

3D Oil, Sauropod 3D Marine Seismic Survey Environment Plan

1. Purpose of this report

NOPSEMA has accepted the 3D Oil Sauropod 3D Marine Seismic Survey Environment Plan (the EP) submitted by 3D Oil Limited (the titleholder) for a seismic survey activity in the Roebuck Basin within an acquisition window of January to April 2021.

As required by the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (the Environment Regulations), the public was provided with an opportunity to comment on the EP between 23 July – 22 August 2019. After this period, 3D Oil Limited took into account public comments and prepared a Report on Public Comment which is published on NOPSEMA's website¹.

Following the public comment period, the titleholder submitted the EP for assessment by NOPSEMA on 28 October 2019. NOPSEMA has since completed its assessment of the EP and has determined that it is satisfied that the EP meets the criteria for acceptance² on 13 July 2020.

This report explains how NOPSEMA took into account comments received from the public during the public comment period in making its decision³. Comments have been grouped into 'key matters' that capture the key issues, concerns or new information provided during the public comment process. This report also contains other key matters that may be of interest to the public.

This report accompanies the accepted Sauropod 3D Marine Seismic Survey (WA-527-P) Environment Plan, Version 3, submitted by 3D Oil Limited, which is available on the NOPSEMA website and should be referred to for further information.

1.1. Information relevant to NOPSEMA's decision:

In making the decision to accept this EP, NOPSEMA took into account:

- the Environment Regulations;
- NOPSEMA Assessment Policy (PL0050), Environment Plan Assessment Policy (PL1347) and Environment Plan Decision Making Guidelines (GL1721);
- the 3D Oil Sauropod 3D Marine Seismic Survey Environment Plan, Dated 12 June 2020, Version 3;
- the information raised by relevant persons, government departments and agencies that is relevant to making a decision;
- the information raised through public comment that is relevant to making a decision;
- There was 1 public comment submission received during the public comment period with issues raised in relation to the key matters outlined in the below report;

¹ 3D Oil report on public comments – 3D Oil Sauropod 3D Marine Seismic Survey, [dated: 28 October 2019]

² Environment Regulations, Regulation 10A Criteria for acceptance of environment plan

³ Environment Regulations, Regulation 11(3) Publication of notice, etc.

- relevant plans of management and threatened species recovery plans developed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and relevant guidance published by the Department of the Environment and Energy;

2. Next steps

Responsibility for the ongoing environmental performance of the 3D Oil Sauropod 3D Marine Seismic Survey activity remains, at all times, with 3D Oil Limited.

NOPSEMA has legislated responsibilities to inspect and investigate offshore petroleum and greenhouse gas storage activities, and to enforce compliance with environmental law. These functions will be applied to this activity in accordance with NOPSEMA's policies.

3. Sensitive Information

Sensitive information received during the public comment period, such as the names and contact details of commenters and specific information identified by the commenter or relevant person as 'sensitive', is not published in this report. Sensitive information is contained in a sensitive information part of the EP which has been considered by NOPSEMA during its assessment process.

4. Further information

If you would like further information about the activity, please contact the titleholder's nominated liaison person specified in the EP and on NOPSEMA's webpage for the 3D Oil Sauropod 3D Marine Seismic Survey.

If you would like to be notified of regulatory information on the activity, such as start and end dates and enforcement actions (if any), please subscribe to updates via NOPSEMA's website.

How NOPSEMA has taken into account key matters raised during public comments (and relevant persons consultation) in the assessment and decision making process for the 3D Oil Sauropod 3D Marine Seismic Survey Environment Plan

#	Issues raised and Key Matters	Titleholder response	NOPSEMA's assessment and decision
1	<p>Issue raised: <i>Naming of commercial fisheries presented in the EP is not accurate.</i></p> <p>Claim:</p> <ul style="list-style-type: none"> The Pilbara Line Fishery is not a managed fishery and the EP incorrectly refers to it as the Pilbara Line Managed Fishery. The EP refers to the Pilbara Fish Trawl (Interim) Managed Fishery, the Pilbara Trap Managed Fishery and the Pilbara Line Fishery collectively as the Pilbara Demersal Scalefish Managed Fisheries. This is also incorrect and the fisheries should be addressed as three completely separate fisheries. 	<p>3D Oil has updated references to the 'Pilbara Line Fishery' and 'Pilbara Demersal Scalefish Fisheries' in the text throughout the EP. The term 'Managed' has been removed where it is not appropriate.</p> <p>In some instances in the EP, the three fisheries continue to be referred to collectively, but are called the 'Pilbara Demersal Scalefish Fisheries'. The EP refers to the three fisheries collectively, consistent with recent State of the Fisheries reports published annually by the Department of Primary Industries and Regional Development (DPIRD) for the purposes of managing the stocks of the key target demersal fish species. The same species are a common component in the catches of each of the three fisheries, therefore, it is appropriate to refer to the fisheries collectively in some instances. The EP distinguishes between the three different fisheries, their gear types and fishing methods, where appropriate.</p>	<p>NOPSEMA recognises that there was concern from commercial fishing stakeholders that the naming of commercial fisheries was not accurate.</p> <p>3D Oil updated the naming of commercial fisheries in the EP in response to this comment.</p> <p>NOPSEMA is satisfied that the contextual information in the EP on commercial fisheries is appropriate to inform an evaluation of impacts from the proposed Sauropod 3D Marine Seismic Survey activity.</p>

<p>2 <i>Issue raised:</i> <i>Underwater sound impacts on fish spawning.</i></p> <p>Claim:</p> <ul style="list-style-type: none"> The timing of the Sauropod 3D MSS during the spawning periods of key commercial indicator species is not justified. There is science demonstrating that seismic surveys impact fish spawning and plankton. 	<p>In assessing the potential effects of seismic sound on fish spawning and potential impacts to fish stocks, 3D Oil has considered the geographical range of the fish stocks, the spawning periods of key species, the biological connectivity of the stocks, and the body of available scientific research on the effects of seismic sound to fish and plankton. The impact and risk assessment has assessed the potential impacts to spawning adult fishes and to planktonic eggs and larvae, considering the potential spatial and temporal overlap of the Sauropod 3D MSS on the fish stocks. 3D Oil considers that the risk assessment is appropriate and the overall level of risk to fish spawning has not changed.</p> <p>Survey scheduling has been based on the predicted level of risk to each receptor, which takes into account the receptors' hearing capabilities, sensitivity to underwater sound, the requirements of protected species conservation management plans, and the potential for impacts to species at both an individual level and at a population level.</p> <p>The Sauropod 3D MSS will have very limited spatial overlap with the habitat of key demersal species and limited temporal overlap with the extended spawning periods of these species. Population level impacts (i.e. impacts to the stocks) are not expected for the reasons provided in the EP.</p> <p>Nonetheless, opportunities to avoid or minimise overlap with fish spawning periods have been considered by 3D Oil, but this is not practicable. The spawning periods of different fish species occur</p>	<p>NOPSEMA recognises that there was concern from commercial fishing stakeholders that the survey could result in disturbance to spawning activity of key commercial indicator species.</p> <p>In making a decision regarding this matter, NOPSEMA took into account information presented in the Sauropod MSS EP, views expressed by relevant persons, relevant scientific literature on the effects of underwater sound on fish, the biology and ecology of relevant fish species, and their stock status as well as NOPSEMA's Decision Making Guidelines (GL1721).</p> <p>NOPSEMA required that 3D Oil conduct a robust, qualitative and quantitative assessment of the potential for impacts to the sustainability of commercial fish stocks both from the proposed Sauropod 3D MSS, and cumulative impacts associated with potential concurrent seismic surveys.</p> <p>NOPSEMA required 3D Oil to demonstrate that the potential impacts to spawning fish stocks from their survey in combination with other accepted seismic activities were of an acceptable level, and if necessary to provide control measures to ensure acceptable levels of impact were not exceeded. This resulted in a comprehensive evaluation of potential impacts to key demersal indicator fish species including</p>
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throughout the year and so it is not possible to avoid the spawning periods of all of these species completely. The Sauropod 3D MSS avoids the migration periods of more sound-sensitive marine mammal species. Further time constraints and attempting to avoid fish spawning periods would mean that the proposed seismic survey could not be acquired.

Although no material changes have been made to the EP in relation to the overall level of risk to fish spawning or the survey scheduling, 3D Oil has made the following updates:

- Sections 4.3.4 and 4.3.10 have been updated with information regarding ruby snapper, a demersal fish species which wasn't previously acknowledged, but is used as an indicator species for the offshore demersal scalefish resources targeted by the Pilbara Line Fishery and for which DPIRD has recently provided species-specific spawning information.
- Section 7.1.6 has been updated to include assessment of the potential impacts to spawning ruby snapper, noting that the Sauropod 3D MSS overlaps only 2.2% of the habitat and principal depth range of this species, and no discernible population level impacts are predicted.
- Section 7.1.6 has been updated to include further research relating to seismic impacts to plankton, including a recent scientific study into the effects of seismic on zooplankton (Fields et al. 2019).
- Section 7.1.9 has been updated to provide clearer explanation in the demonstration of ALARP and

potential disturbance to spawning behaviours, with historical seismic activity levels used to benchmark acceptable levels of overlap between the timing and location of fish spawning and seismic activity.

Taking into consideration the nature and scale of the activity, available peer-reviewed literature, and the outputs of extensive evaluation undertaken by 3D Oil, NOPSEMA is satisfied that the potential impacts to spawning fish will be limited to short term transient behavioural disturbance in a small percentage of spawning fish. Such an impact is small in magnitude when compared with natural levels of variability in larval recruitment, and will not constitute an unacceptable impact to the sustainability of commercial fish stocks.

		why avoidance of fish spawning periods is not practicable.	
3	<p>Issue raised: <i>Cumulative impacts of underwater sound on commercial fisheries and fish spawning</i></p> <p>Claim:</p> <ul style="list-style-type: none"> Cumulative impacts of ongoing and repetitive seismic surveys are unacceptable and do not meet ALARP from a commercial fishing perspective. It is wrong for 3D Oil to dismiss this. 	<p>Cumulative impacts have not been dismissed. An assessment of cumulative impacts is included in Section 7.2 of the EP. This considers previous seismic surveys and other proposed seismic surveys that have the potential to occur concurrently with the 3D Oil Sauropod 3D MSS. The assessment considers the potential for cumulative impacts to fish spawning and to commercial fisheries.</p> <p>Section 7.2 has been updated to more clearly explain the potential cumulative impacts to commercial fisheries and to fish spawning, as well as to recognise other previous and potentially concurrent seismic surveys that have been identified since submission of the EP.</p>	<p>NOPSEMA recognises that there was concern from commercial fishing stakeholders that the cumulative impacts of numerous seismic surveys could impact on their functions, activities and interests, through impacts to the spawning fish stocks and potential disruption to fishery operations.</p> <p>In making a decision regarding this matter, NOPSEMA took into account information presented in the Sauropod MSS EP, views expressed by relevant persons, relevant scientific literature on the effects of underwater sound on fish, the biology and ecology of relevant fish species, and their stock status as well as NOPSEMA's Decision Making Guidelines (GL1721).</p> <p>See Item 2 above for NOPSEMA assessment considerations for cumulative impacts on fish spawning.</p> <p>In relation to potential impacts on commercial fishing operations, NOPSEMA required that 3D Oil conduct a robust, qualitative and quantitative assessment, and evaluate cumulative impacts due to potential concurrent seismic surveys. NOPSEMA required 3D Oil to demonstrate that the potential displacement to commercial fisheries from their survey in</p>

			<p>combination with other potential seismic activities were of an acceptable level, and if necessary to provide control measures to ensure acceptable levels of impact were not exceeded. This resulted in a comprehensive evaluation of historical seismic survey overlap with the PFTIMF and the determination of a benchmark for overlap.</p> <p>The percentage overlap of seismic surveys with the PFTIMF for 2021 was determined to be less than the maximum historical overlap, with the Sauropod MSS only contributing a small amount to the overall level of overlap. The historical levels of seismic overlap were determined to not have resulted in reductions to fishery operations and performance in terms of distribution of effort or historic catch levels.</p> <p>Taking into consideration the nature and scale of the activity, the controls implemented for commercial fisheries and the outputs of the extensive evaluation undertaken by 3D Oil, NOPSEMA is satisfied that the activity will be managed to ensure that there are no unacceptable impacts to fishing operations as a result of the seismic survey.</p>
4	<i>Issue raised: Broad objection or comment regarding cumulative impact assessment not related to the Sauropod 3D MSS EP content.</i>	The NOPSEMA information paper on acoustic impact evaluation and management includes consideration of cumulative impacts.	A focus of NOPSEMA's assessment was on the potential for cumulative impacts on the environment from the Sauropod and other proposed seismic surveys in the Pilbara

	<p>Claim:</p> <ul style="list-style-type: none"> When will NOPSEMA address cumulative impact issues? 	<p>NOPSEMA will consider the evaluation of cumulative risks during their assessment of the Sauropod 3D MSS EP.</p>	<p>region. Refer to above items (2 and 3) for further information.</p>
5	<p><i>Issue raised: Consideration of comments that the organisation understands 3D Oil received from the State government department, DPIRD, regarding fish spawning.</i></p> <p>Claim:</p> <ul style="list-style-type: none"> DPIRD requested scientific peer reviewed literature (location and species specific) which demonstrates there is no impact, and requested that no seismic survey acquisition is to occur during spawning periods for key species. More information is required and a review of the survey scheduling is also required to minimise survey overlap with the peak spawning of key indicator species. 	<p>3D Oil has considered feedback provided by DPIRD and responded to them directly in June 2019, summarising 3D Oil's assessment of the potential risk to commercial fish resources and explaining the timing of the Sauropod 3D MSS.</p> <p>The risk assessment incorporates species-specific spawning information received from DPIRD, as well as other information published by DPIRD regarding the biology of the various stocks. While species-specific research on the effects of seismic sound is limited in some cases, the available research is still highly relevant. Where species-specific research is lacking, it is possible to ascertain the likely hearing sensitivity of the types of fish that occur in this region, based on both global and Australian research into the hearing capabilities of different families of fish. The risk assessment references relevant and credible scientific studies on the effects of seismic, many of which are published in peer-reviewed journals. From the available research, it is reasonable to predict the likely impacts.</p> <p>The issue of scheduling to minimise the overlap of the Sauropod 3D MSS with the peak spawning periods of commercial fish species (which occur year-round) is addressed in the response above and 3D Oil has provided a detailed explanation to the organisation making the comment. Ultimately, the Sauropod 3D</p>	<p>NOPSEMA recognises that there was concern from fishing stakeholders and relevant persons that the seismic survey could impact on the spawning success of commercially important fish species.</p> <p>NOPSEMA required that 3D Oil conduct a robust assessment of the potential for impacts to the sustainability of commercial fish stocks both from the proposed Sauropod 3D MSS, and cumulative impacts associated with potential concurrent seismic surveys. This assessment was supported by relevant scientific literature and included consideration for revising the activity timing to limit temporal overlap with spawning periods for key indicator fish species for commercial fisheries.</p> <p>Taking into consideration the estimated spatial and temporal overlaps of seismic surveys with the spawning areas and periods for key indicator fish species, and the outputs of the extensive evaluation undertaken by 3D Oil, NOPSEMA is satisfied that the activity will be managed to ensure that there are no unacceptable impacts to commercial fish stocks.</p>

		MSS will overlap with a very small proportion of the habitats and spawning periods of the key indicator species and no population-level impacts are expected. No further changes have been made to the EP.	
6	Key matter: <i>There is potential for unacceptable impacts to migrating blue and humpback whales.</i>	<p>3D Oil undertook a comprehensive assessment of the potential impacts to migrating blue and humpback whales. This was informed by underwater acoustic modelling that accounted for physical and behavioural impacts, as well as published literature on the behaviour and distribution of these species in the region.</p> <p>3D Oil will ensure that the activity is managed such that there is no physical injury to listed marine fauna species including blue and humpback whales (EPO 1.1).</p> <p>The control measures that will be implemented to ensure there is no physical injury to listed marine fauna are as follows:</p> <ul style="list-style-type: none"> • Implementation of EPBC Policy Statement 2.1 (Part A) Standard Management including observation zone, increased 2 km power down zone, pre start-up visual observations, soft start procedure, night-time and low visibility procedure (PS 1.1). Relevant EPBC PS 2.1 requirements will be applied to marine turtles and whale sharks as well as cetaceans (PS 1.8 and PS 1.9). • The timing of survey acquisition will avoid the migration periods for humpback whales (PS 1.7). • Use of two dedicated, trained and experienced (>12 months experience in Australian waters) MFOs (PS 1.2). 	<p>NOPSEMA recognises that there is the potential for the activity, if not appropriately managed, to have an unacceptable impact on humpback and blue whales should they be migrating through the region, during the course of the petroleum activity.</p> <p>In making a decision regarding this matter, NOPSEMA took into account the content of the EP; relevant scientific literature; NOPSEMA's Decision Making Guidelines (GL1721), the Conservation Management Plan for the Blue Whale (DoE, 2015); <i>Megaptera novaeangliae</i> (humpback whale) Conservation Advice (DoE 2015); EPBC Act Policy Statement 2.1 (DEWHA, 2008), and the EPBC Act Significant Impact Guidelines 1.1 – Matters of National Environmental Significance (DEWHA, 2013).</p> <p>Considering the lack of overlap between the acquisition area and any migrating biologically important areas for whales and the environmental management measures proposed NOPSEMA has concluded that the activity will not cause unacceptable impacts to migrating humpback whales or pygmy blue whales.</p>

7	<p>Key matter: <i>There is potential for unacceptable impacts to whale sharks due to the overlap of the acquisition area with the whale shark migration BIA.</i></p>	<p>3D Oil undertook a comprehensive assessment of the potential impacts to whale sharks. This was informed by underwater acoustic modelling that accounted for physical and behavioural impacts, as well as published literature on the behaviour and distribution of these species in the region.</p> <p>3D Oil will ensure that the activity is managed such that there is no physical injury to listed marine fauna species including whale sharks (EPO 1.1).</p> <p>The control measures that will be implemented to ensure there is no physical injury to listed marine fauna are as follows:</p> <ul style="list-style-type: none"> • Implementation of EPBC Policy Statement 2.1 (Part A) Standard Management including observation zone, pre start-up visual observations and a shut-down zone (PS 1.1 and PS 1.8). • Use of two dedicated, trained and experienced (>12 months experience in Australian waters) MFOs (PS 1.2). 	<p>NOPSEMA recognises that there is the potential for the activity, if not appropriately managed, to have an unacceptable impact on whale sharks migrating or feeding in the area.</p> <p>In making a decision regarding this matter, NOPSEMA took into account the content of the EP; relevant scientific literature; NOPSEMA's Decision Making Guidelines (GL1721), Conservation Advice for <i>Rhincodon typus</i> (Whale Shark) (DoE, 2015); and the EPBC Act Significant Impact Guidelines 1.1- Matter of National Environmental Significance (DEWHA, 2013).</p> <p>NOPSEMA concludes that with the proposed environmental management measures in place and the lack of temporal overlap with the northern migration of whale sharks from Ningaloo, the potential for impacts to whale sharks is negligible. It is demonstrated through the evaluation of impacts and risks in the EP that the activity can be conducted in a manner that is not inconsistent with the Conservation Advice for <i>Rhincodon typus</i> (whale shark) and will not result in unacceptable impacts to whale sharks within the operational area.</p>
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References

- DEWHA. (2008). EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales. Retrieved from <http://www.environment.gov.au/system/files/resources/8d928995-0694-414e-a082-0ea1fff62fc8/files/seismic-whales.pdf>.
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