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Oil and Gas: National coordination - seismic and other issues

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In submitting this report, the researcher has agreed to FRDC publishing this material in its edited form.

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1 Acknowledgments

Since this project was first conceptualised, many people across the commercial fishing industry and the offshore oil and gas sector have changed roles, so to minimise the risk of missing someone who made an important contribution, the Western Australian Fishing Industry Council would like to thank and acknowledge the commercial fishing industry, oil and gas sector staff, Commonwealth and State Government agencies, NOPSEMA, APPEA, Associations and individuals for their support for this project and providing their valuable time and input in working with the project team. An honourable mention must go to Marilyn (Mannie) Shea who was the first principal investigator of this project.

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2 Abbreviations

Acronyms	
ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
AFMA	Australian Fisheries Management Authority
AMSA	Australian Maritime Safety Authority
APPEA	Australian Petroleum Production and Exploration Association
CFA	Commonwealth Fisheries Association
CSEP	Collaboration Seismic Environment Plan
DAFF	Department of Agriculture, Fisheries and the Forestry
DISR	Department of Industry, Science and Resources
DPIRD	Department of Primary Industries and Regional Development
EP	Environmental Plan
EPBC Act	*Environment Protection and Biodiversity Conservation Act - 1999*
FRDC	Fisheries Research and Development Corporation
IAGC	International Association of Geophysical Contractors
NERA	National Energy Resources Australia
NOPSEMA	National Offshore Petroleum Safety and Environmental Management
NOPTA	National Offshore Petroleum Titles Administrator
NTSC	Northern Territory Seafood Council
OPGGSA	*Offshore Petroleum and Greenhouse Gas Storage Act - 2006*
WA	Western Australia
WAFIC	Western Australian Fishing Industry Council

3 Executive Summary

The commercial fishing industry throughout Australia is under continued pressure on its operations from activities relating to the oil and gas sector such as seismic surveys, drilling, construction of sub-sea infrastructure and decommissioning. These pressures can affect the access rights of commercial fishers, cause displacement and impact aquatic resources and the marine environment that supports their livelihood. In most cases the commercial fishing sector throughout Australia is the largest and only group of relevant stakeholders affected.

Whilst these activities are firmly regulated by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) in Commonwealth waters, and other various State Government agencies regulators in State/Territory jurisdictions, the approval process requires consultation for each environment plan and/or activity. The consultation is therefore conducted on a case-by-case basis. The challenges of ongoing consultation fatigue and the cumulative pressures on commercial fishers and operations are certainly not conducive to providing a cohesive environment to manage multiple titleholders' consultation proposals.

This project examines and develops a national approach for the commercial fishing industry and the offshore oil and gas sector to ensure both parties can work together under a shared and respected understanding for each other's industry and licence to operate. The development of a range of agreed principles presented in this project will, inform the governance framework on how best to manage consultation and expectations between commercial fishers and the oil and gas sector and assist in working collaboratively together to achieve the best possible outcomes for both parties.

Results/key findings

Undertaking a literature review of peer-reviewed research and grey literature exploring seismic-related effects on commercial and non-commercial fishing species, commercial fishing activities and the broad marine environment was an essential component of this project. What was apparent in the review of literature at a broad level is the impacts from seismic surveys varied according to species and habitat type and collective conclusions are not easily demonstrated at a suite or population level. Some of the key gaps in the research include an understanding on the long term or cumulative effects of noise disturbance to aquatic resources, impacts to larval stages of commercially important species, impacts to Elasmobranchs[1], the physiological and behavioural responses to noise disturbance for most species, but in particular pelagic species and the difference between laboratory experiments compared to the natural operating environment. These findings assist in informing future research opportunities as the need for more science in understanding the impacts from seismic survey related activities is required.

The benefits and success of the National Energy Resources Australia (NERA) project *Streamlining Environmental Approvals for Marine Seismic Survey Activities*, in conjunction with the development of the principles from the Australian Petroleum Production & Exploration Association (APPEA) and the peak fishing bodies has shifted the baseline on how to do business and demonstrates how the two industries can work together and improve relationships. Several

[1] Elasmobranchs are any cartilaginous fish of the subclass Elasmobranchii (or Selachii), which includes the sharks, rays, dogfish, and skates.

oil and gas titleholders across Australia are now developing compensation models and other documentation that demonstrate an agreement between titleholders and affected commercial fishers.

With a new operating model and baseline emerging between the commercial fishing industry and the oil and gas sector, the positive momentum in building these relationships also needs to be directed towards the new emerging challenge in oil and gas decommissioning and offshore renewable energy.

Implications for relevant stakeholders

The output from this project creates a "one stop shop" directory of information about the commercial fishing industry and showcases how the offshore oil and gas sector can work collaboratively with commercial fishers and improve consultation, which in turn assists in streamlining the approval process, whilst minimising the impact to commercial fishing and aquatic resources.

Recommendations

1. Undertake an updated Ecological Risk Assessment (ERA) on the impacts from seismic surveys to fish and invertebrates to ensure new science is incorporated into the risk assessment process.

2. As identified through the seismic survey literature review, the following research recommendations would assist in developing our understanding of the impacts associated with seismic surveys on aquatic resources: long term or cumulative effects of noise disturbance on key commercial species; impacts on larval stages of commercially important species; impacts on Elasmobranchs; physiological and behavioural responses for pelagic species; the difference between laboratory experiments compared to the natural operating environment.

3. Explore the benefits in developing a National interactive digital platform for example like the Queensland Department of Agriculture and Fisheries QFish for commercial fishing data from all State/Territories to provide transparency, streamline approvals for the oil and gas sector and improve consultation processes.

4. Regulate the sharing of seismic survey data between titleholders to minimise the need for undertaking new seismic surveys in areas where data is already acquired.

5. As identified in APPEA's Offshore Petroleum Industry's Key Principles for Fishers' Engagement, compensation and/or financial adjustment practices need to be considered and accepted at a national level and become standard industry practise by the oil and gas sector when proposed activities have unavoidable impacts to commercial fishing operations.

6. The concept and outcomes from this project aimed at improving consultation between the two industries for seismic surveys should be applied to oil and gas decommissioning and renewable energy activities. As this emerging challenge faces these industries,

incorporating the key principles learnt to date, will ensure a strategic approach is taken therefore minimising the impacts to the commercial fishing industry and streamlining approval for the oil and gas sector.

Keywords
Seismic, Commercial fishing industry, offshore oil and gas sector, NOPSEMA, Consultation

4 Introduction

The offshore oil and gas sector and commercial fishing industry are both important for Australia's economy and play vital roles in energy production and food security, respectively (DISR 2021). The offshore oil and gas sector's petroleum-related activities such as seismic surveys, geotechnical surveys, drilling, construction of sub-sea infrastructure, production and decommissioning are part of ongoing offshore oil and gas sector requirements. These activities are regulated by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) in Commonwealth waters, and other various State Government agencies regulators in State/Territory jurisdictions.

The commercial fishing industry throughout Australia, not only provides food security, but is the foundation economy for many regional and coastal communities across Australia. Modern day commercial fishing has operated in Australian waters for well over a century and up until approximately the 1960's the industry could undertake fishing activities with limited ocean interactions from other marine users (Knuckey *et al*. 2016).

The *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGSA) provides the regulatory framework administered by NOPSEMA. The subsidiary legislation for the OPGGSA, is the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (Environment Regulations), these regulations provide the framework for environmental management and regulation of offshore petroleum activities in relevant areas. Under this framework, operators must submit environment plans to NOPSEMA for assessment and acceptance prior to undertaking any petroleum-related activities in Commonwealth waters.

As part of an environment plan submission, the Environment Regulations require that operators must demonstrate that they have consulted with "relevant persons". Operators are also required to assess the merits of any objection or claim about the activities made by 'relevant persons' and include copies of full text responses in the Environment Plans (EP).

The commercial fishing Industry considers itself to be a 'relevant person' in circumstances where offshore oil and gas sector related activities may potentially affect commercially important fish species, their prey and habitats and the business activities of commercial fishers who harvest these resources. The commercial fishing sector throughout Australia is the largest group of relevant stakeholders to potentially be affected by offshore oil and gas activities.

As specified in the Environment Regulations 11A (2): *'For the purpose of the consultation, the operator must give each relevant person sufficient information to allow the relevant person to make an informed assessment of the possible consequences of the activity on the functions, interests or activities of the relevant person'*.

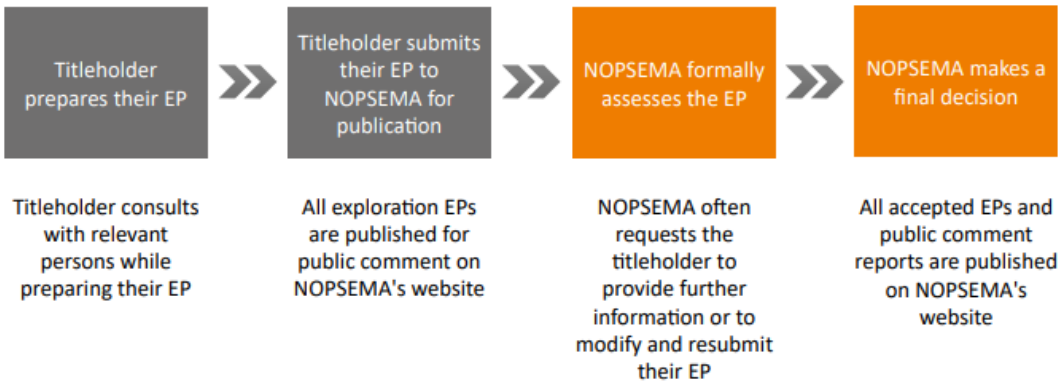

Figure 1. Summarised approval process for titleholders (Source: NOPSEMA Offshore environmental approvals).

In 2014, NOPSEMA undertook a streamlining process under the *Environment Protection and Biodiversity Conservation Act 1999* and these changes brought in a new consultation process for relevant persons to be informed about, and contribute to, decision-making with regards to environmental management of offshore petroleum activities (NOPSEMA, 2015). Following this, NOPSEMA initiated a work program designed to comprehensively improve consultation processes and build community confidence in offshore petroleum activities. They also completed a range of investigations to better understand stakeholder views and attitudes, with the initial investigations identifying issues originating from the seismic industry.

As identified from the above process and through other studies, the ongoing challenges between the two industries working together has resulted in unresolved conflict. As defined in the Mariner's Handbook for Australian Waters (2021), "*seismic survey vessels tow an array up to 5nm long and are unable to manoeuvre freely. Vessels should, therefore, give them an appropriately wide berth*". By following these protocols, the commercial fishing industry is always displaced from fishing grounds impacting on the fisher's access rights and ability to operate. A common misconception by the oil and gas sector is that a fisher can simply fish somewhere else, however this is not the case. A spatial boundary of a fishery does not represent an even distribution of fish stocks over the entire area and also doesn't take into account other spatial measures such as marine protected areas.

Currently the oil and gas sector and commercial fishing industry consultation and engagement is done in isolation by an individual titleholder on a case-by-case basis with varying interpretation of science, inconsistent information, absence of uniformity of overarching communications, limited access to current and appropriate data and the duplication of work across Australia.

This inconsistent approach informs this project in considering the need for a national approach for managing commercial fishing specific research and development needs, improve consultation, seeking and updating available material and identifying gaps in the science. There is an ongoing challenge in undertaking consultation and managing operational impacts with relevant persons in the development of EP managed by the approval process.

As described by Knuckey et al. (2016) there are four overarching communication processes recommended to help reduce conflict between the fishing industry and seismic survey operations and address the current issues: 1. Provide accessible, easy to use web-based information for each industry; 2. Continue Roundtable discussions and feedback into overarching policy and process; 3. Conduct annual regional stakeholder meetings to discuss future planning and issues; 4. Encourage one-on-one industry/individual discussions.

Early engagement with relevant persons in the preliminary planning stages of any proposed oil and gas activity is essential to minimise impacts to both aquatic organisms, aquatic environment and the commercial fishing industry. The challenges of ongoing stakeholder consultation fatigue and the cumulative pressures on commercial fishers and operations are not conducive to providing a cohesive environment to manage multiple titleholder's consultation proposals. It is therefore essential for the development of a range of principles and case studies to inform the governance framework and how best to manage consultation and expectations between the commercial fishing industry and offshore oil and gas sector.

5 Background

The commercial fishing industry throughout Australia, not only provides food security, but is the foundation economy and major employer for many regional and coastal communities across Australia. The fishing industry in Australia has a long history and has supported many fishing families over multiple generations. Over time the industry has endured increasing complexity in legislative reforms and other pressures that create restrictions and erode the commercial fishers' right to fish. These reforms and other pressures in many cases have resulted in the contraction of the commercial fishing fleet and in Australia, where it was estimated that around 70 per cent of the edible seafood consumed (by weight) is imported from overseas predominately Asia (Department of Agriculture, Fisheries and Forestry 2022) to counteract the impact.

The management of fishing relies primarily on input and output controls, such as setting a total allowable catch per fishing season or by specifying the method and type of gear that can be used. The commercial fishing industry commonly uses the following method and gear types; diving and hand collection, droplines, gillnets, longlining, handlines, purse seine, pots and traps and trawling. These fishing methods and gears target a range of different species such as finfish and invertebrates. The commercial fishing industry are custodians of the marine environment, as the long-term sustainability of aquatic resources is essential in ensuring they maintain their livelihood.

As described above minimising the impacts to aquatic organisms, aquatic environment and the commercial fishing industry will ensure ongoing food security for consumers and continue to provide livelihoods for fishing families in regional and coastal communities throughout Australia.

6 Need

There is a need for a national approach for both the commercial fishing industry and the offshore oil and gas sector throughout Australia to ensure both parties can work together under a shared and respected understanding for each other's industry and licence to operate.

At the time this project was conceptualised, the scientific understanding around the impacts to aquatic resources from seismic surveys was limited. It has since progressed and with new information constantly emerging, this project scope evolved with the changing environment.

However, the fundamental principles of the need for this project remained consistent because throughout Australia, commercial fishers are still experiencing ongoing displacement from fishing grounds as they move out of the way of seismic vessels and for other petroleum activities, along with an ongoing concern that seismic surveys are affecting the aquatic resource commercial fishers reply on.

As evident in Figure 2, there has been a significant volume of seismic surveys over the last 60 years incrementally and cumulatively impacting commercial fishing operations throughout Australia.

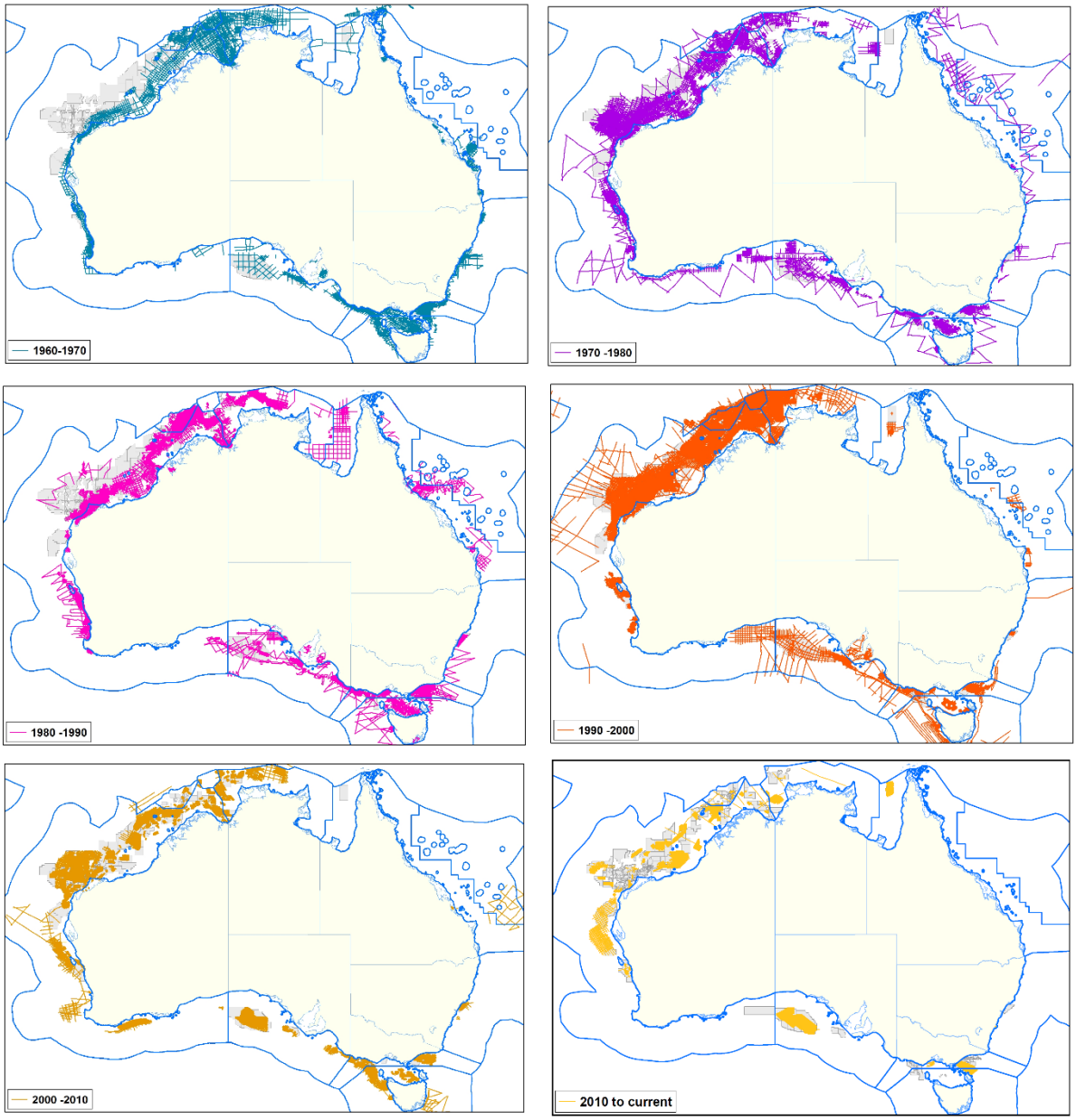

Figure 2. Seismic survey between 1960 to 2020 (National Offshore Petroleum Titles Administrator 2014).

7 Objectives

The objectives first developed for this project are:

1. Deliver a centralised on-line member-only information access portal – a "one stop shop" for seismic research bibliographies and case studies.
2. Deliver ongoing identification and qualification of relevant research papers and reference cases, including annotated summaries to ensure relevance for ready and easy access by portal members.
3. Deliver a set number of supported research applications relevant to the effects of oil and gas activities on commercial fishing / commercial fishing stocks i.e. gap analysis and

prioritisation.
4. Deliver a "best practice" document for commercial fishing representative bodies to use as a strong base for environment plan submissions.
5. Deliver a "best practice" document for commercial fishing representative bodies to use as a strong base and consistent process for fee-for-service environment plan consultation.

The ongoing changes to both oil and gas and the commercial fishing industry required the original objectives to be revised to the following:

1. Deliver a centralised on-line access portal - a "one stop shop" for seismic research bibliographies and case studies.
2. Deliver identification and qualification of relevant research papers and reference cases including annotated summaries to ensure relevance for ready and easy access to stakeholders.
3. Deliver a set number of supported research recommendations relevant to the effects of oil and gas activities on commercial fishing / commercial fishing stocks.
4. Deliver a "best practice" document for commercial fishing representative bodies to use as a strong base for environment plan submissions.
5. Deliver a "best practice" document for commercial fishing representative bodies to use as a strong base and consistent process for fee-for-service environment plan consultation.

8 Methods

The project methodology undertaken primarily relied on extensive consultation, liaison and coordination with a large range of different stakeholders across Australia. National engagement was undertaken in a range of forums including meetings, workshops and conferences.

The original principal and co-investigator were Ms Mannie Shea and Mr Alex Ogg from the Western Australian Fishing Industry Council Inc (WAFIC). During the early stages of the development of this project, a Reference Group was established to consider the values and priorities for national seismic coordination. A meeting was held at Seafood Directions, Sydney in September 2017 where the concept and need for this project was refined and approved.

The Industry Reference Group was also formed across jurisdictions impacted by seismic surveys, to guide the priorities and adopt outputs and outcomes of the project on an ongoing basis and as the project progressed. The Reference Group comprising of state sector bodies/delegates and FRDC representatives.

The significant change of staff across all industries, impacts from COVID-19 restrictions and the overlap with routine consultation with the offshore oil and gas sector meant the formal groups were disbanded and replaced by a range of ongoing meetings and discussion forums.

To support the outputs of this project and other projects initiated by stakeholders, who have provided significant direction for the objectives, detailed information from these initiatives is included in section 11.

In developing the seismic research bibliographies and exploring case studies that formed the primary foundation for this project, the principal investigator utilised networks from across the

offshore oil and gas sector, fisheries and petroleum scientists, State and Commonwealth Government agencies and universities from around the world.

8.1 Summary of Commercial Fisheries across Australia

Initially a significant proportion of time and resourcing was directed towards reviewing and developing individual fisheries' profiles for every fishery in Australia that may be potentially impacted by seismic surveys. The approach in undertaking this task was to have the relevant commercial fishing details easily accessible for the oil and gas sector, so during the development of EP's, the assessment of fishing information was accurate, the right relevant person was consulted, and information provided was consistent across Australia.

The concern about maintaining and keeping these fishery profiles current and relevant meant that this part of the project was revised to include only an overview of the fisheries in each State/ Territory and a directory of where the oil and gas sector can obtain all the necessary information on commercial fishing data in preparation of the EP during planned offshore oil and gas activities.

8.2 Case Studies

The continuous changing nature of the oil and gas sector and the commercial fishing industry nationally, including the different operating environments between the States and/or Territories has meant there are a range of best practice case studies which can inform the national position and approach on how the two industries can work together. The case studies used in this project identify opportunities through worked examples on how to improve the current operating model between the two industries and assist in streamlining EP approvals for the oil and gas sector and in turn assist in minimising the impacts to the commercial fishing industry.

9 Results

9.1 Peer-reviewed research and grey literature exploring seismic-related effects on commercial and non-commercial fishing species

A literature review seeks to uncover the sources relevant to a topic under study and, thus, makes a vital contribution to the relevance and rigour of research (Brocke, Jan vom et al. 2009). When this project was first conceptualised, part of the perceived issues and conflict between the oil and gas sector and the commercial fishing industry was the misinterpretation of information on seismic surveys and the lack of scientific literature on the impacts to the marine environment and aquatic resources. Fisheries Research and Development Corporation (FRDC), Governments, Universities and Scientists from all over the world have invested in a range of projects to investigate the impacts of seismic surveys in the marine environment. This evidentiary-based approach has assisted in the offshore oil and gas sector and the commercial fishing constructively coexisting.

Understanding the scope of peer-reviewed research and grey literature exploring seismic-related effects on commercial and non-commercial fishing species, commercial fishing activities and the broad marine environment, ensure outputs and final recommendations from this project meet the required objectives and work to inform prioritised research gaps.

The peer-reviewed research and grey literature contains 235 publications. A summary of these publications is available in Appendix 1 with the full version available via the FRDC website on https://www.frdc.com.au/seismic-and-marine-sound-research. Note: This list was up to date at the time it was listed on the FRDC website. More recent publications may not be included.

9.2 Overview of relevant authorities and organisations

In undertaking the research for this project and during consultation with key stakeholders such as the Australian Petroleum Production & Exploration Association (APPEA) it became apparent that summaries of how to obtain commercial fishing information throughout Australia would assist in streamlining the approval process for the oil and gas sector and provide relevance for the commercial fishing industry.

The offshore oil and gas sector is transparent with certain information publicly available as required under legislation, however some data, such as the actual seismic data collected, remains commercial in confidence. In contrast, the availability of commercial fishing information is managed by confidentiality provisions where in most cases legislation protects an individual commercial fishers' catch and effort records from being released publicly, unless authorised. Data is usually presented in a consolidated format. The availability of consolidated, or fishery commercial catch and effort data, is available via a request process. Throughout Australia, as expected, the process for obtaining commercial fishing information is different for each State/Territory. The challenge for the oil and gas sector in obtaining information generates issues around identifying relevant persons and identifying the fisheries that overlap the exploration area, assessing the likely impacts in the early planning of oil and gas activities and the associated risks of these activities.

Without undertaking significant legislative reform across Australia to manage the issues of confidentiality provisions around the release of individual commercial fishing information, section 9.2.4 provides a directory of the contacts, descriptions and process for accessing commercial fishing data through the respective management authorities for each State/Territory where oil and gas

sectors operations impact on commercial fishers. Collating the information on how to access commercial fishing information detailed below was conceptualised from DISR (in prep) *Supporting cooperative coexistence of seismic surveys and commercial fisheries in Australia's Commonwealth marine area.*

9.2.1 State and Regional Peak Fishing Bodies

There are numerous State, Territory and regional peak fishing bodies which represent commercial fishing interests, and these groups play a vital role in protecting the rights of the industry and offer support to fishers through the ongoing challenges of sharing the marine environment with other stakeholder groups. These groups also provide guidance to the oil and gas sector and in some cases undertake significant volumes of work to support the interests of commercial fishers.

The key commercial fishing peak representative bodies for each State and Territory are:

- Seafood Industry Victoria - https://www.siv.com.au/
- Tasmanian Seafood Industry Council – https://www.tsic.org.au/
- Western Australian Fishing Industry Council - https://www.wafic.org.au/
- South East Trawl Fishing Industry Association - https://setfia.org.au/
- Northern Territory Seafood Council - https://www.ntsc.com.au/
- Seafood Industry Australia - https://seafoodindustryaustralia.com.au/
- Commonwealth Fisheries Association - https://comfish.com.au/
- Australian Southern Bluefin Tuna Industry Association - https://asbtia.com.au/
- Tuna Australia - https://tunaaustralia.org.au/
- Queensland Seafood Industry Association - https://qsia.com.au/
- NSW Professional Fishers Association - https://www.nswpfa.com.au/

There are also a range of peak bodies which represent specific fisheries or regions from Commonwealth Fisheries. Refer to the AFMA website for a list of commonwealth industry associations https://www.afma.gov.au/contact/industry-association-contacts.

The peak fishing bodies are considered a ''relevant person'' in circumstances where offshore oil and gas sector related activities may potentially affect commercially important fish species, their prey and habitats and the business activities of commercial fishers who harvest these resources.

9.2.2 Offshore Petroleum Government bodies

Department of Industry, Science, Energy and Resources (DISR) is responsible for broader industry and science policy, as well as offshore resources policy and regulation.

DISR acts as a custodian for the legal framework for the operation of the Australian offshore oil and gas industry in Commonwealth waters. This framework encompasses licencing, environmental management, occupational health and safety, well integrity and resource management.

National Offshore Petroleum Titles Administrator (NOPTA) is responsible for the day-to-day administration of offshore petroleum and greenhouse gas titles in Commonwealth waters and is the first point of contact for matters relating to offshore titles administration.

National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) is Australia's expert regulator for health and safety, structural (well) integrity and environmental

management for all oil and gas operations and greenhouse gas storage activities in Commonwealth waters, and in coastal waters where regulatory powers and functions have been conferred.

In the process of assessing EPs for seismic surveys, NOPSEMA must ensure that environmental impacts and risks will be reduced to as low as reasonably practicable (ALARP) and be of an acceptable level.

9.2.3 Offshore Peak Industry Bodies

Australian Petroleum Production and Exploration Association (APPEA) is the peak national body representing Australia's oil and gas exploration and production industry. APPEA aims to secure regulatory and commercial conditions which enable member companies to operate safely, sustainably, and profitably.

EnerGeo Alliance (formally known as International Association of Geophysical Contractors) is the global trade alliance for the energy geoscience industry. EnerGeo represents the geoscience companies, innovators, and energy developers that use earth science to discover, develop, and deliver energy to our world.

9.2.4 Fisheries Management Authorities

There are a range of State and Commonwealth agencies responsible for the management of fisheries in the marine environment. The information provided below summarises the responsibility of the agencies, what data is available, how to obtain it and where to find additional information.

9.2.4.1 Commonwealth agencies

Department of Agriculture, Fisheries and Forestry ***(DAFF)***

DAFF plays an important policy role in promoting the biological, economic and social sustainability of Australian fisheries, particularly those managed by the Australian Government. The department develops policy and prepares advice on the environmental impact of fishing activities and access to Commonwealth fish stocks consistent with their optimal use as a public resource. Areas of coverage include:

- bycatch and protected marine species issues (including marine mammals, sharks and seabirds)
- the interaction of fisheries management issues with the Environment Protection and Biodiversity Conservation Act 1999
- alignment with relevant international agreements such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora, Convention on Migratory Species, Convention on Biological Diversity
- delivery of policy commitments on recreational fishing.

The department works with other Australian Government agencies to provide advice on proposed environment plans for offshore energy activities in Commonwealth waters, in circumstances where the activities may:

- disrupt existing fishing activities
- cause declines in valuable fisheries resources in the area
- damage habitat or marine ecosystems on which valuable fisheries resources depend.

Department of Climate Change, Energy, the Environment and Water ***(DCCEEW)***

DCCEEW has been established to deliver on the Government's climate change and energy agenda and protect Australia's environment and water resources. The department will deliver policies and programs to help address climate change and build a more innovative, future ready energy system, protect our unique environment, biodiversity and heritage, manage Australia's water resources for industry and regional communities and advance Australia's interests in the Antarctic and Southern Ocean.

The development of offshore renewable energy infrastructure is creating a new and emerging challenge for the commercial fishing industry.

Australian Fisheries Management Authority ***(AFMA)***

AFMA is the Australian Government agency responsible for the management and sustainable use of Commonwealth fish resources on behalf of the Australian community. Noting in some jurisdictions the state agencies may have a shared agreement with AFMA around the management of some Commonwealth fish stocks.

AFMA's role in offshore oil and gas operations is to ensure that any broad-scale impacts on commercial fishing in Commonwealth waters are considered during the development of any offshore projects.

AFMA also provides information for the petroleum industry on how to consult with the Commonwealth commercial fishing industry. This information is available via https://www.afma.gov.au/sustainability-environment/petroleum-industry-consultation.

Spatial boundaries for commercial fisheries

The spatial boundaries, closures and fishing areas for Commonwealth fisheries are publicly available at https://www.afma.gov.au/sustainability-environment/fishing-closures/closure-direction-maps.

Catch and Fishing Effort data

As described in section 9.2, to overcome some of the challenges associated with obtaining commercial catch and fishing effort data, details in Table 1, described the process for obtaining Commonwealth fishery related information via AFMA.

Table 1. AFMA - catch and fishing effort data request process

Who to contact	Email: data.request@afma.gov.au
How to make request	Refer to the AFMA Information Disclosure Policy and then send a completed data request form to the email above. https://www.afma.gov.au/sites/default/files/uploads/2014/12/Fisheries-Management-Paper-12-Information-Disclosure-May-2014.pdf
What data is available	AFMA collects information on catch (species and weight) and effort (hours fished, gear type, time, location) from various fish resources. This is available at a fine scale but is subject to AFMA's confidentiality rules and can only be released under a deed of confidentiality.

	Information on fishery/licence areas can be obtained from the relevant fishery management plan and will also be detailed in the fishery management booklet.
Format of data	Data can be provided raw where a deed of confidentiality is in place, otherwise it can be provided as aggregated data.
Data access constraints	Restrictions exist for areas where the data represents fewer than 5 vessels.
Access to confidential data	Refer to AFMA Information Disclosure Policy
Timeframe	Approximately 10 working days.

Australian Bureau of Agricultural and Resource Economics and Sciences *(ABARES) Fishery Status report*

ABARES is the science and economics research division of DAFF. Each year ABARES Fishery Status Reports provides an independent evaluation of the biological and economic status of fish stocks managed solely or jointly by the Australian Government.

The Fishery Status Reports covers the biological status of 100 fish stocks across 22 Commonwealth fisheries, including those managed both solely, and jointly, by the Australian Government. The reports summarise the performance of these fisheries against the requirements of fisheries legislation and policy.

The fisheries assessed in the Fishery Status Reports 2021 generated an estimated gross value of production of $438 million in 2019–20, which is 28% of Australia's total wild-catch fisheries gross value of production of $1.6 billion (Patterson *et al.* 2021).

The Fishery Status Reports form part of a suite of ABARES publications which aim to provide a comprehensive and multidimensional account of the trends and outlook for Australian fisheries. The annual Australian fisheries and aquaculture statistics reports contain comprehensive information on commercial fishing and aquaculture in Australia, including fisheries production and trade data up to and including 2019−20. The Australian fisheries economic indicators reports present results from ABARES fishery surveys of selected fisheries managed by the Australian Government, including detailed analysis of the net economic returns to the Australian community.

The fishery status report for 2021 is available via the following website link.
https://www.agriculture.gov.au/abares/research-topics/fisheries/fishery-status-reports

9.2.4.2 State and Territory Fisheries Management Authority Agencies

These State and Territory agencies are included here as they have responsibility for managing fisheries in the State and overlap with Commonwealth marine areas.

Western Australia

The Department of Primary Industries and Regional Development (DPIRD) has the responsibility to conserve, sustainably develop and share the use of Western Australia's aquatic resources and their ecosystems for the benefit of present and future generations.

They implement this through managing fisheries and aquatic ecosystems, assessment and monitoring of fish stocks, enforcement and education, biosecurity management and licensing commercial and recreational fishing activity, including commercial aquaculture.

Western Australian Fisheries Legislation administered by DPIRD is available via the following link https://www.wa.gov.au/organisation/department-of-primary-industries-and-regional-development/western-australian-fisheries-legislation.

In Western Australia there are 43 commercial fisheries managed by the DPIRD (noting this does not include exemption-based fisheries or developmental fisheries). These fisheries are managed using a range of different input and output controls and regulations. Other measures may also include technical rules on fishing gear, zones and biological-based restrictions. Each fishery is monitored by a compulsory logbook system, which requires a fisher to report the catch and effort for each fishing event.

Fishery Status Report

The *Status reports of the Fisheries and Aquatic Resources of Western Australia* provides an annual update on the state of the fish stocks and other aquatic resources of Western Australia. These reports outline the most recent assessments of the cumulative risk status for each of the aquatic resources within WA's six Bioregions using an Ecosystem Based Fisheries Management approach. DPIRD has an extensive range of other scientific and grey literature available through their website. When preparing an EP, titleholders and/or other relevant proponents should undertake a literature review before consulting with the relevant stakeholders to ensure a detailed understanding of fisheries is known.

Contact details for individual commercial fishers

To obtain contact details for individual commercial fishers in WA, the public can access the public register. The register is required to keep information relating to authorities and exemptions that can be accessed by the public. DPIRD's public register is available by application, where you can request a copy of an entry, or extract from the register. Applicants should complete the following application, pay a prescribed fee as defined under the prescribed regulations and submit the application via enquiries@dpird.wa.gov.au and a list will be provided. It is important to refresh this list routinely to account for licence transfers and owner changes. http://www.fish.wa.gov.au/Documents/commercial_fishing/r-1_application.pdf.

DPIRD also provides information for the petroleum industry on how to consult with the DPIRD and the commercial fishing industry and undertaking seismic surveys in Western Australian waters. These documents are available via the links below.
http://www.fish.wa.gov.au/Documents/occasional_publications/fop112.pdf
http://www.fish.wa.gov.au/Documents/occasional_publications/fop113.pdf

Spatial boundaries for commercial fisheries

The gazetted spatial boundaries for all fisheries in WA are publicly available at https://data.wa.gov.au/ which is the central portal for WA government data.

Catch and fishing effort data

Information on how to obtain commercial catch and effort data from DPIRD is described in Table 2.

Table 2. WA - catch and fishing effort data request process

Who to contact	Email: datarequest@dpird.wa.gov.au
How to make a request	Download data request form and complete the form with required data and submit via email. www.fish.wa.gov.au/Sustainability-and-Environment/Fisheries-Science/Stock-assessment-and-data-analysis/Pages/Making-a-data-request.aspx.
What data is available	Catch, effort, fishery, block locations, species
Format of data	Data extracts are usually sent out as an Excel worksheet.
Data access constraints	Catch data cannot be released for areas/times where there has been effort from less than three boats.
Access to confidential data	Confidential data from areas/times with less than three boats can only be released by authority from the commercial fishing licence holders.
Timeframe	10 business days

South Australia

The Fisheries and Aquaculture division of the Department of Primary Industries and Regions, South Australia (PIRSA) enables the sustainable development of South Australia's aquatic resources and the growth of our fisheries and aquaculture industries. PIRSA manages South Australia's fish stocks in partnership with industry and the community.

South Australia's key wild capture fisheries comprise of 17 key commercial species complexes assessed across 45 individual stocks. Detailed information on these fisheries can be found via https://www.pir.sa.gov.au/fishing/commercial_fishing/fisheries and South Australian Research and Development Institute (SARDI) Research Report series.

South Australian Fisheries Legislation administered by PIRSA is available via the website.

Fishery Status Report

The status report of the Fisheries of South Australia is provided routinely as required with the most recent report available via the website.

Contact details for individual commercial fishers

To obtain contact details for individual commercial fishers in SA the public can access the public register. The register is required to keep information relating to authorities and exemptions which can be accessed by the public. Access to the public register is available on the following website link https://egate.pir.sa.gov.au/fishreg/new/html/FishPubRegMenu/menuDisplay.

Spatial boundaries for commercial fisheries

The spatial boundaries for fisheries in SA are publicly available in the relevant management plan and Data SA.

- https://pir.sa.gov.au/fishing/commercial_fishing
- https://data.sa.gov.au/data/dataset/?tags=Fisheries

Catch and fishing effort data

The fisheries science program in SA develops and maintains databases of commercial catch and effort and fishery-independent survey data. Information on how to obtain commercial catch and effort data from PIRSA is described in Table 3.

Table 3. SA - catch and fishing effort data request process

Who to contact	Email: pirsa.fisheriesinformationservices@sa.gov.au
How to make a request	Request a data request form via the contact details above.
What data is available	Fishery, catch, effort, value (GVP), block locations/regions, species.
Format of data	Data extracts are usually sent out as an Excel worksheet but other formats can be arranged.
Data access constraints	Catch data cannot be released where the distinct licence count of the record is from less than 5 licenses.
Seeking access to confidential data	Confidential data, where the distinct licence count is less than five licenses, can only be released by authority from the commercial fishing licence holders. In some instances, fishing industry supporting document may also be required. It must be noted that catch history is not transferable and therefore if data from a previous licence holder is required then the licence holder will need to authorise the release of their data.
Timeframe	15-20 business days although this may vary.

Victoria

Victorian Fisheries Authority (VFA) is an independent statutory authority established to manage Victoria's fisheries resources. VFA works closely with stakeholders to deliver three core outcomes: sustainable fishing and aquaculture; clear resource access and sharing arrangements; and increased economic, social and cultural value.

Victoria's Fisheries Legislation administered by VFA is available via the following website https://vfa.vic.gov.au/operational-policy/legislation-and-regulation

Fishery Status Report

Reports outlining the status of Victoria's fishery resources including details on recent changes in management arrangements, research and compliance activities is available here.

Additional information relating to fish stock status in Victorian fisheries can be found in the Status of Australian fish stocks reports https://www.fish.gov.au/reports/key-results.

Spatial boundaries for commercial fisheries

The spatial boundaries for fisheries in Victoria are publicly available via Data Vic and via fisheries management plans https://vfa.vic.gov.au/operational-policy/fisheries-management-plans.

VFA also provide information for the petroleum industry on undertaking seismic surveys in Victorian waters.

Other fisheries related publications are available via: https://vfa.vic.gov.au/about/publications-and-resources.

Catch and Effort Fishing data

Information on how to obtain catch and effort data from VFA is described in Table 4.

Table 4. VFA - catch and fishing effort data request process

Who to contact	Email: commercial.licensing@vfa.vic.gov.au
How to make request	For specific data requests or advice on catch and effort information available please contact: Catch and Effort Unit Victorian Fisheries Authority Phone:136 186
What data is available	License areas, number of operators active within an area, timing of catch, catch and effort, spatial mapping of catch at reporting grids (10 X 10 nm).
Format of data	Data can be provided in aggregated raw format or mapping information can be provided as per reporting grids (10 X 10 nm).
Data access constraints	Where there are less than five fishers in a zone, data is not provided for confidentiality reasons. The number of days fished can be provided, but the total catch will not be.
Access to confidential data	A deed of confidentiality can be entered into should the individual fisher agree.
Timeframe	Typically, catch and effort data requests are answered within two weeks.

Tasmania

The Department of Primary Industries, Parks, Water and Environment (DPIPWE) is the lead natural resources agency, responsible for the sustainable management of the State's natural and cultural heritage and the integrity of the racing industry for the benefit of the Tasmanian community.

Detailed information on Tasmanian fisheries is available via https://dpipwe.tas.gov.au/sea-fishing-aquaculture/commercial-fishing

Fishery Status Report

Stock assessments of wild fisheries in Tasmania are undertaken by the nominated service provider, the Institute for Marine and Antarctic Studies (IMAS) at the University of Tasmania: https://www.imas.utas.edu.au/research/fisheries-and-aquaculture/publications-and-resources.

Contact details for individual commercial fishers

The *Living Marine Resources Management Act 1995* requires the Secretary of DPIPWE to keep a register of authorisations and fishing certificates. The Registrar is to make the register available for public inspection and a person may be allowed to obtain a copy of, or an extract from, any entry in the register. Additional information regarding this requirement is available via the following link: https://dpipwe.tas.gov.au/Documents/MG-Release-of-Private-Information.pdf

The following methods can be used to contact the licensing section:
In Person: Level 1, 134 Macquarie Street, Hobart, Tasmania
Phone: 03 6165 3000
Email: fisheries.licensing@dpipwe.tas.gov.au
Website: www.fishing.tas.gov.au

Spatial boundaries for commercial fisheries

The spatial boundaries for fisheries in Tasmania are available via the following links:

- https://dpipwe.tas.gov.au/sea-fishing-aquaculture/recreational-fishing/area-restrictions
- https://dpipwe.tas.gov.au/sea-fishing-aquaculture/commercial-fishing/rock-lobster-fishery/rock-lobster-area-closures
- https://dpipwe.tas.gov.au/sea-fishing-aquaculture/commercial-fishing

Catch and Effort Fishing data
Information on how to obtain catch and effort data from DPIPWE is described in Table 5.

Table 5. Tasmania - catch and fishing effort data request process

Who to contact	Email: Denise.Garcia@dpipwe.tas.gov.au
How to make a request	Contact Denise Garcia to obtain a confidentiality agreement
What data is available	Catch, effort, fishery, species
Format of data	N/A
Data access constraints	Refer to confidentiality agreement
Seeking access to confidential data	Subject to the Confidentiality agreement
Timeframe	Determined by the approval process

Northern Territory

The Northern Territory Department of Industry, Tourism and Trade (DITT) was established in 2020 as the Northern Territory public sector's coordinating agency for economic and industry development.

The Agriculture, Fisheries and Defence division of DITT is responsible for supporting and protecting the Northern Territory's agriculture and fishing industries.

Information on fisheries is available via https://industry.nt.gov.au/industries/fisheries, and via the Northern Territory Seafood Council (NTSC) which is an incorporated association for the commercial fishing industry https://www.ntsc.com.au/.

Annual economic information on fisheries is available via https://industry.nt.gov.au/economic-data-and-statistics/economy/economic-profile and Fisheries-related publications can be obtained at https://industry.nt.gov.au/publications/fisheries-publications which takes you to an advanced search https://industry.nt.gov.au/publications/primary-industry-publications/publications-search.

Fishery Status Report

Current fisheries research information and fish stock status is available through https://industry.nt.gov.au/projects-and-initiatives/fisheries/fisheries-research with the most recent version available here.

Contact details for individual commercial fishers

Contact information https://industry.nt.gov.au/contacts. Senior Licensing Officer NT Fisheries FisheriesLicensing@nt.gov.au (08) 8999 2370

Catch and Effort Fishing data

Information on how to obtain catch and effort data from Northern Territory is described in Table 6.

Table 6. Northern Territory - catch and fishing effort data request process

Who to contact	To discuss data requests: Program Leader, Research and Field Operations NT Fisheries Email: Steven.matthews@nt.gov.au (08) 8999 2148
How to make request	Send detailed request via email to FisheriesLicensing@nt.gov.au A fee is payable for extraction of the data. This fee varies depending upon the complexity of the request. Rate is $40/hr.
What data is available	Number of licenses active, catch and effort data spatially and temporally. Data is based on 60nm x 60nm grids. Some fisheries record data to 10nm x 10nm grids and some even report to GPS location (noting confidentiality constraints may preclude the distribution of data at this scale.
Format of data	Data can be provided in raw format or mapped using GIS capabilities. The more complex a request the greater the cost.
Data access constraints	The Department's policy is not to release data that is derived from less than five licenses (for a given spatial area or period of time).
Access to confidential data	Confidential data can only be provided with the authorization of the license holder. This is the responsibility of the requesting agency.
Timeframe	Timelines of response would depend upon the complexity of the request but generally about two weeks for most requests.

Queensland

The Department of Agriculture and Fisheries is responsible for ensuring the production and protection of Queensland's rich natural resources.

The Fisheries division manages the sustainability and allocation of fisheries resources for all Queenslanders. It also incorporates the enforcement of fisheries and boating safety laws through the Queensland Boating and Fisheries Patrol. This enables profitable businesses and enjoyable recreational fishing experiences for locals and visitors.

Information on fisheries is available via https://www.business.qld.gov.au/industries/farms-fishing-forestry/fisheries/fisheries-profiles.

Fisheries-related publications are available here.

Information on Queensland's fisheries legislation is available here.

Fishery Status Report

Current fisheries research information and fish stock status is available through https://industry.nt.gov.au/projects-and-initiatives/fisheries/fisheries-research with the most recent version available here.

Contact details for individual commercial fishers

Queensland's fisheries resources are publicly owned. Details of commercial fishing authorities (licences, permits, and quota holdings) and developmental approvals (aquaculture) are held in the fisheries register of authorities and fisheries developmental approvals systems. Information on how to search the fisheries register is available here.

Catch and Effort Fishing data

Information on how to obtain catch and effort data from Queensland is described below in section 9.3.1.

9.3 Case Studies

9.3.1 Data access and information sharing

Streamlining the approval process for the oil and gas sector by having access to the most up-to-date fishing information, as described in section 9.2, supports the sector in the early planning stages to understand the potential impacts associated with any proposed activities. It also provides relevance to the commercial fishing industry and their operations as upfront awareness provides an early warning sign for the potential overlap of operations. While the processes described assist in streamlining the EP approval for the oil and gas sector, there are examples across Australia which streamline this even further and provide an effective and efficient way to obtain data.

The Queensland Department of Agriculture and Fisheries produced a streamlined approach in providing Queensland Fisheries resources and spatial datasets using interactive tools called QFish. The QFish mapping interface allows users to spatially view the selected summarised fisheries data. The interactive tool means data is available publicly.

QFish is available via the following link: https://qfish.fisheries.qld.gov.au/

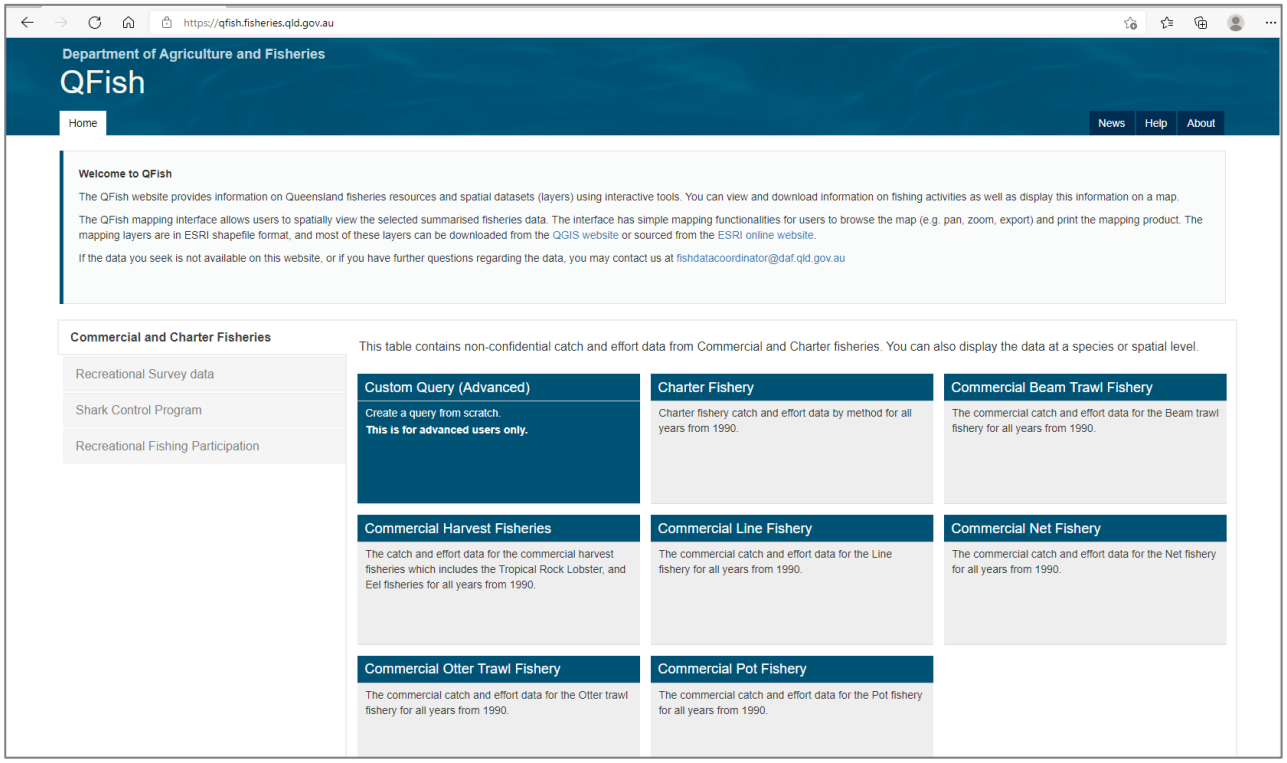

Figure 3. QFish Data Platform

The public accessibility of the QFish platform enables the oil and gas sector to understand fishing data and the potential impacts prior to undertaking any formal consultation for a proposed seismic survey. In the early planning process, coarse data provides information on what fisheries intersect with the proposed survey area, where and when fishing typically occurs through the year and identifies any windows of opportunity which can remove any upfront impacts to commercial fishing operations.

In the preparation of the EP, quantitative data on the fishing catch and effort and seasons informs prioritisation of relevant persons for consultation and environmental impact assessment, including the potential design of control measures to reduce impacts on commercial fishing as a socio-economic value of the environment.

In circumstances where a compensation claim for loss adjustment, as a result of the impacts from seismic surveys, is agreed between a titleholder and an individual fishing licence holder, access to individual catch and effort data in the survey area, as well as historical data for the same area will need to be obtained. In these circumstances a platform such as QFish cannot provide this fine scale and as outlined in section 9.2 the individual commercial fisher would need to provide approval to the relevant State/Territory fisheries agency before the data is released.

In Western Australia, DPIRD has also developed an electronic interface for users to spatially view selected summarised fisheries data, called FishCube. The development of FishCube was based on the QFish model and now provides DPIRD with a streamlined way of managing data requests. Whilst the FishCube platform is not publicly available at the time of publishing this report, the intent is to have it public in the future.

In Tasmania, the Institute for Marine and Antarctic Studies (IMAS) has an Open Data policy, making it easy and accessible to the general public and researchers. IMAS also operates facilities and hosts data sets of national and global interest and for the benefit of the community.

Contact the IMAS Data Manager for any queries regarding how to discover, manage or publish your research data at IMAS.DataManager@utas.edu.au or here.

The examples provided above recognise the benefits of sharing data in a responsible and purposeful manner to create an enabling environment which enhances coordination and collaboration within and between the commercial fishing industry and oil and gas sector.

It's important to recognise that any good data framework should be based around relevancy, accuracy and precision to ensure shared data is representative of the purpose for which it is intended. Whilst models, such as QFish, provide ease of access in a web-based environment the interpretation of data it provides often requires consultation or assessment by scientists or relevant industry experts to give full meaning to its outputs.

9.3.2 Collaboration Seismic Environment Plan

National Energy Resources Australia (NERA) is an independent Industry Growth Centre funded by the Australian Government, focused on the transformation of Australia's energy sector through innovation, collaboration, and efficiency. In 2018, NERA established the Collaboration Seismic Environment Plan (CSEP) project led by a voluntary oil and gas sector consortium of eleven member companies. CSEP's responsibility is to drive acceptance of an EP from NOPSEMA for future seismic survey activities in an area in Commonwealth waters from Northwest Cape in Western Australia through to the Joseph Bonaparte Gulf in the Northern Territory. The project, once approved by NOPSEMA, will remove considerable consultation burden and create a new baseline on how the oil and gas sector and the commercial fishing industry can work together under a shared and respected understanding for each other's industry and licence to operate.

The CSEP project team has worked closely with Western Australian Fishing Industry Council, NT Seafood Council, Commonwealth Fisheries Association, State and Territory Fisheries Resource Agencies and commercial fishery licensees in fisheries which are active within the CSEP operational area.

The project was established to achieve fundamental and long-term improvements to the way seismic activities are planned with consideration for commercial fishing activities. The CSEP project is focused on overcoming some of the main causes of tension between the commercial fishing and oil and gas exploration industries and to establish one common EP for seismic surveys conducted by CSEP consortium member titleholders through a novel whole-of-basin approach and over a five-year period.

The CSEP Project has been addressing the commercial fishing industry's concerns through the development of seismic survey protocols to provide a process for commercial fishers to:

- receive monetary adjustment for evidence-based loss of catch using an independent assessment process;
- receive monetary adjustment for displacement of commercial fishing activities;
- receive monetary adjustment for fishing gear damage from seismic survey vessels;
- to establish standardised communication timing and content related to proposed seismic survey activities; and
- to set out acceptable spatial and temporal parameters for seismic surveys (when/where/how many) to be conducted under the CSEP that take commercial fishing interests into consideration.

Commercial Fishing Industry Adjustment Protocol

The CSEP consortium has committed to ensuring that best endeavours will be made to avoid, minimise and mitigate potential impacts on the commercial fishing industry before the adjustment processes contained in the protocol are applied.

The Commercial Fishing Industry Adjustment Protocol provides a standardised, evidence-based process, whereby commercial fishers may receive monetary adjustment to offset loss of catch, gear damage/loss and displacement of fishing effort in areas where they fish at the same time as a seismic survey conducted under the CSEP. Claim assessments are funded by the seismic survey title holder and a binding independent expert review of claim outcomes is available to commercial fishers. A copy of the final approved Commercial Fishing Industry Adjustment Protocol is provided in Appendix 2.

Operational Protocol

The main objectives of this operational protocol are to:

- provide potentially affected commercial fishers with a standardised format and schedule for communications relating to planned seismic surveys under the CSEP that will take place before, during and after the survey activity; and
- put in place key controls which will limit the size, timing and location of surveys which can take place under the CSEP by a consortium member throughout the anticipated five-year validity period of the CSEP Environment Plan.

Under the protocol, the CSEP consortium members will provide a report to commercial fishers, on an annual basis, with regards to compliance with the Operational Protocol. A copy of the final approved Commercial Fishing Industry Operational Protocol is provided in Appendix 3.

If approved, the common EP framework will be valid for a period of at least five years and will enable consistent assessment of environmental impacts when applying for and conducting seismic acquisition activities in the CSEP project area. In the 12 months to March 2019, approximately $887 million was spent on offshore exploration in Australia. The Carnarvon Basin, Browse and Bonaparte basins, located offshore in the Northwest of Australia, are Australia's most prolific petroleum basins, with more than 60% of Australia's oil and gas production currently sourced from Northwest Australia.

The benefits of a successful project could see improved certainty for both commercial fishing and petroleum industries, greatly reduced consultation burden for all stakeholders, and a strategic assessment of impacts across Northern Australia.

The Two Protocols abovementioned are complete and available publicly here.

At the time of publishing this report the EP for the CSEP project was not yet approved by NOPSEMA. Despite this, the development of these two protocols following an extensive consultation process with the eleven oil and gas companies, WAFIC, NT Seafood Council, the Commonwealth Fisheries Association, State and Territory Fisheries Resource Agencies and commercial fishery licensees establishes a new baseline for industries working together and how to do business for future seismic survey activities.

9.4 Principles of engagement between industries

As described in Knuckey et al. 2016 conflict issues between the fishing and petroleum industries were primarily a result of a fundamental lack of understanding by each industry of the other's operational requirements and constraints, inadequate access to timely information, poor engagement and associated communications challenges.

Additional recommendations based on the best practice case study examples identified four overarching processes by which these issues can be addressed:

- Having accessible, easy to use central website-based information on the two industries' associated communication processes
- Undertaking Roundtable discussion and feedback into overarching policy and process
- Holding annual regional stakeholder meetings to discuss future planning and issues
- Undertaking one-on-one industry/individual discussions.

A project which further underpins the new baseline for the two industries working together set by the NERA CSEP project, and as described by Knuckey et al. 2016, is the development of a guidance framework. This project is led by DISR, DAFF and NOPSEMA and involves a series of workshops to guide more cooperative engagement between the seismic survey operators and fishing industries in Australia. Whilst making some positive steps towards developing a guidance framework between the two parties, it became apparent that overall agreement would not result in final acceptance of one single framework. At the time of publishing this report DISR, DAFF and NOPSEMA intend to proceed with developing the guidance framework and this will be available for voluntary adoption by both the oil and gas sector and the commercial fishing industry.

During the development of the guidance framework, the peak fishing bodies, as identified in section 9.2.1, developed a Policy Framework for Consultation and Engagement, refer to Appendix 4. The purpose of developing this policy was to provide best practice consultation guidelines from the commercial fishing industries perspective to enable oil, gas and seismic survey titleholders to minimise impacts to the commercial fishing industry, whilst still satisfying consultation requirements for Commonwealth and State EPs as defined under the relevant legislation.

APPEA also developed a framework titled *The Offshore Petroleum Industry Key Principles for Fishers' Engagement* which establishes leading practice principles for the offshore oil and gas industry and set the foundation for effective and consistent consultation between offshore oil and gas titleholders and fishing stakeholders, refer to Appendix 5.

The adoption of the key principles from the peak fishing bodies outlined below, and in reference to APPEA's framework will considerably improve the consultation process, streamline consultation requirements and deliver a two-way transparent outcome for both parties.

9.4.1 Key Principles

Good consultation and industry engagement with the commercial fishing industries across Australia should adhere to the following principles:

Early Engagement

Early engagement in the preliminary planning stages of any proposed oil and gas activity is essential to minimise impacts to both aquatic organisms, aquatic environment and the commercial fishing industry.

If stakeholder engagement is undertaken in the early stages of planning, before any operational dates are established, there is a greater opportunity to assess and address areas of concerns. Identified issues can be negotiated with a view to achieving better outcomes.

Engagement with relevant persons should begin a minimum of 12 months prior to the commencement of planned seismic surveys.

Genuine consultation

Genuine consultation is expressed through the ability to negotiate in good faith around areas of concern. As an example, if a titleholder approaches a consultation process with operational plans decided (time, area and method) then the purpose of the consultation is not a genuine attempt to minimise risk and impacts on the fishing business. Genuine consultation is supported by early engagement.

Proportional consultation

Each fisher, business or representative body has a level of exposure to potential impact which could be incurred as a result of the seismic testing. The titleholder should give weight to stakeholder comments in proportion to this exposure.

Weighting can be assessed through considering what proportion of the industry the organisation represents or the proportion of the total allowable catch the fisher is licensed to fish. The titleholder should demonstrate a minimum threshold of consultation. Proportional consultation avoids the appearance of “consultation shopping”.

Thorough consultation

When gathering the relevant data and science the titleholders must do the work which is required to ensure the scientific gaps can be addressed, where possible. Broader impacts must be considered, including:

- Cumulative impacts
- Ongoing consultation fatigue
- Impacts causing financial loss must be adjusted.

Regional coordination meetings

As defined in the NERA CSEP project there is also any opportunity to explore an improvement in facilitating and sharing of information in early engagement, though the establishment of regional coordination meetings. The meetings should be held with multiple stakeholders across both

industries in key regions where multiple seismic survey activity is planned. The concept of this stems from standard practice undertaken in the fishing industry where fisheries managers, scientists and commercial fishers meet annually to go through information relating to their fishery.

The purpose of the regional coordination meetings would be to:

- Share information on future planned petroleum activities, including location, timing and nature of operations, in the region of interest.
- Identify areas of potential overlap/interaction and allow early identification of important stakeholders for continued engagement to manage this cooperatively.
- Build relationships and develop an understanding between members of these two important industries.
- Provide opportunities for information sharing of mutual interest to be presented (for example new research findings on the impacts of seismic surveys, fisheries stock assessment results and cumulative impacts from multiple surveys.

Attendees should be able to provide expertise on matters to be discussed and include representatives of the fishing and seismic industry associations, individual seismic operators, and fishers, as well as representatives from petroleum and fishing government policy agencies and regulators. Meetings would be held at least once annually. When there is proposed activity in a region, meetings should be held more frequently. The regional coordination meetings can be one mechanism to identify relevant person(s) for a proposed seismic survey activity, but they do not replace consultation processes with relevant persons for the purposes of EP development (DISR, 2021).

Regional coordination meetings will also provide an opportunity to discuss continuous improvement in the consultation and information sharing processes and explore ways to increase information and data exchange between industries.

9.5 Petroleum Safety and Cautionary Zones

Within the scope of the FRDC project a review of the use of petroleum safety zones was undertaken to determine where applicable if any modifications to exclusions could allow for safe access to otherwise restricted areas by the commercial fishing industry. With 3,821 petroleum wells currently in situ in Australian waters (current in August 2021) with most likely having an exclusion zone around it, the loss of access to those areas, has a compounding effect for the commercial fishing industry across Australia. This does not consider or include the associated infrastructure such as pipeline, cables and the restriction on trawling over structures.

Across Australia, NOPSEMA commenced administration of petroleum safety zones as provided for OPGSS, on 28 April 2020. Safety zones are specified areas surrounding petroleum or greenhouse gas wells, structures or equipment which vessels or classes of vessel are prohibited from entering. As required by any marine user, it is essential that exclusion zones are known prior to departure. However, the challenge for marine users is maintaining this information to ensure no incidents or safety breaches occur. NOPSEMA publishes current notices and safety zones are shown as a 'Restricted Area' on navigation charts.

Justification for the extent of a safety zone OPGGS Act sections 616(2) and 617(2) provide that a safety zone may extend to a distance of 500 metres around a well, structure or equipment. An application by an oil and gas titleholder must provide a case for the extent of a safety zone in the interests of balancing the risks to the safety of the well, structure or equipment with the potential impacts on other users of the ocean commons. Such a case should include (but not be limited to) consideration of factors such as:

(1) proximity to shipping lanes;
(2) proximity to commercial fisheries;
(3) water depth;
(4) the activities that will, or are likely to, take place at, or in connection with the well, structure and/or equipment; and
(5) the outcomes of consultation.

The Australian Maritime Safety Authority (AMSA) also has a role in safety zones as the national agency responsible for maritime safety, protection of the marine environment, and maritime aviation search and rescue. AMSA contributes to the continuous improvement and development of maritime safety, environmental management, and emergency response systems in our region and globally.

AMSA provides a range of information for commercial fishing vessels and offshore oil and gas industry to ensure they are compliant and all the safety obligations under Australian standards and regulations are applied. Additional information is available via the AMSA website:

- https://www.amsa.gov.au/audiences/commercial-fisher
- https://www.amsa.gov.au/safety-navigation/navigating-coastal-waters/offshore-oil-and-gas-exploration
- https://www.amsa.gov.au/vessels-operators/domestic-commercial-vessels/hook-response-trawlers.

The Australian Hydrographic Office (AHO) is responsible for providing Australia's national charting service under the terms of United Nations Safety of Life at Sea convention and the *Navigation Act 2012*. This role requires provision of nautical charting (including charts in electronic form) and associated services in support of maritime safety, the coordination and determination of policy and standards which cover both hydrographic surveying and charting, as well contributing to the coordination, exchange and standards related to maritime geospatial data in general.

Cautionary Zones

AMSA also make provision and advise on the potential charting of additional cautionary areas around offshore oil and gas facilities. These additional cautionary areas may be 2.5 to 5.0 nautical miles in diameter. Vessels not involved with the operations of the offshore facility are advised to avoid navigating, anchoring, stopping or fishing within the limits of any charted cautionary area. This is particularly relevant for seismic operations where fishers and fishing gear must be removed from the path of an active vessel. This temporary displacement can have implications to commercial fishing operations and can disrupt catch rates as fish may move away from the seismic source.

Detailed information on the offshore exclusion zones is provided in the Seafarers Handbook for Australian Waters (AHP20) from the Australian Hydrographic Service, which is available via: https://www.hydro.gov.au/prodserv/publications/AHP20_Edition_5.pdf.

As detailed above, the use of petroleum safety zones and cautionary zones is an essential component of ensuring the safety of oil and gas activities and the safety of all marine users, including the commercial fishing industry. The nature of oil and gas and the products they extract make the risks higher in comparison to other industries, as an emergency spill event would have catastrophic consequences to the marine environment. That is why throughout the world, petroleum safety zones and cautionary zones are implemented to protect marine users from incidents such as collision, snagging, loss of gear and damage to underwater petroleum equipment.

At a simplistic level, petroleum safety zones restrict access to commercial fishers, who have an access right to catch fish in certain areas managed and licensed through the relevant fisheries management authorities. However, compromising on safety to gain some additional fishing grounds near offshore oil and gas infrastructure is not an option and was therefore not recommended or considered further in this project. However, for other marine infrastructure and industries, such as offshore renewable energy and artificial reefs the risks are considerably lower and therefore regulators and Government need to ensure that the development of exclusion zones and cautionary zones factor the lower risk into policy settings.

Collectively, exclusion zones around oil and gas infrastructure may have positive benefits by providing artificial habitat for aquatic resources, particularly in areas of intensive petroleum activities such as the Pilbara region in WA. The benefit, whilst unsubstantiated, may actually support population growth for some aquatic resources. As the oil and gas industry moves into the decommissioning of wells and the associated infrastructure, the understanding of this benefit may become clear in the coming years.

The assumption made here is that the oil and gas sector does not permit staff, contractors or sub-contractors in undertaking any kind of fishing activities from offshore infrastructure and/or from vessels.

9.6 Fee-for-service environment plan consultation

There is an ongoing challenge in undertaking consultation and managing operational impacts with relevant persons in the development of EP managed through NOPSEMA in Commonwealth waters, and other various State Government agencies regulators in State/Territory waters.

In many cases the consultation process between the oil and gas sector and the commercial fishing industry has resulted in consultation burden and broader misunderstandings about who is the relevant persons and importantly a non-response from a commercial fisher does not always mean they are not potentially impacted by a proposed petroleum activity.

NOPSEMA developed an information paper to provide advice to titleholders to improve the quality of environmental impact assessments for marine seismic surveys and ensure common deficiencies are avoided. Some of these deficiencies relate to commercial fishing and the approach to consultation and the process does not encourage stakeholders to provide information of relevance to the environmental management of the activity. Further details are available via: https://www.nopsema.gov.au/sites/default/files/documents/2021-03/A625748.pdf.

Consideration for managing issues arising from the consultation burden generated through over-consultation with non-affected fishers, difficulty identifying relevant persons, the diversity of consultation methods (for example mail and/or email) and growing concerns from the commercial

fishing industry, resulted in the development of the Fee-for-Service model at WAFIC, refer to Appendix 6 (note this model is no longer current).

The Fee-for-Service model not only streamlined who to consult, but also allowed information to be targeted and customised to ensure fishers understood the content. Additionally, it simplified the consultation method as email addresses could be utilised, which aren't currently available through the extract from the public register when requesting commercial fisher licence holder information. The challenges associated with the Fee-for-Service model is having the resources to maintain the expected workload and managing the (perceived) conflict of interest. While serving a purpose, this model in its current form has proved problematic in that the volume of work can be overwhelming and the ability for WAFIC to deliver under the current fee structure is challenging. Recently, and after a detailed review of the model, WAFIC has commenced the trial of a revised Fee-for-Service model. For more information, please contact WAFIC directly via oilandgas@wafic.org.au.

There is another Fee-for-Service model utilised by the South East Trawl Fishing Industry Association (SETFIA). Information relating to this service is provided in Appendix 7 - *A guide for the Oil & Gas Industry – South East Trawl Fishing Industry Association*. SETFIA offers its fee-for-service model to help minimise the impacts on all South East fisheries by optimising the consultation process.

The Fee-for-Service model presents an opportunity to the oil and gas sector for future consideration in exploring innovative solutions to manage the ongoing challenges of consultation fatigue and non-response. In other jurisdictions overseas, such as Canada, the oil and gas industry benefit from the use of a fisheries liaison in order to help proposals run smoothly. Fisheries liaisons function as a link between the two industries, providing critical information, developing plans to avoid conflict and impacts to the fishing industry and sending out notices to fishing industry (Perry et al. 2012). With additional funding, the implementation of this model could benefit both parties and provides another solution to the ongoing consultation challenges.

10 Discussion

As identified in the project scope at commencement there was a need for a national approach for both the commercial fishing industry and the offshore oil and gas sector throughout Australia, to ensure both parties can work together under a shared and respected understanding for each other's industry and licence to operate in the marine environment.

Throughout Australia, the operations of commercial fishers continue to experience ongoing displacement from fishing grounds as they move away from seismic vessels and other petroleum activities, and with rising concerns from commercial fishers that seismic surveys are affecting the aquatic resource in the short and long-term. By examining peer-reviewed and grey literature on seismic-related effects on commercial and non-commercial fishing species, commercial fishing activities and the broad marine environment, research gaps became more evident. At a broad level, impacts from seismic surveys varied according to species and habitat type and collective conclusions are not easily demonstrated at a suite or population level.

On 16 September 2019, the Parliament of Australia referred to the Environment and Communications References Committee for an inquiry and report on the impact of seismic testing on fisheries and the marine environment, with particular reference to:

a) the body of science and research into the use of seismic testing; and
b) the regulation of seismic testing in both Commonwealth and state waters; and
c) the approach taken to seismic testing internationally; and
d) any other related matters.

This crossover between the objectives defined in this project and the outcome of the Senate Inquiry released in June 2021 support the recommendations that more science is needed to fully understand the impacts of seismic testing on fisheries and the marine environment. https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Environment_and_Communications/SeismicTesting/Report.

The key gaps in research include an understanding on the long term or cumulative effects of noise disturbance to aquatic resources, impacts to larval stages of commercially important species, impacts to Elasmobranch species, impacts on all key commercial species in Australia within concentrated oil and gas areas, the physiological responses to noise disturbance for most species and the difference between laboratory experiments compared to the natural operating environment.

The ongoing requirement to undertake seismic surveys as part of standard oil and gas sector practices further underpins the need for research, importantly as identified through the Senate Inquiry. The committee recommends that the Australian Government actively consider a levy on oil and gas companies which conduct offshore seismic activities to fund research into the impacts of seismic testing on marine fauna and the environment. The independence to any such research would form an important element to give any findings conclusive merit. Recent discussions have suggested that the use of seismic surveys is reducing across the oil and gas sector and whilst this may provide some relief for the commercial fishing industry, it does not change the need for further research.

The Ecological Risk Assessment Workshop undertaken in 2016, as described in Webster et al. (2018) (Appendix 8) provided DPIRD with the first step in understanding the broader impacts seismic

surveys may pose to finfish and invertebrates in waters off Western Australia. The risk assessment involved estimating the level of risk associated with seismic surveys on the survival and/or the reproductive capacity of marine finfish and invertebrates' individuals closest to the seismic source, for a period of 12 months directly following exposure. The outcomes of the risk assessment were used to inform fisheries advice and guidance provided to titleholders and the regulators in relation to proposed seismic surveys in both State and Commonwealth waters.

The commercial fishing industry and oil and gas sectors would benefit from an updated Ecological Risk Assessment Workshop on the impacts from seismic surveys to fish and invertebrates. This will ensure the risk assessment outcomes are informed by updated science. The outcomes from a revised Ecological Risk Assessment process will assist in prioritising what science should be done next and inform future mitigation opportunities.

The accessibility and availability of commercial fishing data enables the oil and gas sector to understand the potential impacts prior to undertaking any formal consultation for a proposed seismic survey. In the early planning process, coarse data provides information on what fisheries intersect and therefore who are the relevant persons, where and when fishing typically occurs through the year and whether there are any windows of opportunity that can remove any upfront impacts to commercial fishing operations. Having this information available upfront supports the consultation process between both parties. Typically, the information presented to commercial fishers from the oil and gas sector is very technical and not easily understood. Obtaining data from key stakeholders will enable a more constructive and tailored communication processes upfront and overtime this builds relationships and learnings about both sectors.

The QFish case study presented, highlights the benefits of sharing data in a responsible and purposeful manner to create an enabling environment that enhances coordination and collaboration within and between commercial fishing industry and the oil and gas sector. The QFish platform also demonstrates transparency and can raise the awareness on fisheries information to a broader audience and potentially raise the profile of the commercial fishing industry.

Petroleum safety zones and cautionary zones is an essential component of ensuring the safety of oil and gas activities and the safety of all marine users, including the commercial fishing industry. The nature of oil and gas and the products they extract make the risks higher in comparison to other industries, as an emergency spill event would have catastrophic consequences to the marine environment. At a simplistic level, petroleum safety zones restrict access to commercial fishers, who have an access right to catch fish in certain areas managed and licensed through the relevant fisheries management authorities. However, compromising on safety to gain some additional fishing grounds near offshore oil and gas infrastructure is not an option and was therefore not recommended or considered further in this project. However, for other marine infrastructure and industries, such as offshore renewable energy and artificial reefs the risks are considerably lower and therefore regulators and Government need to ensure that the development of exclusion zones and cautionary zones factor the lower risk into policy settings.

The ongoing challenges in undertaken consultation and data access limitations resulted in the development of fee-for-service options. Whilst the initial scope of this project included developing a national fee-for-service model, it became apparent, that there are other models that may provide an alternative approach. With the fee-for-service model working well in parts of Australia, other parts of the model are proving a challenge regarding resourcing and maintaining the expected workload and managing any conflict of interest. The Fee-for-Service model presents an opportunity to the oil and gas sector and the regulators to consider exploring a range of innovative solutions to

manage the ongoing challenges of consultation fatigue and non-response.

The benefits and success of the NERA CSEP project in conjunction with the development of the guiding principles from APPEA and the peak fishing bodies has shifted the baseline on how to do business and demonstrates how the two industries can work together and improve relationships. A number of oil and gas titleholders across Australia are developing compensation models and other documents that demonstrate an agreement between titleholders and affected commercial fishers.

With a new operating model and baseline emerging between the commercial fishing industry and the oil and gas sector, the positive momentum in building these relationships needs to be directed towards the new challenge in oil and gas decommissioning. With the lessons learnt since the inception of NOPSEMA, now is the time for both parties to continue the conversation to enable both parties to work together under a shared and respected understanding for each other's industry and licence to operate.

11 Implications

The financial implications to both the oil and gas sector and the commercial fishing industry as they work towards co-existence could be significant for both if changes in consultation aren't achieved. For the oil and gas sector, any time delays can result in hundreds of thousands of dollars' worth of impacts to activity costs. For the commercial fishing industry, a single seismic survey may cost an individual thousands of dollars, but the cumulative impacts to multiple fishers from multiple seismic surveys could cost hundreds of thousands of dollars' worth of impacts and jeopardise food security to the consumer.

More recently there has been a positive shift where some oil and gas titleholders are recognising by default the impacts to commercial fishing operations and how financial adjustment/compensation is assessed and awarded to fishers whose operations are affected by seismic surveys. This positive step forward creates an opportunity for compensation to become standard industry practice, as the two industries work towards reducing conflict and supporting co-existence.

12 Recommendations

There are six recommendations which could benefit both the oil and gas sector and the commercial fishing industry as they work towards achieving a more streamlined consultation process and ensure both parties can work together under a shared and respected understanding for each other's industry and social licence to operate.

1. Undertake an updated Ecological Risk Assessment (ERA) on the impacts from seismic surveys to fish and invertebrates to ensure new science is incorporated in the risk assessment process.

2. As identified through the seismic survey literature review, the following research recommendations would assist in developing our understanding of the impacts associated with seismic surveys on aquatic resources: long term or cumulative effects of noise disturbance on key commercial species; impacts on larval stages of commercially important species; impacts on Elasmobranchs; physiological and behavioural responses for pelagic species; the difference between laboratory experiments compared to the natural operating environment.

3. Explore the benefits in developing a national interactive digital platform for example like the Queensland Department of Agriculture and Fisheries QFish for commercial fishing data from all State/Territories to provide transparency, streamline approvals for the oil and gas sector and improve consultation processes.

4. Regulate sharing of seismic survey data between titleholders to minimise the need for undertaking new seismic surveys in areas where data is already acquired.

5. As identified in APPEA's Offshore Petroleum Industry's Key Principles for Fishers' Engagement, compensation and/or financial adjustment practices need to be considered and accepted at a national level and become standard industry practise by the oil and gas sector when proposed activities have unavoidable impacts to commercial fishing operations.

6. The concept and outcomes from this project aimed at improving consultation between the two industries for seismic surveys should be applied to oil and gas decommissioning and renewable energy activities. As this emerging challenge faces these industries, incorporating the key principles learnt to date, will ensure a strategic approach is taken therefore minimising the impacts to the commercial fishing industry and streamlining approval for the oil and gas sector.

13 Further Development

This project offers some policy principles, case studies and opportunities to improve consultation between the oil and gas sector and the commercial fishing industry and it is up to all stakeholders involved to ensure that everyone benefits. Ongoing promotion of the information presented in this report, with a scope to review and improve processes as required will aid in supporting how these two industries work together in the future.

With the support from DISR, DAFF and NOPSEMA there is scope to have some of the principles developed by this project incorporated into regulatory policy and guidance notes.

14 Extension and Adoption

The Industry Reference Group, which was formed across jurisdictions impacted by seismic surveys, that was originally part of the extension scope for this project, was disbanded due to significant change of staff across all industries, impacts from COVID-19 restrictions and the overlap with routine consultation with the offshore oil and gas sector. This group was replaced with a range of ongoing meetings and discussion forums on an as needs basis at a national level coordinated by DISR. As these national meetings progress to develop the document titled *Supporting cooperative coexistence of seismic surveys and commercial fisheries in Australia's Commonwealth marine area*, there will be opportunities to present and promote the recommendations to ensure this project is extended and adopted at a national level.

The EP approval process regulated by NOPSEMA requires ongoing consultation, this presents an ongoing opportunity to extend this information in this final report to ensure its adoption.

15 Project Materials Developed

Commercial Fishing Industry Adjustment Protocols published and completed by the National Energy Resources Australia - https://12259-console.memberconnex.com/Attachment?Action=Download&Attachment_id=349

Commercial Fishing Industry Operational Protocols published and completed by the National Energy Resources Australia - https://12259-console.memberconnex.com/Attachment?Action=Download&Attachment_id=363

Peer-reviewed research and grey literature exploring seismic-related effects on commercial and non-commercial fishing species, commercial fishing activities and the broad marine environment - https://www.frdc.com.au/seismic-and-marine-sound-research

16 Appendices

Appendix 1. Peer-reviewed research and grey literature exploring seismic-related effects on commercial and non-commercial fishing species, commercial fishing activities and the broad marine environment (available via - https://www.frdc.com.au/seismic-and-marine-sound-research).

Year / Date Published	Full Title	Author(s)	How to Cite	Online Link
25/05/2020	Taking the Animals' Perspective Regarding Anthropogenic Underwater Sound.	Arthur N. Popper, Anthony D. Hawkins and Frank Thomsen.	Popper, A., Hawkins, A. and Thomsen, F. (2020). Taking the Animals' Perspective Regarding Anthropogenic Underwater Sound. *Trends in Ecology & Evolution*. 35 (9), pp.787-794	https://www.sciencedirect.com/science/article/abs/pii/S0169534720301324#!
31/10/2017	Multiple field-based methods to assess the potential impacts of seismic surveys on scallops.	Rachel Przeslawskia, Zhi Huang, Jade Anderson, Andrew G. Carroll, Matthew Edmunds, Lynton Hurt and Stefan Williams.	Przeslawski, R., Huang, Z., Anderson, J., Carroll, A., Edmunds, M., Hurt, L. and Williams, S. (2017). Multiple field-based methods to assess the potential impacts of seismic surveys on scallops. *Marine Pollution Bulletin*, 129(2), pp.750-761.	https://www.sciencedirect.com/science/article/pii/S0025326X17309128?via%3Dihub
30/5/2011	Reactions of temperate reef fish larvae to boat sound.	Christian A. Jung and Stephen E. Swearer.	Jung, C. and Swearer, S. (2011). Reactions of temperate reef fish larvae to boat sound. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 21(4), pp.389-396.	https://onlinelibrary.wiley.com/doi/full/10.1002/aqc.1190
2010	Seismic testing and monitoring of farmed fish- Storfjorden 2009-2010.	Snorre Bakke and Jan Erik Dyb.	Bakke, S. and Dyb, J.E. (2010). Seismic testing and monitoring of farmed fish- Storfjorden 2009-2010. Møreforsking, Ålesund Norway. Report MA10/07.	https://gisserver.intertek.com/JIP/DMS/ProjectReports/Cat1/JIP-Proj1.2_Storfjorden_final_2010.pdf
10/10/2002	High intensity anthropogenic sound damages fish ears.	Robert D. McCauley, Jane Fewtrell and Arthur N. Popper.	McCauley, R., Fewtrell, J. and Popper, A. (2003). High intensity anthropogenic sound damages fish ears. *The Journal of the Acoustical Society of America*, 113(1), pp.638-642.	https://www.awionline.org/sites/default/files/uploads/documents/McCauley-1238105863-10165.pdf

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2016	Aiming for Progress in Understanding Underwater Noise Impact on Fish: Complementary Need for Indoor and Outdoor Studies.	Hans Slabbekoorn.	Slabbekoorn H. (2016) Aiming for Progress in Understanding Underwater Noise Impact on Fish: Complementary Need for Indoor and Outdoor Studies. In: Popper A., Hawkins A. (eds) The Effects of Noise on Aquatic Life II. Advances in Experimental Medicine and Biology, vol 875. Springer, New York, NY.	https://link.springer.com/chapter/10.1007%2F978-1-4939-2981-8_131
23/10/2014	Pile-driving pressure and particle velocity at the seabed: Quantifying effects on crustaceans and groundfish.	James H. Miller, Gopu R. Potty and Hui-Kwan Kim.	Miller, J., Potty, G. and Kim, H. (2014). Pile driving pressure and particle velocity at the seabed: Quantifying effects on crustaceans and groundfish. *The Journal of the Acoustical Society of America*, 136(4), pp.2206-2206.	https://asa.scitation.org/doi/10.1121/1.4900001 https://link.springer.com/chapter/10.1007%2F978-1-4939-2981-8_87
6/8/2014	Anthropogenic noise compromises antipredator behaviour in European eels.	Stephen D. Simpson, Julia Purser and Andrew N. Radford.	Simpson, S., Purser, J. and Radford, A. (2014). Anthropogenic noise compromises antipredator behaviour in European eels. *Global Change Biology*, 21(2), pp.586-593.	https://onlinelibrary.wiley.com/doi/abs/10.1111/gcb.12685
3/4/2019	Population-level consequences of seismic surveys on fishes: An interdisciplinary challenge.	Hans Slabbekoorn, John Dalen, Dick de Haan, Hendrik V. Winter, Craig Radford, Michael A. Ainslie, Kevin D. Heaney, Tobias van Kooten, Len Thomas and John Harwood.	Slabbekoorn, H., Dalen, J., Haan, D., Winter, H., Radford, C., Ainslie, M., Heaney, K., Kooten, T., Thomas, L. and Harwood, J. (2019). Population-level consequences of seismic surveys on fishes: An interdisciplinary challenge. *Fish and Fisheries*, 20(4), pp.653-685.	https://onlinelibrary.wiley.com/doi/full/10.1111/faf.12367

19/10/2016	Assessing the impact of marine seismic surveys on southeast Australian scallop and lobster fisheries.	Ryan D. Day, Robert D. McCauley, Quinn P. Fitzgibbon, Klaas Hartmann and Jayson M. Semmens	Day, RD and McCauley, RD and Fitzgibbon, QP and Hartmann, K and Semmens, JM, Assessing the impact of marine seismic surveys on southeast Australian scallop and lobster fisheries, Fisheries Research and Development Corporation, University of Tasmania, Hobart, FRDC 2012/008 (2016) [Government or Industry Research].	https://www.frdc.com.au/Archived-Reports/FRDC%20Projects/2012-008-DLD.pdf
31/7/2018	Noise affects multimodal communication during courtship in a marine fish.	Karen de Jong, Maria Clara P. Amorim, Paulo J. Fonseca and Katja U. Heubel.	de Jong, K., Amorim, M., Fonseca, P. and Heubel, K. (2018). Noise Affects Multimodal Communication During Courtship in a Marine Fish. *Frontiers in Ecology and Evolution*, 6.	https://www.researchgate.net/publication/326715469_Noise_Affects_Multimodal_Communication_During_Courtship_in_a_Marine_Fish
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Appendix 2. Commercial Fishing Industry Adjustment Protocol (embedded PDF)

NATIONAL ENERGY RESOURCES AUSTRALIA

Creating connections for growth

NATIONAL ENERGY RESOURCES AUSTRALIA

COLLABORATIVE SEISMIC ENVIRONMENT PLAN PROJECT

COMMERCIAL FISHING INDUSTRY ADJUSTMENT PROTOCOL

Loss of catch – Displacement – Fishing gear loss or damage

Revision	Date	Purpose
A	May 2020	Engagement with WAFIC/NTSC/CFA
B	August 2020	Broader commercial fishing industry consultation
C5	February 2021	Round 2 commercial fishing industry consultation
1	May 2021	Final published document

Appendix 3. Commercial Fishing Industry Operational Protocol (embedded PDF)

NATIONAL ENERGY RESOURCES AUSTRALIA

Creating connections for growth

NATIONAL ENERGY RESOURCES AUSTRALIA

COLLABORATIVE SEISMIC ENVIRONMENT PLAN PROJECT

COMMERCIAL FISHING INDUSTRY OPERATIONAL PROTOCOL

Communication requirements and seismic survey spatial and temporal controls between commercial fishers and petroleum titleholders

Revisions	Date	Purpose
A	18 Jan 2021	Draft for circulation to consortium members
B	4 Feb 2021	Inclusion of feedback from project team & consortium members
C	12 Feb 2021	Document revisions based on WAFIC feedback
D	20 Feb 2021	Further revisions based on additional WAFIC feedback to Rev C
E	19 Mar 2021	Revisions based on March 9, 2021 Zoom Meeting feedback
F	27 Mar 2021	Revisions after 3rd consortium review.
G	8 Apr 2021	Revisions based on April 7th Zoom Meeting feedback.
1	30/06/2021	Final document for initial release

Seafood Industry Australia

Policy Framework
Consultation and Engagement

Overall Goal

The overall goal of good consultation is to **minimise the impact and risk** on both the seafood industry and the oil and gas industry.

Background

Seismic surveys, drilling, exploration, geotechnical surveys, construction and installation of sub-sea infrastructure, and decommissioning are part of ongoing oil and gas industry requirements. These activities have the potential to affect aquatic organisms, including commercially and recreationally important finfish and invertebrate species and their food source. The impact of these activities also has a demonstrated effect on the business activities of commercial fishers.

There is an ongoing challenge in undertaken consultation with relevant person(s) in the development of environment plans (EP) managed through National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) in Commonwealth waters, and other various State Government agencies regulators in State waters.

Stakeholder fatigue and the cumulative pressures on commercial fishers and operations are not conducive to providing a cohesive environment to manage multiple titleholder's consultation proposals. It is therefore essential for the development of a guideline to inform the governance framework and how best to management consultation expectations between the commercial fishing industry and oil and gas offshore titleholders.

The commercial fishing sector throughout Australia is the largest group of relevant stakeholders to potentially be affected by offshore oil and gas activities. In many instances, commercial fishers are the only potentially affected person.

Seafood Industry Australia (SIA) together with state peak industry bodies have developed this bet practise guidance to deliver a better consultation outcome for the commercial fishing sector.

Purpose

The purpose of this document is to provide best practice consultation guidelines to enable oil, gas and seismic survey titleholders to minimise impacts of a relevant person(s), whilst satisfying consultation requirements for Commonwealth and state environment plans (EP) as defined under the legislation.

The adoption of the key principles below will considerably improve the process for all person(s) and streamline consultation requirements and delivery of a two-way transparent outcome.

appea

the voice of australia's oil and gas industry

Offshore Petroleum Industry's Key Principles for Fishers' Engagement

November 2021

Version 1

Appendix 6. Fee-for-Service Model – WAFIC (embedded PDF)

WAFIC FISHING PEARLING AQUACULTURE

WAFIC Oil and Gas Consultation
Fee-for-Service Schedule
Current as at 22nd January 2021

1. Environment Plan Commercial Fishing – Information EP Review and Feedback

Encompassing:

1. Initial stakeholder consultation review;
2. A review of proponent's information prior to the proponent sending to qualified commercial fishing stakeholders;
3. Identification of issues potentially impacting commercial fishing stakeholders within a proponent's initial communication and fact sheet to ensure a proponent can review issues raised by WAFIC on behalf of commercial fishers and mitigate/address, prior to the proponent sending to relevant commercial fishing stakeholders;
4. Review the proponent's list of relevant parties to the scope of the EP activity;
5. Review the proponent's list of relevant parties to the scope of the EP's EMBA; and
6. Email response to the proponent / proponent's representative agency, no formal report.

Fee-for-Service

- Flat fee of $2,000 + GST.
- Work beyond this scope to be agreed on a case-by-case basis.

2. Environment Plan Commercial Fishing – Despatch of Information

Encompassing:

1. Assured accurate commercial fishing contact information (WAFIC maintains an accurate list of licence holders via a CRM system, including in almost all cases, email and mobile telephone information);
2. On behalf of the proponent, send the proponent's reviewed EP information to commercial fishing relevant parties (via email in almost all cases);
3. No report or follow-up required / provided.

Fee-for-Service

- Flat fee of $2,000 + GST.
- Above fee covers:
    - Despatch of EP information to identified relevant commercial fishing stakeholders;
    - Despatch of any required secondary information to identified relevant commercial fishing stakeholders;
    - Start and finish notifications.
- It does not include communication between the project activity manager and commercial fishers at sea (for example, vessel to vessel communication during seismic survey activity), this is managed by the proponent on an agreed engagement basis with commercial fishers;
- If additional multiple notification communications are required, the service fee to be agreed on a case-by-case basis.

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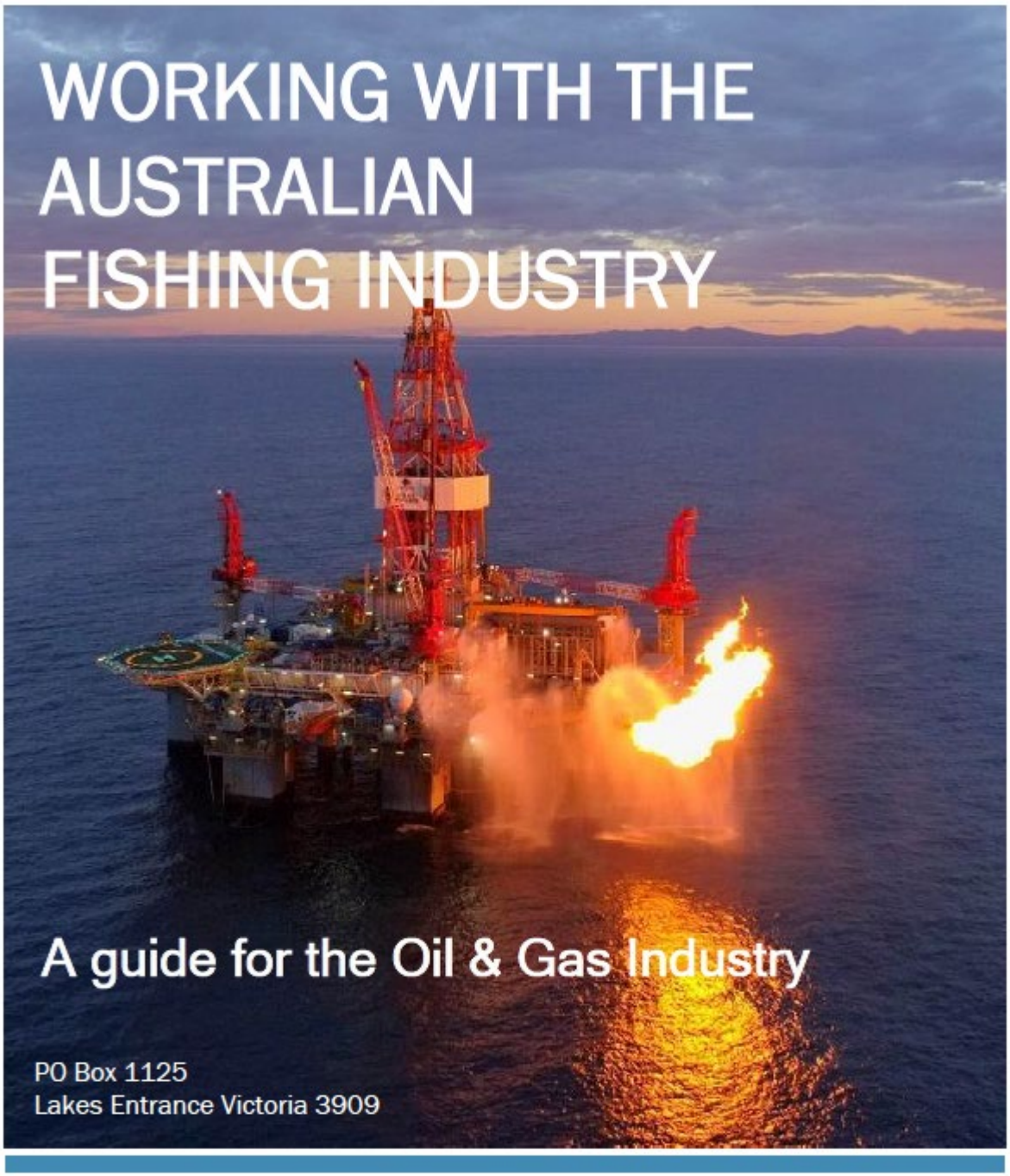
Appendix 7. A Guide for the Oil & Gas Industry – South East Trawl Fishing Industry Association (embedded PDF)



SETFIA
SOUTH EAST TRAWL FISHING INDUSTRY ASSOCIATION

sustainable fishing practices protect our future

Appendix 8 - Risk Assessment of the potential impacts of seismic air gun surveys on marine finfish and invertebrates in WA (embedded PDF)

Department of
Primary Industries and
Regional Development

Fisheries Research Report No. 288

Risk Assessment of the potential impacts of seismic air gun surveys on marine finfish and invertebrates in Western Australia

Webster, F.J., Wise, B.S., Fletcher, W.J., and Kemps, H

June 2018

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