping or egg-laying, and juveniles of New Zealand coastal fish. NIWA Final Research Report for Ministry of Fisheries Research Project ENV 1999/03. Little is known of the reproductive behaviour of Chilean mackerel in New Zealand waters.

⁴⁰ Penny, A and Paul Taylor (2008). An Overview of the New Zealand Jack Mackerel Fishery: Catch Composition, Catch Trends, Seasonality and Length-Frequency Composition Information paper submitted to SPRFMO Jack Mackerel Workshop, Santiago, Chile.

- 4.11 The species' pelagic life-cycle and serial spawning behaviour mean that Tamarind's proposed activities are unlikely to result in any disruption of jack mackerel life-cycle features. I am not aware of any potential changes in wider ecosystem functioning, fish habitat, or predator/prey relationships in the vicinity of the Tui Field that may affect the distribution and abundance of jack mackerel or other commercially harvested species.
- 4.12 In summary, Tamarind's planned activities may result in some short-term, localised changes to the distribution of commercially harvested fish species. No impacts on stock abundance at a population level have been identified and in my opinion, the adverse effects on commercial fishing are likely to be negligible.

Other impacts on fishing operations

- 4.13 Jack mackerel trawl gear is typically fished on or near the seafloor. Debris on the seafloor, such as cement deposits or anchors, may therefore interfere with the physical activity of fishing by entangling or damaging trawl gear. All the planned activities associated with Tamarind's application will take place within areas from which commercial fishing is already excluded (or will be excluded if a non-interference zone is established) and therefore no damage to trawl gear or other physical interference with fishing operations is expected.
- 4.14 Tamarind's proposed drilling activities will result in an increase in support vessel traffic. Given that commercial fishing vessels and petroleum industry vessels currently co-exist in the South Taranaki Bight and that vessel traffic is likely to be within the range of current and historic vessel movements, I consider any additional navigation risk for fishing vessels to be negligible.

Impacts on commercial fishing rights

- 4.15 Factors which influence the value of quota include fish stock-related matters (e.g., stock abundance), market conditions and requirements, fishing-related matters (e.g., the cost of fishing), and fisheries access (e.g., spatial access to fisheries). A new activity authorised under the EEZ Act may therefore have adverse effects on quota value if it affects, or if it is perceived to affect, any of these factors.

4.16 As set out in this evidence, I consider that the adverse effects of Tamarind's planned activities (including discharges from deck drainage, as discussed below) on commercial fishing will be negligible. No downstream business impacts on fish processing or other fisheries-related services have been identified. Therefore, quota rights (including Settlement Quota) for JMA 7 or associated stocks will not be affected by Tamarind's planned activities.

B. Potential Impacts from Unplanned Activities

Oil spill arising from loss of well control

4.17 I reviewed the oil spill modelling in Annex F of the IA and the evidence of Dr Alison MacDiarmid, Dr Alison Lane and Dr Brian King in order to assess the possible consequences for commercial fishing of a worst case loss of well control.

4.18 An oil spill may have adverse effects on commercially harvested species as a result of: toxicity effects leading to sub-lethal or lethal impacts on vulnerable fish life stages; contamination of fisheries habitat; disruption of marine food webs; and contamination of seafood (actual or perceived). If these impacts on commercially harvested species are sufficiently serious, sectors of the seafood industry may face temporary loss of access to fishing grounds, reduced catch levels, loss of market access (e.g., due to reputational risk), and loss of income, livelihood and asset value. In the case of Settlement Quota, an oil spill may undermine the value of the Māori Fisheries Settlement.

4.19 The scale and significance of adverse effects on commercial fishing will depend on numerous factors including the characteristics of the spill, the location of the fishery in relation to the spill trajectory, and the sensitivity of affected fisheries. The sensitivity of affected fisheries is influenced by factors such as:

4.19.1 The sensitivity of the species and its habitat to hydrocarbon spills (e.g., the presence or absence of vulnerable fish lifecycle stages, or the time it takes for fisheries habitat to recover);

- 4.19.2 The ability or otherwise of fishers to move elsewhere; and
- 4.19.3 The resilience of the stock to localised changes in abundance and/or fishing effort. For example, in a fully-utilised, spatially-dependent fishery such as rock lobster, if fishers are displaced from an area of contaminated shoreline, the extra fishing effort on the remainder of the stock is likely to cause localised stock depletion which may increase the sustainability risk to the stock and result in reductions in allowable catches in future. This effect is less likely, however, in more mobile species such as jack mackerel.
- 4.20 For pelagic fisheries such as jack mackerel, and for most trawl, line and set net fisheries, the main source of exposure to a spill would be oil entrained or dissolved in the water column. Sensitive life stages of fish (e.g., eggs and juvenile stages) would be affected across a wider area than adult fish, particularly where these life stages are present in the upper parts of the water column.⁴¹ The eggs and larvae of jack mackerels float in the open sea and the juvenile fish are often found in association with floating objects such as drifting seaweed.⁴² These life stages may therefore be directly impacted in areas affected by dissolved aromatics, entrained hydrocarbons and surface slicks. Other commercially-harvested species may also be directly adversely affected – including egg, larval and juvenile stages of species targeted by inshore trawlers and set netters, and pelagic juvenile stages of rock lobster.
- 4.21 Although the area of potential direct harm to commercially-targeted species is relatively confined (i.e., the zone where exposure levels exceed thresholds for harm to adult or vulnerable fish life stages), commercial fishers and seafood companies would nevertheless be affected across a much wider area, which could extend along the west coast of the North Island and across to the northern coasts of the South Island, as a result of:

⁴¹ Impact Assessment, page 164.

⁴² Hurst, RJ et al (2000). Areas of importance for spawning, pupping or egg-laying, and juveniles of New Zealand coastal fish. NIWA Final Research Report for Ministry of Fisheries Research Project ENV 1999/03.

4.21.1 Avoidance of harvesting in areas of visible surface slicks or shoreline contact (so as to prevent gear contamination or tainting of harvested seafood); and

4.21.2 Adverse market perceptions of seafood contamination.

4.22 Fisheries disruptions and closures could be in place for a period of weeks to months.⁴³ Recovery of fish stocks to previous levels of local abundance could take much longer, depending on the attributes of the species and the recovery of suitable habitat. The economic impact on vulnerable sectors of the seafood sector is therefore likely to be moderate to significant, particularly in fisheries with limited capacity to adapt.

4.23 In terms of the vulnerability of potentially affected fisheries, I consider that:⁴⁴

4.23.1 The CRA 9 rock lobster fishery is highly vulnerable because around half the CRA 9 catch is taken from the Taranaki coast, so reduced catch rates in a relatively small part of the coastline could affect the overall profitability and value of the CRA 9 fishery;⁴⁵

4.23.2 The inshore set net fishery is highly vulnerable primarily because it is already severely spatially restricted by regulations designed to protect Māui's dolphins. Set netters displaced by a spill would have limited flexibility in terms of alternative fishing locations;

4.23.3 Although the jack mackerel trawl fishery and inshore trawl fisheries along the west coast of the North Island are more mobile and therefore less sensitive to a localised spill, if the surface exposure from a spill has a high degree of spatial overlap with these fisheries, significant disruption of fishing activity could result; and

⁴³ Impact Assessment page 164.

⁴⁴ I have not explicitly assessed the vulnerability of other smaller fisheries as I consider that the fisheries identified in this paragraph are likely to be the most affected by an oil spill at the Tui Field.

⁴⁵ Rock lobster statistical reporting area 935, on the Taranaki coast, usually produces around half of the CRA 9 TACC.

4.23.4 If a visible surface slick were to extend to South Island waters, additional fisheries including the Cook Strait hoki fishery, and coastal fisheries and aquaculture in the Marlborough and Tasman districts could be disrupted.

4.24 In summary, I consider that the impacts on commercial fishing of a worst case oil spill at the Tui Field would be inter-regional in scale (i.e., potentially extending along the west coast of the North Island from Waikato south to Kapiti and possibly including parts of coastal Marlborough and Tasman), would affect a range of inshore and deeper-water fisheries for a duration of weeks or months, and would result in moderate to significant economic loss for quota owners, fishers and downstream businesses. I note, however, that the likelihood of a loss of well control at the Tui Field is considered to be “negligible” and a hydrocarbon release from a loss of well control is considered to be “extremely unlikely”.⁴⁶

Marine diesel spill and other unplanned events

4.25 Aside from a loss of well control, the worst case spill from within the AOI is a marine diesel spill.⁴⁷ Commercial fishers targeting jack mackerel are likely to avoid any surface slicks in order to prevent contamination of fishing gear and tainting of catch. I consider that, although inconvenient, any temporary displacement of fishing activity is unlikely to be significant given the widespread nature of the fishery. A spill in winter months could result in a surface slick extending to the shoreline.⁴⁸ If this were to occur, inshore and coastal fisheries may be affected, with potential for economic loss.

4.26 I consider that any adverse effects on commercial fishing from the other unplanned events identified in the IA (i.e., dropped objects and marine vessel incidents) will be negligible because:

4.26.1 The occurrence of these events is considered to be “unlikely” or “extremely unlikely”;

⁴⁶ Impact Assessment, page 164.

⁴⁷ Impact Assessment, page 150.

⁴⁸ Tamarind’s RFI Response (July 2018).

4.26.2 Any such incidents are more likely to occur in the Protection Zone where no fishing activities occur; and

4.26.3 Ongoing disruption of fishing activity is unlikely, as dropped objects will be recovered and sunken vessels salvaged where practicable, and any significant non-recovered objects will be reported to Maritime New Zealand.⁴⁹

C. Potential Impacts from Deck Drain Discharges

4.27 I have reviewed the IA and the evidence of Dr Alison Lane and Dr Alison MacDiarmid on behalf of Tamarind to identify any direct effects on fish or environmental changes arising from deck drain discharges that could affect commercially harvested fish.

4.28 Dr Lane and Dr MacDiarmid conclude that there is negligible potential for impacts on marine ecosystems and species as a result of offshore processing drainage. Based on these findings, I consider that deck drain discharges will have a negligible impact on species targeted by commercial fishers.

4.29 Pelagic species such as jack mackerels may accumulate contaminants in their body tissues as a result of consuming prey species that have elevated burdens of contaminants. Contaminants in the body tissues of fish can potentially have a toxic effect on the fish themselves, as well as raising concerns in relation to the consumption of contaminated seafood.⁵⁰ These concerns can be actual (i.e., risk of damage to human health) or perceived (i.e., fear of consuming seafood that may be contaminated). Fish quality and seafood safety concerns have immediate economic consequences for the seafood industry, as well as broader adverse effects on the industry's reputation.

4.30 Offshore processing drainage is a potential source of contamination in harvestable fish. However, jack mackerels and their prey are highly mobile

⁴⁹ Impact Assessment, page 165, 167.

⁵⁰ World Health Organisation (March 2017). Fact Sheet. Mercury and Health. <http://www.who.int/mediacentre/factsheets/fs361/en/>

and are not 'resident' at the Tui well locations. The fish would therefore experience only brief, one-off, low-level exposure to any contaminants.⁵¹ Commercial fishing vessels are already excluded from the area around the rig and, for operational reasons, would also avoid the immediate vicinity of drilling activities. I therefore consider that any adverse effects on commercially harvested fish species, fishing operations, or human health (from the consumption of seafood) arising from the deck drain discharges will be negligible.

D. Cumulative Effects

- 4.31 There may be some potential for cumulative effects of contaminants from offshore processing drainage discharges at the Tui Field, other nearby discharges (e.g., Māui, Maari) and discharges from land-based activities (e.g., agriculture, urban development). A mixing and dispersion study undertaken by RPS shows that at a distance of 120 metres from the release point the No Effects Dilution ratio of 1:124 was exceeded,⁵² suggesting that there is unlikely to be any overlap between discharges from Tamarind's activities and these other sources. I note that the MPI's National Chemical Residues Programme includes commercially harvested seafood and provides a mechanism for MPI and the seafood industry to monitor selected fish species.⁵³ However, I am not aware of any particular seafood industry concerns about contaminants in jack mackerel.
- 4.32 I have not identified any other potential cumulative effects on commercial fishing, either from the cumulative impact of different activities at the Tui Field, or from the cumulative impact of Tamarind's activities and other activities in or affecting the waters of the South Taranaki Bight.

⁵¹ Refer to Evidence of Alison Lane.

⁵² Tui Field – Offshore Taranaki Basin, Produced Formation Water Dispersion Modelling. RPS report issued 21 June 2017.

⁵³ The species and contaminants to be monitored are selected and agreed on a year-by-year basis by MPI and the Seafood Standards Council. See <http://www.mpi.govt.nz/food-safety/food-monitoring-and-surveillance/monitoring-programmes-under-the-animal-products-act/seafood-monitoring-programmes/>

5. RESPONSE TO ISSUES RAISED BY THE EPA KEY ISSUES REPORT AND TECHNICAL REVIEWS

- 5.1 I note the EPA Key Issues Report discusses fisheries interests and navigation. I have addressed the interactions between fisheries interests and the proposed activities elsewhere in my evidence and the exclusion zones which will apply.

6. RESPONSE TO ISSUES RAISED BY SUBMITTERS

- 6.1 The submissions of Te Kāhui o Taranaki (**TKOT**) on behalf of Taranaki Iwi and Te Korowai o Ngāruahine Trust (**TKONT**) indicate that both iwi have an existing interest in commercial fishing in the vicinity of the Tui Field. TKOT does not identify any specific fisheries-related issues but does identify “*the degradation of the marine environment impacting on the potential for the development of our fishing rights*” as an assessment criteria.
- 6.2 TKONT’s submission requests that further effort be made to understand the impacts on fish populations and the “*extent to which the activities could affect the fishing interests and access to the fishery quota derived from the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992.*” TKONT is also concerned that “*a spill would contaminate and affect the abundance of fish stocks, [and] affect our commercial fishing operations...*”
- 6.3 The matters relating to commercial fishing raised by TKOT and TKONT are addressed in my evidence.
- 6.4 No other submitters state that they have an existing interest in commercial fishing, although several raise general concerns related to fisheries impacts – for example, the “*devastating impacts on kaimoana*” of an oil spill (e.g., submitters adopting the template submission prepared by Climate Justice Taranaki), the “*harm to our fisheries*” caused by harmful discharges (Otaraua Hapu), the “*high risk to... kaimoana*” of drilling (350 Aotearoa) and barriers to migrating eels (Robert Warrington). These concerns are addressed, in respect of commercial fishing only, in my evidence.

7. PROPOSED CONDITIONS AND MITIGATION MEASURES

- 7.1 The proposed conditions on Tamarind's marine consent and marine discharge consent contain no provisions of direct relevance to commercial fishing. I am satisfied that this is appropriate. I am further satisfied that the mitigation measures outlined in section 11 of the IA are appropriate as they relate to commercial fisheries.

8. CONCLUSION

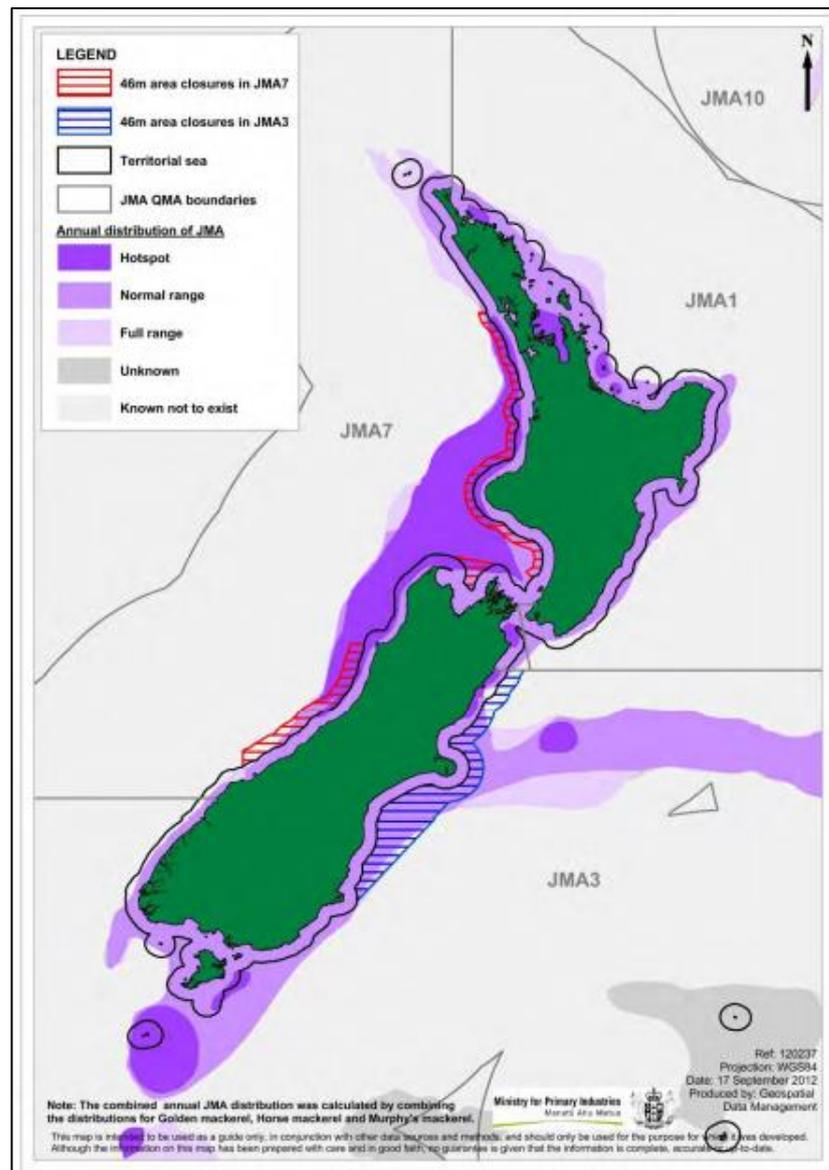
- 8.1 Tamarind's planned activities will result in negligible additional spatial displacement of commercial fishing. There may be some short-term, localised changes to the distribution of commercially harvested fish species. However jack mackerel and associated species are highly mobile and the scale and duration of any changes are such that I expect adverse effects on commercial fishing to be negligible.
- 8.2 A worst case oil spill arising from a loss of well control could result in impacts on commercial fishing which extend across several regions and disrupt a range of inshore and deeper-water fisheries for a period of weeks or months. This could result in moderate to significant economic loss for quota owners, fishers and downstream businesses. However, a hydrocarbon release from a loss of well control is considered to be an "extremely unlikely" event.
- 8.3 Any adverse effects from offshore processing drainage on jack mackerels or other commercially harvested fish species will be negligible and unlikely to result in the contamination of seafood.



NICOLA GAY GIBBS

20 July 2018

Figure 1: The boundaries of JMA 7 and the distribution of jack mackerels⁵⁴



⁵⁴ Ministry for Primary Industries (2013). National Deepwater Fisheries Plan. Jack Mackerel Chapter. July 2013.

Figure 2: JMA 7 landings and Total Allowable Catch⁵⁵

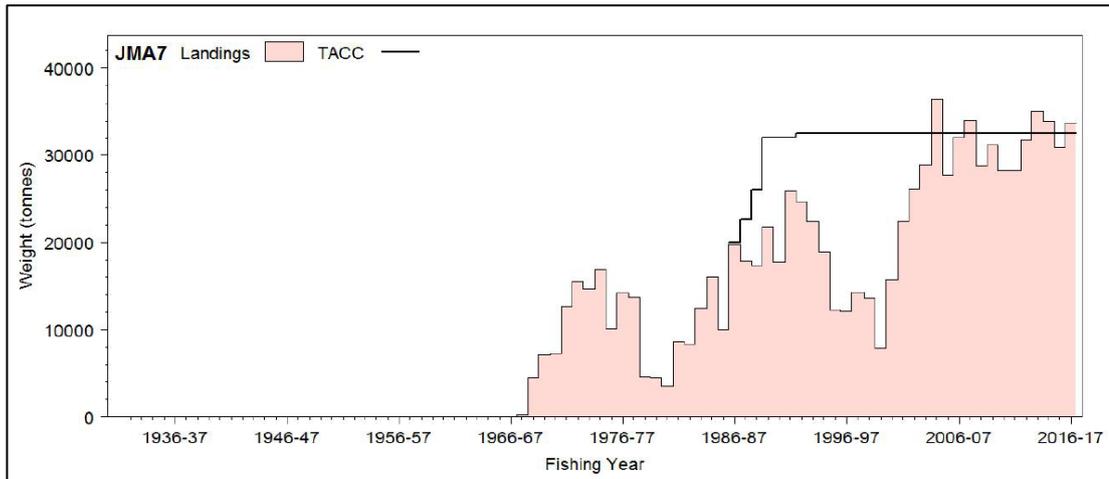
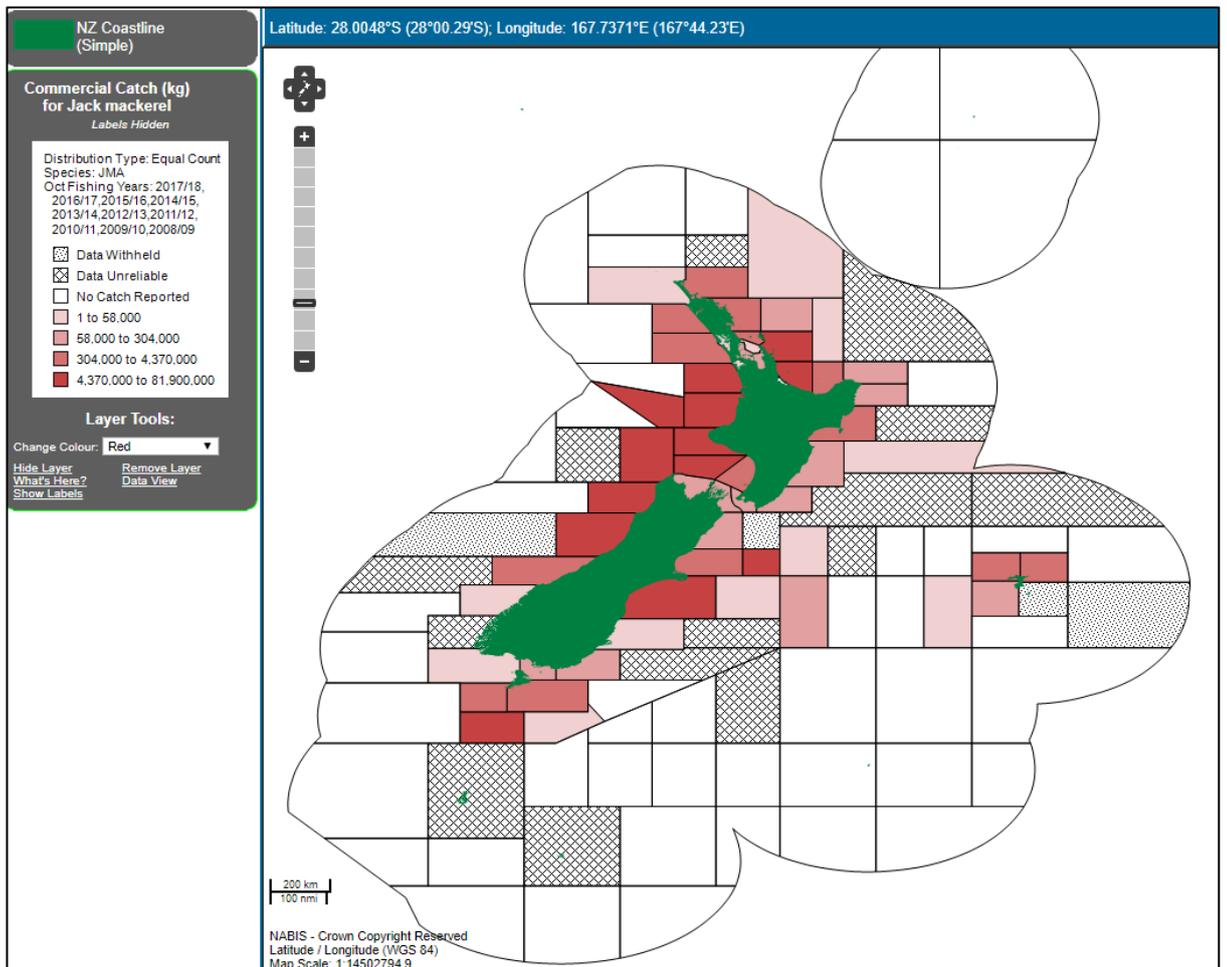


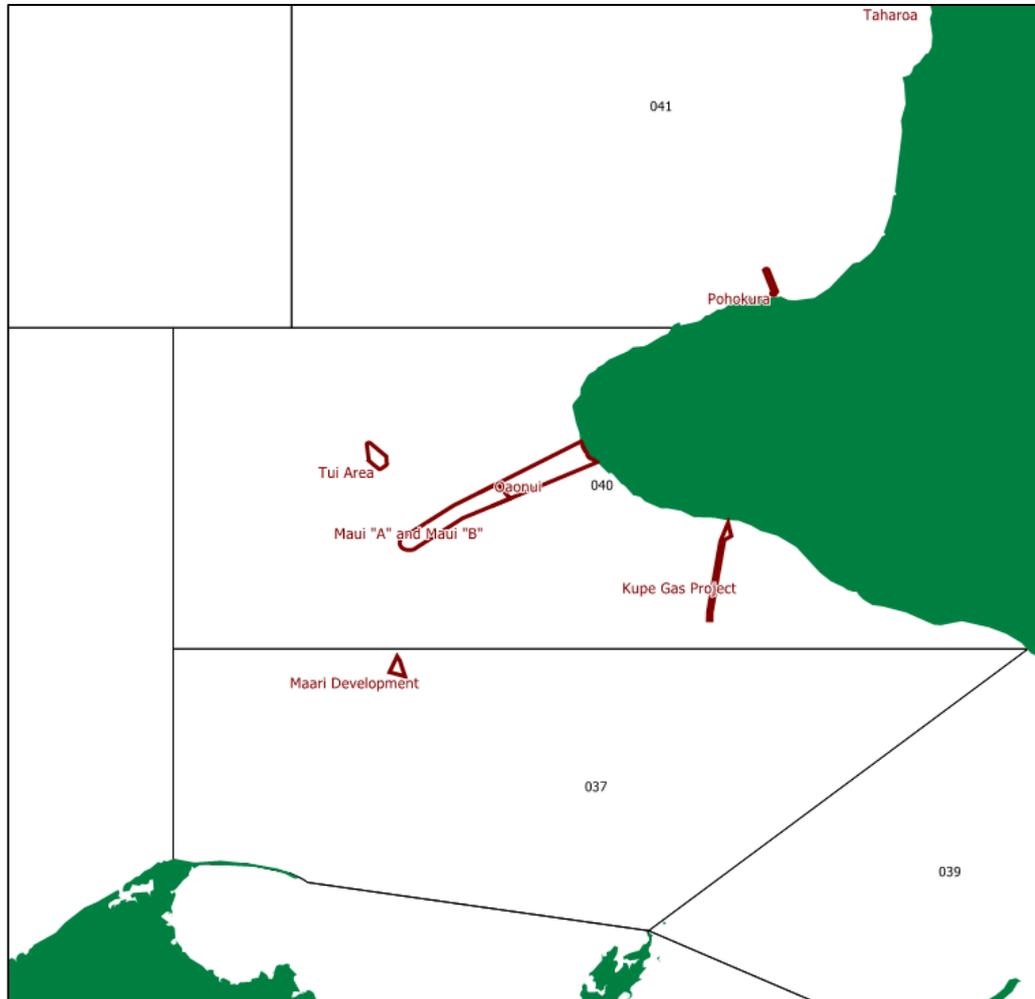
Figure 3: Distribution of jack mackerel catch (2008/09 – 2017/18)⁵⁶



⁵⁵ Fisheries New Zealand (2018). Fisheries Assessment Plenary May 2018: stock assessments and stock status. Compiled by the Fisheries Science Group, Fisheries New Zealand.

⁵⁶ NABIS <http://www.nabis.govt.nz/>

Figure 4: Fisheries statistical areas in the vicinity of the Tui Field (showing stat areas 041, 040, 037 and fisheries restrictions under the Submarine Cables and Pipelines Protection Act). The Tui Field is located in stat area 040.⁵⁷



⁵⁷ NABIS <http://www.nabis.govt.nz>