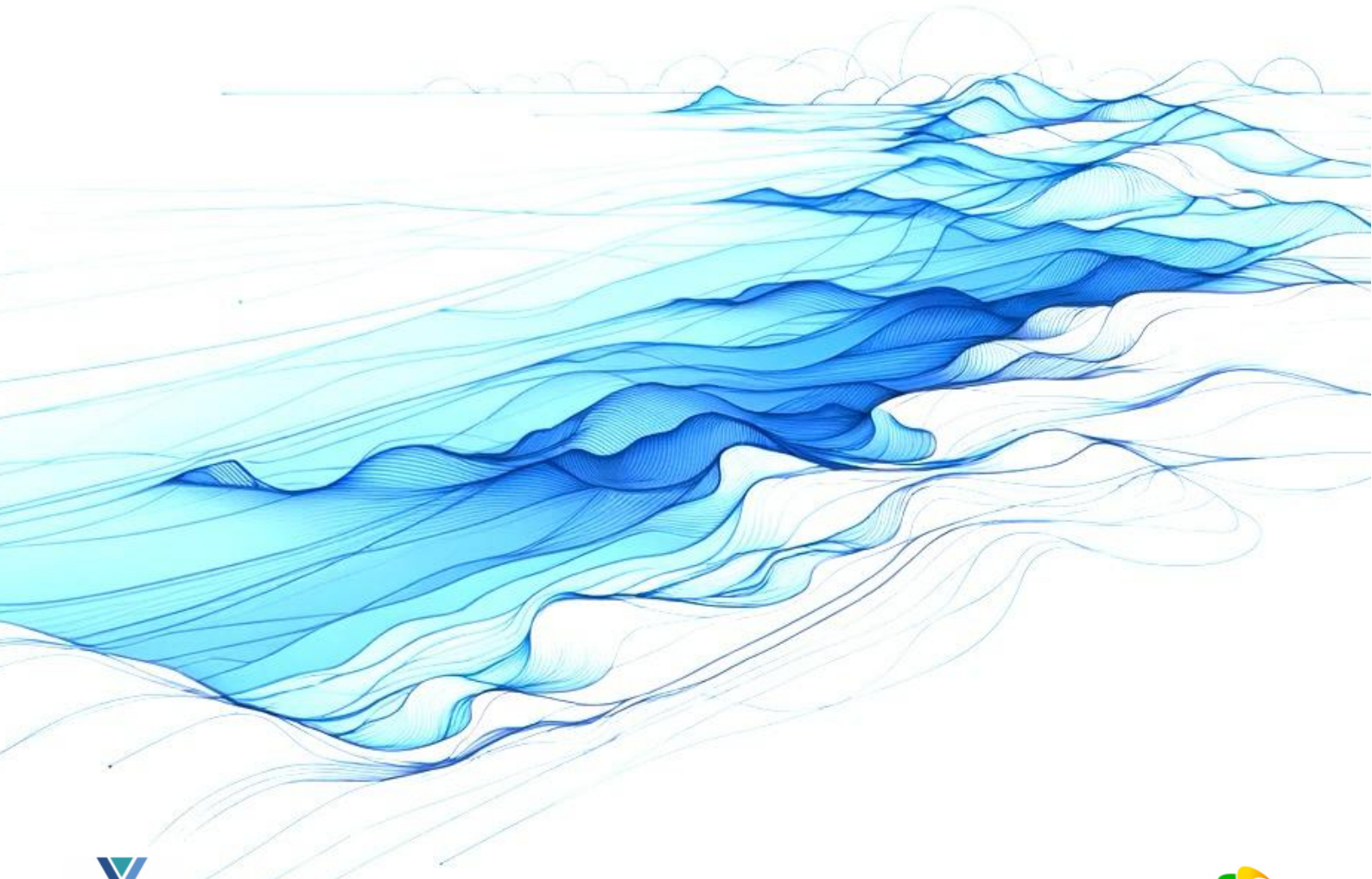
REGIA
Marine Seismic Survey

Further Assessment of Key Environmental Values and Sensitivities

Appendix F3: REG-EP-032-F3

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Klarite

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1 Introduction

This document is part of Stage 3 of CGG's assessment of the environmental impacts and risks arising from the Regia Marine Seismic Survey (**Regia MSS**). This document records further assessment of key environmental values and sensitivities. The key environmental sensitivities have been selected following a self-assessment by CGG of whether the preliminary and secondary assessments have resulted in all environmental impacts and risks being reduce to ALARP and an acceptable level, and the criteria for acceptance being met. A further assessment was also undertaken if there was significant interest from relevant persons, or high levels of predictive uncertainty remaining after the secondary assessment.

2 Purpose

The purpose of this document is to further assess environmental impacts and risks and support the demonstration that environmental impacts and risks arising from the activity will be of an acceptable level. This additional assessment was either required because:

- CGG self-identified that the result of the environmental assessment:
  - Had some residual uncertainty about whether impacts or risks were of an acceptable level; and/or
  - Contained environmental values and sensitivities (species) of key importance due to their protection status or commercial value; and/or
- Consultation with relevant persons revealed a particular value or sensitivity required further attention and material to support the consultation.

The content aims to demonstrate that a thorough assessment of environmental values and sensitivities that may be affected by the activity has been undertaken in accordance with the environmental assessment methodology (Appendix B3). Further assessments have been undertaken for the reasons outlined in Table F3-1.

Once these further assessments have been completed, any modifications required to the originating environmental assessments will be briefly described in Section 6 and any modifications required shall be made in the relevant impact or risk assessment.

Table F3-1 - Further assessments undertaken in stage 3 of the Regia assessment process.

Further Assessment Topic	Reasons for Further Assessment
Southern Right Whales / Koontapool (*Eubalaena australis*)	The species is listed as threatened (Endangered) under the EPBC Act. The species was identified as culturally important.
Blue Whales / Wuulok (*Balaenoptera musculus*)	The species is listed as threatened (Endangered) under the EPBC Act. The species was identified as culturally important.
Australian Sea Lion (*Neophoca cinerea*)	The species was identified to be of concern to relevant persons.
Little Penguin (*Eudyptula minor*)	The species was identified to be of concern to relevant persons.
Southern Rock Lobster (*Jasus edwardsii*)	The species was identified as of key commercial value. The impacts of elevated levels of sound were identified as one of the few to have permanent physiological effects. The species was identified to be of concern to relevant persons.
Giant Crab (*Pseudocarcinus gigas*)	The impacts of elevated levels of sound were identified as one of the few to have permanent physiological effects. The species was identified to be of concern to relevant persons.
Glass Eels / Kooyong (*Aquilla australis*)	The species was identified as culturally important.
Gould's Squid (*Nototodarus gouldi*)	The species was identified to be of concern to relevant persons.

Further Assessment Topic	Reasons for Further Assessment
Pale Octopus (*Octopus pallidus*)	The species was identified to be of concern to relevant persons.
Blacklip Abalone (*Haliotus rubra*)	The species was identified to be of concern to relevant persons.
Pink Snapper (*Chrysophrys auratus*)	The species was identified to be of concern to relevant persons.
King George Whiting (*Sillaginodes punctatus*)	The species was identified to be of concern to relevant persons.
Plankton Communities and the Bonney Upwelling System	The impacts of elevated levels of sound were identified as one of the few to have permanent physiological effects. The species was identified to be of concern to relevant persons.
Spawning Patterns	The value was identified to be of concern to relevant persons.
Budj Bim Cultural Landscape	This sensitivity was identified as culturally important by relevant persons.
Cultural Features of the Environment	This sensitivity was identified as culturally important by relevant persons.

3 Further Assessment of Key Environmental Values and Sensitivities

This part of the demonstration underscores the importance of conducting a thorough evaluation of key environmental values and sensitivities as part of our overall assessment of impacts and risks associated with the Regia MSS. Focusing on key values and sensitivities enables us to:

- Continue the assessment of higher order impacts and risks.
- Change perspective to increase confidence in the assessment process.
- Put the magnitude of impacts and risks into their proper context.
- Address specific concerns raised by relevant persons.

The following detailed evaluations not only enhances the robustness of our overall environmental assessments but also serves to test and validate the appropriateness of our preceding analysis. For each of the key values and sensitivities identified through the environmental assessment process this evaluation will address:

- **Species-Specific Sensitivity:** Assess the vulnerabilities of each species to the seismic activity, including breeding, feeding, migration patterns, and habitat preferences.
- **Magnitude of Effect:** Evaluate the potential scale of impact on each key value and sensitivity, considering both direct and indirect effects.
- **Cumulative Impacts:** Consider the combined effects of the seismic survey with other existing or planned activities in the area.
- **Recovery Potential:** Assess the ability of species or ecosystems to recover from potential impacts.
- **Conservation Status:** Factor in the conservation status of species, especially those that are endangered or protected.
- **Mitigation Effectiveness:** Evaluate the effectiveness of proposed mitigation measures specific to each key value and sensitivity.

3.1 Southern Right Whales / Koontapool (*Eubalaena australis*)

In the assessments completed to date (Appendix E7), CGG have used a defined threshold as the basis for understanding when a behavioural response may occur and predicted an effect distance. To demonstrate that any elevated sound exposures beyond this predicted distance are of an acceptable level assumes that no behavioural response occurs beyond the predicted distances. In other words, the traditional dose-response model assumes that above a certain SPL threshold, animals will exhibit predictable behavioural responses.

However, real-world observations do not support this assumption. For example, in Ellison et al. (2012), Gray whales altered their migration paths in response to a sound source only when it was positioned within their typical travel corridor, even when sound exposures remained similar across different trials. This suggests that context matters more than a fixed threshold. Similarly, Southall et al. (2023) emphasise that vulnerability varies between species and populations, meaning that different species can react differently to the same exposure regime depending on their ecological and physiological characteristics.

A recent study by Darias-O'Hara et al. (2025) derived a median behavioural threshold of 139 dB for low-frequency cetaceans using expert elicitation informed primarily by humpback whale data and adjusted for other species. The authors emphasise substantial uncertainty due to limited data, a lack of global consensus on appropriate behavioural thresholds, and the context-specific nature of their findings, figure

Considering that the thresholds apply only under the assumptions and Antarctic scenarios assessed. While the values provide a conservative indication of where behavioural responses may begin, their biological significance depends on multiple external factors, and the study is positioned as an early step requiring further research to strengthen regulatory assessment.

Southall 2024 demonstrated that simple received-level thresholds are inadequate for predicting behavioural responses of marine mammals to noise. This paper highlights that all-or-nothing thresholds fail to account for the substantial variability observed between species, individuals, and contexts. Instead, a probabilistic, context-dependent approach has emerged as more scientifically robust, reflecting the reality that behavioural responses are influenced not only by received sound levels but also by factors such as behavioural state, exposure history, and proximity. This shift supports the development of more ecologically meaningful noise exposure criteria, particularly for acute noise events, and lays the foundation for improved assessment of both individual and population-level impacts.

Another flaw in selecting a fixed behavioural response threshold is that it ignores chronic noise effects. The dose-response model focuses on acute, immediate responses, but does not account for cumulative impacts from prolonged exposure, such as communication masking, stress-related physiological changes, or gradual displacement from key habitats. Even at relatively low levels, if noise is persistent, it can disrupt essential behaviours over time. This means that using a single threshold to predict behavioural impacts could be misleading, as it fails to capture these long-term effects.

Instead of relying on a single threshold, both Ellison et al. 2012, Southall et al. 2023, and Southall 2024 advocate for a multi-factor assessment that includes various threshold levels alongside context-dependent variables. This means incorporating species-specific sensitivity assessments, evaluating exposure severity relative to background noise conditions, and considering behavioural context to determine the likelihood and severity of responses. This approach allows for more accurate and ecologically meaningful assessments of how noise affects marine mammals, rather than assuming a universal threshold applies across all situations. Therefore, this further assessment will focus on the residual uncertainty from the impact assessment on marine mammals (Appendix E7), namely on whether impacts to any SRW within the reproduction BIA are of an acceptable level and what additional measures may need to be incorporated to increase predictive certainty.

3.1.1 Acoustic Species-Specific Sensitivity

Baleen whales, which include SRW, are categorised as low-frequency cetaceans. The acoustic repertoire of right whale species is similar, comprising of a variety of short, low frequency (<1 KHz) vocalisations (DCCEEW 2023, DOSITS 2023). Vocalisations have a fundamental frequency range of 50 to 500 Hz, with modelled hearing range between 10 Hz to 22 kHz (functional range of 15 Hz to 18 kHz), and source levels ranging from 132 to 192 decibels (Parks & Tyack 2005, Parks et al. 2007, Nielsen et al. 2019).

SRW mother-calf pairs on a Western Australia breeding ground were found to produce low amplitude vocalisations; acoustic tags measured received levels between 123 and 134 decibels at low rates (< 10 calls per hour, 1 call per dive) (Nielsen et al. 2019a). Calls were more likely to occur during dives, indicating that these signals function to coordinate movements between mothers and calves.

SRW mothers tend to bring their calves close to the shore into the surf zone as the higher levels of ambient noise from crashing waves provides a refuge from potential predators (Nielson et al. 2019a).

The frequency of the sound produced from each seismic pulse is primarily less than 2 kHz, with the highest levels at frequencies in the range of 10-500 Hz (McCauley 1994). Thus, there is an overlap with low-frequency cetaceans hearing frequencies.

Interestingly, the SRW source level of 132 to 192 decibels means that SRW calls can be louder than the current noise assessment criteria for behavioural disturbance of 160 decibels.

The National Recovery Plan for SRW (DCCEEW 2024) assessed threats to SRWs through a risk assessment process. For the eastern population of SRWs, which are relevant to the Regia MSS, the consequence of seismic surveys was assessed as moderate, which is defined as population recovery slows or stalls. The risk assessment outcome for threats to the eastern population of SRWs from underwater noise from seismic surveys stated, "the likelihood of occurrence was assessed as likely, expected to occur at least once every five years, resulting in a risk level of high, requiring additional mitigation action and an adaptive management plan required; the precautionary principle should be applied."

The risk assessment is deemed to be conservative as the National Recovery Plan for SRW (DCCEEW 2024) details there is an increase in long-term population trend for SRW, albeit slowly for the eastern population.

Other threats assessed as having a moderate consequence and a likelihood of occurrence of almost certain are:

- Anthropogenic underwater noise; industrial noise.
- Habitat degradation; infrastructure of coastal development.
- Habitat degradation; infrastructure of offshore development.

Other threats assessed as having a major consequence and a likelihood of occurrence of almost certain are:

- Entanglement: active fishing or aquaculture equipment.
- Collisions; vessel strike.
- Anthropogenic climate variability and change.

3.1.1.1 Behavioural Ecology in the Reproduction BIA

Observations of female southern right whale births are rare, Christiansen et al. (2022) noted in many cases large, fat females are observed pregnant, and days later, they are resighted with a calf.

During the last month of gestation, southern right whale foetuses' grow between 3 and 4 cm per day (Christiansen et al. 2022). At birth, calves can typically range from 4.5 to 5 meters in length, with the largest calves being born to the largest mothers, measuring approximately 35% of the mother's total length (Christiansen et al., 2022). Giving birth to such sizable offspring requires a significant energy investment from the females. The primary energetic demand during pregnancy is generating the heat needed for gestation (74%), followed by foetal growth (21%) and the placenta's energy requirements (5%). This overall energy expenditure continues to rise during the 12-month gestation period and is at its highest during the last 4 months (Christiansen et al. 2022).

Christiansen et al (2018) examined the relative cost of lactation in female southern right whales in relation to growth rates in their calves over a breeding season, at the Head of the Bight in South Australia. They found over the first 3 months of lactation, females lost around 25% of their body volume. This suggests females invest as much energy as they can into their calves.

Nielson et al (2019b) studied the developmental behaviour in SRW calves over a period of 2.5 months on their breeding grounds, at the Head of the Bight in South Australia. SRW calves were in the nursing position for 10% of their time on the breeding grounds, and this increases with calf size, back-riding composed ~5% of the total observation time in SRW mother– calf pairs. This behaviour decreased by 9% during the 2.5 months of observations (Nielson et al. 2019b). Surface active behaviours such as tail

and pectoral fin slapping, breaching and rolling remained low and did not increase with calf size. Calves were within an adult body length to its mother for 90% of the time (Nielson et al. 2019b).

For the Regia MSS, detecting the departure of SRW from the reproduction BIA at the end of their utilisation of the area is important. Dickenson (2018) investigated the factors that influence the migration of SRW calf cow pairs from their wintering breeding grounds at the Head of the Bight, South Australia. Diurnal period was the best indicator of migration timing for SRWs leaving the wintering grounds. Diurnal periods are consistent year to year; therefore, it is logical for taxa to align their internal rhythms and crucial life history stage with this predictable environmental cue. Most mother calf pairs departed the wintering grounds at a mean day length of 11.6 hours. The authors suggest calf length was the second-best predictor of migration timing, the mean length of SRW calves at the time of migration was 7.63m. Sea surface temperature was a poor indicator of SRW migration and surprisingly, maternal body condition was the poorest indictor of migration (Dickenson, 2018). Although the author acknowledged the limitations of this study, understanding the factors that trigger southern right whale migration is crucial for the recovery of the species. Due to the proximity of SRW to the coast when they are utilising the reproduction BIA, there is a high degree of certainty that, with the appropriate measures in place, CGG will be able to monitor the presence of SRW within the BIA prior to the survey and detect the departure from the reproduction BIA, into the migration BIA. Once departure is confirmed, it becomes certain that sound exposures from the Regia MSS will be of an acceptable level.

3.1.1.2 Timing of Residence in BIA

A recent study by Charlton et al. (2025) examined SRW residency and site fidelity along the south coast of Australia. Mean residency for female and calf pairs at the Head of the Bight was approximately 3.5 months and site fidelity remained consistent with 57.6% of females identified between 1984–2019 resighted in multiple years (Charlton et al. 2025).

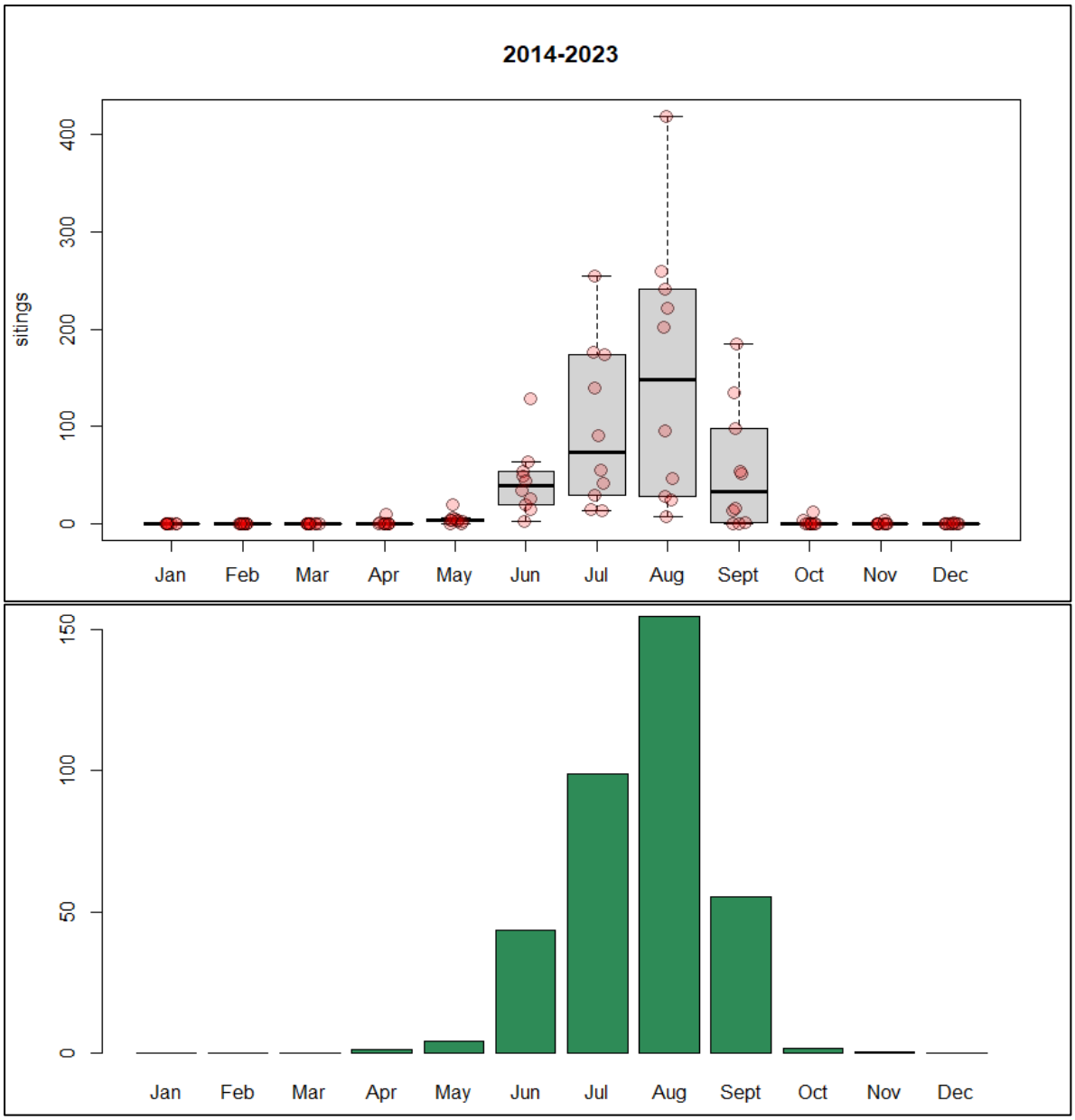


Figure F3-1: Monthly sightings of SRW along the Otway coast for the 10 years between 2014-2023. Top - boxplots illustrating the range of counts for each month, Bottom – Bar plot of 10 year average of sightings for each month.

CGG examined long term sighting records of southern right whales recorded in the WhaleFace Southern Right Whale photo identification project, located on the SWIFFT website. The data underlying these observations was extracted from the NatureKit online database (https://maps2.biodiversity.vic.gov.au/Html5Viewer/Index.html?viewer=NatureKit). This database contains observations of SRW presence along the entire Victorian coastline for over 40 years and has been used for multiple published scientific studies (e.g. Stamation et al 2020, Watson et al 2021). CGG extracted a spatial subset of the data encompassing all observations between Apollo Bay and 30km NW of Cape Duquesne off Portland. From this data it can be seen that June – September is the core period for SRW residence along the Otway coast. Arrival is predominantly in June while their migration from the BIA is usually complete by September. SRW have only been seen in October twice over the past 10 years with no sightings for the previous 5 years (see Figure F3-1). The SRW Research and monitoring Project hosted on the SWIFFT website has stated that there were no sited SRW after 26th August for the 2024 season. The sightings data are demonstrating that migration out of the BIA is usually complete by October but will often be complete weeks earlier.

In 2025, Klarite undertook a SRW monitoring program from Cape Otway Light Station to Cape Bridgewater as Whaleface data for 2025 may not be available for 2 years.

The monitoring program resulted in just over 466 hours of observation effort from July through to October 2025. Most SRWs observations were at Logans Beach Whale nursery. The 2025 reproduction season concluded with a total of four confirmed SRW calf-cow pairs utilising the south-west portion of the Victorian SRW reproduction BIA between July and September 2025. These calf-cow pairs were identified at Logans, Beach, Cape Bridgewater and Portland Bay, with Logans Beach being the most visited site by one calf-cow pair in particular. The calf-cow pair at Logans Beach was identified as a regular breeding female named Tripod and her calf. Tripod was first identified at Logans Beach in 1995 (Whaleface, 2025). No calf-cow pairs seemed to remain resident in any one location with detection being sporadic and often weeks between sightings.

Klarite tested the tested the feasibility of using onshore MFO's to detect SRWs in the Reproduction BIA and found this to be a successful detection method. Klarite also found the use of local citizen science platforms provide near real time alerts of SRW detections and SRW movements in the BIA.

3.1.1.3 Behavioural Effects to SRW From Other Stressors

Sprogis et al. (2023) examined the behavioural impacts to Southern Right Whales from whale-watching activities in South Australia at 300 m from the mother-calf pairs. No significant reduction was observed on the whales' respiration rate, swim speed, nursing rate and duration, maternal rate of active behaviours, tactile contact or calf pectoral fin contact. There was a significant reduction in resting during some phases of the study, for both mothers (halved) and calves (to near null). The rate of active behaviours for calves was also observed to be significantly higher prior to the whale-watching vessel approaching. This was noted as may having been due to the calf hearing the whale-watch vessel upon approach and reacting to the vessel in the before phase, and/or due to other external factors. Sprogis et al. (2023) suggest that whale resting behaviours may have been disturbed in the presence of the vessel and this disturbance was sustained once the vessel departed. It is unknown if this cumulative reduction in resting on mother and calf pairs is sustainable, or could lead to long-term energy deficits (by increasing energy expenditure). Sprogis et al. (2023) suggest it might also be possible for mothers and calves to compensate for this disturbance by resting at other times in the day, and/or at night.

An exclusion zone is in place from 1 June until 31 October to protect migrating Southern Right Whale mother-calf pairs in the Logans Beach Nursery. Recreational boaters must remain 200 metres from whales during this period (GoV 2022). Evidence exists however to suggest that behavioural impacts from recreational activities occur within 300 m from the mother-calf pair.

Currently, there are no noise standards for whale-watching vessels, thus, a loud vessel is able to approach whales at the same distance as a quieter vessel, even though there are known disturbance effects from louder vessels (Arranz et al. 2021; Sprogis et al. 2020)

Short-term negative impacts from behavioural responses to whales can include bioenergetic consequences like reduced energy intake or increased energy expenditure, associated with altered respiration rates, nursing, and resting due to the disturbance (Arranz et al. 2021; Sprogis et al. 2020; Christiansen et al. 2013). If resting is frequently disturbed by anthropogenic impacts, the cumulative effects could have significant long-term consequences on the bioenergetics of the whales (Sprogis et al. 2023).

Charlton et al (2023) studied the impacts associated with implantable tagging SRWs at their wintering grounds at the Head of the Australian Bight in South Australia. They noted there was no observed difference in body condition between two tagged and non-tagged females. Nielson et al (2019) tagged female calf cow pairs at Flinders Bay and found the typical behavioural response to be a slow dive, with the calf moving into a back-riding position, while the pair moved slowly away from the tagging boat. After a short period of time (about 15 min) during which the whales were diving slowly, the mother–calf pair resumed their original behaviour. Christiansen et al (2020) examined behavioural responses from southern right whale calf cow pairs of using a UAV (Unmanned Aerial Vehicle). They found flying the UAV at 5m altitude for 10 minutes, elicited no behavioural responses from mother calf pairs as they likely did not hear the UAV.

3.1.2 Magnitude of Effect

3.1.2.1 Behavioural Impacts of Seismic on Baleen Whales and Calf Cow Pairs

Dunlop et al (2017a) noted 'for a change in behaviour to be considered biologically significant, it should have an effect on one or more life functions (e.g. migration, survival, mating), affecting individual vital rates (e.g. maturation, reproduction) and ultimately leading to population effects. For example, an animal that is under stress can exhibit behaviours outside their normal behavioural repertoire and/or cease to exhibit typical behaviours. If this stressor is chronic, then the animal is likely to have a reduced likelihood of surviving and reproducing.'

Richardson et al (1999) examined the effects of seismic on migrating bowhead whales and found migrating bowhead whales avoided the seismic source within 20km of the operating guns with received sound levels of between 120–130 dB re: 1 μ Pa. Wood et al (2012) defined behavourial response categories for sensitive species and migrating mysticetes using the Richardson et al (1999) study. Wood et al (2012) proposed a graded probability of response for impulsive sounds using a frequency weighted SPL metric, and graded the probability of mysticetes to respond at 140 dB re: 1 μ Pa as 90%.

Robertson et al (2016) sought to determine the extent to which analyses of the distribution of bowhead are affected by changes in visual 'availability' caused by seismic operations. Roberston et al (2016) found no evidence of changes in distribution of whales exposed to sound levels up to ~150 dB re 1 μ Parms, whereas Richardson et al. (1999) found evidence of avoidance behaviour. The authors suggested earlier analyses of displacement by bowhead whales of seismic operations are likely to have overestimated displacement because the numbers of whales in areas ensonified by seismic operations may have been as much as 33–68% higher than were previously estimated, implying some whales are not avoiding those areas as previously suggested.

McCauley et al. (2003) found resting humpback female-calf pairs showed avoidance responses at a considerably lower level 11km from the array. The calf cow pairs moved 3km to the south of the array (mean of 140 dB re 1 µPa). There were no indications of increased stress on a cow-calf pair which allowed the operating seismic vessel to pass three km to the North. This contrasts with migrating humpbacks which showed clear course changes at received levels of 144–151 dB re 1 µPa.

From 2010 to 2015, BOEM funded the Behavioural Response of Australian Humpback Whales to Seismic Surveys (BRAHSS) to investigate the effects of seismic surveys on humpback whales. Studies were conducted off the coast of Queensland at Peregian Beach on the southeast coast of Australia. Humpback whales were likely to avoid airgun arrays within 3km when the received level was greater than about 140 re. 1 µPa2 s (Dunlop et al 2017b). Another study as part of the BRAHSS project used a 3130 cubic inch airgun array to examine effects of seismic on migrating humpback whales. The authors found none of the groups exhibited any behaviours that were outside their normal repertoire of behaviours (e.g. continuous surface activity, female–calf separation) and none of the groups ceased to migrate or turned and continued to head northwards after the trial was over. Groups continued to generally move southwards and socially interact during active and control treatments (Dunlop et al 2017a). There were also no abnormal behaviours, such as instances of a female separating from her calf or sustained bouts of high energy surface behaviours (which are considered abnormal behaviour indicative of a stress response in humpback whales), were observed (Dunlop et al 2017b). The authors continued to observe typical behaviours including singing, socializing with conspecifics, using social signals such as surface slapping, and general migratory travel southwards. Since no abnormal behaviours were observed and there was no clear evidence that the whales were experiencing stress, humpback whale behaviours seemed to be primarily influenced by social interactions and their need to migrate, with minimal impact from the seismic vessel and airguns (Dunlop et al 2017a).

Bröker et al (2015) developed and examined the effectiveness of an extensive monitoring program to investigate the effects of a 4D seismic survey on a critically endangered population of foraging gray whales off Sakhalin Island, Russia. The authors used a behavioural threshold of 156 dB re μ Pa2-s. They found with a monitoring program and mitigation measures in place, some individual responses in movement patterns were observed, however the results from the behavioural analysis suggested the seismic survey did not have a large impact on the movement or respiration patterns of the population of gray whales as a whole.

3.1.2.2 Acute and Chronic Noise Exposure

Southall et al (2021) sought to make distinguishes between acute and chronic noise exposures. Southall et al (2021) defined acute exposure as short term, often high noise events with identifiable exposure to known individuals or groups (e.g. Military sonar, seismic airguns, pile driving, and sudden

vessel pass-bys. Southall et al (2021) noted behavioural responses from acute noise can range from brief orientation to prolonged avoidance, or separation of mother-calf pairs. Acute exposure responses can be studied using Controlled Exposure Experiments (CEEs) or direct observations.

Chronic exposure as defined as sustained or repeated exposure over weeks, seasons, or years—usually at lower intensity but over longer durations (e.g. whale watching operations, ongoing vessel traffic, long-term seismic surveys, and industrial coastal activities) (Southall et al 2021). To study the effects of chronic noise exposure, Southall recommends using ecological models, UAVs and energetic modelling and systematic reporting of exposure context, species traits, and potential stressors.

The Regia MSS will only occur during one season when SRWs are present in Australia waters, the noise exposure associated with the survey is acute. The Regia Operational Area does not overlap with the SRW Reproduction BIA. The Regia MSS has been planned to ensure there is only a 20% overlap with the SRW calving season. The Regia MSS will only overlap with half of the migration period for SRWs in one season. The survey will not lead to long term sustained repeated exposures to SRWs.

3.1.2.3 Thresholds and Criteria for Behavioural Disturbance

The 160 dB re 1 μ Pa SPL threshold for behavioural disturbance is a commonly applied regulatory benchmark derived from empirical studies, particularly those examining mysticete responses to seismic sources. This threshold is widely recognized in national (NOAA) and international guidelines, including the National Marine Fisheries Service (NMFS) criteria. However, emerging research challenges the universality of this fixed threshold. Southall et al. (2021) and Ellison et al. (2012) argue for a contextual interpretation of behavioural responses, highlighting that the same sound exposure level (SEL) can result in different behavioural outcomes depending on factors such as behavioural state (e.g., nursing vs. migrating), group composition (e.g., mother-calf pairs), and habitat importance (e.g., reproductive BIAs).

Another major flaw in selecting a fixed behavioural threshold is that it ignores chronic noise effects. The dose-response model focuses on acute, immediate responses, but does not account for cumulative impacts from prolonged exposure, such as communication masking, stress-related physiological changes, or gradual displacement from key habitats. Even at relatively low SELs, if noise is persistent, it can disrupt essential behaviours over time. This means that using a single SEL-based threshold to predict behavioural impacts could be misleading, as it fails to capture these long-term effects.

The dose-response approach, while useful for predicting the likelihood of a response based on exposure level, fails to account for these ecological nuances. It assumes a uniform reaction to sound across individuals and settings, which does not reflect observed variability. The context-based model proposed by Ellison et al. (2012) considers behavioural ecology and situational variables, offering a more precautionary and biologically relevant framework. This is particularly important for SRWs, where low-level disturbances in critical reproductive habitats may still have significant energetic and developmental consequences.

This approach, whilst complex and not yet adopted by regulators, CGG believes that the behavioural context assessment approach does have greater merit than the more simplistic dose-response approach. This is particularly true in circumstances such as those found for the Regia MSS and the reproductive BIA for SRW.

Additional work has been commissioned by CGG to provide some further analysis and discussion around the application of the 160 dB threshold in project contexts and its overall suitability. They also consider the continuing relevance of the 160 dB threshold in contemporary acoustic modelling applications, evaluating whether it remains an appropriate benchmark considering current scientific understanding and technological advancements. See Appendix B7c. for this report.

3.1.2.4 Behavioural Disturbance Within and Adjacent to the SRW Reproduction BIA

Behavioural disturbance to Southern Right Whales (SRW) within or adjacent to the reproduction Biologically Important Area (BIA) is a central consideration of the National Recovery Plan for the Southern Right Whale (DCCEEW 2024). The requirements placed on CGG's actions have been adopted as defined acceptable levels of the Regia MSS and they establish two clear and measurable expectations near the reproduction BIA:

1. SRWs must be able to continue utilising the area, and
2. Behavioural disturbance must be minimised.

While modelled thresholds for behavioural disturbance are informative, the scientific literature shows that behavioural responses can still occur at received sound levels below 140 dB re 1 µPa SPL(e.g. Southall et al. 2016). Studies indicate that responses at these lower levels tend to be of low severity, but may still occur (Affatati & Camerlenghi 2023), although SRW-specific studies remain limited.

For the Regia MSS:

- Modelled results show no exceedance of the 140 dB threshold in the SRW reproduction BIA (See MAP-REG-EPM-188).
- Modelled results show sound levels within the BIA fall within ~120–140 dB re 1 µPa SPL (See MAP-REG-EPM-187, MAP-REG-EPM-188 and MAP-REG-EPM-189).
- Modelled sound level results within the BIA overlap with natural ambient sound levels in the Otway region, which have been found across multiple studies to vary between 90–158 dB, with a mean around ~110 dB (Beach Energy 2022 and references therein).

This overlap means that modelled effect thresholds alone cannot reliably distinguish natural variability from activity-related sound within the BIA. SRW mothers and calves may occupy the BIA for extended periods, where even low-severity behavioural responses could compromise the Recovery Plan requirement that utilisation be maintained and behavioural disturbance minimised.

To meet the Recovery Plan obligations and the defined acceptable levels, the management approach must ensure that SRWs can continue to utilise the reproduction BIA and that the risk of behavioural disturbance is minimised in practice – not just in modelling. Given the uncertainties described above, CGG has adopted a precautionary approach based on the following principles:

1. Where natural ambient levels and modelled results overlap, modelled thresholds alone may not ensure behavioural disturbance is minimised.
2. An ambient sound management framework to monitor sound in the reproduction BIA provides a more reliable, real-time assurance of protection.
3. Real-time monitoring of SRWs within the BIA provides a direct, species-specific control measure that is fully aligned with the Recovery Plan.

To operationalise these principles, CGG will manage to an EPO whereby, 'No behavioural disturbance will occur to any SRW within the reproduction BIA as a result of the Regia MSS.

To support this approach, CGG will:

- Characterise ambient (~baseline) sound levels within the reproduction BIA recognising natural variation across weather, sea state, biological activity and anthropogenic activities not associated with the MSS
- Conduct sound source verification as close as practicable to the reproduction BIA to confirm that activity-related sound does not elevate received levels above defined ambient-based ranges during sampling periods.
- Use this verification to guide real-time decision-making, providing a direct, measurable basis for ensuring behavioural disturbance is minimised.

By adopting the measured ambient seascape as our reference for the management framework, CGG removes reliance on modelled behavioural effect distances as the primary control measure. This increases predictive certainty and strengthens confidence that SRWs within the reproduction BIA will not be exposed to sound levels capable of causing behavioural disturbance.

To inform this approach CGG will deploy a suite of monitoring measures including shoreline observations, offshore monitoring platforms, aerial surveys, and acoustic detection systems.

Under this framework:

- If any SRW is detected within the reproduction BIA, the seismic source will be shutdown,
- Restart of the seismic source will only occur once monitoring confirms that SRWs have departed the reproduction BIA, ensuring actions must not prevent whales from utilising the area.
- Uncertainty regarding behavioural thresholds is removed entirely, ensuring that the activity is conducted in a manner that minimises behavioural disturbance.

More detail on mitigation effectiveness is discussed below.

3.1.3 Recovery Potential

The life history traits of Southern Right Whales such a long-life span, low reproductive output, late sexual maturity, and strong fidelity to calving areas, make them vulnerable to anthropogenic threats. These life history traits mean that any long-term response to disturbance and impacts from threats that may affect recovery are unlikely to be detectable, or even reliably identified to a specific threat, over short timescales (i.e., 1 to 3 years).

As SRWs recover from commercial whaling and their distribution and abundance increases, anthropogenic underwater noise may have the potential to displace and/or deter SRWs from habitats critical to the species or currently unused but historically important areas (DCCEEW 2023).

Based on the magnitude of effect from the Regia MSS to SRWs, which is limited to behavioural avoidance for migrating SRWs for one season, no long-term disturbance are impacts that may affect their recovery are predicted.

3.1.4 Conservation Status

The SRW is listed as threatened (*Endangered)* under the EPBC Act because population numbers have been severely reduced by historical commercial whaling (DCCEEW 2024). SRWs are also listed as Migratory. The National Recovery Plan for SRW (DCCEEW 2024) identifies the Commonwealth legislation and management arrangements that relate to the protection of SRWs in Australian waters.

Two populations of SRW occur in Australian waters: the western and eastern. SRW occur seasonally in all State coastal waters, with sightings ranging from Hervey Bay in Queensland on the east coast, along the entire southern coastline and including Tasmania, to Exmouth Gulf in Western Australia. The geographical boundary between the Australian populations is unclear. For management purposes, the western population includes Western Australia and South Australia waters, whereas the eastern population comprises the coastal waters of Victoria, Tasmania, New South Wales, and Queensland (DCCEEW 2024).

SRWs predominantly occur in aggregations in coastal water reproductive areas where they calve and nurse their young from May to October, primarily occupying shallow waters (< 10m depth) within 1 km of the coastline (Charlton et al. 2019).

Is there serious or irreversible harm to SRW from the Regia MSS requiring action under the Precautionary Principle?

In evaluating the threat (impacts) of seismic surveys on marine species, it is crucial to distinguish between different levels of harm—specifically, what constitutes serious or irreversible harm. The Regia MSS EP has shown that only behavioural effects are predicted to occur and that those effects are below the threshold for underwater level B harassment.[1]

The full range of possible behavioural effects has been acknowledged and shown to likely be at the lower end of the severity scale proposed in Southall et al 2021. These behavioural effects often do not meet the threshold for serious or irreversible harm for several reasons:

1. Behavioural changes in marine species in response to acoustic disturbances are typically reversible. Once the sound source ceases, the affected species are predicted to return to their normal behavioural patterns. This reversibility indicates that the changes do not result in long-term detrimental effects on any individual nor at the population level.
2. Behavioural effects are distinct from physical injuries that can cause immediate and lasting harm to individuals. Physical injuries can directly impact the health, reproductive capabilities, and survival of marine animals. In contrast, behavioural changes are less likely to have direct physiological consequences that could be considered serious or irreversible, particularly in circumstances such as the Regia MSS where sound exposures are impulsive (i.e. not continuous) and episodic due to survey downtime and the location changes of survey sail lines.

[1] Level B harassment is a defined term from the Marine Mammal Protection Act (MMPA) 1972 (US) which Southall 2007 et al state "would almost certainly not constitute biologically significant disturbance (or consequently level B harassment under the MMPA)."

3. Marine species often exhibit adaptive behaviours that allow them to cope with and adjust to changes in their environment, including sound. These adaptations can mitigate the potential negative effects of behavioural disturbances, further reducing the likelihood of serious or irreversible harm.
4. The scientific consensus (i.e. excluding outliers or adopting worst-case scenario thinking) indicates that while behavioural responses can be significant, they rarely translate into population-level impacts that would be considered serious or irreversible. This distinction is critical in applying the precautionary principle appropriately; the principle is intended to prevent significant harm, and its application must be supported by evidence of potential serious consequences (i.e. not hypotheticals, worst-case thinking, or scientific outliers).
5. Effective management and mitigation measures, including real-time monitoring and adaptive management strategies, are in place and are designed to reduce the intensity and duration of disturbances, thus preventing them from reaching a threshold that could be considered serious or irreversibly harmful.
6. The precautionary principle requires a proportionate response. Applying the highest level of precaution—reserved for preventing serious or irreversible damage—to relatively low-risk behavioural effects can lead to unnecessary restrictions and may divert resources from addressing more significant environmental threats. Thus, while precaution is necessary, it must be balanced with the actual level of harm presented by the behavioural effects.

CGG has shown in the impact and risk analysis documents that regulatory requirements relevant to the Regia MSS and SRW will be met. Relevantly, the National Recovery Plan for SRW (DCCEEW 2024) has significant weight in CGG's assessment due to the involvement of Commonwealth and State regulatory agencies, threatened species managers, and scientific experts in the development of the recovery plan. As such, recommended actions from the plan relevant to the Regia MSS have been implemented as detailed in Section 3.1.5 Mitigation Effectiveness.

3.1.5 Mitigation Effectiveness

CGG has already adopted a suite of mitigation measures that address most of the impact pathways for effects to SRW. These have been detailed in Appendix E7. However, no one measure is entirely effective and there are uncertainties in the assessment which will be addressed in this section.

Assessment of Uncertainty

This section explains how CGG has identified the key sources of uncertainty relevant to predicting and managing the environmental impacts and risks of the Regia MSS on SRW, and how those uncertainties are reduced through a structured suite of activity limitations, monitoring programs, detection platforms, and strict procedures for managing to below acceptable levels.

The tables presented in this section serve a specific function. Each Commitment is an activity limitation or management measure adopted to remove or materially reduce a defined source of uncertainty, and each Rationale explains why that measure ensures impacts remain within defined acceptable levels.

Where uncertainty exists, CGG will implement activity limitations, monitoring programs, validation mechanisms, and conservative procedures that remove or materially reduce that uncertainty. This demonstrates that CGG is managing uncertainty proactively so that environmental impacts and risks are maintained below acceptable levels.

Identifying Types of Uncertainty

A range of uncertainties are inherent when trying to predict environmental responses to offshore seismic activities, particularly for SRW and other cetaceans in the Otway region. We have categorised these uncertainties as follows:

1. *Ecological uncertainty*- reflects natural variability in whale arrival timing, utilisation of the reproduction BIA, migration pathways, and behavioural sensitivities to sound.
2. *Model uncertainty* or *Predictive uncertainty* - arises because underwater sound propagation models rely on assumptions and environmental inputs that are not always clearly defined or easily measured. Factors such as source-level variability, bathymetry resolution, and sound-speed structures can influence model accuracy. In addition, there is

inherent uncertainty in how well modelled thresholds translate to real-time sound fields during survey operations.

3. *Detection uncertainty,* - relates to the likelihood of observing whales reliably across multiple detection platforms. All detection systems have inherent probabilities of false negatives, especially when weather or sea-state conditions reduce visibility or acoustic performance. Spatial and temporal gaps in coverage can also occur, particularly during migration peaks or poor weather windows, creating uncertainty in whether cetaceans are present but undetected.
4. *Operational uncertainty* - arises from variable conditions and vessel behaviour during the survey. Weather-driven changes in sailing patterns, line turns, vessel repositioning, and equipment handling can influence sound propagation or detection system performance. Contractor variability and operational constraints also contribute to this uncertainty, requiring robust procedures and real-time adaptability.

Management of Uncertainty

The most effective way to reduce uncertainty in the impact assessment is to reduce the nature and scale of the activity itself. CGG acknowledges that maintaining two potential acquisition windows (April–June and September–December) creates operational uncertainty, particularly because these windows overlap with periods of high SRW sensitivity. The April–June period is especially critical, as it coincides with the arrival of pregnant females and mothers with newborn calves. For this reason, CGG has eliminated the April–June window entirely, representing a major reduction in ecological uncertainty. This change is now formalised as a new activity limitation in Appendix A2 (Description of Activity).

Additional activity limitations adopted through this further assessment to reduce uncertainty include:

- *24-hour shutdown for any SRW detections within the migration or reproduction BIA*: In the September window, SRWs observed in the BIA are typically preparing for southbound migration. A shutdown for every confirmed detection, regardless of distance, is a highly precautionary measure that provides sufficient time for the animal to move naturally away from the area. Given the long sail lines and racetrack acquisition pattern, there is high confidence this approach prevents interference with migration and ensures SRWs are not displaced from using the BIA.
- *Extending the northern activity limitation from the most northerly 20 lines to the most northerly 30 lines while SRWs are using the reproduction BIA*: This restriction is strongly protective, as it ensures received sound levels in the reproduction BIA stay within the ambient statistical window, well below 140 dB re 1 µPa SPL and far below the NMFS 2024 recommended 160 dB re 1 µPa SPL behavioural threshold. These refinements have been implemented across the relevant EP appendices.

Below summarises the specific measures adopted by CGG to reduce key ecological, detection, modelling and operational uncertainties relevant to SRW management. The commitments are structured as a stepwise sequence that begins prior to the survey and progressively builds the evidence base required to validate modelling assumptions, strengthen detection performance, and confirm operational readiness. Early-season activities focus on establishing empirical baselines and verifying SRW presence, distribution and behaviour, while subsequent phases apply validated thresholds, precautionary shutdown procedures and real-time monitoring to actively prevent unacceptable impacts. Each stage builds upon the information obtained in the previous one, reducing uncertainty and enabling CGG to progressively tighten environmental control measures as biological sensitivity increases, thereby supporting a robust demonstration that impacts and risks will be of an acceptable level.

Uncertainty	Commitment	Rationale why the commitment is necessary to manage uncertainty and supports a demonstration that impacts will be managed to an acceptable level	EP Cross Reference
Pre-Survey – In Season SRW Detection and Management Program (May 2025 – October 2025)			
Ecological Uncertainty	Commence Season 1 of a SRW monitoring program	Real-time, on-country monitoring reduces ecological uncertainty by validating suitable SRW observation locations and independently corroborating citizen-science sighting information, which cannot be relied upon alone because publicly available databases (e.g., Whaleface) are updated post-season and therefore provide no in-season verification capability.	This commitment has been completed. This document (F3) has provided a summary of the findings.
	Carry out SRW monitoring in the season prior to the survey.	This pre-survey dataset reduces ecological and detection uncertainty by establishing verified SRW presence and distribution patterns for the 2025 season, identifying suitable locations for shore-based MFOs and drone deployment, and assessing the reliability of local citizen-science sighting platforms as real-time information sources.	
Pre-Survey – Out-of-season Monitoring Program (October 2025 – April 2026)			
Model Uncertainty	Undertake extended logging of underwater sounds between Cape Otway and Cape Bridgewater.	Long-term pre-survey ambient sound recordings reduce modelling uncertainty by providing empirically derived baseline distributions of central tendency, variability, and upper-tail levels across relevant spatial and temporal scales. These baselines enable accurate differentiation between natural soundscape conditions and any MSS-related contributions, and are required to establish defensible, acceptable thresholds for deviation during operations. This aligns with the SRW Recovery Plan action to "Improve understanding and characterisation of marine soundscapes, including the application of new technologies for data processing, within southern right whale BIAs to facilitate quantification of anthropogenic noise in the marine soundscape"	This commitment is captured in the Sound Source Verification Procedure (Appendix G6). As this is a procedural control measure the relevant performance standards can be found in Appendix G1.

Uncertainty	Commitment	Rationale why the commitment is necessary to manage uncertainty and supports a demonstration that impacts will be managed to an acceptable level	EP Cross Reference
Detection Uncertainty	Aerial surveillance preparation.	Finalising the aerial surveillance strategy reduces detection uncertainty by ensuring that all permitting, operator competencies, and platform capabilities are validated prior to operations, thereby confirming that aerial surveillance methods and technologies can reliably detect SRW at the ranges and conditions required for effective environmental management.	This commitment occurs before commencement of the activity, so it is captured in the Implementation Strategy (Appendix B3) and in the Coastal SRW Monitoring Programme Implementation Plan (Appendix G5).
Pre- survey – In Season SRW Monitoring Program (1 May 2026 – 30 July 2026)			
Ecological Uncertainty	Commence Season 2 of monitoring of SRW presence between Cape Otway and Cape Bridgewater	This monitoring reduces ecological and detection uncertainty by generating current-season data on SRW presence and abundance within the scope area, ensuring CGG is accurately informed leading up to and throughout the acquisition period, and providing empirical validation of improvements made to SRW detection methods prior to commencement of the survey. This is best practice as required by the SRW Recovery Plan 2025: "Baseline surveys and monitoring undertaken during activity implementation are conducted in accordance with best practice standards and guidelines to ensure standardised datasets are obtained and suitable to inform environmental management decision making that can reduce the risk of threats to southern right whales."	This commitment is captured in the implementation strategy (Appendix B3) and has an associated implementation plan in Appendix G6.
	Pre-survey aerial surveillance of nearshore/SRW reproduction BIA.	This commitment aligns with, and directly implements, the SRW Recovery Plan requirement that "Baseline surveys and monitoring undertaken during activity implementation are conducted in accordance with best practice standards and guidelines to ensure standardised datasets are obtained and suitable to inform environmental management decision making that can reduce the risk of threats to southern right whales."	This commitment fits under the *Pre-survey and aerial surveillance procedure* control measure. Performance standards that reflect this commitment can be found in Appendix G1.

Uncertainty	Commitment	Rationale why the commitment is necessary to manage uncertainty and supports a demonstration that impacts will be managed to an acceptable level	EP Cross Reference
Model Uncertainty	Undertake ongoing sound logging of nearshore/SRW reproduction BIA.	Ongoing nearshore sound logging reduces modelling and ecological uncertainty by quantifying ambient sound levels within areas routinely used by SRW, providing empirical reference conditions necessary to distinguish natural variability from any survey-related contributions during operations.	This commitment is captured in the Sound Source Verification Procedure (Appendix G6). As this is a procedural control measure the relevant performance standards can be found in Appendix G1.
Pre survey – In Season SRW Monitoring Program – Pre-Activity Operations Phase (1 August – 15 September)			
Ecological Uncertainty	Expand monitoring of SRW presence between Cape Otway and Cape Bridgewater to commence all platforms and programs.	Expanded pre-activity monitoring reduces ecological and detection uncertainty by providing up-to-date information on SRW presence and abundance during the expected peak period, thereby validating the survey start criteria and confirming that all detection programs and platforms are performing effectively before acquisition begins.	This commitment is captured in the implementation strategy (Appendix B3) and has an associated implementation plan in Appendix G6.
Detection Uncertainty	Deploy and calibrate Sound Source Verification Buoys (SSV Buoys)	Deployment and calibration of the SSV buoys reduce modelling and operational uncertainty by confirming correct buoy operation, quantifying and adjusting for any mooring-related noise, verifying reliable communication pathways between the buoys and shore, and ensuring each buoy can continuously transmit full-spectrum acoustic data via satellite/4G, and Wi-Fi prior to the commencement of acquisition.	This commitment is captured in the Sound Source Verification Procedure (Appendix G6). As this is a procedural control measure the relevant performance standards can be found in Appendix G1.
Operational Uncertainty	Run the Acquire Seismic On Paper (ASOP) workshop	The ASOP workshop reduces operational and management uncertainty by ensuring all teams have a shared understanding of roles, expectations, and decision pathways across a range of credible survey scenarios, and by testing and validating the response actions required for SRW detections before the activity commences.	This is an existing component of the Implementation Strategy (Appendix B3) and contributes directly to the management of uncertainty.
Ecological Uncertainty	Conduct pre-survey aerial surveillance (likely by onshore drones)	Pre-survey aerial surveillance reduces ecological and detection uncertainty by extending visual coverage beyond the limits of land-based observers, improving the accuracy of SRW presence and abundance estimates, and validating the reliability of existing monitoring datasets before acquisition begins. This aligns with the SRW Recovery Plan action to "Establish effective monitoring techniques for the eastern population and implement a targeted long-term monitoring program capable of measuring and evaluating population recovery."	This commitment is captured in the implementation strategy (Appendix B3) and has an associated implementation plan in Appendix G6.
During survey – In Season SRW Monitoring Program – Activity Operations Phase (16 September - 31 October)			

Uncertainty	Commitment	Rationale why the commitment is necessary to manage uncertainty and supports a demonstration that impacts will be managed to an acceptable level	EP Cross Reference
Ecological Uncertainty	Continue monitoring of SRW presence between Cape Otway and Cape Bridgewater.	Ongoing in-season monitoring reduces ecological and detection uncertainty by providing current information on SRW presence and abundance within the scope area, thereby ensuring that whale-related shutdown decisions are based on accurate, real-time data during acquisition.	This commitment is captured in the implementation strategy (Appendix B3) and has an associated implementation plan in Appendix G6.
Ecological Uncertainty	Shut down the sound source if impulsive noise levels exceeding 120 dB SPL are repeatedly detected by the SSV buoys. In October, if there have been 14 consecutive days without a confirmed SRW detection, the shutdown trigger for repeated impulsive-noise exceedances increases to 140 dB SPL.	Context is essential when considering behavioural disturbance. For the Regia MSS: • The NMFS (2024) threshold for behavioural disturbance is 160 dB SPL. • Existing shutdowns extend to 13km which corresponds to the 140 dB SPL threshold. • Shutdowns also occur for any confirmed detection of a single SRW. Despite these unprecedented control measures, CGG recognises that the scientific literature acknowledges some behavioural responses may occur at or below 140 dB SPL. Given the uncertainty in the literature, the data showing reducing numbers in September, and no observations in October since 2018, CGG will implement this ultra-precautionary shutdown measure. This approach will ensure that impacts to SRWs remain of an acceptable level also addressing uncertainties regarding behavioural responses and thresholds. The conditional part of this measure can only be applied in October if there have been no detections of SRWs from any detection platform for a period of two weeks. This two-week timeframe was determined to be appropriate based on the Whaleface sightings data, which shows that there have been no SRW sightings in October over the past five years. In the unlikely event that a SRW were to be detected in October, which has historically occurred, then the threshold for impulsive sound detection would return to 120 dB SPL for a minimum period of 2 weeks. Applying this conditional shutdown measure ensures that any remaining SRWs in the BIA can continue to utilise the area without experiencing behavioural disturbance because of the Regia MSS, thus ensuring impacts are of an acceptable level.	A new EPO will be adopted to address this uncertainty: *Underwater sound emissions from the Regia MSS are empirically measured and validated through the sound source verification procedure to ensure they remain within levels that do not cause injury or unacceptable disturbance to Southern Right Whale.* Additions have been made to the Environmental Performance for the survey including shutdown and restart procedures. They can be found in Appendix G1, in the Fauna Management Plan (Appendix G2). This procedure and metrics associated with this measure are defined in Appendix G6 (Sound Source Verification Procedure).

Uncertainty	Commitment	Rationale why the commitment is necessary to manage uncertainty and supports a demonstration that impacts will be managed to an acceptable level	EP Cross Reference
Operational Uncertainty	Shutdown the sound source upon "confirmed detection" of any SRW from any detection platform. Soft restart of the survey can only commence when there have been no confirmed detections of a SRW across all the platforms for a period of 24 hours.	Applying an immediate shutdown for any confirmed SRW detection eliminates the potential for behavioural disturbance or TTS within the Reproduction BIA by ensuring that all shutdown triggers are based on verified detections, defined as observations confirmed by a qualified MFO, an expert scientist, or time- and date-stamped photographic evidence.	Additions have been made to the Environmental Performance Standards for the Shutdown and Restart Procedures. They can be found in Appendix G1 and in the Fauna Management Plan (Appendix G2).
Operational Uncertainty	Investigate all "unconfirmed detections" of SRW from any information platform or program within 12 hours.	Investigating all unconfirmed SRW detections reduces detection uncertainty by ensuring that any claimed sighting (defined as an observation not yet verified by a qualified MFO, an expert scientist, or time- and date-stamped photographic evidence) is rigorously validated before triggering a shutdown or extending an existing shutdown, thereby preventing false positives and ensuring that management actions are based solely on confirmed, reliable detections.	Additions have been made to the Environmental Performance Standards for the Shutdown and Restart Procedures. They can be found in Appendix G1 and in the Fauna Management Plan (Appendix G2).
Model Uncertainty	Gather ambient and received sound levels throughout the survey from locations just outside the reproduction BIA via SSV buoys.	Real-time SSV data reduces modelling and operational uncertainty by providing continuous empirical information on ambient and received sound levels adjacent to the Reproduction BIA, enabling informed management decisions about vessel positioning and line acquisition, and validating modelled sound predictions against measured field conditions.	This commitment is captured in the Sound Source Verification Procedure (Appendix G6). As this is a procedural control measure the relevant performance standards can be found in Appendix G1.
Model Uncertainty	Investigate potential causes for pre-defined exceedances of ambient sound levels as detected by any SSV buoy.	Investigating any detected sound levels above the established historical maximums reduces modelling and operational uncertainty by confirming whether anomalous peaks are attributable to Regia MSS impulsive sound, triggering immediate shutdown where required, and providing empirical data necessary to test the hypothesis that acquisition along lines 31–67 will not produce statistically significant deviations from ambient sound levels within the Reproduction BIA while SRW may be present.	

Uncertainty	Commitment	Rationale why the commitment is necessary to manage uncertainty and supports a demonstration that impacts will be managed to an acceptable level	EP Cross Reference
Operational Uncertainty	Soft (re)start of the survey can only commence if the sound source detected by SSV buoys is confirmed not to be from the Regia MSS and it is during daylight hours.	This requirement ensures that, irrespective of visual detection limitations within the Reproduction BIA, the survey will not elevate received sound levels above ambient conditions, thereby managing residual uncertainty in both the effectiveness of detection platforms and the predictive accuracy of sound-propagation modelling.	Additions have been made to the Environmental Performance Standards for the Start-up Procedure. This can be found in Appendix G1 and in the Fauna Management Plan (Appendix G2).
Operational Uncertainty	The spotter vessel will travel parallel to the seismic vessel, 20km away and on the northerly side, while it is acquiring lines 31-67.	Positioning the spotter vessel between the survey vessel and the expected SRW distribution within the Reproduction BIA reduces detection uncertainty by maximising the probability of visually or acoustically detecting migrating whales before they approach the survey footprint, thereby supporting timely and precautionary shutdowns.	Additions have been made to the Environmental Performance Standards for the Spotter Vessel Procedure. This can be found in Appendix G1 and in the Fauna Management Plan (Appendix G2).

Taken together, the measures in the tables form a conservative, multi-layered framework that progressively eliminates or controls uncertainty at every stage of the activity. High-uncertainty periods are removed entirely through temporal exclusions, and spatial buffers ensure that the highest-sensitivity zones remain insulated from potential exposure. Model assumptions are then validated in real time through the Sound Source Verification program and continuous comparison of measured and baseline ambient sound levels, ensuring that predictions remain accurate under operational conditions.

At the same time, detection probability is maximised by deploying overlapping, independent platforms across visual, acoustic, and aerial domains. This redundancy ensures that no single point of failure can compromise the system. Any residual uncertainty is absorbed through deliberately conservative procedures, including mandatory shutdowns, confirmation protocols, and relocation triggers that apply long before behavioural or auditory thresholds could be approached.

Collectively, these layers ensure that SRW are not prevented from utilising biologically important areas, and that no individual is exposed to sound levels capable of causing auditory injury or sustained behavioural disturbance. The approach also ensures that the activity is not inconsistent with the SRW National Recovery Plan. Most importantly, by managing uncertainty at its source and validating real-time conditions as the survey progresses, CGG ensures the predictions of the impact and risk assessments remain robust and reliable under real-world conditions.

Demonstration that behavioural impacts to SRW from underwater sound are of an acceptable level

Through application of the most up-to-date modelling, direct real-time sound management, and verification by calibrated SSV buoys, CGG can demonstrate that impulsive sound emissions from the Regia MSS will not exceed acceptable levels of impact for SRW, which are defined as:

1. Actions within and adjacent to southern right whale BIAs and HCTS should demonstrate they do not prevent any southern right whale from utilising the area or cause auditory impairment.
2. Actions within and adjacent to southern right whale BIAs and HCTS should demonstrate that they minimise behavioural disturbance.
3. Sound exposures to southern right whales must be below a TTS per pulse and TTS 24 hr SEL threshold of 216 dB and 168 dB respectively.

The Environmental Performance Outcome states that:

> *As a result of the implementation of real-time monitoring and activity limitations, SRW are not exposed to sound levels that cause behavioural disturbance within or adjacent to BIAs or HCTS.*

The acceptable levels of impact can be demonstrably met because sound levels within the reproduction BIA will remain within the statistical window of ambient sound levels, as established by pre-survey baseline monitoring and verified through a running baseline during operations.

Moreover, this approach exceeds standard industry practice, provides a transparent and scientifically defensible basis for demonstrating environmental protection, and fully aligns with the Regulations, the SRW National Recovery Plan, and NOPSEMA's decision-making guidelines.

3.2 Blue Whales / Wuulok (*Balaenoptera musculus*)

3.2.1 Species-Specific Sensitivity

Blue whales are categorised as low-frequency cetaceans. Blue whales produce high-intensity, low frequency vocalisations which can be detected over large distances (Miller et al. 2021). Blue whale calls last up to 18 s and generally consist of three segments: a 9-s-long, 27-Hz tone, followed by a 1-s downsweep to 19 Hz and another, longer-lasting downsweep to 18 Hz (Širović et al. 2004, Rankin et al. 2005).

Antarctic blue whale source levels have been estimated to be 189 underwater decibels (Širović et al. 2007), although a more recent study has estimated source levels to be between 188-191 decibels (Miller et al. 2021).

Gavrilov and McCauley (2013) found pygmy blue whales in Australian waters display a diel pattern in vocalisation, noting pygmy whales are more vocally active during hours of darkness compared to daylight hours. Tripovich et al. (2015) noted Antarctic blue whales calls were more prevalent in the night to early morning.

The frequency of the sound produced from each seismic pulse is primarily less than 2 kHz, with the highest levels at frequencies in the range of 10-500 Hz (McCauley 1994). Thus, there is an overlap with low-frequency cetaceans hearing frequencies.

The blue whale source level of 188 to 191 decibels means that blue whale calls can be louder than the current sound effect criteria for behavioural response of 160 decibels.

The Blue Whale Conservation Management Plan 2015-2025 (DoE 2015c) assessed threats to blue whales through a risk assessment process. For both the pygmy blue whales and Antarctic blue whales, which are relevant to the Regia MSS, the consequence of seismic surveys was assessed as moderate, which is defined as population recovery slows or stalls. For pygmy blue whales the likelihood of occurrence was assessed as almost certain, expected to occur every year, resulting in a risk level of very high for which immediate additional mitigation action is required. For Antarctic blue whales the likelihood of occurrence was assessed as possible, the event might occur at some time, resulting in a risk level of high requiring additional mitigation action and an adaptive management plan required; the precautionary principle should be applied.

The risk assessment is deemed to be conservative as the Blue Whale Conservation Plan 2015-2025 (DoE 2015c) details that given the behavioural impacts of noise on blue whales are largely unknown, a precautionary approach has been taken regarding assignation of possible consequences.

Other threats assessed as having a moderate consequence and a likelihood of occurrence of possible are vessel collisions. Other threats assessed as having a major consequence and a likelihood of occurrence of possible are climate variability and change.

3.2.2 Magnitude of Effect

The Conservation Management Plan for Blue Whales (DoE 2015c) details that impacts from anthropogenic noise can include hearing impairment (e.g. permanent and temporary threshold shifts) masking of communication, displacement, and other significant behavioural changes (including to vocal behaviour). There have been no recorded mortal injuries to blue whales from seismic surveys.

The Conservation Management Plan for Blue Whales 2015-2025 (DoE 2015c) details the potential for impacts from anthropogenic underwater noise is of particular concern within biologically important areas at biologically important times. CCG will implement an activity limitation where the seismic source will only be operated in the pygmy blue whale foraging BIA from 16 September and during October, November and December.

During this time permanent or temporary hearing loss and/or displacement of blue whales is not predicted based on the implementation of detection systems and actions as described in the Fauna Management Plan (Appendix G2). Furthermore, it has been suggested that blue whales may

continue to forage within 2.5 km of an operating seismic survey if resources are abundant enough to outweigh the physical and energetic costs of acoustic disturbance (Burton et al. 2023).

As the Regia MSS will only occur during one season when blue whales are present in Australia waters, potential impacts to individual blue whales will not impact on the recovery of the population.

3.2.3 Recovery Potential

Blue whales exhibit long life history traits reaching sexual maturity at 10 years old and calve every 2 or 3 years, making their population recovery slow and vulnerable to anthropogenic threats, although it is thought that blue whale populations are recovering.

Estimates of pre- and post-whaling abundance of Antarctic blue whales indicate that they have been increasing in abundance since the cessation of whaling. The estimated original population size was 239,000 (95% interval 202,000 – 311,000) (Branch et al. 2004). A more recent estimate of the Antarctic blue whale population was 2,280 (95% interval 1,160 – 4,500) individuals in 1996 (estimated from the circumpolar International Decade of Cetacean Research, Southern Ocean Whale and Ecosystem Research survey conducted from the 1992/1993 to 2003/2004 season) (Branch 2007).

There is little knowledge of the pre-exploitation abundance of Australian pygmy blue whales, making it difficult to assess population recovery. Pygmy blue whales in the sub-Antarctic are estimated to have reduced from 7,598 at the start of the 1960/1961 season to 3,996 at the end of the 1971/1972 season, however this is based on out-of-date methodology and the population identity of these sub-Antarctic blue whales is unknown (Zemsky and Sazhinov 1982). Preliminary estimates of the number of pygmy blues caught are 13,022 though this encompasses all catches from South Africa to New Zealand and the northern Indian Ocean for which the extent of connectivity is unknown (Branch et al. 2008).

Based on the magnitude of effect from the Regia MSS to blue whales, no long-term disturbance impacts that may affect their recovery are predicted.

3.2.4 Conservation Status

The blue whale is listed as endangered under the EPBC Act as population numbers have been severely reduced by historical commercial whaling (DoE 2015c). The Conservation Management Plan for Blue Whales (DoE 2015c) identifies the Commonwealth legislation and management arrangements that relate to the protection of blue whales in Australian waters.

There are two sub-species of blue whale found in the Southern Hemisphere. The Antarctic blue whale *(B. musculus intermedia*) which occurs in the southern hemisphere and averages 27 m in length and the pygmy blue whale (*B. musculus brevicauda*), occurs in waters of the southern Indian Ocean, eastern South Atlantic Ocean and western South Pacific Ocean, and averages 22 m in length (Victorian State Government, 2009). The Pygmy Blue Whales give birth in the tropical waters of the Banda Sea migrating to and from this area to reach the cool temperate waters of the Southern Ocean.

Antarctic blue whales breed and calve in warm water (latitude 20° S) during the southern hemisphere winter. They then migrate to cold Antarctic waters (60 - 70° S) during the southern hemisphere summer to feed, mainly on krill. Pygmy blue whales occur only in the southern hemisphere (southern Indian Ocean, eastern South Atlantic Ocean and western South Pacific Ocean). They do not migrate as far south as Antarctic blue whales, and in summer are generally found north of latitude 55 °S (DoE 2015c).

Important foraging grounds for blue whales include the Great Australian Bight, South Australia, and off Portland Victoria. Research to date has found that Pygmy Blue Whales occupy the western area of the Bonney Upwelling system in the Eastern Great Australian Bight and adjacent to the Kangaroo Island canyons from November and December (DoE 2015c). Pygmy Blue Whales then move south-east to the Bonney Upwelling system off eastern South Australia and Victoria (e.g., between Robe, SA and Cape Otway, Vic). This occurs predominately between January to April (DoE 2015c) though they have been recorded in the Otway area as early as October and as late as June.

CGG has shown in the impact and risk analysis documents that regulatory requirements relevant to the Regia MSS and blue whales will be met. Relevantly, the Conservation Management Plan for Blue Whales (DoE 2015c) and Guidance on Key Terms within the Blue Whale Conservation Management

Plan (DAWE 2021) have significant weight in CGG's assessment due to the involvement of Commonwealth and State regulatory agencies, threatened species managers, and scientific experts in the development of the conservation management plan and guidance. As such, recommended actions from the conservation management plan relevant to the Regia MSS have been implemented as detailed in Section 3.2.5 Mitigation Effectiveness.

3.2.5 Mitigation Effectiveness

Mitigation of the Regia MSS effects can be best implemented with regards to blue whales by temporal exclusions to avoid the periods of time when blue whales are most likely to be present in the foraging BIA. Thus, CGG will implement an activity limitation where the seismic source will only be operated in the pygmy blue whale foraging BIA from 16 September and during October, November and December.

The Conservation Management Plan for Blue Whales (DoE 2015c) details the following in relation to marine seismic surveys:

- The risk of physical impacts to blue whales is minimised by implementation of the practical measures outlined in the *EPBC Act Policy Statement 2.1— interaction between offshore seismic exploration and whales*.

CGG will implement the requirements of *EPBC Act Policy Statement 2.1— interaction between offshore seismic exploration and whales* for the Regia MSS as detailed in the Fauna Management Plan. In addition, detection methods above typical industry standards, such as passive acoustic monitoring and in-water acoustic detection monitoring systems for low-frequency whales will be implemented. This will result in an effective mitigation system for detecting blue whales and taking actions to prevent acoustic injury or displacement to foraging blue whales in vicinity of seismic survey operations.

Additionally, the Conservation Management Plan for Blue Whales (DoE 2015c) identifies actions that are relevant to the Regia MSS and underwater noise. CGG has considered each of these actions in the completion of an assessment of the activity (action) according to the principle of ESD (Appendix F4), and the application of a Fauna Management Plan (Appendix G2) which includes minimising the risk of injury and displacement of blue whales.

3.3 Australian Sea Lion (*Neophoca cinerea*)

[Section added in response to Matter I17 and updated in response to Matter F17].

3.3.1 Species-Specific Sensitivity

The Australian Sea Lion is an otariid pinniped with Southall et al. (2019) categorising the species within the *other marine carnivores in water* hearing group. Otariid pinnipeds have a generalised hearing range of 60 Hz to 39 kHz (NMFS 2018). Little data exists on sounds produced by the Australian Sea Lion, or on the effects of noise on their behaviour (Pidcock et al. 2003) with available literature mostly referring to the California Sea Lion in the northern hemisphere. This species is considered to show some similar characteristics to the Australian Sea Lion. California Sea Lions make both airborne and underwater sounds, including barks, whinnies and buzzing associated with social interactions (Pidcock et al. 2003). The frequency of these sounds underwater is below 4 kHz. Most energy for these sounds is projected between 0.25 and 2 kHz (Richardson et al. 1995). Underwater source levels for the Australian Sea Lion are unknown as according to Erbe et al. 2017 there are no subsea recordings for the species.

The frequency of the sound produced from each seismic pulse from the Regia MSS is primarily less than 2 kHz, with the highest levels at frequencies in the range of 10-500 Hz (McCauley 1994). Thus, there is an overlap with the Australian Sea Lion hearing range.

The impacts to the Australian Sea Lion population which are relevant to the Regia MSS, were assessed as medium. The assessment predicted the Regia MSS to have some effect to seals and sea lions, but the effect is not considered significant or at a level to affect the population.

The Issues Paper for the Australian Sea Lion (*Neophoca cinerea*) (DSEWPaCa 2013a) and Recovery Plan for the Australian Sea Lion (*Neophoca cinerea*) (DSEWPaCa 2013b) list noise as a secondary threat to the Australian Sea Lion. However, research into the vulnerability of the Australian Sea Lion to noise disturbance has not been undertaken with studies only conducted on similar species (e.g. harbour seal and grey seal) in the Northern Hemisphere (DSEWPaCa 2013b).

Historically, the main anthropogenic threat to the Australian Sea Lion was hunting and overharvest through sealing activities during the 1700s, 1800s and early 1900s. Although this activity was stopped in the 1920s, the Australian sea lion population has not recovered to pre-exploitation levels (AFMA, 2010). Estimating the abundance of the Australian Sea Lion is difficult. Techniques used are based on estimates of pup production and the use of population models. Using these techniques, the best estimate for the 2011 population was approximately 14,700 Australian sea lions, with most (86 per cent) occurring in South Australian waters (Shaughnessy, et al. 2011). Population trends at studied colonies varies with some showing decline, with others showing growth. No population data post 2011 could be sourced.

Primary threats to the Australian Sea Lion, (DSEWPaCa 2013a, 2013b) are not activities connected with the Regia MSS. In summary these are:

- interactions with commercial gillnetting operations resulting in drowning.
- interactions with commercial pot fishing for rock lobster resulting in drowning.
- entanglement in marine debris resulting in drowning or causing extensive wounds.

In addition, secondary threats to the Australian Sea Lion (DSEWPaC 2013a, 2013b) which are also not connected to activities during the Regia MSS are:

- loss of habitat due to marine aquaculture.
- entanglement in subsurface equipment from marine aquaculture.
- 32
- land based run-off causing habitat degradation.
- human disturbance from either deliberately or accidentally being near Australian sea lions.
- direct killing because of fishers or aquaculture operators shooting animals that are perceived to be a threat to their operations.
- disease.

- pollution (research is ongoing with to date no supporting evidence).
- oil spills leading to hypothermia if fur is affected and poisoning if toxic hydrocarbons are ingested.
- competition and prey depletion from resulting from human activities and other marine predators.
- climate change associated to events such as sea level rise and 'wave wash' resulting from extreme weather patterns.

3.3.2 Magnitude of Effect

The Issues Paper for the Australian Sea Lion (*Neophoca cinerea*) (DSEWPaCa 2013a) and Recovery Plan for the Australian Sea Lion (*Neophoca cinerea*) (DSEWPaCa 2013b) details that anthropogenic noise can cause avoidance behaviour and/or hearing threshold changes in pinnipeds. In addition, seismic pulses may affect marine mammal prey species.

Permanent (PTS) or temporary (TTS) threshold shift (hearing loss) to otariid pinnipeds is not predicted based on underwater noise modelling (Appendix B7 – Sound Modelling Reports). The effect criteria for PTS for otariid pinnipeds was not reached. In addition, the per pulse effect criteria for PTS and TTs for these species was reached at 51m-55m and 63m-68m respectively, from the sound source. The PTS cumulative effect criteria for these species was reached at 50m-55m from the sound source and TTs cumulative criteria was reached at 660m-1.02 km from the sound source. It is highly unlikely that a seal or sea lion would stay within 1.02 km of the sound source for up to 24 hr, thus TTS impacts are not predicted.

The impacts to otariid pinnipeds, resulting from noise generated by the Regia MSS, are limited to avoidance behaviour within an area between 3.12 km-6.96 km depending on where in the Operational Area the Regia MSS is being undertaken. As Australian Sea Lions are not dependent on any specific area and typically forage up to 60 km and can forage up to 190 km from their colony, impacts may occur to individuals but not at a level to reduce fitness.

The Australian Sea Lion is a specialised benthic forager, primarily feeding on the sea floor (DSEWPaC 2013b). They typically feed on a range of prey including fish, cephalopods (squid, cuttlefish and octopus), sharks, rays, rock lobster and penguins (DSEWPC 2013b). Underwater noise modelling (Appendix B7 – Sound Modelling Reports) and assessment (Appendix E4 - Underwater Sound: Invertebrates) does not predict mortality or physiological damage to cephalopods. In addition, the predicted effect level to Southern Rock Lobster is assessed as minor as impacts are predicted to have some effect, but the effect is not considered significant or at a level to affect the population given.

Mortality of fish (both immediate and delayed) is not predicted based on lack of documented cases of mortality in free-swimming fish exposed to seismic source emissions under experimental or field conditions (DFO 2004; Boeger et al. 2006; Popper et al. 2014; Popper et al. 2016; Carroll et al. 2017; Popper and Hawkins 2019). Site-attached fish species are species that rely on the benthic habitat and demonstrate a very high degree of site fidelity to the extent that they are unlikely or unable to flee an approaching seismic source and are likely to remain and/or seek refuge within habitat structures. However, impacts to site-attached fish were studied by Woodside at Scott Reef during the Maxima 3D MSS activities (Miller and Cripps 2013) and no lethal or sub-lethal effects on fish were experienced nor any significant decreases in the diversity and abundance of fish after the seismic survey, compared with the long-term temporal trend before the survey.

As the Regia MSS will only occur during a limited period in Australia waters (maximum 60 days acquisition), potential behavioural impacts to individual Australian Sea Lions will not impact on the recovery of the population. Population impacts to prey species for the Australian Sea Lion are also not predicted.

3.3.3 Recovery Potential

Slow recovery of populations due to the extreme philopatry of females and limited dispersal of males between breeding colonies make Australian Sea Lions vulnerable to anthropogenic threats. The removal of only a few individuals annually may increase the likelihood of decline and potentially lead to the extinction of some of the smaller colonies (DSEWPaCa 2013b).

Based on the magnitude of effect from the Regia MSS to Australian Sea Lions which is limited to behavioural avoidance for the duration of the activity (maximum 60 days acquisition), no long-term disturbance that may affect the recovery of the species are predicted.

3.3.4 Conservation Status

The Australian Sea Lion is listed as endangered under the EPBC Act which was based on declining population trends, the life history characteristics of the species and the fact that the species was still under pressure from some sectors of the Australian commercial and recreational fishing industries at the time of listing. The Australian Sea Lion population underwent a massive decline in numbers caused by seal harvesting (DSEWPaC 2013).

The Australian Sea Lion is the only endemic, and least abundant, pinniped that breeds in Australia (DSEWPaC 2013). Breeding colonies for the Australian Sea Lion are found only in South Australian and Western Australian waters; however, the species is known to forage in Commonwealth waters adjacent to these states. The population can be broadly separated into three main metapopulations (Goldsworthy et al. 2009):

- one in SA accounting for ~84% of pup production
- one on the south coast of WA accounting for ~10% of pup production
- one on the west coast of WA accounting for ~6% of pup production.

The Australian Sea Lion uses a variety of shoreline types but prefer the more sheltered side of islands and typically avoid rocky exposed coasts (Shaughnessy 1999).

CGG has shown in the impact and risk analysis documents that regulatory requirements relevant to the Regia MSS and Australian Sea Lions will be met. Relevantly, the Recovery Plan for the Australian Sea Lion (*Neophoca cinerea*) (DSEWPaC 2013) has significant weight in CGG's assessment due to the involvement of Commonwealth and State regulatory agencies, threatened species managers, and scientific experts in the development of the recovery plan. As such, recommended actions from the recovery plan relevant to the Regia MSS have been implemented as detailed in Section 3.3.5 Mitigation Effectiveness.

3.3.5 Mitigation Effectiveness

Mitigation of the Regia MSS effects can be best implemented with regards to Australian Sea Lions by limiting the spatial boundaries of the survey to avoid the sound source being discharged within 11.8 km of Lady Percy Julia Island / Deen Maar. This distance is the furthest distance to the sound effect criteria for pinnipeds (seals and sea lions). This criterion was used as Deen Maar is the largest Australian Fur Seal breeding colony in Australia with and the Australian Sea Lion may occur within the area.

The Issues Paper for the Australian Sea Lion (*Neophoca cinerea*) (DSEWPaCa 2013a) and Recovery Plan for the Australian Sea Lion (*Neophoca cinerea*) (DSEWPaCa 2013b) lists noise as a secondary threat to the Australian Sea Lion. However, neither publication provides practical measures on the interaction between offshore seismic exploration and the Australian Sea Lion.

CGG has assessed potential cumulative noise impacts (Appendix F1) of other activities within the Otway Basin and identified additional mitigations to ensure cumulative noise impacts are within acceptable levels.

Assessment of the Regia MSS activities are consistent with the principles of ESD (Appendix F4).

3.4 Little Penguin (*Eudyptula minor*)

3.4.1 Species-Specific Sensitivity

Little penguins are found only in Australia and New Zealand where they are widely distributed along the coastlines of New Zealand and along the southern half of Australia. While the majority of little penguin colonies are located on islands - often cohabiting with other seabird species such as shearwaters and petrels – there are multiple colonies to be found on the mainland and this is the case

along the Otway Coast where up to seven colonies have previously been identified (Norman et al. 2017)(see Figure F3-2 below).

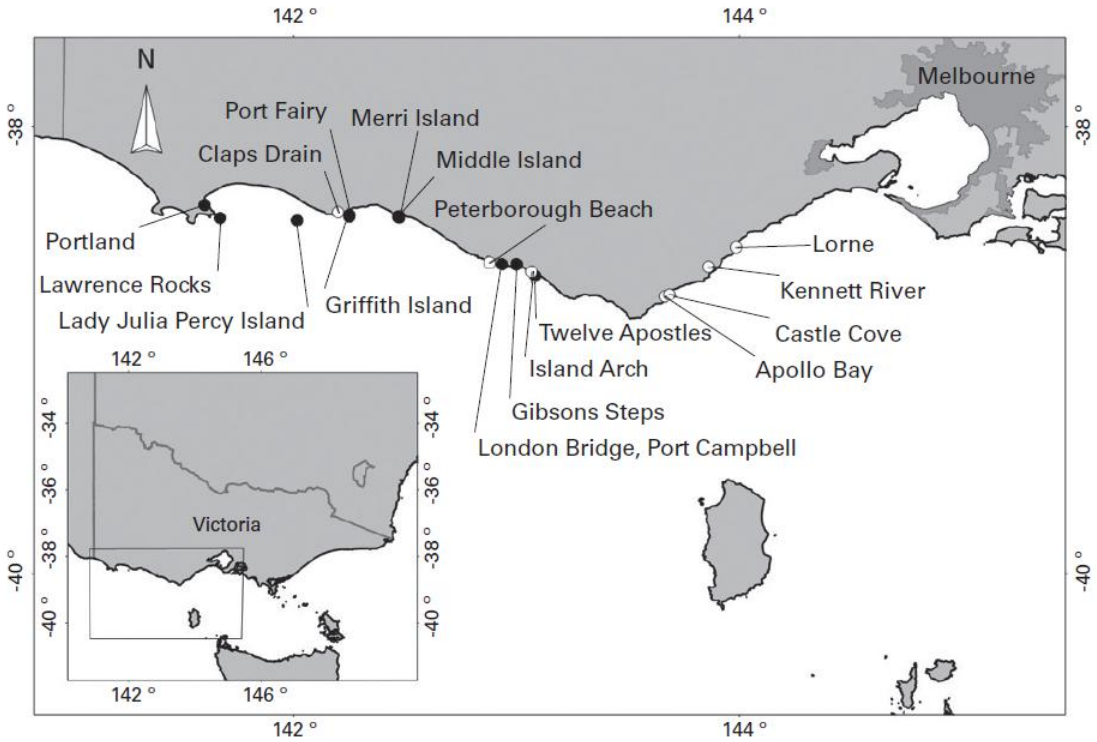


Figure F3-2 - Locations of past and present breeding sites across Western Victoria (from Norman et al 2017). Past or present breeding sites shown as ●, other sites as ○.

Mainland colonies are subject to large changes in the number of breeding animals which has been principally attributed to predation from foxes, dogs and cats (Norman et al. 2017). Most mainland colonies in New Zealand and Australia are in decline because of such impacts, while island colonies are faring much better. Food limitation has been seen previously with the collapse of the Anchovy population across southern Australia in the mid 1990's (Dann et al. 2000) however stocks of Anchovy and Sardines are currently considered healthy and not limiting (Grammer, Bailleul and Ivey, 2023). Philip Island remains the epicentre of the little penguin population in the region with current estimates of ~32,000 individuals (Philip Island Nature Parks; https://www.penguins.org.au/about/). Compare this with estimates of 7 individuals for Middle Island (` 2020-21; reports from 2021/22 and 2022/23 did not provide population estimates), 317 active burrows on Lady Julia Percy Island in 2000 (Dann et al. 2004) and 70 nests at London Bridge in 2012/13 (Berlincourt and Arnould, 2014)[2].

Norman et al (2017) updated estimates to 300 burrows in 1981 at Gibson Steps. There was a small colony in Portland located in clay cliffs on Henty Beach, however this colony decreased due to predation from dogs (Norman et al 2017). There were small colonies located at Lawrence Rocks (109 burrows, Harris and Norman (1981)), and Merri Rocks (5 burrows Dann and Norman 2006)), however they cannot be used to define current colony existence and/or size. It is understood the colony located at Griffiths Island has disappeared in recent times as a result of fox predation (Dann and Norman, 2006). CGG has contacted several government and local bodies but could not obtain more recent population estimates for these colonies.
Little penguins are resident central-place foragers that remain tied to their colony throughout the year, not just in the breeding season. They visit the colony to moult, breed and rest. Most little penguin colonies are located on islands where terrestrial predators are usually absent. It is these islands,

[2] These counts represent the most recent numbers we could find from the literature.

together with the food resources around them that limit and determine the distribution of colonies, population size of colonies and foraging ranges of penguins (Wiebkin 2012). Little penguins can store prey, which gives them the flexibility to forage for the entire day before returning to their chicks at dusk. Diet studies indicate that they are generalist predators that target whichever small schooling prey are abundant near their colony (Klomp and Wooller, 1988; Montague and Cullen, 1988; Gales and Pemberton, 1990; Cullen, Montague and Hull, 1991; Chiaradia, Costalunga and Kerry, 2003; Eberle, 2003). There is large variability in diet amongst colonies and even between years at the same colony. They feed mainly on clupeids, such as anchovy and sardines, when feeding chicks, but they may also feed on krill and several species of cephalopods at all stages of breeding (https://datazone.birdlife.org/species/factsheet/little-penguin-eudyptula-minor/text).

Studies into daily feeding range limits for nesting penguins have found forays out to 30+ km however the vast majority of feeding during this period is occurring within 15-20 km of their nesting sites and this has been confirmed across multiple studies from multiple locations (e.g. Montague and Cullen, 1988; Hoskins et al. 2008; Berlincourt and Arnould, 2014; Pelletier et al. 2014; Phillips et al. 2019, 2022). Feeding dynamics can be very different between locations and is correlated with prey abundance and distribution patterns. Feeding range limits can also change outside nesting season. When adults no longer need to return to the nest each day, they can venture out over 100km from the colony to feed. As has been demonstrated with references throughout the EP, the Otway region is well supplied with sardines and squid, with quality of food resources correlated with nearness to upwelling areas (Norman et al. 2017).

Because penguins feed on mobile prey species such as fish, squid and krill they must be able to regularly expend considerable searching effort and flexibility in foraging behaviour (Chiaradia et al 2007). Tagging studies conducted over three breeding seasons have revealed that little penguins are flexible in their foraging behavior and can adjust their activity budgets in relation to breeding stage and local environmental conditions (Berlincourt and Arnould, 2015). Little penguins tagged at London Bridge decreased their foraging efforts during periods of rough sea states and increases in wave heights, The authors suggested two potential reasons for this: high sea states and swells may increase foraging efforts of penguins or rough sea states may modify prey behavior, alternating the penguins ability to find prey (Berlincourt and Arnould, 2015). This study did note that although little penguins at London Bridge would have increased their foraging efforts, individuals at London Bridge did not vary in their body condition between breeding seasons. This suggests that individuals breeding at London Bridge may have more scope for increasing their foraging effort to compensate for reductions in prey availability. During the chick guard stage, close to their colony Little penguins at London Bridge mainly foraged at hotspots primarily located south-west of the colony. The maximum foraging distance during the chick guard stage was 16.9km (Berlincourt and Arnould, 2015). During the post guard stage, core foraging areas were located up to 15 km from the colony to south-west and south south-west, and in some instances, it was also very close to the shore. Maximum foraging distances in the post guard stage for the colony at London Bridge ranged from 12.5km to 25.9km (Berlincourt and Arnould, 2015).

A subsequent tagging study conducted on breeding colonies at Gabo Island and London Bridge confirmed little penguins are shallow divers and inshore foragers at these study sites (Camprasse et al. 2017). This study found a lack of short-term consistency in bearings to maximum distance, indicating that over subsequent days, little penguins foraged in different locations within their home range. These findings confirm that little penguins are behaviourally highly plastic (Camprasse et al. 2017). The study also found individual consistency in foraging metrics was only present over subsequent foraging trips, with no consistency detected for longer timescales. This suggests that little penguins are adapted to feed on prey that is temporally unpredictable on timescales longer than multiple consecutive days. This study concluded, although little penguins have a limited foraging range during their breeding season, foraging behaviour and its consistency varied extensively across sites, years, breeding stages and clutches, showing that little penguins are highly plastic and have high flexibility in foraging behaviour (Camprasse et al. 2017).

Egg-laying and chick raising covers the period from August to February which is the most critical time for obtaining sufficient food to sustain developing chicks (see Figure F3-3 below).

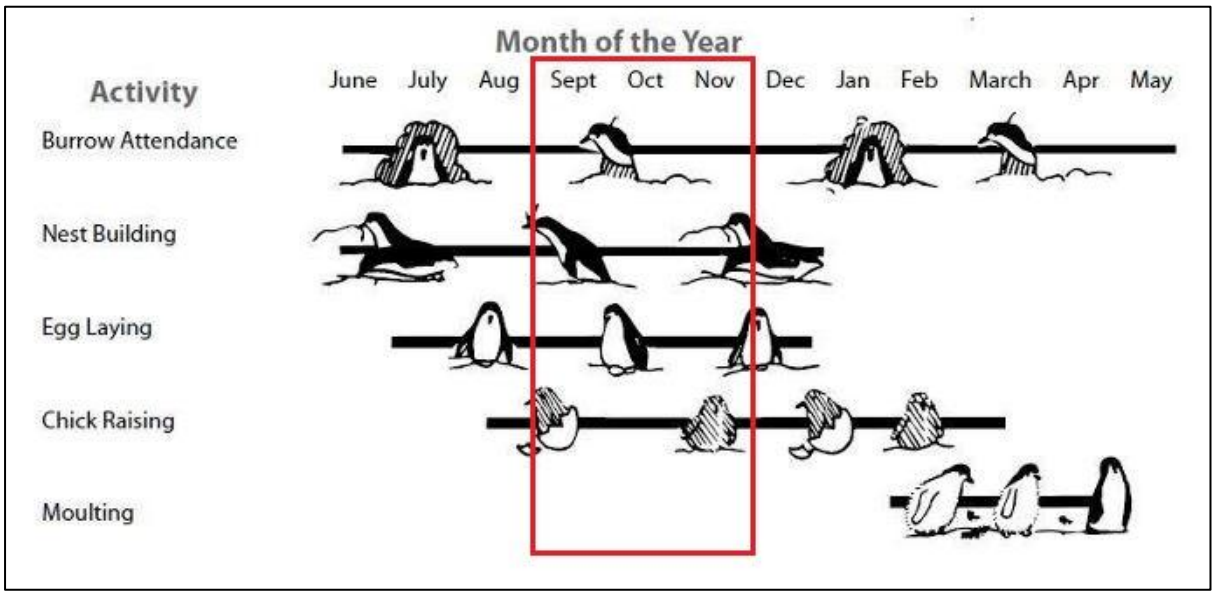


Figure F3-3 - Schematic of reproductive cycle in little penguins at Philip Island (from https://penguins.org.au/conservation/education/nature-notes/little-penguins/).

***** *Red box highlights the Regia MSS windows.*

During consultation with relevant persons, it was noted that as referenced by the Middle Island Project (Event ID 6412) there were instances of breeding cycles beginning as early as June.

There have been no studies looking at seismic effects on little penguins specifically, so we have looked for seismic studies on other penguin species. A study by Pichegru et al. (2017) investigated the behavioural response of endangered African penguins (*Spheniscus demersus*) before, during and after a seismic survey conducted within 100 km of their breeding colony in South Africa, using a multi-year GPS tracking dataset. They found penguins foraging within 100 km of the active seismic operations showed a change of foraging direction during seismic periods, increasing their distance between their feeding area and the location of the seismic vessel. While the avoidance behaviour observed in this study was unable to be definitively attributed it was most likely to have been due to penguins responding directly to the noise. Small-scale acoustic fish surveys assessing distribution and abundance of small pelagic fish in Algoa Bay around both penguin colonies did not however, show a significant change in distribution and/or abundance of small pelagic fish in the region in March 2013 compared to a few months prior to or after the seismic operations. Moreover, further monitoring as part of this study highlighted that the African penguins quickly reverted to normal foraging behaviour after cessation of seismic activities, indicating a relatively short-term influence of seismic activity on these birds' behaviour and/or that of their prey.

While no seismic studies exist for little penguins, recent research has modelled sound reception and hearing in little penguins through anatomical analysis of the head structures of deceased individual penguins (Wei and Erbe, 2024). They predicted the hearing capabilities of little penguins across a broad frequency range (100 Hz – 10kHz) (see Figure F3-4 below).

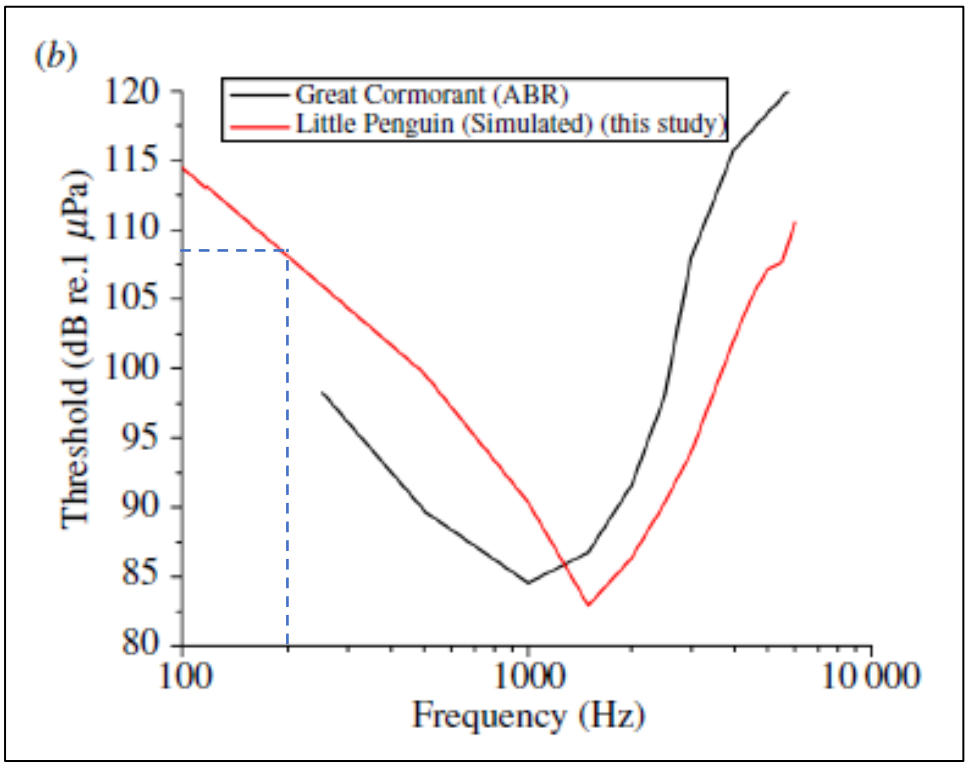


Figure F3-4: Predicted underwater audiogram of the Little Penguin (from Wei & Erbe 2024). Overlaid dashed lines represent the hearing threshold relative to the expected frequency level of the Regia MSS.

Sound modelling undertaken for the Regia MSS used 200kHz frequency for the MSS and extrapolating this from Figure F3-4 indicates a hearing threshold of ~107-112 dB re.1 µPa. Wei & Erbe (2024) indicate that humans have strong behavioural responses at 50dB above thresholds while for whales it is as high as 100dB above threshold hearing levels. Using this range as a guide and noting that little penguin hearing is most sensitive in the 1000-2000 Hz range we can extrapolate to a potential SEL TSS threshold of 170 dB re.1 µPa and this is the threshold level modelled for impacts by SLR. It remains the case that more research is needed into penguins and sound however it is reassuring to see that the modelled thresholds are in line with current research. With behavioural effects, Sorensen et al. (2020) found a response by Gentoo Penguins at 120 dB re.1µPa but this appears too low for Little Penguins given it is only 5dB above their calculated hearing threshold. It must also be highlighted that Sorensen et al. (2020) obtained their outcomes from penguins enclosed in a pool which is not reflective of normal conditions. Testing of seismic effects through caging of subjects remains a significant weakness of current experimental approaches and limits extrapolation of effects to real-life applications.

3.4.2 Magnitude of Effect

The limited science around Penguin responses to seismic surveys indicates they respond to the presence of active seismic by moving away from the area. The same science also indicates they return to previous areas once seismic moves away. The most recent study examining hearing thresholds based on skull morphology (Wei and Erbe, 2024) indicates a TTS hearing threshold in the region of 180 dB re. 1µPa is appropriate for understanding thresholds distances (i.e. an additive on top of the calculated minimum hearing threshold of ~115 dB re. 1µPa at 200Hz frequency). At this level penguins would have to be within 600m of the seismic source for 24 hrs to sustain temporary damage. Given the limited time that seismic will be active within the potential feeding halos of Little Penguins, the intermittent timing of seismic in those areas and the extensive nearshore feeding grounds available to Little Penguins we expect the magnitude of any effects to be small and temporary.

If the seismic survey occurs in the chick rearing stage (September to November), it is understood little penguins will be provisioning for chicks and foraging close to their colonies. CGG acknowledges some penguins may be behaviourally impacted and may have to extend their foraging times . However, there have been numerous studies on the foraging flexibility exhibited by little penguins and increasing foraging effort does not lead to impacts to the fitness and survival of penguins, CGG anticipates any potential impacts to little penguins during the chick provisioning stage to be temporary, localised and recoverable.

The Regia MSS is expected to collect seismic data for 60 days within a 90-day timeline, which provides flexibility to accommodate stoppages due to scheduled and/or unscheduled events. Such events may include adverse weather conditions or mitigation measures as part of the EP (see Appendix A2 for Description of Activity).

A seismic survey acquires data by running parallel sail lines towing streamers back and forth within the defined Activity Planning Area. The survey can be carried out in sections and the sail lines acquired in any order. Acquisition is a continuously moving process hence seismic sound levels are not static and will increase when moving to a point in space and then decrease as it moves away. This is strictly true for sessile animals but not for mobile ones. Mobile animals such as penguins can actively respond to seismic sources and will move away from the activity, as has been noted by researchers (Pichegru et al. 2017).

In response to concerns raised by a relevant person, CGG sought to conduct some analysis on how much of an overlap the Regia MSS has with little penguin foraging areas. By overlaying the proposed sail line plan with 20km core feeding halos centred around nominated penguin colonies (from literature and consultation) we can calculate the amount of time and proportion of core foraging habitat that the Regia MSS will intersect with. Of the 5 main colonies identified through community consultation only the colony on Deen Mar will intersect with active sail lines within the 20km feeding halo.

The area within the halo that will be traversed with active seismic is ~32km^2 which is ~3% of the total feeding halo area of ~1006km^2. There will be 11 lines that will be actively acquiring seismic within the halo for a portion of their path. However, because the acquisition process involves running parallel lines extending the length of the total acquisition area, the time each relevant line spends inside the Deen Maar feeding halo is very short and is not cumulative (see Figure F3-5 and Table F3- 2below).



Figure F3-5- Map illustrating core penguin foraging areas for all identified colonies (in red) relative to the location of the Regia MSS survey lines (green).

Table F3- 2: Proportion of time and distance that survey lines will be acquiring within the 20km Deen Mar core feeding halo. Line #'s corresponds to distance from shore, i.e. line 1 is closest to shore. The survey does not actually start at line #1 so number position in the table reflects the likely survey path to be taken.

Line #	High Power (km)	Time Acquiring (min@9.3kmh^{-1})	Return Time (hrs)
2	4.2	27	31
3	3.9	25	48
1	3.6	23	326
11	1.9	12	25
10	4.0	26	25
9	5.8	37	25
8	6.7	43	24
7	5.8	37	24
6	5.0	32	24
5	4.4	28	24
4	4.2	27	

For example, the first entry into the halo will be running at full power for ~4.2km (see Line # 2 in Table F3- 2) and will leave the halo after 27 min at an average speed of 4-6 knots. The second entry into the halo will not occur for another 31 hours. It will be running at full power for ~3.9 km (Line # 3) and will exit the halo after 25 min. The third entry into the halo will not occur for another 48 hours. It will be running at full power for ~3.6 km and will leave the halo after 23 min. The 4th entry will not occur for another 13.5 days as the MSS is operating further offshore. This process will continue like this for the other 8 entries into the halo. The very short time inside the halo followed by extended time away between each seismic line drastically reduces the likelihood of any impacts whether singular or cumulative in nature. Total time acquiring seismic in the Deen Mar feeding halo is only ~5.3 hours spread over 3.5 weeks.

With significant overlap of halos around each colony we suggest that all the habitat running parallel to the coast out to 20km will provide suitable feeding opportunities. This equates to ~ 3370 km2 of suitable area for fishing of which the seismic area constitutes < 1 %. CGG acknowledges some little penguins may be behaviourally impacted and displaced from their foraging areas which may impact the fitness of an individual. There have been multiple studies examining little penguin foraging behaviours. Camperasse et al (2017) examined tagged breeding little penguins at Gabo Island and London Bridge. This study revealed an absence of short-term consistency in bearings to the maximum distance, suggesting that over the following days, little penguins foraged in various locations within their home range. This confirms that little penguins exhibit high plasticity and flexibility in their foraging behaviours. The study also found differences in foraging behaviour across space and time arose from differences in the local distribution and abundance of Clupeiformes, thought to be associated with different environmental conditions, rather than from differences in prey types. Berlincourt and Arnould (2015) noted rough sea conditions caused little penguins at London Bridge to increase their foraging effort. These individuals did not vary in body condition suggesting breeding individuals at London Bridge may have a greater ability to increase their foraging effort in response to declines in prey availability. Little penguins have also been documented group foraging to increase foraging success (Sutton et al. 2015). Given that Little Penguins exhibit high flexible foraging behaviours and tend to prey on species that is temporally unpredictable, if little penguins are temporarily displace from foraging areas impacts to penguin fitness and survival are not expected.

A dedicated study of little penguin diving behaviours during nesting season and across their whole distribution range, clearly shows that they prefer to constrain their diving to shallow water (Chiaradia et al 2007). Across 4 widely separated colonies they found almost all Little Penguin dives were less than 50m deep with the overwhelming majority less than 30m deep (Figure F3- 6). When the bathymetry of the Otway coastline is examined, it can be seen that the 50m contour line lies within 15km of the coast and the 30m contour line lies within 5km of the coast.

While studies into daily feeding range limits for nesting penguins have found forays out to 30+ km the vast majority of feeding during this period is occurring within 15-20 km of their nesting sites and this has been confirmed across multiple studies from multiple locations (e.g. Montague and Cullen, 1988; Hoskins et al. 2008; Berlincourt and Arnould, 2014; Pelletier et al. 2014; Phillips et al. 2019, 2022).

The study by Chiaradia et al (2007) demonstrates that all chick-rearing Little Penguins face similar diving and dispersal limitations across their distribution range. These dispersal limitations are heavily influenced by the water depth and geographical features of the foraging zones. When applied to the Otway coast region encompassing known penguin colonies it can be seen that the majority of foraging will be occurring within 15km of the coast with less occasional forays out to 20km.

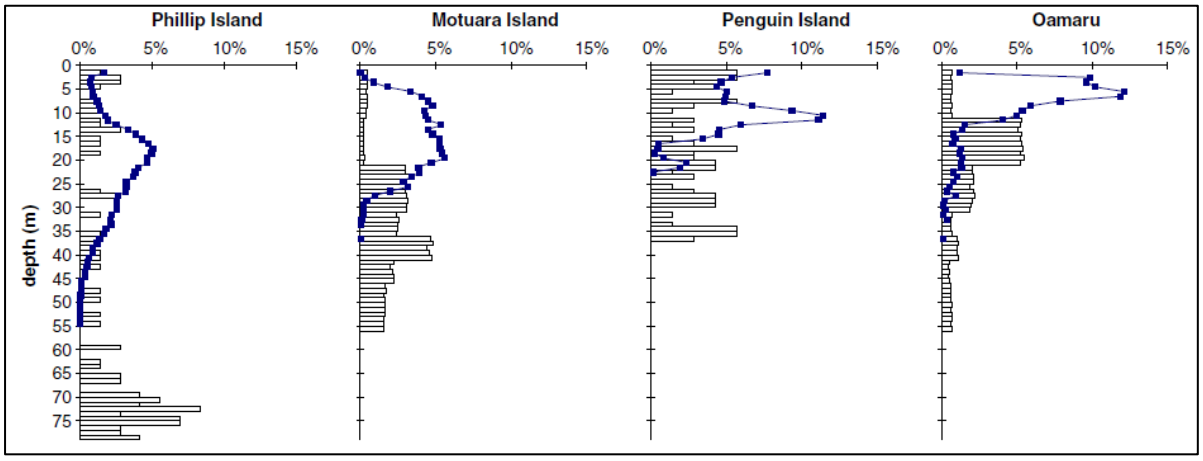


Figure F3- 6 - The proportion of foraging area depth (bathymetry, clear bars) and diving depths (dark squares and lines) per 1 m interval for Little Penguins in Australia (Phillip Island and Penguin Island) and New Zealand (Motuara Island and Oamaru). From Chiaradia et 2007)

Consequently, we assess the likelihood of any significant impact to food resources and feeding opportunities for little penguin colonies as low. CGG believe any behavioural impacts to little penguins are of an acceptable level as any knock-on effects from the survey will not impact the foraging success penguins, their ability to rear their chicks and their overall fitness.

3.4.3 Recovery Potential

While there is no research into seismic effects on little penguins there is enough parallel/ complementary research to make an informed assessment of the scale of any impacts to little penguin colonies from seismic activity. Coastal colonies in the region have undergone major fluctuations in abundance over the past 30 years which reflects the influence of a multitude of factors. Mainland colonies have faired poorly in most locations as they have succumbed to predation from feral animals and nearness to human populations. Multiple mass mortality events in the 1990's of their preferred food source, the Australian Anchovy, also caused substantial declines in colony sizes of little penguins across the south coast. Current anchovy stocks are in good health however and this species is commonly distributed along the shelf. There is also a very large coastal foraging area available so food limitation will not be an issue throughout the duration of the proposed Regia MSS. While behavioural responses can be expected, previous research has shown penguin species exposed to seismic will quickly revert to normal foraging behaviour after cessation of seismic activities, indicating a relatively short-term influence of seismic activity (Pichegru et al. 2017). Additionally, the specific

source used in the Pichegru et al. (2017) study had a total volume of 4,230 in^3 compared to the 2,630 in^3 proposed for the Regia MSS hence the size of the seismic source is ~45% less here.

3.4.4 Conservation Status

There is no conservation status assigned to little penguins (*Eudyptula minor*) as noted on the Species Profile and Threats Database (http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=1085). They are considered a species of Least Concern under the IUCN Red List, with the last assessment undertaken in September 2020. The global population estimate at this time was 469,760 animals (https://www.iucnredlist.org/species/22697805/202126091)

3.4.5 Mitigation Effectiveness

There are multiple processes that will contribute to mitigation of any effects of seismic surveys on Little Penguins. They include, "soft start" procedures and timing the survey to avoid the most sensitive parts of their lifecycle e.g. summer months. The survey program avoids the core feeding areas with the exception of limited time within the outer edge of the Deen Mar zone. Additionally, the seismic within this area is being undertaken in short sections separated by at least 24 hrs between successive survey lines. There are also mitigation measures for feeding birds which will indirectly support mitigation for Little Penguins, namely reducing to low power within 500m of feeding birds.

3.5 Southern Rock Lobster (*Jasus edwardsii*)

3.5.1 Species-Specific Sensitivity

Substantial research on the interaction between seismic surveys and the Southern Rock Lobster (*Jasus edwardsii)* has confirmed that while lethal effects are not seen, sub-lethal effects are likely to impact all stages of their life cycle that are within ~700m of a seismic system when it is firing (see Appendix B8 and references therein). In adults/juveniles, these effects are principally manifest as an impaired righting reflex and/or delayed progression through the moulting cycle. However, due to seismic signal attenuation over distance, its interaction with variability in individual vulnerability, habitat complexity, and time spent within proximity to the seismic source points, these effects are neither ubiquitous nor consistent. The larval stage of *J. edwardsii* is long (up to 2 years) and subject to persistent and high natural mortality during this time. Any effects on individual animals will not be measurable against the natural mortality rates that exist, and which operate over far greater spatial and temporal scales than the intended MSS schedule.

A recent experimental study used cages to assess seismic effects on Western Rock Lobster (*Panulirus cygnus*) in shallow reef habitat adjacent to Dongera on the central WA coast (de Lestang et al. 2024). Juvenile lobsters were confined to cages and subject to seismic pulses from very close quarters (2-5m metres) after which they were released. A recapture program was followed to determine what effects seismic might have on catches. Results indicated a short-term reduction in catchability for the first month of the recapture program which subsequently disappeared. The recapture rates after the first month were very low (e.g. max of 1-3 animals per treatment) and not appropriate to draw any further conclusions from, as highlighted by the breadth of the 95% CI's associated with the analysis (6-68%). Treatment was not reflective of normal seismic activity nor normal activity and domiciles of WRL. Natural mortality rates of WRL are also very high with density-dependent mortality between the time that pueruli settle on inshore reefs and the time they move offshore as juveniles to recruit to the fishery estimated to be as high as 80–98% during the first year after settlement (Phillips et al 2003).

3.5.2 Magnitude of Effect

Individual adult and juvenile animals within proximity to a seismic system when firing is occurring will likely be impacted in a non-lethal way as described above and in Appendix E4. The effects will vary across individuals and reduce with distance from source of the disturbance.

Puerulus settle into their preferred benthic habitat from June – September each year so potential seismic effects on the most vulnerable stage of the life cycle can be drastically reduced by scheduling the MSS for outside this window. Most mortality happens in the larval stages of marine organisms that incorporate a planktonic phase in their life cycle. Estimates can vary widely however > 90% mortality is common (Morgan 1995 - Life and death in the Plankton) hence reducing or minimising impact at time of settlement will provide more powerful mitigation of any potential seismic effects.

All SRL (Southern Rock Lobster) located within the MSS operational area are considered part of a single genetic stock spread across southern Australia (Ovenden et al. 1992; Thomas & Bell 2013). The huge geographical spread of this species means that larval supply to any individual area, such as the MSS operational area, comes from many other areas and hence is not linked to the number of reproductively active animals in any one place. Research has highlighted the complex processes affecting settlement strength in SRL which indicate that environmental conditions that reduce settlement strength in one region of the fishery often increase settlement strength in other regions. A system such as this is extremely resistant to localised disturbances as it receives larvae each year from what is effectively, a 'bank' of SRL stretching across southern Australia. Output from modelling of larval supply as seen in Figure F3-7 and Figure F3-8 clearly shows the dispersal extent of larvae released from locations in Victoria and Western Australia.

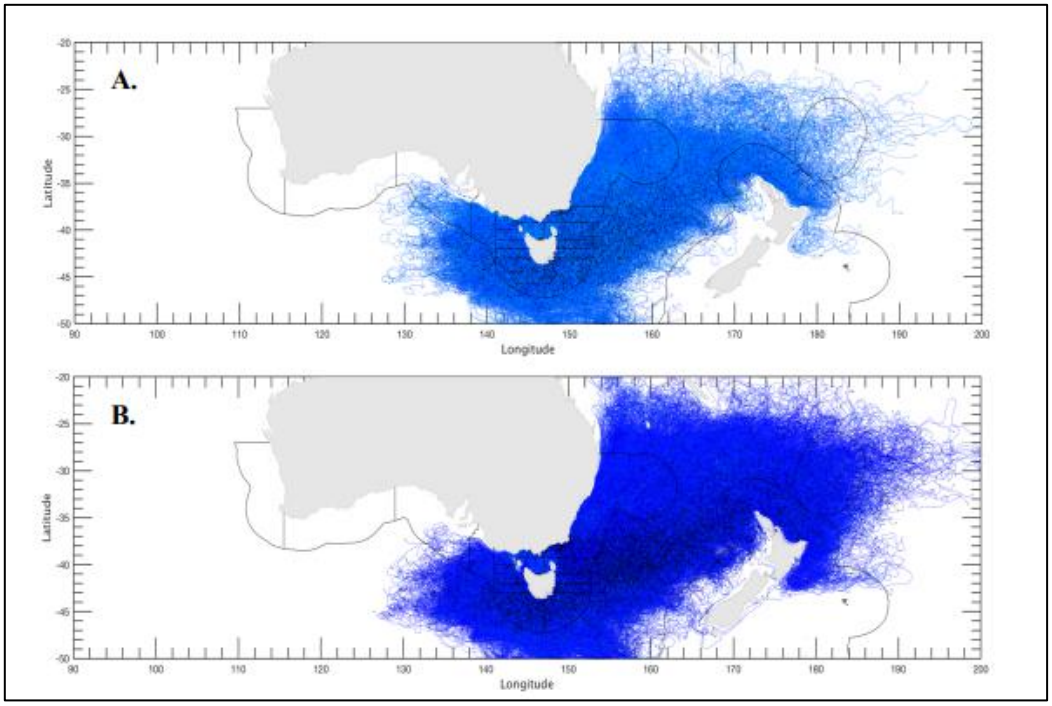


Figure F3-7 - Simulated trajectories of larvae released from Victorian fisheries: A. VIC_W fishery, B. VIC _ E fishery. The location of larvae at the end of the dispersal simulation is marked with black dots (from Vasile 2018 PhD thesis).

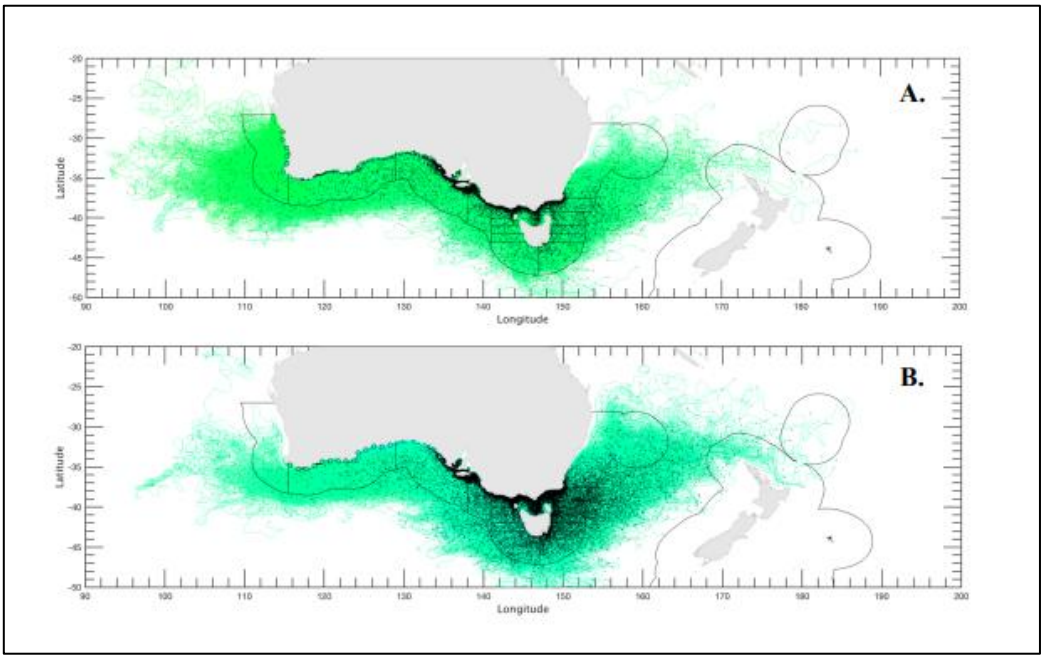


Figure F3-8- Simulated trajectories of larvae from Western Australia fisheries A. WA _ W fishery, B. WA_ S fishery. The location of the larvae at the end of the dispersal simulation is marked with black dots (from Vasile 2018 PhD thesis).

During consultations several commercial rock lobster fishers claimed there were cumulative effects from seismic surveys that were adversely affecting the Southern Rock Lobster stock. Following the first round of consultations, CGG agreed to undertake a case study on the effects of seismic activity on the Southern Rock Lobster population in the Victorian western rock lobster zone over time. Historical catch data would be used to look at the whole of the fishery over the last 20 years and determine if there was any correlation between the previous seismic surveys that have occurred in that timeframe.

CGG made an additional request from the Victorian Fisheries Authority to aggregate data over three previous seismic surveys which fishers identified as particularly damaging to their activities (Investigator in 1999; Enterprise in 2002/03; and Crowes Foot in 2016). The aggregated data was received by CGG however there were inconsistencies in the totals rendering the data unusable.

Instead, CGG obtained the records of monthly catch between 2006 and 2023 (to June) and completed an analysis of this data with respect to the following surveys:

- Astrolabe MSS
- La Bella MSS
- Enterprise MSS
- Flanagan MSS
- Crowes Foot MSS
- Schlumberger MSS
- Sequoia MSS

Both landed catch in kilograms was analysed as well as monthly catch rates. Table F3-3 and Figure F3-9 show the landed catch with the relevant surveys timing shown in the colour coded months. Table F3-4 and Figure F3-10 show the monthly catch rates for the western zone over the same period.

Table F3-3 - Monthly landed catch for western zone rock lobster 2006 to 2023 (kilograms).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Nov	Dec
2006	80,448	67,773	51,122	18,232	13,564	4,444	10,102	21,613	8,277	24,310	57,969
2007	58,420	60,874	48,526	35,566	15,459			23,622	12,629	30,250	52,531
2008	57,486	46,325	45,760	25,440	15,501			9,710	6,870	16,364	42,874
2009	50,832	38,302	32,925	16,721	12,935	7,380	4,665	8,652	4,403	17,678	40,534
2010	43,258	36,321	30,794	19,515	17,655	6,789	9,427	11,358	6,447	18,803	36,774
2011	51,010	32,071	31,007	23,973	11,098	2,857	14,362	22,781	9,452	20,588	46,788
2012	38,315	36,617	24,814	12,885	6,532	2,587	13,486	17,944	11,377	29,668	50,809
2013	49,542	33,937	24,786	13,506	9,922	3,471	16,131	14,725	11,695	23,051	47,961
2014	53,505	42,108	33,359	11,375	5,151	338	13,514	27,796	9,325	18,866	39,416
2015	35,959	44,462	19,222	13,341	5,214	2,349	7,401	22,587	15,611	14,419	47,935
2016	40,933	39,996	30,252	9,138	3,089	858	6,435	25,889	10,912	15,819	41,918
2017	43,708	18,171	22,373	16,607	6,293	1,770	9,566	25,336	9,302	22,729	49,403
2018	38,983	45,405	18,603	4,229	869	1,159	9,814	26,921	11,704	26,111	54,928
2019	55,358	35,562	13,571	3,391	4,102	3,300	11,489	29,124	16,532	15,052	39,247
2020	43,738	5,028	16,891	18,800	24,036	5,289	14,908	22,558	12,563	12,609	35,590
2021	28,203	35,457	41,889	33,517	14,169	3,148	11,413	22,856	9,413	24,030	54,098
2022	45,875	25,848	24,632	25,927	4,222	1,110	17,923	24,864	6,299	13,594	47,562
2023	51,752	25,591	25,522	27,004	5,511	306					

Astrolabe MSS
La Bella MSS
Enterprise MSS
Flanagan MSS
Crowes Foot MSS
Schlumberger MSS
Sequoia MSS

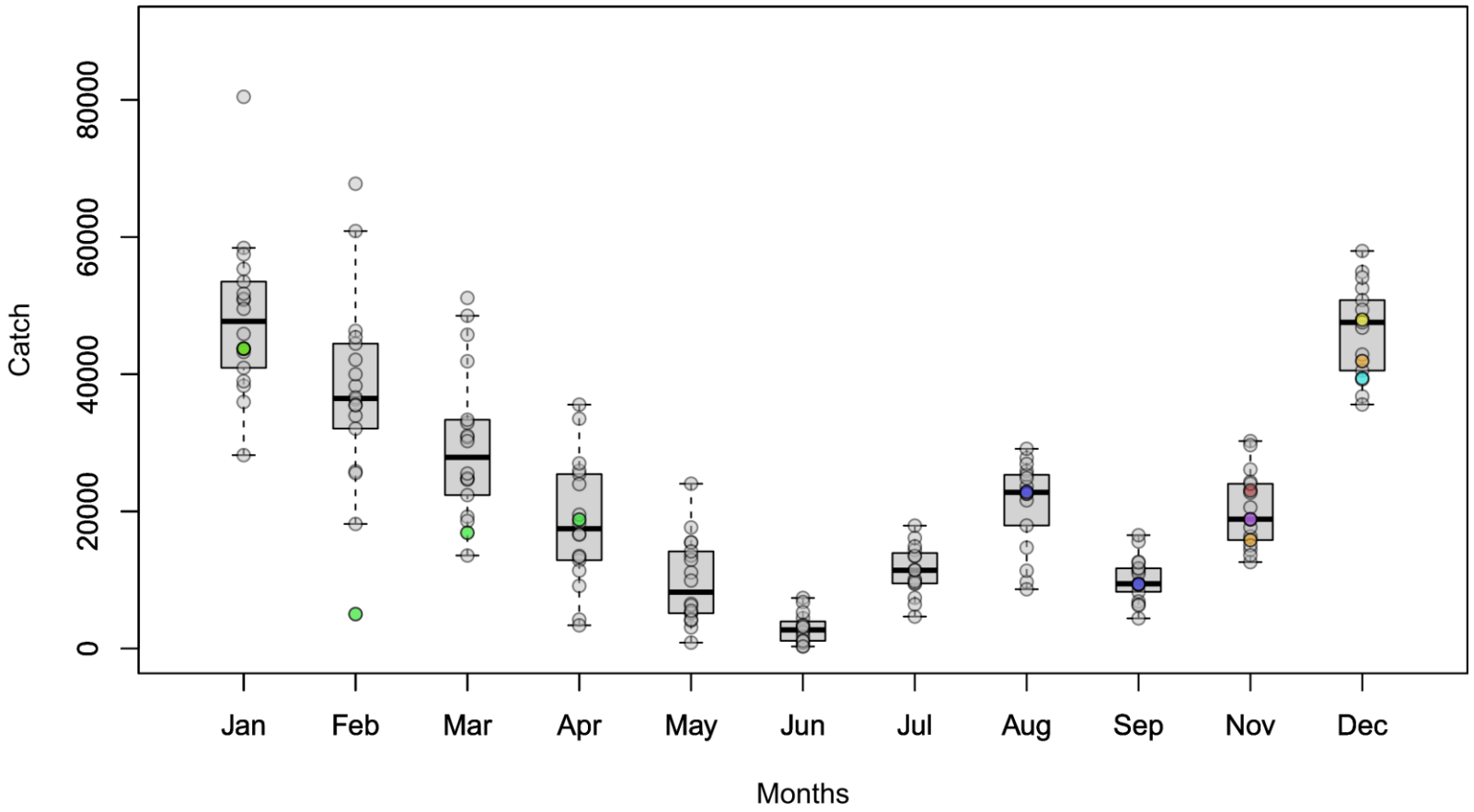


Figure F3-9 - Box plot of catch rates (kilograms) month by month with each year represented by a circle, coloured circles represent months seismic was acquired. Colour corresponds to the survey colour code in Table F3-3.

Table F3-4- Monthly catch rates for western zone rock lobster 2006 to 2023 (CPUE

2006	0.74	0.67	0.53	0.40	0.27	0.16	0.26	0.25	0.26	0.47	0.57
2007	0.56	0.64	0.54	0.41	0.25			0.28	0.26	0.57	0.49
2008	0.56	0.52	0.47	0.32	0.25			0.18	0.22	0.40	0.50
2009	0.51	0.44	0.40	0.25	0.20	0.12	0.18	0.19	0.15	0.40	0.40
2010	0.45	0.45	0.35	0.30	0.28	0.21	0.22	0.27	0.26	0.49	0.48
2011	0.59	0.56	0.50	0.40	0.29	0.22	0.36	0.32	0.34	0.57	0.61
2012	0.64	0.58	0.48	0.40	0.36	0.29	0.33	0.41	0.41	0.71	0.71
2013	0.69	0.60	0.56	0.42	0.33	0.28	0.41	0.35	0.34	0.58	0.67
2014	0.68	0.59	0.56	0.44	0.37	0.21	0.34	0.44	0.41	0.62	0.70
2015	0.66	0.68	0.45	0.49	0.41	0.32	0.28	0.44	0.51	0.61	0.89
2016	0.77	0.71	0.68	0.50	0.50	0.23	0.33	0.48	0.48	0.60	0.80
2017	0.83	0.65	0.69	0.68	0.47	0.37	0.40	0.52	0.55	0.79	0.96
2018	0.90	0.98	0.95	0.65	0.51	0.34	0.48	0.59	0.56	0.94	1.15
2019	0.99	0.97	0.82	0.52	0.60	0.41	0.53	0.64	0.64	0.74	0.99
2020	1.02	0.93	0.81	0.97	0.79	0.47	0.63	0.72	0.64	0.88	0.97
2021	0.96	1.07	1.07	1.22	0.87	0.44	0.52	0.62	0.59	1.18	1.24
2022	1.20	1.14	1.10	1.25	0.73	0.59	0.83	0.85	0.73	1.25	1.41
2023	1.43	1.24	1.24	1.26	0.89	0.61					

Astrolabe MSS
La Bella MSS
Enterprise MSS
Flanagan MSS
Crowes Foot MSS
Schlumberger MSS
Sequoia MSS

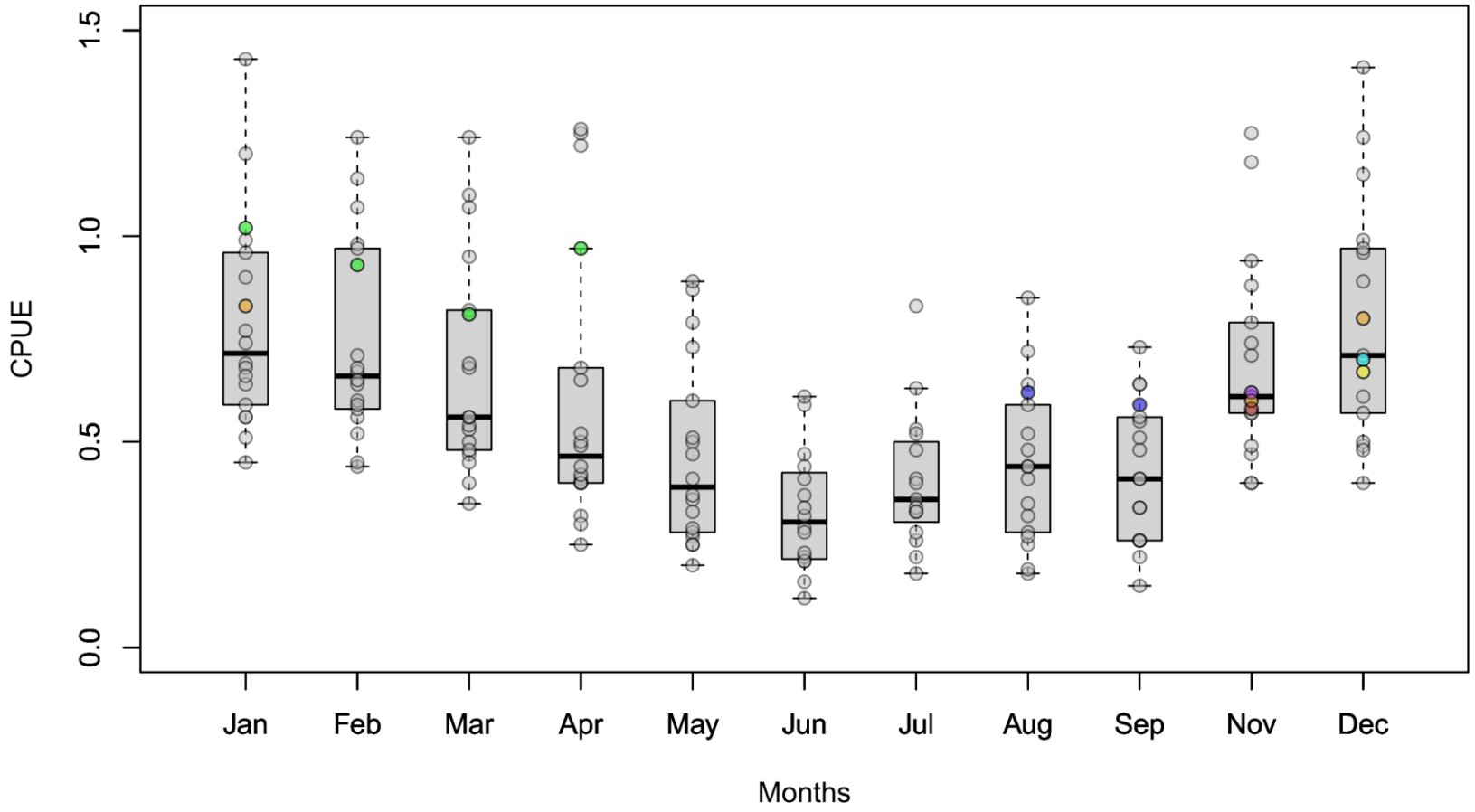


Figure F3-10 - Box plot of catch rates (CPUE) month by month with each year represented by a circle, coloured circles represent months seismic was acquired. Colour corresponds to the survey colour code in Table F3-4.

This analysis shows a general and unsurprising decline in catch in the winter months when males only may be taken, with a slight dip in September (note the fishery is closed on 16th September and opens on the 15th November). The data shows, at the whole of western zone level, the catch rates remain within normal distributions both in the month(s) of the survey and in the subsequent months, and in the subsequent years. This extends to more than 7 years post surveys, the timeframe claimed by fishers that catch rates and populations would take to recover.

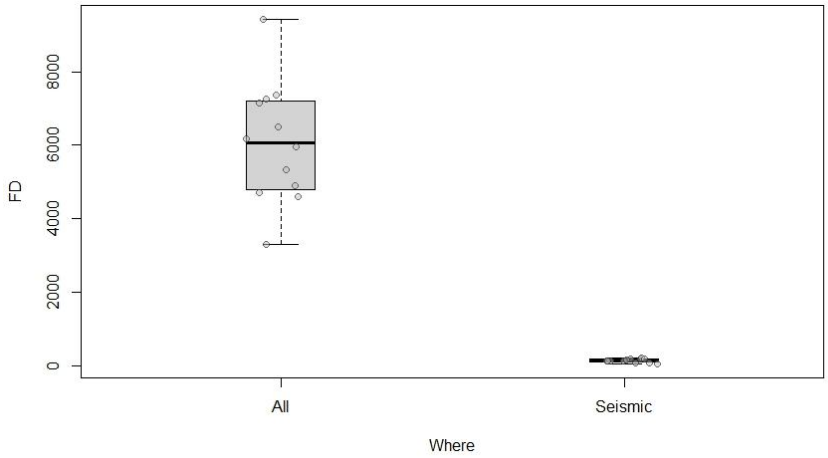
The data shows only one statistical anomaly in February 2020 in the landed catch. This is likely to be due to Covid-19 affects in Victoria and a subsequent reduction in fishing effort. The corresponding months CPUE shows that those who were able to fish did not suffer a reduction in CPUE beyond normal distribution. This data is conclusive that there are no detectable long-term effects to catch rates, and presumably the population of Southern Rock Lobster, in the western zone SRL fishery attributable to seismic surveys. Therefore, cumulative impacts to the SRL populations and the knock-on effects to fishers from sub-lethal effects are not measurable.

The MSS will be a pulse event with a timeline of 60 days within 90 days. For site attached SRL, individual animals will be exposed to high intensity seismic on a reducing exposure curve which will be defined by the closeness of the individual to the source, the depth of habitat where the individual is residing (defines the minimum distance from the seismic source), the complexity and density of the (limestone) habitat they are inhabiting and the direction and speed of the seismic survey. Hence impacts will be extremely varied and inconsistent. There will likely be a reduction in overall fitness of the population of animals exposed to the MSS which may influence adult mortality for a period, but the scale of any potential impact will be subsumed into the far larger natural and fishing mortality schedules that already exist.

Impacts to larval SRL will be confined to those animals in the plankton present in the area at the time the array is working. Plankton is highly variable in both space and time (Robinson et al 2021) which favours affected larvae being subsumed into a larger planktonic assemblage containing larvae not exposed to the MSS. The nett effect will be any affected larvae will be spread out within a greater pool of non-affected larvae, mitigating the probability of significant localised effects.

The Bureau's (BOM) long-range forecasts indicate warmer than average Sea Surface Temperatures (**SST**s) (up to around 2 °C warmer than average) off the coast of south-east Australia will likely continue through the southern hemisphere summer 2023–24 (http://www.bom.gov.au/climate/enso/). Such large-scale climate changes will exert a much greater influence on population dynamics than the Regia MSS given they can operate at the scale of the entire population. Warming temperatures attributed to climate change have already been shown to increase growth of animals in temperate waters and lead to larger-size-at-maturity (McLeay et al 2019).

Commercial fishing statistics from the VFA 20/21 season Stock Assessment Report highlight that CPUE has almost tripled from 2009/10. While some of these gains have come from fleet modernisation and associated efficiencies, standardised catches have continued to increase, reflecting a stable and relatively healthy fishery. Commercial fishing is a press disturbance and exerts a much greater and clearly quantifiable effect on populations than a pulse disturbance over a defined space. Despite this, the assessment concluded the fishery is stable with increasing recruitment over the past few years from a long-term trend of lower-than-average recruitment. Additionally, within the MSS operational area fishing effort is extremely low with only ~2% of total fishing days occurring within this area over the past 12 years (see Figure F3-11).



** Box encompasses 50% of the data points. Black line indicates median value. Whiskers encompass full range of values.*

Figure F3-11 - Comparison of the number of fishing days (FD) undertaken within all designated fishing blocks across Victoria (All) with number of fishing days undertaken within those blocks encompassed by the proposed MSS (Seismic). Individual data points are yearly.

While seismic operations have been shown to cause injury to SRL at the level of individuals there is no evidence that supports population level effects. A large part of this conclusion is based on the research base that exists for SRL and which clearly shows the size of the 'population' of SRL is very large and well connected. The MSS area is a very small component of this system and the SRL population within is resilient because of this.

3.5.3 `Recovery Potential

Research has indicated that some of the physical and chemical changes seen in SRL exposed to seismic may be permanent. For those individuals their fitness will likely be reduced and their susceptibility to predation may increase. For those animals whose exposure window is smaller there is evidence of recovery although there are no definitive time frames known.

The largest effects on SRL populations are from fishing and climate drivers such as increased water temperatures. Nevertheless, management of the fishery in the state indicates it is stable and improving over the past few years. This indicates a population that can recover even under sustained fishing pressure. Effective management underpinned by continued collection of appropriate data is key to this outcome.

3.5.4 Conservation Status

The Fisheries Research and Development Corporation (FRDC) recognises SRL *Jasus edwardsii* as a sustainable species found broadly across Southern Australia. Unlike the Western Rock Lobster in Western Australia whose habitat is a Key Ecological Feature (KEF), SRL have no elevated level of conservation protection.

3.5.5 Mitigation Effectiveness

Mitigation of MSS effects to SRL can best be implemented by limiting the spatial boundaries of the survey to minimise interaction with areas of high SLR density and fishing activity, which is predominantly located shoreward of the 40m depth contour. Additionally, timing the MSS to avoid the June-September period when peurulus are settling is also advisable. The period after release of fertilised eggs is the preferred window as this is when natural mortality is extremely high and localised seismic effects are likely to be subsumed into this mortality schedule.

3.6 Giant Crab (*Pseudocarcinus gigas*)

3.6.1 Species-Specific Sensitivity

Giant crabs are a long-lived slow growing species that inhabit soft sedimentary environments and feed on sessile or slow-moving benthic species including gastropods, asteroids, and other decapods. The species is found across all southern Australia and up into Southern NSW, generally occupying depths between 120-370m but can be found from 20-600+m. Key stages in the life history of *P. gigas* appeared to be synchronised across southern Australia suggesting that factors operating at a large scale are influencing the species' distribution and life cycle off southeast Australia (Levings 2008). These large-scale drivers are responsible for population level changes with small-scale disturbances buffered by connectivity and dispersal across large scales. Genetic studies have indicated that the species is effectively a single stock with little evidence of sub populations. This is likely due to the 3–4-month larval phase and the ability of individual adults to move up to 400km (Currie & Ward 2009).

Climate change is expected to cause a southerly shift of the austral subtropical high-pressure belt, with models predicting more upwelling-favourable winds. This would likely provide *P. gigas* with increased access to benthic food resources and their growth rate may increase in some regions (Levings & Gill 2010). This has the potential to increase productivity at the population level.

Multiple studies have looked at seismic effects on crustacean larvae amongst other taxa, and results have been mixed, with any mortality limited to very close proximity to the source. Adult crab species that have been tested have shown very little response to seismic pulses (Appendix E4 and references therein).

Based on the evidence available the sensitivity of giant crabs to the MSS is likely to be small and immeasurable relative to normal population variance. The species undergoes annual cross-shelf movements to align with favourable temperatures and feeding opportunities (see Figure F3-12 and Figure F3-13) which provides a temporal window for minimising any potential seismic effects.

Fishing for female crabs is banned between June 1st and November 15th to protect the peak timings of their reproductive cycle (see Figure F3-14). If Giant Crabs were the only receptor of concern, then potential effects from the MSS could be avoided by excluding activities over this period to align with fisheries protections already in place. However, the overlap of with female crabs is lessened because:

- The 200 m depth limitation for acquisition means only a partial overlap with depths female crabs are likely to be present.
- More than half of the period is already avoided because:
    - Two of the five-and-a-half period is already excluded due to weather limitations (July and August).
    - At least a further month of no overlap will occur because the Regia MSS cannot occur in both June and September to December.

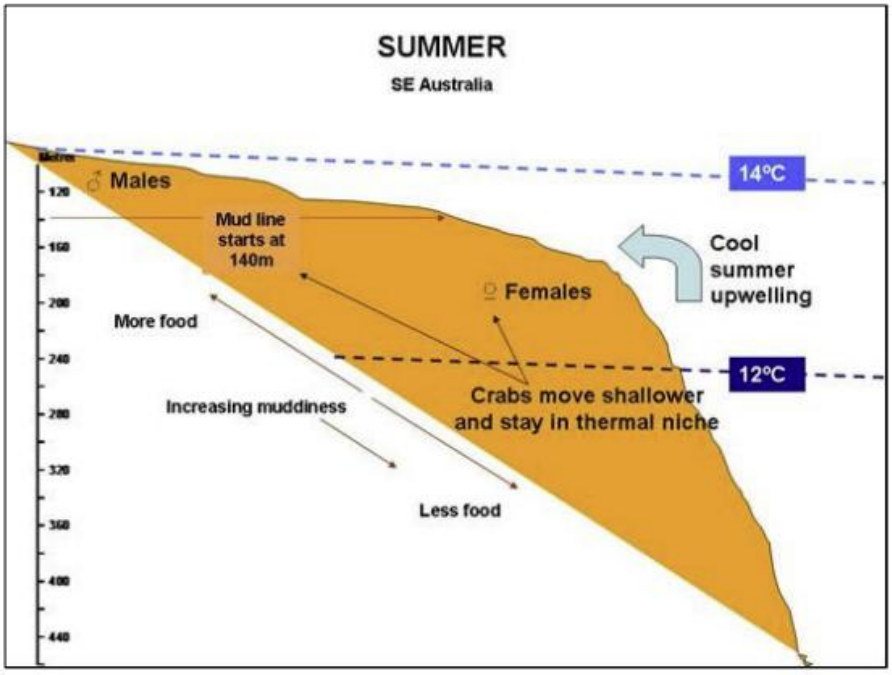


Figure F3-12 - Summer model for P. gigas off south-east Australia (Levings 2008).

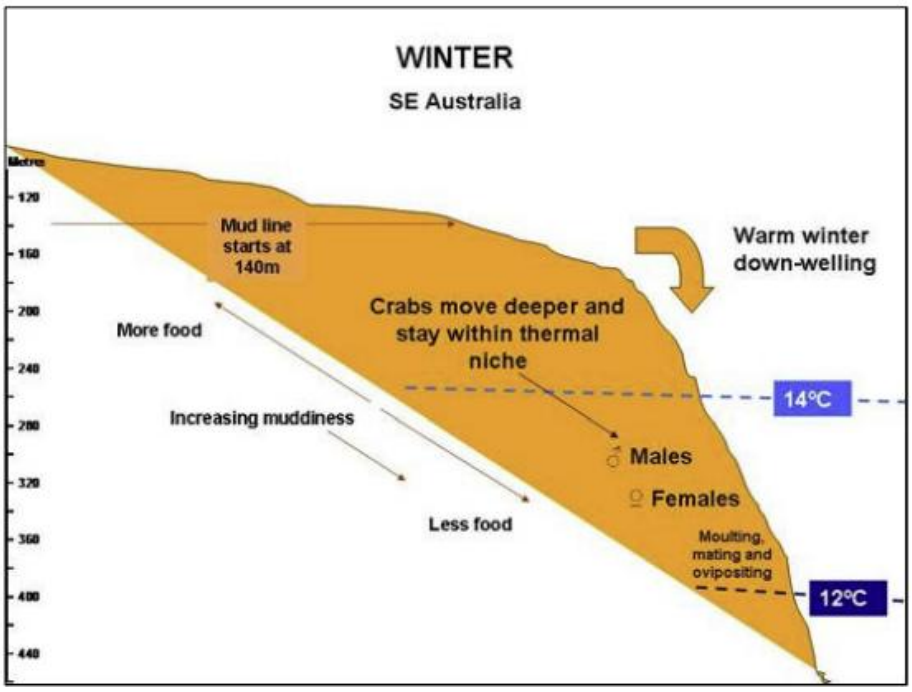


Figure F3-13 - Winter model for P. gigas off south-east Australia (Levings 2008).

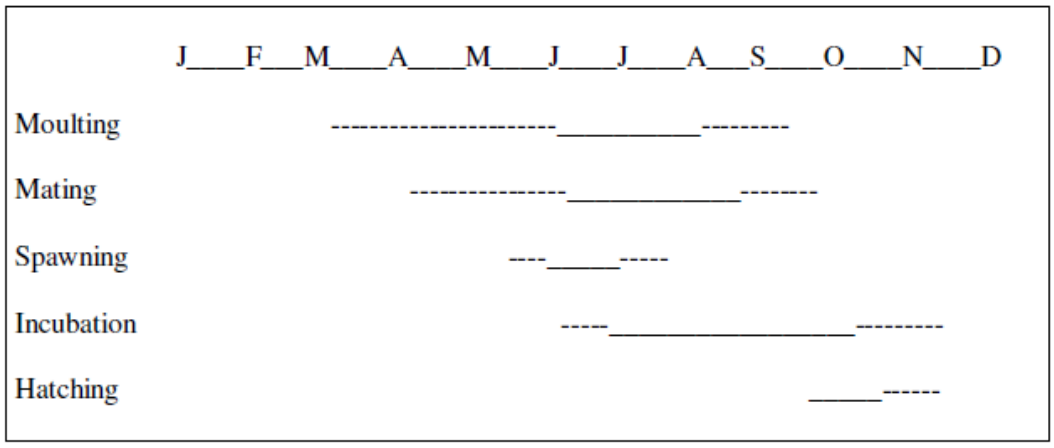


Figure F3-14 - Reproductive cycle of P. gigas based on extensive field observations. Solid lines represent peak periods, while broken lines represent temporal extent of observations (from Levings 2008).

3.6.2 Magnitude of Effect

Seismic effects on individuals have been shown to be limited to larvae within very close proximity to the discharge source.

Timing the MSS to avoid the peak period in the reproductive cycle period will mitigate any potential impacts.

Fishing days within the Regia MSS Active Source Area averaged out at 17.3 % of total fishing days from 2011-2022. However, fishing effort in the Active Source Area over recent times has shrunk to 7.5% of total fishing days from 2018-2022.

As discussed above there is no evidence to support an expectation of significant and measurable cumulative impacts to *P. gigas* because of the MSS. Large scale environmental drivers driven by a changing climate, and fishing effort, will continue to be the major influences on the population health of giant crab.

Regarding any impacts on the giant crab fishery, the targeted catch in 2021/22 of 0.95kg per 24 hour was a substantial reduction from 1.27kg/24-hour pot-lift in 2017–18 but still remained well above the limit reference point of 0.52 kg/24-hour pot-lift for the fishery (VFA 2022). Factors including the lack of fishery independent surveys, limited length frequency data, the significant decline in the number of operators targeting giant crab and a decrease in the spatial distribution of the fishery, all add to the uncertainty in the assessment of the Victorian component of the Giant Crab stock. More data is needed from the fishery to better understand the changes to catch rates and to better determine the size of the fishable stock available.

3.6.3 Recovery Potential

The population stocks of *P. gigas* have been declared sustainable across 75% of their range (WA, SA, Victoria) however the Tasmanian population is considered depleted and not sustainable at current fishing levels. Data collection remains insufficient to more accurately assess future trends (FRDC Report 2020 Giant Crab 2020 (fish.gov.au)). Fishing effort is the major anthropogenic driver of changes to populations, and it is this interaction with a changing climate that will drive population changes in the future.

3.6.4 Conservation Status

Based on the evidence presented above, the Giant Crab Fishery (Victoria) management unit is classified as a sustainable stock and there are no conservation concerns. Temperature is a primary driver of their life-history strategy and this, along with fishing effort will be the drivers of population dynamics of this species.

3.6.5 Mitigation Effectiveness

With most of the reproductive cycle occurring in the June-December period ensuring the MSS is undertaken outside this period would provide the most effective mitigation approach to minimising effects from seismic surveys.

3.7 Short-finned Eel / Kooyang (*Anguilla australis*)

3.7.1 Species-Specific Sensitivity

There are two species of freshwater eels that inhabit the southeast and east coasts of Australia, *Anguilla australis* and *A. reinhardtii* known colloquially as the short-fin and long-fin eel respectively. Only *A. australis* is relevant to the MSS because the westward edge of distribution for the long-finned eel is around Wilsons Promontory which is 300 km from the nearest edge of the MSS survey path (see Figure F3-15).

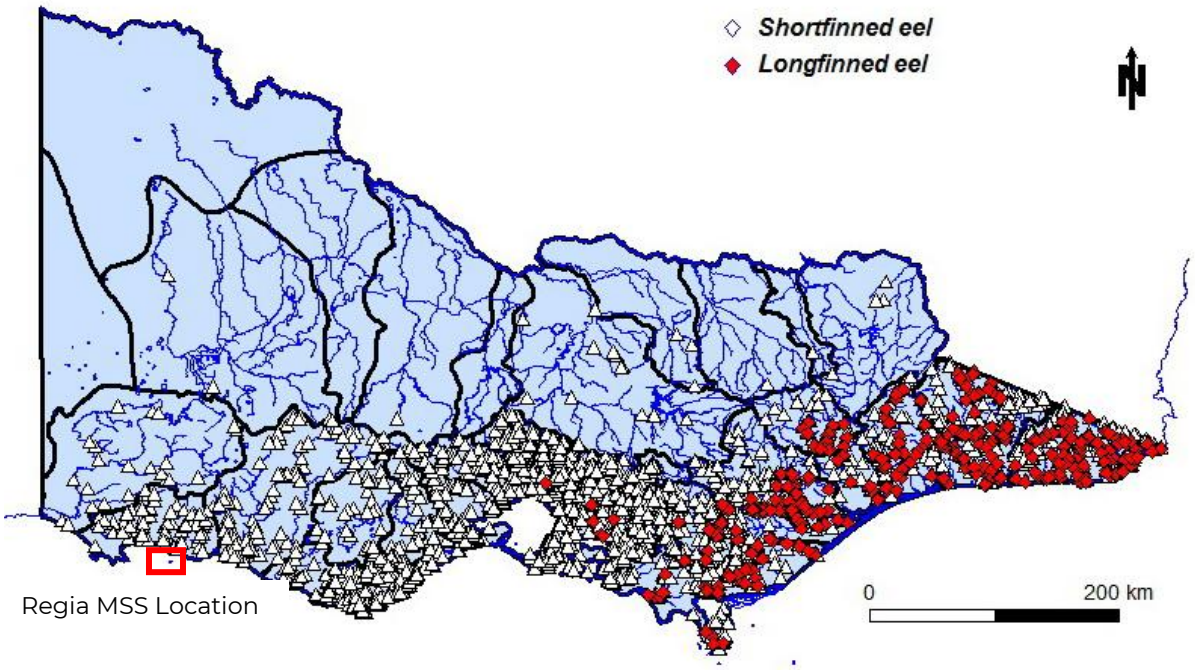


Figure F3-15 - Spatial distribution of both species of freshwater eel across Victoria (VFA Eel Fishery Management Plan) and the location of the proposed Regia MSS survey.

The short-fin eel has a complicated but spectacular life cycle. The juveniles and adults live in freshwater rivers but when reproductively mature the adults migrate many thousands of kilometres to spawning grounds in the Coral Sea (Gooley et al 1999). Once spawning has finished the adults perish and never return. The life cycle is then continued by the many trillions of larvae who attempt to make their way back to river systems over 200 plus days using prevailing currents and an evolving swimming ability. There is no homing into river systems as seen with salmon, rather larvae will randomly enter river systems they encounter. Adult migration out of the estuaries to the spawning grounds occurs from January to May while the returning glass eels stage occurs during the July-September period (Figure F3-16).

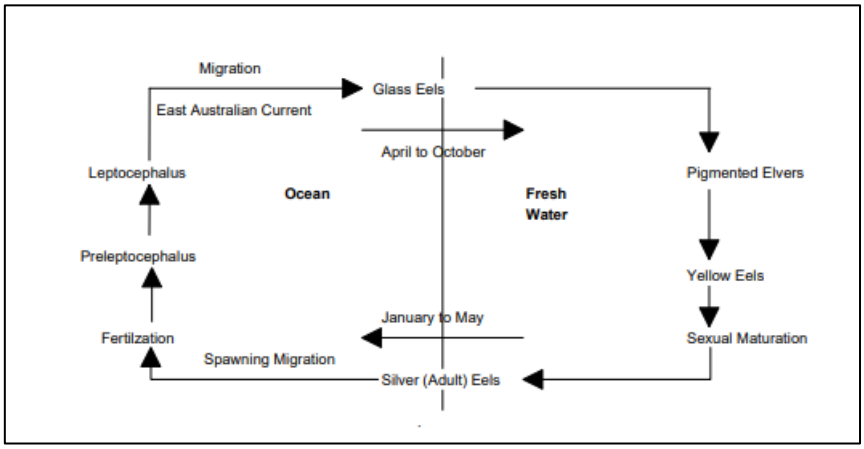


Figure F3-16 - Life cycle of Anguilla australis eels. After Gooley et al. (1999).

This life cycle predisposes this species to very large mortality rates both as larvae and as adults. Adult mortality has been estimated to be at least 30% for migrating adults (Koster et al 2021) and while there have been no direct measurements of larval mortality in eels, as a broadcast spawner it likely exceeds >95 % as could reasonably be expected from a larval life-history which encompasses 200+ days at sea and many thousands of kms of travel from spawning grounds to river systems (Figure F3-17) For example, modelling work by Bonhommeau et al. (2009) on A. anguilla indicated <0.2 % of larvae survived the trans-Atlantic migration.

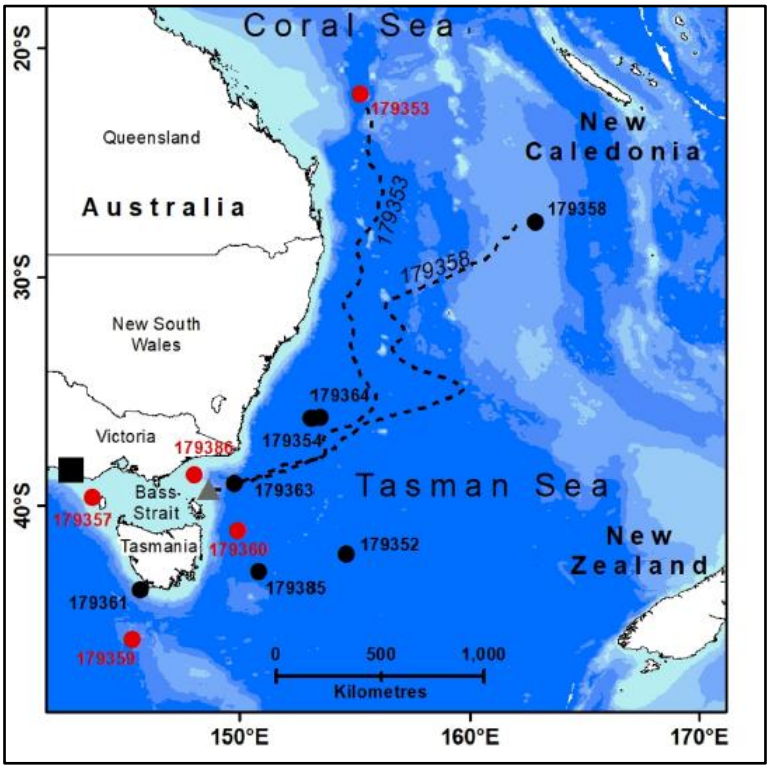


Figure F3-17 - Map indicating locations of tagged adult eels originating from Otway coast region (from Koster et al 2021)

Australasian short-finned eels are listed as 'near threatened' on the IUCN Red List of Threatened Species, with barriers to riverine movement and freshwater habitat loss identified as key threats. In addition, changes in ocean currents, primary production, and thermal regimes may affect eel migration, spawning success, and recruitment (Koster et al. 2021). These processes operate at landscape scales and are heavily influenced by long term climate trends. Changes to riverine flows

and water quality are affected not only by changing climates but also land management regimes adjacent to riverine systems.

Changes in the size of the spawning stock (i.e. adults) have been identified as the most likely cause of declining recruitment of eels (see review by Jellyman 2022) and so it is factors affecting the adult population that will have the largest effect on the population health of *A. australis*. As previously mentioned, climate related changes and modification of the landscape are affecting the carrying capacity of rivers to support populations of eels and other species. Fishing is also a major pressure on eel stocks and there has been a commercial fishery for short-finned eels across Southern Victoria since the 1950's.

Pre-migrating adults have been found to spend a lot of time in the estuaries of rivers before starting their migrations, making them more vulnerable to net fisheries than was previously thought (Crook et al. 2014). Catches reached a peak in the mid 1990's with a low in 2009, but have since stabilised around 30-80 tonnes/year (Southern Shortfin Eel 2020 (fish.gov.au)) (see Figure F3-18). The massive decline in catches from 1993 was related to the so-called millennium drought throughout the late 90's and early 2000's (van Dijk et al 2013) illustrating the powerful links between eel health and environmental conditions.

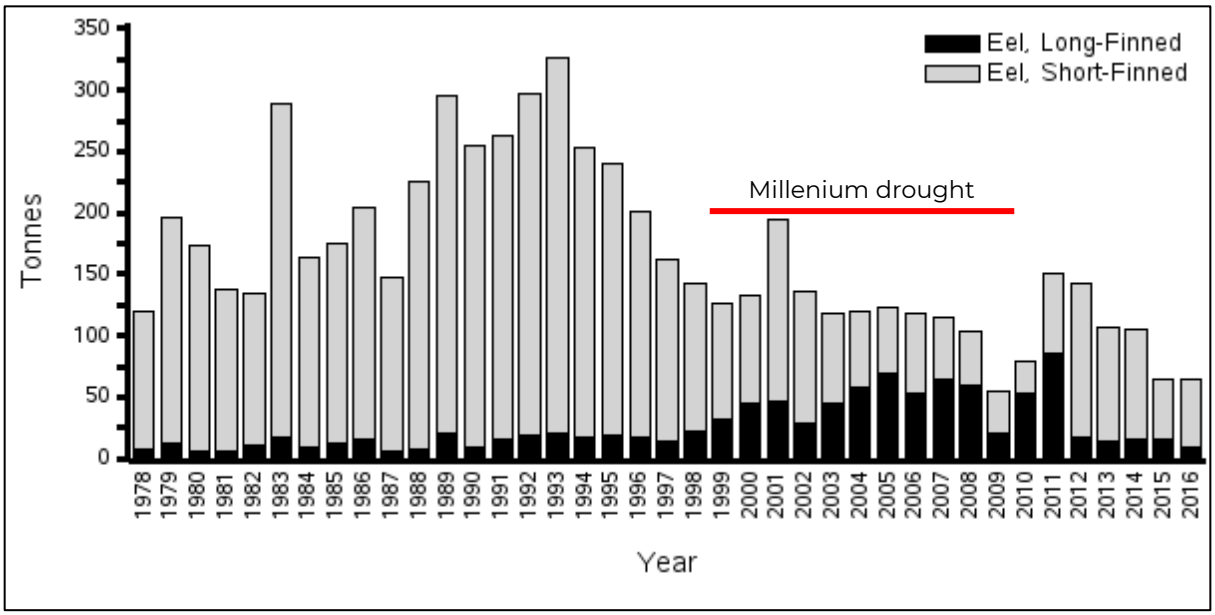


Figure F3-18 - Annual commercial catches of eels in Victoria (VFA 2017). Red line encompasses those years when extended drought conditions prevailed.

Once adults begin migrating to their spawning grounds they travel quickly, with migration speeds averaging 30.8 ± 7.3 km/day although one individual was found travelling at 80km/day (Koster et al 2021). The annual timing of adult migrations is from January to May each year.

There are no scientifically derived studies indicating mortality effects on eels from seismic surveys, which we group with fish containing swim bladders when assessing seismic effect studies. Adult eels are undertaking their migrations over an extended period of 5 months and the work of Crook et al (2014) indicates that migration from estuaries is a highly variable process. Given the extended and volatile timing of migration from estuaries and the high mobility of individual animals we do not anticipate any critical effects to the local populations of eels from the Regia MSS.

3.7.2 Magnitude of Effect

If any individual adult eels are within proximity to the seismic arrays when acquisition is occurring, there will likely be non-lethal impacts. However, given the mobility of adult eels, their intrinsic drive to get to their spawning grounds, and the soft startup procedures of the Regia MSS the risks

associated with this event are extremely low and impossible to distinguish from the large-scale changes inherent in the population each year and driven by multiple factors as previously described. However, once the source passes, animals will be free to move back into the habitat that they departed from. [Paragraph updated in response to Matter I04].

For the larval leptocephelae and glass eel stages, they are most prevalent in regional waters during the winter-spring months. If the Regia MSS is scheduled outside this timeframe, then all interactions with this stage of the life cycle will be avoided.

3.7.3 Recovery Potential

There is no identified recovery plan for this species, nor do we anticipate impacts of sufficient scale to be considered for future recovery plans. The species has proven resilient to fishing and other anthropogenic pressures for millennia.

3.7.4 Conservation Status

The short-finned eel *Anguilla australis* is not under any conservation status. However, short-finned eels are of cultural significance to First Nations people. The Gunditjmara people of south-western Victoria built and used sophisticated aquaculture systems throughout the Budj Bim Cultural Landscape to exploit eel migrations at least 7,000 years ago. Budj Bim Cultural Landscape is listed as a World Heritage Area and is protected by Victoria's Aboriginal Heritage Act 2006. One of the values of this World Heritage Area is the Budj Bim lava flows, which provides the basis for one of the world's most extensive and oldest aquaculture systems developed by the Gunditjmara, based on deliberate redirection, modification and management of waterways and wetlands (UNESCO 2023). There is no direct effect, and no measurable indirect effect, from the Regia MSS to the Budj Bim Cultural Landscape (see section 3.15).

3.7.5 Mitigation Effectiveness

Potential impacts could be minimised or avoided by scheduling of the Regia MSS to outside the period when elvers are returning to the river systems along the Southwest coast during the months of April to October. However, this measure would increase the effects on other more sensitive species. No petroleum activity will be carried out between 1 January and 15 September, so the overlap with this period is reduced.

3.8 Gould's Squid (*Nototodarus gouldi*)

3.8.1 Species-Specific Sensitivity

There remains minimal research completed on the effects of seismic surveys on squid. Two key sources have been the work of McCauley et al (2000) and Fewtrell & McCauley (2012). Startle or alarm responses out to 4-5 km from the seismic source were the only consistent outcomes from the experimental work, and these were shown to reduce with amount of exposure i.e. habituation to the sound. Potential effects from damage to the tissue surrounding the statoliths were not evident as experimental animals showed consistent responses even after multiple seismic pulses.

Gould's Squid which is the primary targeted species in the Southern Squid Jig Fishery (SSJF), is short-lived (<1 year) and has been found to spawn up to 4 times a year. They also display highly variable growth rates and size and age-at-maturity. Populations with life-history characteristics like these have high turnover rates and are consequently much more resilient to fishing pressure. Moreover, with fishing concentrated over the few months of summer there remains multiple other spawning events to provide new recruits for the population.

Research has shown that squid populations are highly responsive to variations in environmental conditions from year to year, however it has been difficult to pinpoint whether any factor is more important than another. This is borne out by the correlation between all the fisheries across SE Australia having peak catches around the same time. A final model for all zones of the SSJF sector combined included Year, zone, depth, and the interaction of depth and moon phase as the variables of most influence with Year explaining the greatest source of variation in CPUE (15.1%; see Figure F3-19) (Koopman et al 2018). Genetic studies support the hypothesis of a single biological stock of Gould's Squid throughout southeastern Australian waters (Jackson and McGrath-Steer 2003) which provides another layer of resilience at the population level.

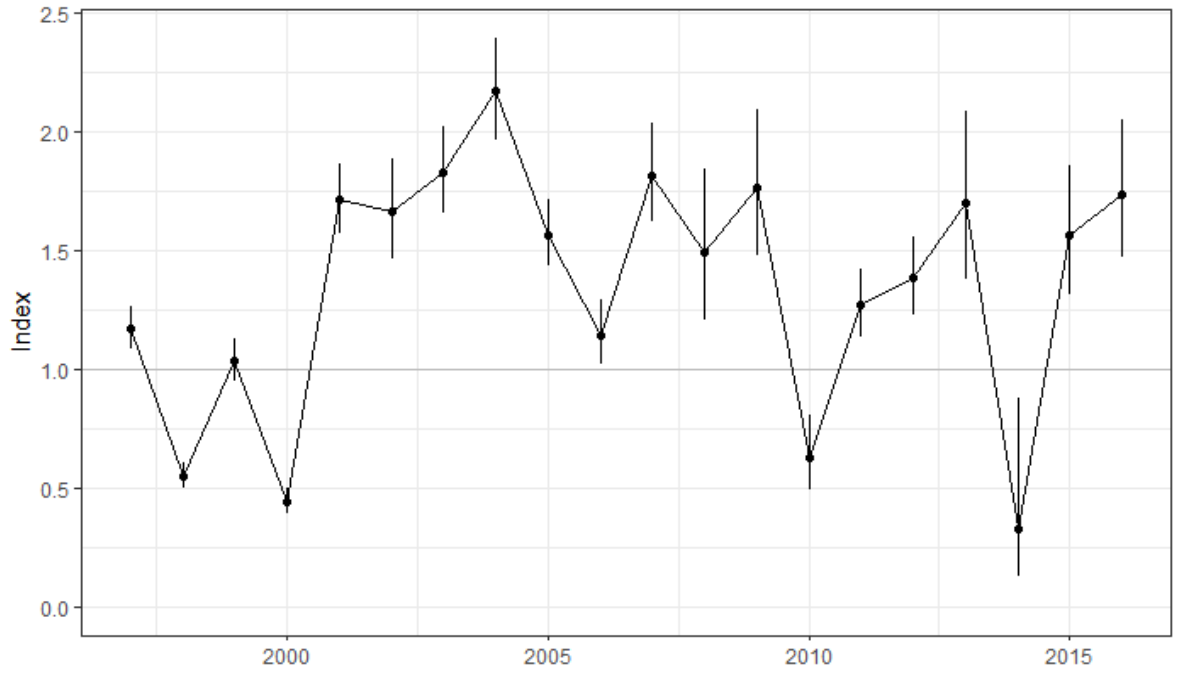


Figure F3-19 - Final model showing annual variation of Standardized CPUE for all catches of Gould's squid.

Very large catches were taken by foreign vessels in the 70's and 80's without appearing to reduce available biomass in subsequent seasons. Modelling of heavy fishing in the GAB fishery has also shown that even when biomass is reduced to 10% of original size, recovery still occurs (Virtue et al 2011). The overall productivity of the region is the likely key driver of dynamics.

3.8.2 Magnitude of Effect

Fishing remains the largest anthropogenic impact on populations and this source has been shown to carry less impact on standing biomass of the population than environmental parameters. Hence any potential impacts from seismic activity on the resilience of the squid population in the region is not going to be measurable against the backdrop of annual variation that is naturally occurring.

3.8.3 Cumulative Impacts

Studies have not identified any large-scale impacts to squid from seismic blasting. Short term behavioural changes as observed are not likely to have any impacts on the squid population in the vicinity of the seismic surveys. Soft starting will provide a catalyst for squid to move and provide scope for a learned response such that subsequent seismic pulses will not illicit as strong a response from individual animals. In this context there is a very low probability of cumulative impacts occurring. However, once the source passes, animals will be free to move back into the habitat that they departed from. [Paragraph updated in response to Matter I04].

3.8.4 Recovery Potential

As outlined in the previous sections current knowledge indicates only temporary localised effects to individual squid and no evidence of effects that could cascade into population level impacts. Squid populations are highly dynamic and responsive to larger scale environmental influences.

3.8.5 Mitigation Effectiveness

While the probability of adverse consequences for squid populations from seismic is extremely low it is appropriate to reduce any probability to as low as possible. The timing of peak catches has centred around February/ March in the Western Victoria fishery hence avoiding seismic during this period is advisable.

3.9 Pale Octopus (*Octopus pallidus*)

[Section added in response to Matters: F11 and F12]

3.9.1 Species-Specific Sensitivity

While there are a number of species of octopus that can be caught in Victorian waters (e.g. Maori Octopus, *Macroctopus maorum* and Gloomy Octopus, *Octopus tetricus*) the most abundant species and focus of commercial fishing, is the Pale Octopus, *Octopus pallidus*. This species is most commonly found on sandy substrates, often near beds of sponges or sea squirts (VFA website).

The pale octopus is found from the Great Australian Bight across to Tasmania and up into Southern NSW. It has a typical life span of 12 months but can live for up to 18 months. It is a benthic species with no pelagic stage in its development. They spawn throughout the year but with an optimal spawning period during late summer (Leporati et al. 2008). Lack of a pelagic cycle is correlated with strong spatial genetic structuring in populations, with connectivity mostly through movement of adults between locations (Higgins et al 2013)

Cephalopods are increasingly being identified as highly dynamic organisms that grow and mature with great degrees of individual variability, often influenced by external factors such as temperature and diet (Moltschaniwskyj 2004).

Sensitivity of the pale octopus to seismic has been specifically tested through a dedicated research program funded by the Fisheries Research and Development Corporation (FRDC), with the final report recently released (Day et al 2023; Examining the potential impacts of seismic surveys on Octopus and larval stages of Southern Rock Lobster, FRDC). The key findings were that exposure to seismic airgun signals did not kill adult octopus and nor was there any indication of harm to offspring. There were some observed behavioural changes but no indications that this would translate to sustained and deleterious changes in the health of exposed populations.

3.9.2 Magnitude of Effect

Fishing and climate changes are the largest impacts to fisheries in general. A stand-alone octopus fishery commenced in Victoria as recently as 2020 and is focussed on Eastern Victoria. Octopus fishing in central and western Victoria is less established and is managed through exploratory, temporary permits. A fishing experiment found that continual local fishing pressure appeared to have altered the age and reproductive structure of the female *O. pallidus* population, reflecting size selective fishing mortality, which could lead to smaller sizes at maturity, fecundity, and ultimately recruitment (Leporati 2008). A recent and substantive meta-analysis of studies looking at climate-change impacts on cephalopods (Borges et al. 2023) has highlighted that ocean warming poses a clear threat to cephalopods with impacts seen across all stages of the life cycle. There is no evidence to support significant impacts to pale octopus from the proposed Regia MSS.

3.9.3 Recovery Potential

There is no evidence to support significant impacts to pale octopus from the proposed Regia MSS such that Recovery Potential has to be assessed.

3.9.4 Conservation Status

There are no conservation consequences associated with the Pale Octopus in Australian Waters. Stocks in Victoria are classified as undefined with a dedicated octopus' fishery only starting in 2020 in eastern Victoria.

3.9.5 Mitigation Effectiveness

While the probability of adverse consequences for pale octopus' populations from seismic is extremely low, scheduling the Regia MSS outside of summer months, when spawning peaks, would reduce this probability even further.

3.10 Blacklip Abalone (*Haliotus rubra)*

[Section added in response to Matters: F12 and F16]

3.10.1 Species-Specific Sensitivity

Blacklip Abalone stocks in Victoria are in relatively poor condition having suffered greatly from disease and overfishing. In addition, the southeast coast of Australia is in a climate change 'hot-spot' where sea surface temperatures are experiencing rapid warming at rates 3–4 times the global average. These increasing SSTs are predicted to have negative impacts on the abundance of *H. rubra* in South coast waters. Modelling work has identified summer SST as the most influential variable on density distribution of *H. rubra*, with smaller sizes and lower catches coinciding with warmer SST's (Young et al 2020 and refs therein).

The pelagic larval duration of abalone is short at ~10 days, nevertheless genetics studies have found that abalone stocks along Victorias south coast are well connected, with high levels of gene flow within and between reef patches. Larval supply and recruitment success may therefore not depend predominantly on local reef sources. The marine physical environment of the south coast is highly variable, driven by converging ocean currents, strong environmental gradients, habitat discontinuities and varying degrees of exposure to wave energy (Miller et al 2016).

Regia MSS will be operating at depths greater than 50m. While almost all diver-harvested abalone will come from depths <30m the majority will come from depths <20m, hence there is approximately 15-20km distance between the 20m and 50m depth contours adjacent to where the proposed Regia MSS will approach the coast.

There has not been any direct testing of seismic effects on Abalone, so a weight-of-evidence approach is taken where we use results from testing on other molluscs, notably scallops and pearl oysters. Testing outcomes on scallops were consistent with studies on seismic effects to other invertebrates, with impacts clearly noted within very close proximity to seismic pulses (i.e. hundreds of metres) but then rapidly dissipating (see response to Matter F09). Estimated mortality rates in all cases remained well below natural mortality rates. A recent, major study into seismic effects on silverlip pearly oysters found no evidence of reduced productivity or mortality (Parsons et al 2024).

We do not therefore, find compelling evidence for a high likelihood of significant lethal or sub-lethal effects to abalone stocks from the proposed Regia MSS. As already stated, Abalone stocks are being influenced by climate, overfishing and disease and these remain the primary areas of concern.

3.10.2 Magnitude of Effect

There is no evidence to support significant impacts to black-lip abalone from the proposed Regia MSS. There is a possibility for impacts to abalone divers working in the fishery, however this has been recognised and appropriate measures put in place based on feedback from the Abalone Fishers in the region (see Appendix E8: Underwater Sound – Divers).

There is no evidence to support the Regia MSS causing significant impacts to black-lip abalone stocks in the region. Cumulative impacts to Abalone stocks are coming through climate, overfishing and disease and these remain the primary areas of concern. Rebuilding biomass has been proposed through a combination of conservative catch and minimum size limits, spatial management of fishing and catch, and a combination of fishery-independent and fishery-dependent data collection to demonstrate ongoing recovery and guide future TAC setting (Peeters et al 2023). Climate change will however pose further challenges to management objectives as temperature increases have been linked to fitness reductions in abalone along with smaller size and lower catches (Young et al 2020 and refs therein).

3.10.3 Recovery Potential

There is no evidence to support significant impacts to black-lip abalone from the proposed Regia MSS such that recovery potential must be assessed.

3.10.4 Conservation Status

There is no conservation status classification with black lip abalone in Australian Waters. However, stocks in 2 of 3 fishing zones in Victoria are classified as depleting while the western zone is considered sustainable.

3.10.5 Mitigation Effectiveness

While the probability of adverse consequences for black lip abalone from Regia MSS is extremely low, scheduling the Regia MSS for outside of the summer months, when spawning peaks, would reduce this probability even further.

3.11 Pink Snapper (*Chrysophrys auratus*)

[Section added in response to Matter: F12]

3.11.1 Species-Specific Sensitivity

Pink Snapper are widely distributed in the Indo-Pacific and an important species for both recreational and commercial fisheries in Australia and New Zealand. The reproductive biology of the snapper has been studied in several places across its distribution and is well understood However, there is geographic variation with respect to the timing of spawning, length of season and the environmental conditions associated with spawning, such as water temperature and photoperiod (Saunders et al 2012). Such geographic differences indicate the need to understand the reproductive biology of the species at the local scale to understand regional population dynamics.

Most adult snapper recruiting into the major fisheries in Port Phillip Bay (PPB), Western Port, and Western Victorian coastal waters originate from one major spawning/nursery area in PPB. Spawning happens between November and February with larval durations of ~ 18-32 days. Settlement will start to occur from 1 month after spawning occurs and will continue through to early winter. Therefore, it is the strong fluctuations in juvenile recruitment within PPB that dominate the population dynamics of the entire western Victorian snapper stock (Hamer & Jenkins 2007). Young snapper (1–4 years of age) born in PPB can migrate large distances (100's km) to replenish populations in coastal waters and other bays.

The latest assessment of stock health (Bell et al 2022) classifies snapper as sustainable and highlights the extremely strong recruitment cohorts of 2018 and 2022 which should result in increased adult fish in the system over the following years. Recruitment patterns have been highly variable over the years and are more influenced by local-scale processes e.g. at the estuary level.

Testing of seismic effects on adult snapper has found damage to the sensory epithelia within their ears, for fish exposed to a towed single seismic array <15m away (McCauley et al 2003). However there have been no reports of mortality in adult fish of any species nor evidence to support population-level effects on fish stocks from seismic surveys. A review of the potential impacts of marine seismic surveys on fish & invertebrates (Carroll et al 2017) found that while there was some evidence to support lethal and semi-lethal effects to fish larvae near a seismic source, these effects dissipated with distance and were not consistent between taxa.

Annual counts of snapper recruitment to Port Philip Bay were also compared with counts of annual seismic surveys in the region to see if there was any correlation between the two. We found no evidence of a link, with high recruitment of snapper equally likely to coincide with low or high seismic activity levels (see Figure F3-20).

In summary we find that the species-specific sensitivity to seismic is low for *Chrysophrys auratus* and further reduced because of spatial and temporal distance from the proposed location and timing of the Regia MSS.

3.11.2 Magnitude of Effect

Because the key parts of the lifecycle of snapper are centred on PPB and its surrounds and this is ~170km from the proposed Regia MSS zone any possible effects will be substantially diluted. Management of timing for the proposed survey to avoid the peak recruitment period over Dec -Jan - Feb will further mitigate any possible effects.

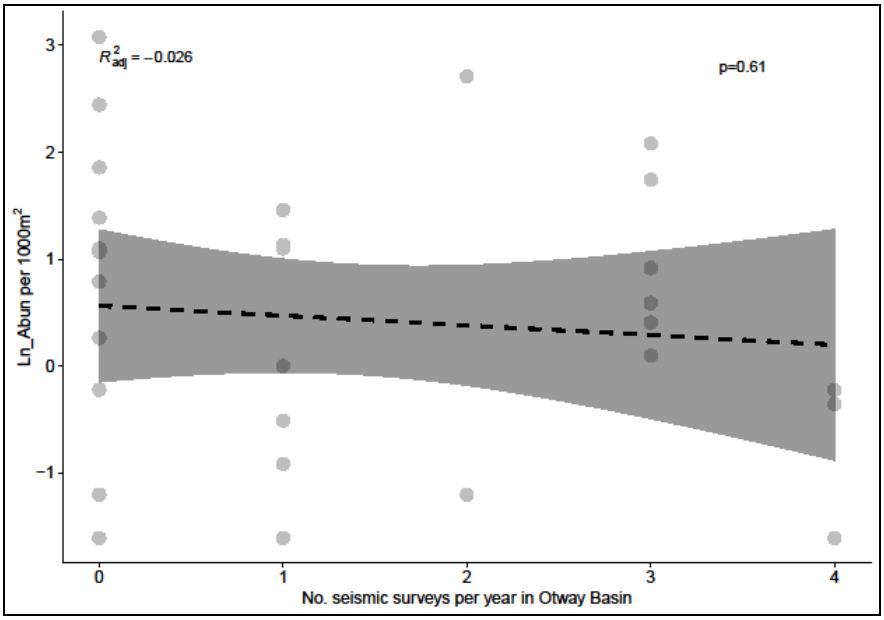


Figure F3-20 - Snapper recruit abundance (transformed) versus level of seismic activity each year for all basins combined (top) and for Otway basin only (bottom).

The dynamics of the entire western Victorian snapper fishery, encompassing over 500km of coastline from Portland to Wilsons Promontory, are linked to recruitment variation in PPB. The focus is therefore on maintaining the processes/habitats that support the production and survival of juvenile snapper in PPB. This dynamic demonstrates the importance of the spawning adults that migrate into PPB from coastal waters during spring/summer, and the potential implications of over-fishing of this spawning aggregation. Hence the main impacts to snapper stocks in the region are fishing and the ongoing health of PPB.

3.11.3 Recovery Potential

Recent strong recruitment with two high peaks observed during the past 5 years is expected to reverse any declining biomass trends and drive a rebuilding of adult biomass consistent with forecasts from Port Philip Bay creel showing an expected improvement in fishery performance over the next 5–10 years. Length compositions are not showing signs of truncation, and commercial fishing pressure has reduced substantially in recent years due to the Port Phillip Bay buy-outs and reduced landings by South Australian and Commonwealth operators. The available evidence indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired.

3.11.4 Conservation Status

Pink Snapper are not under any conservation protection status other than state and commonwealth fishing regulations. Snapper populations in Victoria are currently classified as sustainable and improving based on a successful recruitment year in 2018.

3.11.5 Mitigation Effectiveness

As noted, the key dynamics of pink snapper stocks in Victoria are centred around PPB and to a lesser extent Westernport Bay. Their distance from the proposed Regia MSS area provides an inherent buffer to any potential effects of seismic. In addition, there are multiple adaptions to the MSS protocols to further reduce risk of seismic effects. This includes soft starting procedures with seismic and depth limitations (>50m). Recruitment dynamics, the health of spawning populations and the interaction with fishing effects remain the main drivers of population health in pink snapper stocks.

3.12 King George Whiting (*Sillaginodes punctatus*)

[Section added in response to Matter: F14]

3.12.1 Species-Specific Sensitivity

King George Whiting are found within the bays, estuaries, and coastal waters of Victoria. They are a popular target of recreational fishers with most fish taken within the semi-sheltered waters of Port Phillip Bay (PPB), Corner Inlet-Nooramunga (CI) and Western Port (WP), where commercial fishers are also located. Population dynamics are strongly influenced by climatic factors determining numbers of larvae transported to bay and estuarine nurseries from coastal spawning areas in spring [Jenkins and May 1994, Hamer and Jenkins 1996, Jenkins et al. 2000, Jenkins 2005]. As most King George Whiting leave the bays and inlets permanently by four years of age (prior to adulthood) [Hamer et al. 2004], these fisheries are based on just a few age classes at any one time, making catches highly variable over relatively short time scales. Over the past 60 years catches have shown peaks and troughs at about 10 to 12-year intervals. These cycles are thought to be related to variation in westerly winds driving larval transport and survival (Jenkins 2005). Because fishing effort is concentrated in bays and inlets, adults in coastal waters are likely subject to low fishing mortality.

King George Whiting has a complex life history, exhibiting ontogenetic shifts in habitat at different life history stages (Fowler and Jones, 2008). Spawning occurs during late autumn and early winter at offshore reefs, shoals, and mounds in relatively deep water (30–100 m) in exposed locations (Fowler, 2000, Fowler et al., 1999, Steer et al., 2018). The larvae of King George Whiting can be advected across hundreds of kilometers over a prolonged pre-settlement period (3–5 months), dispersing larvae from the offshore spawning grounds to the shallow water nursery areas in protected shallow bays (Fowler et al., 2000b, Rogers, 2019). Juvenile fish develop and grow in the vicinity of these nursery areas until 3-4 years of age (Fowler et al., 2000a) when they move to their offshore spawning grounds to repeat the cycle (Fowler et al., 2000a, Fowler et al., 1999).

Most of the investigative research into seismic effects on fish (and invertebrates) has been from laboratory, or field-based studies where the animals are confined and hence not representative of a normal environment. A recent scientific publication conducted a systematic literature review of the effects of marine seismic surveys on free-ranging fauna only (Affatati & Camerlinghi (2023)). Frontiers in Marine Science Vol 10: 1222523). Unlike many review papers, they looked only at field studies on wild animals to provide the most realistic context for interpreting effects, ending up with 6 relevant publications for fish. Results described either no changes or temporary changes in behaviour/distribution of populations of animals. Studies were constrained to the North Sea and two solitary studies in the NE (Meekan et al. 2021) and SE (Bruce et al. 2018) corners of Australia, reflecting areas with appropriate resources to conduct ‘natural’ experiments.

The scientific evidence is clear that individuals within very close proximity to seismic sources will potentially face lethal or sub-lethal damage. There is, however, no evidence to support levels of disturbance greater than natural rates of mortality, for those species that may encounter the proposed Regia MSS. As such any potential effects will be immeasurable. Long term cumulative drivers of change in KGW fish populations remain closely linked to commercial and recreational fishing pressure and changing climate with little evidence to suggest seismic testing is driving population changes.

3.12.2 Magnitude of Effect

To further investigate the potential influence of seismic on KGW populations we sought to understand if there was any relationship between the annual frequency of seismic programs running in Victorian waters and the annual recruitment levels of King George Whiting in Port Philip Bay (PPB). PPB is the main area for KGW stocks in Victoria and hence where any correlations would be most likely to show up.

One of the arguments used by both sides of the “effects of marine seismic testing” issue is that the persistent presence of seismic testing in Victoria over a prolonged period has either been a primary driver of declines in fishing catches or it is evidence that the systems are relatively resilient to the scale of these effects. Providing a direct cause and effect is virtually impossible given the scale of the operating environment and the large number of confounding factors that are also acting at any given point in time and/or space.

In lieu of this, one approach is to look at long term datasets of a resource such as fish and see if the patterns revealed have any coherency with long-term patterns of MSS in the greater region. If seismic testing is having a significant effect on a stock at population level, then it might be argued that the more seismic testing that is done then the greater any likely impact will be. Hence in years of multiple seismic there will be a greater impact than in years where there has been little or no seismic.

To investigate this hypothesis CGG compared a long-term dataset of annual counts of newly settled King George Whiting recruits within Port Philip Bay (as described in VFA 2021 – Review of key Victorian fish stocks) with a similarly long-term dataset on annual seismic surveys in Victorian waters. Patterns of recruitment into this bay are representative of the other 2 catchments of Western Port Bay and Corner inlet as described in multiple papers and reports already submitted as part of the EP.

A simple linear regression approach was used to test for any correlations between the annual recruitment of KGW to Port Philip Bay and the annual count of seismic surveys across Victorian waters. This data was further subdivided to test for correlations with only seismic conducted in waters of the Otway Basin region which is more closely linked to offshore spawning behaviours of KGW in Victorian waters. For each of the two seismic datasets CGG compared KGW recruitment counts in the same year and then also lagged by 1 year, 2 years and 3 years. This is a test to look for delayed effects of seismic. For example, with a 1-year lag CGG compare the seismic accounts from 1999 with the recruitment counts in 2000, 2000 with 2001, 2001 with 2002 and so on. For a 2-year lag CGG compared seismic in 1999 with KGW recruitment in 2001 and so on. This analysis is shown in Figure F3-21.

CGG found no evidence of a relationship between annual recruitment levels of KGW to PPB and annual seismic levels, whether in the same year or lagged by multiple years. High recruitment of KGW was just as evident during years with high seismic activity or low seismic activity.

As analysed and described in the previous sections we do not foresee any measurable impact on KGW stocks in Victoria from the proposed Regia MSS. Analysis of long-term seismic frequency versus long term KGW recruitment records finds no evidence of linkages between these two outcomes. Therefore, we conclude that the risk of the proposed Regia MSS causing an impact of sufficient scale and intensity as to cause synergistically greater impacts to KGW than already exist, is low.

3.12.3 Recovery Potential

Indicators of stock status for King George Whiting are all directly related to juvenile life stages and are highly variable, being primarily driven by recruitment dynamics – which CGG could not link to annual seismic frequency. None of the fishery CPUE or pre-recruit time series show persistently declining trends, providing reassurance that the poorly known and lightly fished adult stock in coastal waters is continuing to be replenished at rates that are sufficient to prevent declines in recruitment potential/egg production. Recent modest post-larval recruitment is expected to result in a decline in fishery performance, but it is expected to remain within historical bounds so the stock should remain sustainable (Bell et al 2022).

3.12.4 Conservation Status

King George Whiting is not under any conservation protection status other than state fishing regulations. King George Whiting populations in Victoria are currently classified as sustainable.

3.12.5 Mitigation Effectiveness

As noted, the key dynamics of KGW stocks in Victoria are centred around PPB, WPB and CI. Recruitment dynamics, the health of spawning populations and the interaction with fishing effects remain the main drivers of population health in KGW stocks.

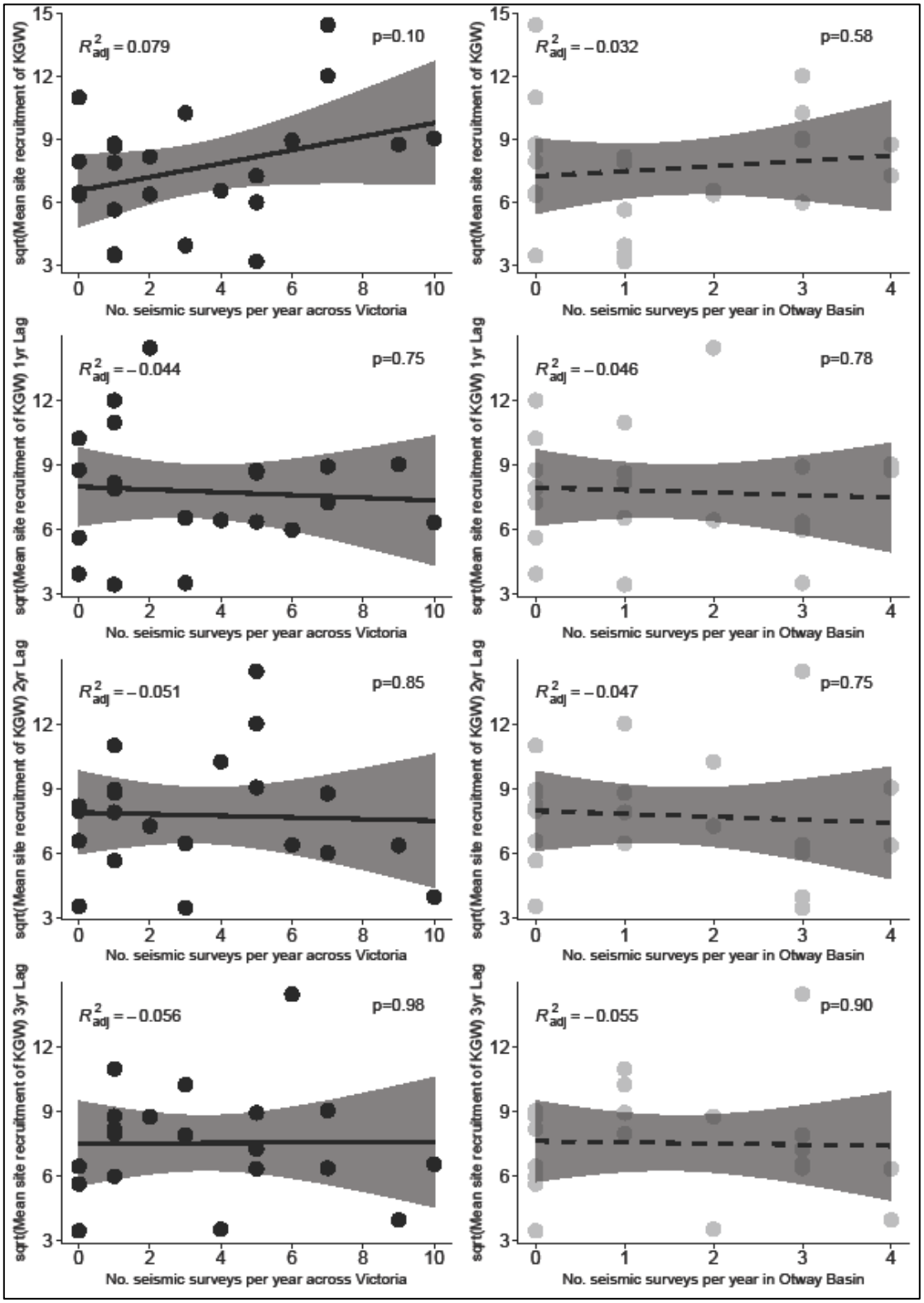


Figure F3-21 - Relationship between frequency of seismic surveys and KGW recruitment levels in PPB. Left hand column includes seismic surveys across Victoria, Right hand column is seismic surveys conducted in the Otway Basin only. Rows represent a lag effect of 0, 1, 2 and 3 years respectively.

3.13 Plankton Communities and the Bonney Upwelling System

3.13.1 Species-Specific Sensitivity

The plankton communities of the general region encompassing the Regia MSS area are dominated by copepods, cladocerans, euphausids (Krill) and chaetognaths amongst others (Kampf & Chapman 2016; Van Ruth & Ward 2009). Much of the work on direct effects of seismic to plankton has focussed on copepods, krill and fish/invertebrate larvae. Results are mixed, with the consensus indicating a range of effects, including mortality, for individuals within close proximity to the seismic pulses at the time of discharging. However, the evidence is much less compelling for large scale mortality and potential population level effects to plankton communities at ever increasing distances from the seismic discharges. A pivotal study cited as definitive proof of large-scale mortality of krill (McCauley et al 2017) presented an outcome more extreme than previous research, concluding that there was large-scale mortality out to 1.2 km from the source. A subsequent study was conducted by three highly cited CSIRO modellers/ researchers (Richardson et al 2017) to model the effects of a seismic survey on zooplankton in a hypothetical survey conducted off the NW Shelf of Australia. This work was also suggested by McCauley et al (2017),

> "*There is an urgent need to conduct further study to mitigate, model and understand potential impacts on plankton and the marine environment…*"

The model outcomes demonstrated substantial impact within 15 km of the seismic in keeping with previous empirical research, but unlike McCauley et al (2017) they found no likely population level effects, with recovery of zooplankton populations within 26 days of the survey completion. Modelling is a proven tool for investigating systems that are difficult to study at large scales and the model outcomes were closely aligned with previous research outcomes across a range of plankton species. As with all models there were numerous caveats due to insufficient information to inform aspects of the model. Richardson et al (2107) however also identified multiple outcomes from the McCauley et al (2017) study that cannot be taken as absolute, especially the apparent lack of any attenuation by distance effects on mortality rates. The obvious conclusions were that there needs to be an independent, rigorous, largescale follow up study to see if the results of McCauley et al (2017) can be verified and validated.

Sensitivity of individual plankton species across multiple studies have all indicated maximum mortality rates from Regia MSS to be below estimated natural mortality rates, with reduced impact at increasing distances/depth from the seismic source (multiple references in the EIA doc on UWS – Plankton).

A significant component of plankton community dynamics in the region is collectively known as the Great Southern Upwelling which mostly refers to three distinct upwelling centres located off the Bonney coast, the southwest coast of Kangaroo Island and the west coast of the Eyre Peninsula. While these centres are not seen as being connected (see Huang and Wang 2019) there is evidence of upwelling at a lower level across the greater shelf region and blue whales are known to aggregate for feeding along the Otway coast SE of Cape Nelson (Gill et al 2011). There is also evidence of sub-surface phytoplankton blooms occurring along the shelf region (Shute et al. 2022, Kampf & Kavi 2017).

Upwelling is a key driver of seasonal biomass enhancements of mesozooplankton (Van Ruth and Ward, 2009), sardine (*Sardinops sagax*) (Ward et al. 2006) and other small pelagic fishes (e.g. *Arripis georgianus*, *Etrumeus teres*, *Trachurus declivis*, *T. novaezelandiae*, *Scomber australicus*, *Emmelichthys nitidus* and *Scomberesox saurus*) (Ward et al., 2008), which are in turn important in the trophic webs of higher order predators in the region (Goldsworthy et al., 2013). Productivity associated with the Bonney Upwelling is also linked to enhancements of euphausiid (*Nyctiphanes australis*) biomass and associated blue whale (*Balaenoptera musculus*) feeding aggregations (Gill, 2002).

In the case of the euphausiid *N. australis*, while its highest abundance is found in summer in response to the upwelling, this species is short-lived and extremely productive, reaching maturity within 4 months and reproducing continuously throughout the year (UTas, IMAS website).

When the upwelling season starts during late spring and early summer (November and December), the influence of the Bonney coast upwelling is often restricted to the coast. During the mid-summer

and early autumn (January to March) when the upwelling is the strongest (measured by AoI), the upwelling influence often extended to the shelf break before retreating in April. At the height of the Bonney coast upwelling during February and March, the upwelling's area of influence often exceeds 12,000 km^2, its SST anomaly often exceeds 1 °C, and its chlorophyll-a concentrations are often >1.5 times of its adjacent areas (All part of Huang and Wang 2019).

The upwelling area of influence is affected by ENSO events, especially at inter-annual level (Huang and Wang 2019). El Nino or La Nina events tend to increase or reduce, respectively, the upwelling's area of influence. It has even been suggested that La Nina events could potentially stop the upwelling events from happening altogether. For example, the Bonney coast upwelling season in 2008–09 was restricted to February only. Interannual variation in areal extent (AoI) can be as high as 50 % from year to year. At the Bonney Coast Western Victoria (BCWVIC) area, the highest annual means in 2009–10 (13,029 ± 5894 km^2) and 2015–16 (12,414 ± 7794 km^2) were more than twice the lowest two in 2004–05 (5378 ± 3184 km^2) and 2012–13 (5184 ± 4838 km^2).

The inherent variability in the dynamics of plankton productivity and the oceanographic processes that drive their life cycles, including concentrating food in upwelling systems, is driven by global-scale climate cycles such as the El Nino Southern Oscillation, with rising SST's also impacting at regional scales. While the direct effects of seismic pulses are felt by individual animals within proximity to the Regia MSS the impacts on population dynamics of these communities are insignificant relative to the scales of change that operate normally.

Krill is a key component of the plankton communities of the region. Because of its primary role in the regional food chains, many species long term sustainability is closely linked to the annual upwelling events that drive the krill blooms upon which animals converge to feed. Because upwelling is the key driver of krill population dynamics, it follows that the huge shifts in temporal and areal extent of the GSU both within and between years will cause krill populations to shrink and expand in a similar way. Such changes, as previously noted, can be as much as 50%. The animals that rely on this system (e.g. whales) for their survival must therefore have evolved to survive and thrive within a system that changes markedly in scale and extent. When put into this context the scale of any potential impacts to plankton communities from the proposed Regia MSS will have no measurable effect on the population health of plankton communities. By extension the risk associated with reduced krill biomass available to feeding animals as a result of the proposed Regia MSS is immeasurably low. [Paragraph added in response to Matter: M10].

The Bonney Upwelling is also identified as culturally significant to the Gunditjmara People (Appendix F3, Section 3.16.1), with its current bringing cold nutrient-rich waters that support culturally significant species such as phytoplankton, fish, squid, seals, dolphins, whales, penguins, gannets and other sea birds (GMTOAC, 2023).

3.13.2 Magnitude of Effect

As noted in Appendix E2 (Underwater Sound – Plankton) there are multiple studies detailing the effects of seismic on fish larvae (see also Sivle et al 2021) and other inhabitants of the plankton. The results consistently indicate that there are deleterious effects on plankton in close proximity to seismic sources however the scale of the impacts is varied and species specific. There is a general relationship of decreasing effects with increasing distance from the seismic sources, although the work of McCauley et al (2017) disputes this relationship.

There has been a constructive assessment of the work of McCauley et al (2017) by Richardson et al (2017) which highlights the need for more research into the findings of this work, especially the apparent lack of attenuation in responses with distance from the seismic source. There is much variation in experimental and study methodologies undertaken to assess seismic effects, and most do not replicate 'real-life' scenarios adequately. Hence more targeted research is needed.

The outcomes discussed by McCauley et al (2017) have indeed catalysed further research into the effects of seismic on planktonic assemblages. Norway has a long history of oil and gas exploration and a concomitant program of research into its effects on the environment (Sivle et al 2021). As a direct result of this work the Norwegian Research Council has funded a 4-year project (ZoopSeis) aimed at uncovering the effects of seismic sound on zooplankton (https://www.hi.no/hi/nettrapporter/toktrapport-en-2022-9). This work is designed to investigate effects under realistic seismic survey conditions and finishes at the end of 2023. Peer-reviewed papers of the research are being completed, with the first publication now available. Mortality rates and

reduced growth of copepod larvae of *Acartia* spp were found to be high in the vicinity of the airgun discharges however the actual rates were significantly lower than normal population mortality rates and hence would likely not be detected (Vereide et al. 2023). They did not test for the effects of distance-from-seismic in this work, but their results remain consistent with most of the other research already published in this area.

A second publication derived from the ZoopSeis work (Vereide et al. (2024a)) has also found that while there was significant damage at close quarters to seismic discharges, there was not extensive and unattenuated mortality out to 1 km + as reported by McCauley et al (2017). Mortality levels reported were also lower than natural mortality rates and hence are predicted to be difficult to separate from background mortality. As well as experimental work a review was conducted as part of the ZoopSeis program and highlighted the vexed issue of extrapolating experimental results to real-life situations (Vereide et al 2024b). They noted that although a seismic survey may cover up to 3000 km^2 and shoot continuously for many weeks the animals will not be constantly exposed throughout that period. The duration of exposure in the reviewed studies lasted for a maximum of 3–4 days, which could be considered too long to be transferred into a real-life setting, considering advection and migration processes that typically occur in the plankton. [Paragraph added in response to Matters: P04 and P06].

Zooplankton will be exposed to airgun discharges when a seismic survey is conducted but over varying time durations and sound levels. In addition, seasonal, diel, and species-specific changes in copepod distribution, both within and among species (Hygum et al., 2000; Thor et al., 2005), will influence exposure level and, therefore, the overall impact of seismic discharges. Dongen-Vogels et al (2011) found up to 4 magnitudes of difference in the abundance of picophytoplankton communities in GAB which highlighted the role of localised physical events including upwelling, downwelling, water column stratification and eddy formations.

A recent study attempted to quantify the patchiness of planktonic assemblages off Florida and clearly demonstrated the multi-scale nature of this phenomenon – see Figure F3-22 below (Robinson et al 2021).

While effects of seismic will be felt by plankton assemblages at localised scales the highly dynamic nature of populations in space and time will ensure there are no population level effects hence the magnitude of any effects will be minor.

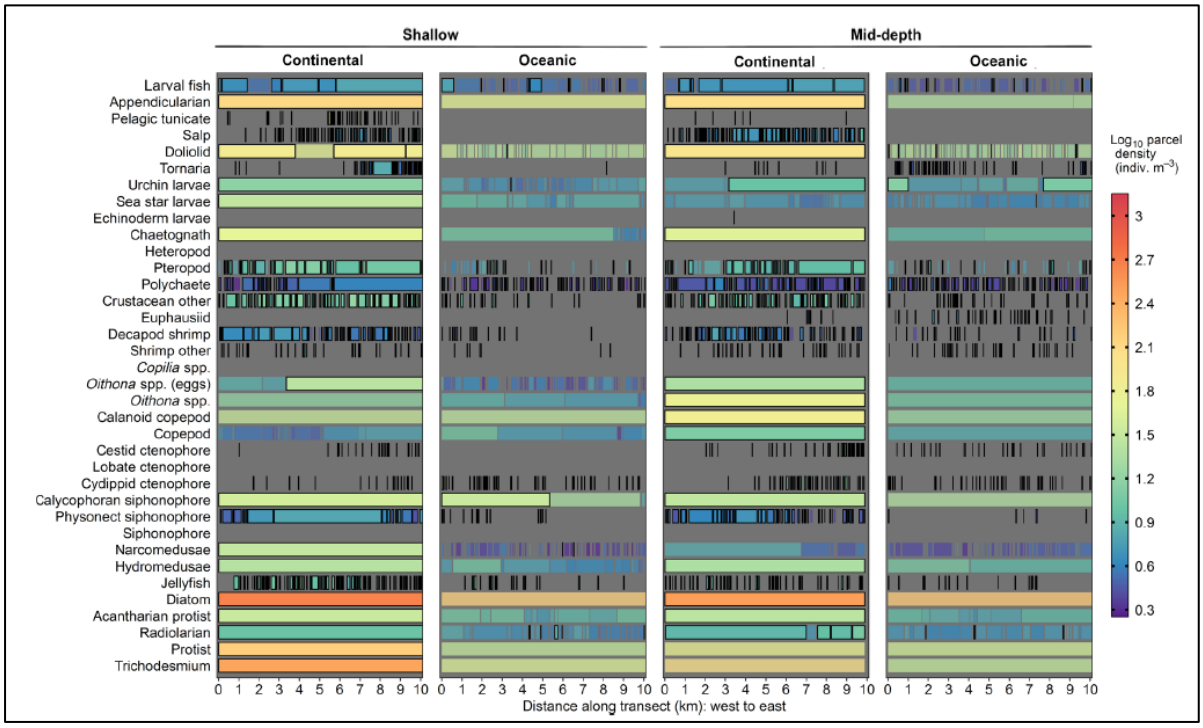


Figure F3-22 - Position and length of plankton catches for 36 taxa. The position and length of patch (coloured bars with black outline) and aggregated parcel (opaque coloured bars) for each taxonomic group along with a single example set of 10-km ISIIS transects in the shallow and mid-depth waters of continental oceanic regions of the SOF. The bar colour gradient indicates the log $_{10}$ – transformed density of individuals (individuals per cubic meter). Multiple groups had patches of aggregate parcels that extended the entirety of the 10-km transects (e.g. diatom).

3.13.3 Recovery Potential

The scale of seismic effects relative to natural background mortality and patchiness of planktonic communities precludes any impacts on such a scale that 'recovery' would be a process specifically applied to a seismic event.

3.13.4 Conservation Status

Planktonic communities of themselves are not given any conservation status. The Bonney Upwelling has been recognised as a Key Ecological Feature however this has no formal legal standing. Whale conservation and management plans may indirectly confer a conservation status on plankton communities in the same area.

3.13.5 Mitigation Effectiveness

Plankton exists in the oceanic environment off the Otway coast and greater south coast region all year round. Localised areas of extremely high plankton density such as upwelling areas should be avoided, however they do not exist within the Regia MSS area. Mitigation might otherwise be better targeted towards avoidance of aggregations of animals that either feed on plankton or who target those species that are feeding on plankton.

3.14 Spawning Patterns

3.14.1 Species-Specific Sensitivity

The commercially important fish species that occur proximate to the survey are largely broadcast spawners (i.e. species that release vast numbers of sperm and eggs into the water column, or in some cases scatter them on the substratum), with several species forming spawning aggregations on the continental shelf, shelf break and slope.

The commercially important crustacean species fished in the vicinity of the Operational Area (i.e. southern rock lobster and giant crab) also spawn eggs but incubate them under their abdomen until hatching. Some species may aggregate at locations to spawn all their eggs and sperm at a specific time within a certain period, batch spawn across a region multiple times during certain seasons (e.g. pink ling and Australian sardine) or spawn continuously throughout the year (e.g. Gould's squid). Significant spawning aggregation areas are not known to occur in the vicinity of the Operational Area, although information regarding fish spawning in offshore regions of the Otway Basin is generally not well documented.

Spawning periods for key species of Commonwealth and State managed fisheries (as identified in B6) overlapping the Operational Area are shown in Table F3-5 with Table F3-6 providing more spawning detail for those species most likely fished in the operational area. Austral spring-summer is the predominant spawning period for most species as it coincides with warmer conditions although many of the deeper water species prefer winter/spring for spawning.

Table F3-5 - Commercial fisheries species spawning timings and depths.

	Spawning Timing												
Fish species	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**Depth Range**
Australian sardine									■	■	■	■	0-200 m
Blue grenadier						■	■	■	■				200 - 700 m
Blue warehou					■	■	■	■	■				50 - 600m
Blue-eye trevalla			■	■	■								200 - 900 m
Eastern School Whiting	■	■	■									■	0-180m
Eels					■	■	■						0-300m
Elephant fish		■	■										0-30m
Giant Crab						■	■	■					20-6 00 m
Gould's squid	■	■	■	■	■	■	■	■	■	■	■	■	<200 m
Gummy Shark		■	■										80-350m
Jack mackerel	■	■	■									■	10-460 m
Orange Roughy						■	■	■	■				700-1400m
Pink ling							■	■	■	■			40-700 m
Pink Snapper	■	■									■	■	20-250m
Redbait								■	■	■	■		86-500 m
Ribaldo						■	■	■	■				450-2500m
Saw Sharks						■	■	■	■				40-650m
School Shark									■	■	■	■	20-550m
Southern rock lobster									■	■	■		<200 m
Tiger flathead	■	■	■								■	■	10-400 m

Table F3-6 - Fish species potentially spawning in Regia MSS Operational area.

Fish species	Spawning activity	Impacted by survey
Blue Grenadier	Main spawning areas located off the central west coast of mainland Tasmania (Gunn et al. 1989b) and eastern VIC / southern NSW (Bruce et al. 2001).	Main spawning areas outside of the active source area and overlap of spawning limited to one month at end of spawning period
Elephant fish	Only partly known. Females migrate to shallow coastal waters in spring to lay their eggs (AFMA 2024).	Broad distribution across southern Australia but only incidental catches in SESSF. No aggregations known in OA.
Gummy shark	Similar to elephant fish	A continuous stock across southern Australia (ABARES Fishery Status Reports 2024).
Saw sharks	Also similar to elephant fish although timing of migration is in winter	Biological structure unknown but found across southern Australia.
School sharks	Pups and juveniles aggregate in shallower 'nursery' waters during the spring and summer.	Found across southern Australia. Stocks are considered overfished. No known aggregations inside OA.
Tiger Flathead	Mature fish migrate to shallow continental shelf waters (<200 m depth) prior to the spawning period (AFMA 2017).	Minimal overlaps at start of general spawning season. OA not a major location for TF
Eastern School Whiting	Spawning is regionally variable but peaks in summer for the region. Spawning is twice a year in deep water.	Minimal overlaps at start of general spawning season. OA not a major location for TF
Blue Warehou	Major spawning areas are located off the west coast of mainland Tasmania.	Main spawning areas outside of active source area and overlap of spawning limited to two months at end of spawning season
Blue Grenadier	Major spawning areas are located off the west coast of mainland Tasmania.	Main spawning areas outside of active source area and overlap of spawning season limited to a month at end of spawning season
Pink Ling	Mature fish migrate to shallow continental shelf waters (<200 m depth) prior to the spawning period (CSIRO 2002).	Main spawning areas deeper than survey and overlap of spawning limited to two months at end of spawning season.
Blue-eye Trevalla	Spawning occurs in summer and autumn where they move into shallower depths (320–400 m) and form spawning aggregations over rough ground and drop-offs on the continental slope, as well as over seamounts (Kailola et al., 1993).	No overlap with spawning period. Spawning is widespread across the South-east Marine Region (CSIRO, 2002) although most spawning activity occurs in waters from central NSW to north-eastern TAS (AFMA, 2017).
Ribaldo	Spawning occurs in winter and early spring. Ribaldo are not thought to form large spawning aggregations.	No overlap with spawning period.
Jack Mackerel	Spawning occurs near the edge of the continental shelf with eggs and sperm released among schooling fish deep in the water column (CSIRO, 2002). Larvae are thought to be carried inshore by currents (Marshall et al. 1993).	No overlap with spawning period. Multiple spawning events over areas outside of acquisition timing.
Redbait	Spawns on outer continental shelf, mostly at night, once every three to five days over the spawning period between Sept. – Nov..	Multiple spawning events over an extensive area between Tasmania and King Island. Spawning is confined to narrow corridor along the shelf break including within the active source area. Minor component of CSPF with no state catches reported.

Fish species	Spawning activity	Impacted by survey
Australian Sardine	Spawns on continental shelf (200 m) with larvae moving Inshore towards bays and inlets during a planktonic period of around 120 days after hatching.	Multiple spawning events over the spawning season. Overlaps the active source area. Stock is spread over >6000km and assessed as highly abundant in 2024.
Orange Roughy	Usually found at depths of 700 - 1400 m where it forms dense spawning aggregations around pinnacles in winter	No spawning or feeding aggregation areas have been identified in the Operational Area. Major spawning locations located on the east coast of Tasmania
Gould's Squid	Spawn throughout the year with 2-3 peaks of spawning activity (AFMA website)	Spawning is continuous throughout year with multiple intra-year peaks that can vary from year-to-year depending on inter- and intra-year variability of environmental conditions. Highly resilient stock that can be subject to 90% mortality.
Southern Rock Lobster	Mating is in autumn with fertilised eggs released from Sept – Nov. where they spend 12-24 months in the plankton.	SRL are considered a single stock across their entire range with high connectivity. Extremely resilient to episodic disturbances.
Giant Crab	Spawning occurs in June-July	No overlap with spawning period

Overlapping Spawning Species

Australian Sardine

Some locations identified as Australian Sardine spawning areas overlap with the Regia MSS area with timing of spawning centred around spring-summer months. Mapping of egg densities along the south coast shows the distribution and abundance of sardine spawning locations is centred around Kangaroo Island and the Cape Otway region (Ward et al. 2018). However, Ward et al. (2018) state that these results are underestimates of the total spawning biomass of the south coast region. This has recently been confirmed by Ward et al (2023) who have discovered that the size of the SE Australian Sardine stock is substantially bigger than previously estimated. This species is recognised as one genetically identical stock, subdivided into meta-populations that are still connected but more self-regulating (Izzo et al. 2017). The distribution of spawning areas is extensive across the south and southeast coast and connected at a much larger scale than the Regia MSS area (Figure F3-23 and Figure F3-24). As such, the scale of any effects to the spawning output of sardines across the greater region are expected to be immeasurable.

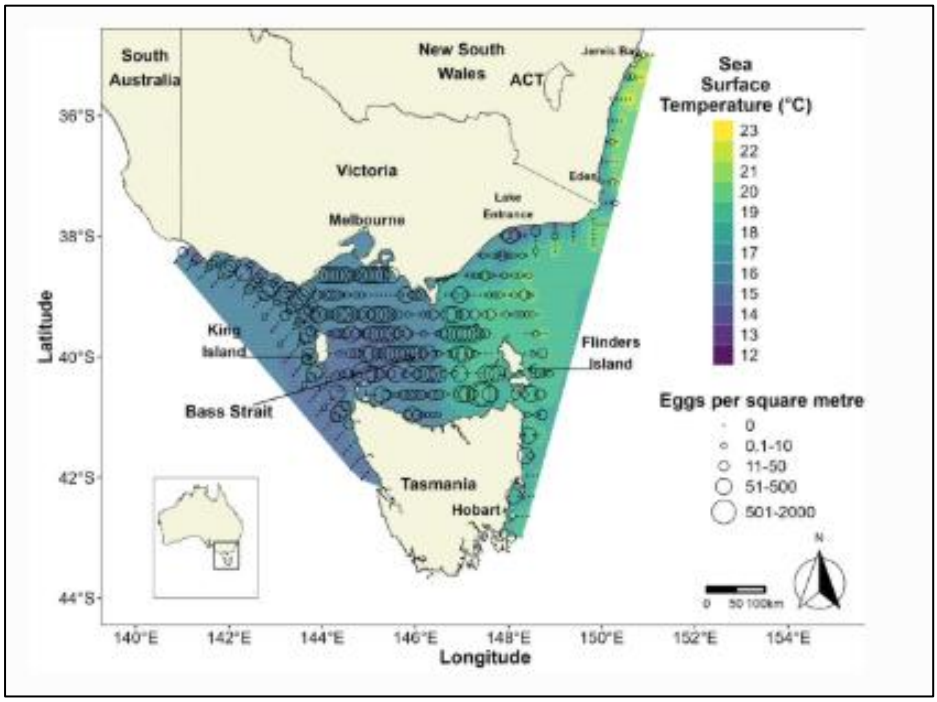


Figure F3-23 - Spatial patterns and density of Sardine eggs between December 2023 and January 2024. Along with the corresponding sea surface temperature (Credit: Tim Ward UoT 2024).

Redbait

There is overlap of redbait spawning locations with the Regia MSS area (Table F3-6) with timing of spawning during spring/early summer (Table F3-5). However, distribution of redbait eggs was found to be greater to the west and east of the Regia MSS area with highest concentrations off the west coast of Tasmania and the Bonney Upwelling region (Ward et al 2019) (Figure F3-24).

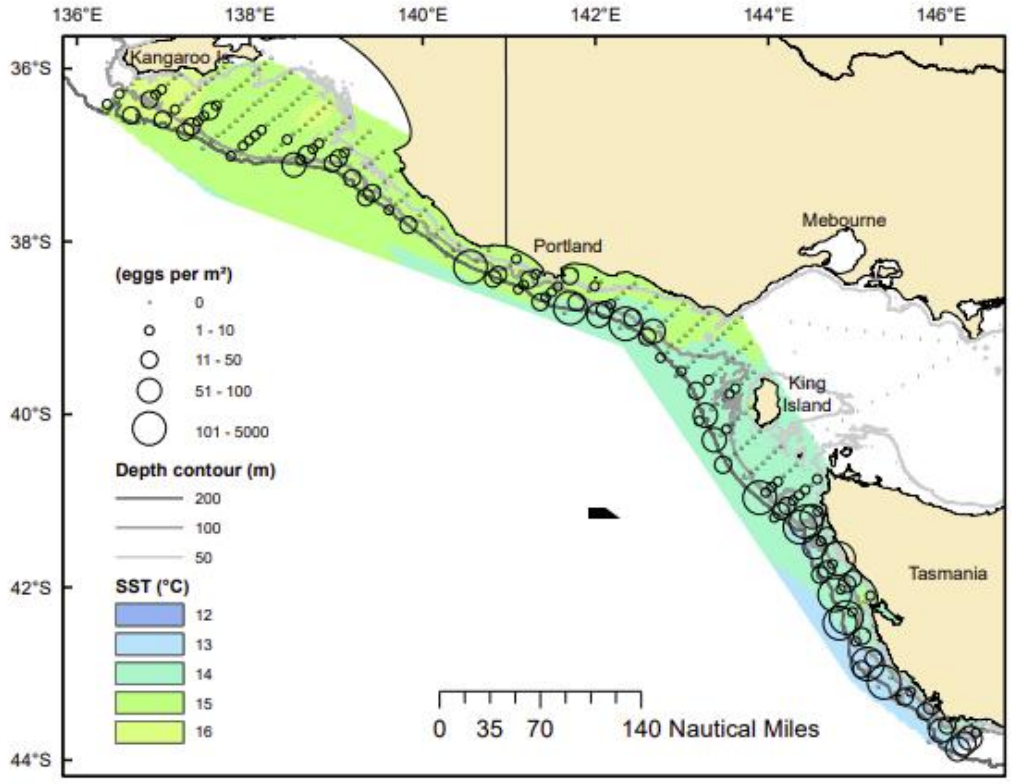


Figure F3-24 - Distribution and abundance of Redbait eggs between western Tasmania and Kangaroo Island in October 2017 (from Ward et al. 2019).

3.14.2 Magnitude of Effect

An effect on spawning from the operation of the seismic source could only happen if seismic is occurring at the time of spawning and is within the threshold distances for each particular species. . Moreover the levels of energy and scale of effects that marine biota will be exposed to within the ensonified area will vary by species and by individual according to their closeness to the sound energy source, their behaviour and physiology, the complexity and density of their preferred habitat and the speed and direction of the survey. Actual near-field and far-field received sound levels are influenced by several factors including the overall size (capacity) of the acoustic source, the array configuration, water depths in the area, position in the water column, distance from the source and geo-acoustic properties of the seabed.

Appendices B7 and B8 highlight that the distance thresholds selected for understanding the effects of elevated levels of sound on fish eggs and larvae are defined as the active source area plus 740 m. In selecting impact thresholds, the EP considers an extensive list of different studies which have investigated the effects of underwater sound on plankton (which includes the eggs and larvae of finfish and invertebrates). Guideline thresholds for mortality to eggs and larvae have been drawn from the sound exposure guidelines of the ANSI-Accredited Standards Committee S3/SC 1, Animal Bioacoustics Working Group (Popper et al. 2014). The critical level proposed for mortality in eggs and larvae is 207 dB re 1 µPa Lpk and this is based on the maximum sound levels measured from repeated pile driving that indicated no damage to the larvae of the common sole (Bolle et al. 2012). This level has been used for the assessment of underwater sound from seismic on plankton including fish larvae and eggs (see Appendix E2). The spatial extent within which effects are being assessed is conservative in keeping with the precautionary approach because it encompasses all physiological and behavioural disturbance effects to all the marine fauna considered, at the seabed and in the water column.

In general, there have been few studies into the effects of marine seismic surveys on plankton. Up until recently, studies on the effects of noise from airguns on plankton have indicated that any effect

is likely to be highly localised (<10 m from the source and typically within 0.5 to 5 m) (Kostyuchenko 1973; Matishov 1992; Booman et al. 1996; Payne 2009). These studies indicated that impacts would be insignificant compared with the naturally high turnover rates of zooplankton.

Scale of impacts is also closely linked to the size of the population. Species with high abundance and a large, interconnected distribution will be resilient and robust to a spatially and temporally constrained seismic survey. Any localised mortality will be buffered by the scales of advection and dispersal that are intrinsic to highly connected populations. Recent work has demonstrated the abundance of sardine stocks across the region (Ward et al 2023) while Redbait populations are also spatially extensive and relatively abundant across southern Australia, occurring continuously at the shelf break between southern NSW and south-western Western Australia (Ward et al 2019). potential mortality of larval fish that rely on zooplankton for food is difficult to predict but is not expected to affect a significant proportion of larvae based on the assumptions that not all zooplankton are killed by exposure to airguns (Richardson et al. 2017) and only a very small proportion of the plankton would be exposed at any one time.

No population level effects are predicted from an individual survey, however there is the potential for an overlap with the TGS Otway 3D MSS. TGS and CGG have committed that both surveys will not occur at the same time. The two surveys are targeting acquisition in different water depths such that cumulative effects are not predicted to species whose spawning distributions are depth limited. The only species with depth ranges affected by both surveys have such broad distributions that cumulative effects remain within acceptable levels. The recoverability of populations and levels of natural mortality are such that no effect is predicted to commercially caught species, or to their catch rates as an indirect result of impacts on eggs/larvae.

3.14.3 Recovery Potential

Although the work by McCauley et al. (2017) and Richardson et al. (2017) suggests that the zone of impact for zooplankton may be two orders of magnitude higher than previously thought, there is still evidence that for certain components of the plankton effects are likely to be limited to <10 m. Further, for many components of the zooplankton and phytoplankton, recovery is expected to be rapid (in the order of days), so the effects are expected to be limited and within the range of natural variability.

Richardson et al. (2017) showed that zooplankton communities can begin to recover during the survey period during periods of good oceanic circulation (and periods of upwelling). Hence, a continuous decline in zooplankton throughout the survey period is not anticipated, and parts of the Active Source Area would progressively recover as the survey proceeded. It is unlikely therefore that localised patches of reduced food availability for plankton feeders would occur over the period of the survey and during the 3-day recovery period (as modelled by Richardson et al. (2017)).

3.14.4 Conservation Status

Fish eggs and larvae are not protected in Australia.

3.14.5 Mitigation Effectiveness

There are no known critical spawning areas (i.e. species with restricted distribution and/or a relatively large-scale event) for any commercially important fish species within the Regia MSS area-of-effect and the survey will not have population level impacts on spawning output of commercially important fish and invertebrate species. Given the broad distribution and high natural mortality of spawning and the potential mortal injury effects the only viable mitigation measures are avoidance of spawning timing. In all cases, the avoidance of minor impacts to spawning should not be traded off against higher order effects of moving to other times.

In consideration of the spatial and temporal extent of this predicted impact it is also important to consider the following:

- Any plankton, including fish eggs and larvae, present in the water column within the Active Source Area will not be evenly distributed with substantial spatial patchiness the most likely (e.g. Robinson et al 2021).
- The seismic source will be constantly moving, and plankton populations are constantly being replenished by currents from non-impacted areas. Plankton populations' recover quickly due

to their fast growth rates, and the dispersal and mixing of plankton from both inside and outside of the impacted area.

- Any mortality or mortal injury effects to fish eggs and larvae resulting from seismic noise emissions are likely to be inconsequential compared to natural mortality rates of fish eggs and larvae, which are very high (exceeding 50% per day in some species and commonly exceeding 10% per day). For example, in a review of mortality estimates (Houde and Zastrow 1993), the mean mortality rate for marine fish larvae was M = 0.24, a rate equivalent to a loss of 21.3% per day.

3.15 Budj Bim Cultural Landscape

The Budj Bim Cultural Landscape, located in the traditional Country of the Gunditjmara Aboriginal people in south-eastern Australia and comprises three components: Budj Bim – Northern Component (Budj Bim IPA and National Park), Kurtonitj – Central Component (Budj Bim IPA) and Tyrendarra Southern Component (Budj Bim IPA and Tyrendarra IPA) (GMTOAC, 2023). Budj Bim is recognized for its world heritage values due to its ancient and sophisticated aquaculture systems. The Budj Bim lava flow is recognised as an attribute contributing to the Outstanding Universal Value of the Budj Bim World Heritage Site which extends into Portland Bay (Wheeler et al., 2023). These systems are among the world's oldest, dating back at least 6,600 years.[3] The Gunditjmara people utilized the lava flows from the Budj Bim volcano to create one of the largest and oldest freshwater aquaculture systems in the world. This system comprises of an extensive network of channels (yereoc), weirs (stone and wood), dams, ponds and sinkholes. This network was ingeniously designed to manage floodwaters and create basins for the systematic trapping, storing, and harvesting of Kooyang (short-finned eel - Anguilla australis), providing a sustainable economic and social base for their society over millennia.[4] More recently, acoustic tagging of Kooyang from 2008 to 2020 traced their migration from Tae Rak out to sea before spawning, with tags recorded near Tasmania, Sydney and New Caledonia. In 2019, the Kooyang Killara Water Project also piloted a six-tub, solar-powered aquaculture facility that strengthened participants' skills in feeding Kooyang, monitoring water levels and flows, and recording results.

The landscape embodies the continuing and evolving relationship between the Gunditjmara people and their land, showcasing a unique interrelationship of cultural and environmental systems. This connection is evidenced through the continuation of traditional knowledge, practices, and cultural traditions expressed through oral traditions, dance, landscape management methods such as cultural burning, and resource utilisation, such as basket weaving and rock building. This connection is also physically evidenced both archaeologically and contemporarily via the extensive aquaculture systems and interconnected geological, hydrological and ecological systems.

3.15.1 Sensitivity (World Heritage Outstanding Universal Values)

The World Heritage values of Budj Bim are recognized under two specific criteria:

Criterion (iii): This criterion highlights the Budj Bim Cultural Landscape as an exceptional testimony to the cultural traditions, knowledge, practices, and ingenuity of the Gunditjmara people. Their aquaculture system serves as a testament to their engineering skills and sustainable fishing practices, which have been passed down through generations.

Criterion (v): Under this criterion, the Budj Bim Cultural Landscape is acknowledged as an outstanding example of human interaction with the environment. The Gunditjmara's manipulation and management of the landscape through their aquaculture system demonstrate a profound understanding and relationship with their natural surroundings, emphasizing the dynamic ecological-cultural relationships that have been maintained over thousands of years.

The integrity and authenticity of the site are maintained through the intact and operational nature of the aquaculture systems, the ongoing connection of the Gunditjmara to their land, and the continuation of cultural practices. The landscape is managed to respect the rights and obligations of

[3] UNESCO 2019 https://whc.unesco.org/en/list/1577/
[4] Budj Bim website https://www.budjbim.com.au/about-us/world-heritage/

the Gunditjmara Traditional Owners. The preservation of its cultural and natural values are currently managed by the Ngootyoong Gunditj Ngootyoong Mara South West Management Plan (2015), the Gunditj Mirring Budj Bim Indigenous Protected Area Plan of Management 2022 – 2027 (Event ID 352), the Budj Bim Cultural Landscape Master Plan 2022 – 2030, a GMTOAC Budj Bim World Heritage Unit and a Steering Committee that includes membership from GMTOAC, Winda-Mara, World Heritage experts and state and federal agencies. The 'Tyrendarra Indigenous Protected Area Management Action Plan 2015–2018' is a strategic document outlining the conservation, protection, and management of the Tyrendarra Indigenous Protected Area (IPA) (Event ID 352)

3.15.2 Magnitude of Effect

CGG undertook a review of the World Heritage Listing information on the UNESCO website, the Budj Bim and GMTOAC websites, the Ngootyoong Gunditj Ngootyoong Mara South West Management Plan, the Gunditj Mirring Budj Bim Indigenous Protected Area Plan of Management 2022 – 2027 (Event ID 352), the Budj Bim Cultural Landscape Master Plan 2022 – 2030, Tyrendarra Indigenous Protected Area Management Action Plan 2015–2018' and social media posts related to the cultural values in the region. CGG has also undertaken a tour of the Budj Bim site and consulted with GMTOAC and other Traditional Owner groups in the region to better understand the significance of cultural heritage features of the environment in and around the area in which it proposes to operate.

The management plans (listed above in section 3.15.1) for the Budj Bim Cultural Landscape integrate requirements to protect the site's UNESCO Outstanding Universal Value, describing the World Heritage aims for the landscape to be universally recognised and protected as a dynamic living place with internationally recognised cultural heritage and sustainable ecological systems, with a specific long-term target of zero substantial decline in natural or cultural heritage values. Other fundamental indicators and goals focus on preventing significant decline in the condition and function of the aquaculture features (channels, weirs, dams, and ponds), including ensuring water flows are within the range that enables the aquaculture system to function sustainably, increasing native fauna populations, the development and implementation of a long-term kooyang and fish monitoring program, and building the resilience of the landscape to the impacts of climate change

The cultural values documented in the UNESCO listing and the Management Plans identified the Budj Bim Cultural Landscape and the example of human interaction with that environment. CGG subsequently considered the environmental aspects arising from the Regia MSS on the World Heritage values of the Budj Bim Cultural Landscape. The understanding CGG had of the values were analysed from both direct and indirect perspective.

Direct effects

Since Budj Bim's World Heritage values are tied to its ancient aquaculture systems, cultural traditions at the site, and the deep historical connection between the landscape and the Gunditjmara people, a seismic survey undertaken over 20km offshore will not change the physical characteristics or resources of the Budj Bim Cultural Landscape. Culturally important species, places, and practices can continue without disruption to their role, accessibility, or long-term viability, in alignment with the related Management Plans.

Indirect effects

Indirect effects could potentially be more significant, especially concerning the marine environment and its interconnectedness with the cultural practices and values of the Gunditjmara people. Since the Gunditjmara's traditional practices and cultural significance associated with the Budj Bim Cultural Landscape include the management and harvesting of aquatic resources, changes in marine ecosystems could indirectly impact these cultural practices.

CGG understood from our consultations the cultural significance of the Kooyang eel (Short-finned Eel - *Anguilla australis* – also known as Glass Eels when they are ocean bound before they migrate to inland freshwater systems). CGG undertook a detailed assessment of the effects of short-term seismic surveys on this species which can be found in Section 3.7 Short-finned Eel / Kooyang (*Anguilla australis*)

3.15.3 Recovery Potential

Due to the absence of direct effects and immeasurable indirect effects, this is no recovery potential to assess.

3.15.4 Conservation Status

As a World Heritage Listed environmental value it was important for CGG to thoroughly assess the Outstanding Universal Value of the Budj Bim site. This assessment has found no threat to the values of the site from the proposed activity.

3.15.5 Mitigation Effectiveness

Whilst there are no direct effects, and immeasurable indirect effects, from the Regia MSS on the World Heritage Values of Budj Bim, CGG recognises that there may be other indirect effects to spiritual values held by the Gunditjmara people and that this information may be sensitive such that it cannot be shared.

In acknowledgement of the ongoing sovereignty of the Gunditjmara people, and CGG's willingness to find ways to protect cultural heritage, a Sea Country Protection Plan will be implemented to facilitate the identification and management of new information, relevant to the activity, through collaboration of First Nations people who decide to be part of the program.

3.16 Cultural Features of the Environment

3.16.1 Sensitivities

Following review of relevant literature, case law, and information provided through consultation, the following environmental values and sensitivities were identified as cultural features of the environment that may be affected by the Regia MSS. Where an impact and risk on a cultural feature has been identified, environmental assessment has been undertaken and can be located as per the 'Reference to Evaluation' column in Table F3-7 below.

Table F3-7: Table showing the cultural features that may be impacted by the Regia MSS.

Cultural Features	Description	Source	Cause and Effect Pathway	Reference to Evaluation
Tangible				
Koontapool Woorrkngan Yakeen	Whale Birthing Dreaming Sites, are in coastal bay areas from Port Campbell to Portland, including Warrnambool. These places on Gunditjmara Country are known resting and feeding sites for mothers and calves and are directly related to Gunditjmara Neeyn (midwives), explaining why Gunditjmara is a Matrilineal Nation.	DCCEEW 2024 Appendix C3, Desktop Research: Org ID 316 & Person ID 1163	**Planned:** Underwater sound Physical Presence **Unplanned:** Fauna interactions Accidental release of fuel Accidental release of materials or waste overboard	Underwater Sound (Marine Mammals), Appendix E7 Fauna Interactions, Appendix D2 Accidental release of fuel, Appendix D4, *(cited in section 9.3.6).* Release of materials or waste overboard, Appendix D1 Physical Presence, Appendix E1

Cultural Features	Description	Source	Cause and Effect Pathway	Reference to Evaluation
Whale	Southern Right Whales (*Eubalaena australis*) and Blue Whales (*Balaenoptera musculus*) have been identified as a culturally significant species for Indigenous peoples. The GMTOAC Nyamat Mirring Plan 2023-2033 describes the spiritual connection Gunditjmara maintain with all species of whale that travel through their sea country, with the arrival of Karntubul signifying the start of the big wet season. Their whale ancestors and kin, Koontapool, the southern right whale, and Wuuloc, the pygmy blue whale, are sacred to the Gunditjmara and hold a significant place in their cultural practices. [This sentence has been updated follow public comment FN01] Koontapool are a culturally significant species for the Eastern Maar people. Blue Whales, Southern Right Whales and Killer Whales use Wadawurrung Warre (sea country).	Event ID 3678Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC, 2023 Wadawurrung Traditional Owners Aboriginal Corporation, 2020 Event ID 6624 Feedback ID 4389 Appendix C3, Desktop Research: Org ID 316 & Person ID 1163	**Planned:** Underwater sound Physical Presence **Unplanned:** Fauna interactions Accidental release of fuel Accidental release of materials or waste overboard	Underwater Sound (Marine Mammals), Appendix E7 Fauna Interactions, Appendix D2 Accidental release of fuel, Appendix D4, *(cited in section 9.3.6)* Release of materials or waste overboard, Appendix D1 Physical Presence, Appendix E1

Native Title Areas & Rights	In July 2011 the Eastern Maar and Gunditjmara peoples were recognised as the native title holders for an area of their Traditional Country in south-west Victoria between the Shaw and Eumerella Rivers and from Yambuk in the south to beyond Lake Linlithgow in the north. For the Gunditjmara People, their recognised native title rights and interests include the non-exclusive right to: • have access to or enter and remain on the land and waters • camp on the land and waters landward of the high water mark of the sea • use and enjoy the land and waters • protect places and areas of importance on the land and waters • take resources of the land and water Native Title rights and interests are non-exclusive and sit alongside the broader community's right to enjoy these places. A significant site of early conflict in Gunditjmara Country was at a place now known as the "Convincing Ground". In 1832 – 33, when Kilcarer Gunditj came together at a beached whale, whalers used the gathering, murdering approximately 60 people at the Convincing Ground. Only two members of the clan survived the massacre. 'The 'Convincing Ground' is located in Portland Bay and is listed on the Victorian Heritage Register. Deen Maar and its surrounding area hold deep spiritual significance	https://easternmaar.com.au/about/ https://www.gunditjmirring.com/nativetitle Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC, 2023	**Planned:** Light Emissions Physical Presence Diving, Surfing and Swimming **Unplanned:** Accidental release of materials or waste overboard Accidental release of fuel	Light Emissions, Appendix E9. Physical Presence, Appendix E1 Release of materials or waste overboard, Appendix D1 Accidental release of fuel, Appendix D4, *(cited in section 9.5.4)* Diving, Surfing and Swimming, Appendix E8

Cultural Features	Description	Source	Cause and Effect Pathway	Reference to Evaluation
	for the Gunditjmara people and fall within one of their native title determinations. Gunditjmara hold recognised native title rights and interests over this part of Mirring (see also '*Deen Maar'* below).			
Registered Aboriginal Party	Wadawurrung Traditional Owners Aboriginal Corporation was appointed in May 2009 as a Registered Aboriginal Party under the Victorian Aboriginal Heritage Act 2006.Wadawurrung's RAP area covers over 10,000 square kilometres on the western side Melbourne and including the major regional cities of Geelong and Ballarat. Their coastal Country extends from the Werribee River to Airey's Inlet, with Sea Country east of Anglesea to Clifton Springs. Bunurong Land Council Aboriginal Corporation are the Registered Aboriginal Party for the Mornington Peninsula, Westernport, and a portion of South-West Gippsland.	Wadawurrung Traditional Owners Aboriginal Corporation, 2020. https://www.bunuronglc.org/rap-map.html	**Planned:** Physical Presence **Unplanned:** Accidental release of materials or waste overboard Accidental release of fuel	Physical Presence, Appendix E1 Release of materials or waste overboard, Appendix D1 Accidental release of fuel, Appendix D4 *(cited in section 9.5.4)*
Deen Maar	Lovett on behalf of the Gunditjmara People v State of Victoria ((No 5) [2011] FCA 932) identified Deen Maar as a spiritually significant place. A culturally significant site and special place to Eastern Maar and Gunditjmara peoples. The island of Deen Maar is part of the homeland of the Gunditjmara and Eastern Maar peoples and contains important cultural sites and artefacts as well as spiritual significance. [This sentence has been updated follow public comment FN01]	Victoria State Government, 2023 Eastern Maar Aboriginal Corporation, 2015 Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC, 2023 Event ID 1891, Feedback ID 1103. Cultural heritage desktop assessment, Appendix B12	**Planned:** Physical Presence Light Emissions **Unplanned:** Accidental release of fuel Accidental release of materials or waste overboard	Physical Presence, Appendix E1 Release of materials or waste overboard, Appendix D1 Accidental release of fuel, Appendix D4 *(cited in section 9.5.4)* Light Emissions, Appendix E9.

Cultural Features	Description	Source	Cause and Effect Pathway	Reference to Evaluation
	A story associated with Deen Maar Island is that the spirits go first to Deen Maar and then up to the stars, as Bunjil had done (Eastern Maar Aboriginal Corporation, 2015). The island is where the Gunditjmara believe the spirits of their dead travel to wait to be reborn. Ancestral creation beings revealing themselves in the landscape: erupting volcanoes; tsunamis; mountains forming; sea country creeping up onto the land. (Weir 2009). Deen Maar holds cultural significance (Event ID 1891, Feedback ID 1103) Deen Maar (Lady Julia Percy Island) is the point where two creator deities, Punjil and Pallian left this earth. Pallian was the creator deity of the sea and fish and the governor of the oceans (after William Thomas, Letters from Victorian Pioneers, in National Oceans Office 2003:12). This island holds and creation story holds significance for both the Gunditj Mara and Eastern Maar. (Appendix B12)			
Point Nepean & Mornington Peninsula	During consultation with Bunurong Land Council Aboriginal Corporation (Org ID 144) identified Mornington Peninsula, and particularly Point Nepean, as an area of high cultural significance.	Event ID 2371, Feedback 1170 Thomas et al. (2017)	**Planned:** Physical Presence Light Emissions **Unplanned:**	Physical Presence, Appendix E1 Release of materials or waste overboard, Appendix D1

Cultural Features	Description	Source	Cause and Effect Pathway	Reference to Evaluation
	With significant input from Dan Turnbull of Bunurong Land Council Aboriginal Corporation, Thomas et al., describe Point Nepean/Monmar as a culturally significant and sacred site on the Mornington Peninsula, which is itself culturally significant with values including tradition, story and song. Stating that within Point Nepean is a special women's place, used for birthing, ceremony and initiation.		Accidental release of fuel Accidental release of materials or waste overboard	Accidental release of fuel, Appendix D4 *(cited in section 9.5.4)* Light Emissions, Appendix E9.
Budj Bim	See detailed description and assessment in Section 3.15 Budj Bim Cultural Landscape			
Waterway/water bodies	Spirits of the dead reside in waterways and water bodies. The estuaries where Yulluk (waterways) and Warre (Sea Country) meet are vital breeding grounds, crucial for the continued renewal of marine life. The sea, caves, estuaries, reefs, nearshore islands, and extensive dune and wetland systems along the coast are embodied with stories from continuous use by Gunditjmara over millennia.	Eastern Maar Aboriginal Corporation, 2015 Wadawurrung Traditional Owners Aboriginal Corporation, 2020. Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC, 2023	**Unplanned:** Accidental release of fuel Accidental release of materials or waste overboard	Release of materials or waste overboard, Appendix D1 Accidental release of fuel, Appendix D4 *(cited in section 9.1, 9.5.5)*
Kooyang (eels)	Are culturally significant and are a resource. Fishing is described as a cultural activity in The Wadawurrung Country Plan 2020 – 2030, with eel (buniyak) caught in tubular-shaped baskets (buniya). Eeling also remains an important traditional, social and economic practice among the Eastern Maar People. They continue to fish for perch, blackfish.	Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC, 2023 Wadawurrung Traditional Owners Aboriginal Corporation, 2020. Eastern Maar Aboriginal Corporation, 2015.	**Planned:** Physical presence. Underwater sound. **Unplanned:** Accidental release of Fuel.	Physical Presence, Appendix E1 Underwater Sound (Fish), Appendix E3 Accidental release of fuel, Appendix D4 *(cited in section 9.3.3)* Refer to Section 3.7 above.

Cultural Features	Description	Source	Cause and Effect Pathway	Reference to Evaluation
Koorn Moorn (seals)	Feature in song and dance and are used as a resource. They were collected in traditional times by women along the Gunditjmara coast with evidence at Tarragal cave site dated to 10,000 years. During consultation, seals were identified by the Eastern Maar people as a culturally significant species.	Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC, 2023 Event ID EVT272	**Planned:** Physical presence. Underwater sound. **Unplanned:** Release of waste overboard. Fauna interactions. Accidental release of fuel.	Physical Presence, Appendix E1 Underwater Sound (Marine Mammals), Appendix E7 Fauna Interactions, Appendix D2 Release of materials or waste overboard, Appendix D1 Accidental release of fuel, Appendix D4 *(cited in section 9.3.6)*
The Bonney Upwelling	Supports culturally significant species such as phytoplankton, fish, squid, seals, dolphins, whales, penguins, gannets and other sea birds.	Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC, 2023	**Planned:** Underwater sound **Unplanned:** Release of waste overboard. Accidental release of fuel.	Underwater Sound (Plankton), Appendix E2 Release of materials or waste overboard, Appendix D1 Accidental release of fuel, Appendix D4, *(cited in section 9.3.1)* Refer to Section 3.13 above.
Nyamat Mirring IPA	The Nyamat Mirring Indigenous Protected Area [currently under consultation], encompasses the coastal section of native title areas including sea, submerged lands and potential traditional fish traps found therein.	Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC, 2023	**Planned:** Physical Presence Light emissions. **Unplanned:** Release of waste overboard. Accidental release of fuel.	Physical Presence (Appendix E1) Light Emissions, Appendix E9. Accidental release of fuel, Appendix D4 *(cited in section 9.5.4)* Release of materials or waste overboard, Appendix D1

Cultural Features	Description	Source	Cause and Effect Pathway	Reference to Evaluation
Marine Mammals – General	Marine mammal species are identified by the Gunditjmara people as culturally significant as important resources, particularly as food sources, and as a feature in dreaming stories, ceremony, song and dance. Relating to Koorn Moorn (seals) and Karntubul (whales), dolphins. The Wadawurrung People recognize marine mammals, including Blue Whales, Southern Right Whales, Killer Whales, and seals, as culturally significant species. During consultation, whales, seals and sea lions are identified by the Eastern Maar people as culturally significant species.	Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC, 2023 Wadawurrung Traditional Owners Aboriginal Corporation, 2020. Event ID EVT272	**Planned:** Physical presence. Underwater sound. **Unplanned:** Release of waste overboard. Fauna interactions. Accidental release of fuel.	Underwater Sound (Marine Mammals), Appendix E7 Physical Presence, Appendix E1 Fauna Interactions, Appendix D2 Accidental Release of Fuel, Appendix D4 *(cited in section 9.3.6)* Release of materials or waste overboard, Appendix D1
Fish - General	Two freshwater species, blackfish and eels continue to be harvested by the Gunditjmara people Fishing is described as a cultural activity in The Wadawurrung Country Plan 2020 – 2030, with eel (buniyak) caught in tubular-shaped baskets (buniya). Eeling also remains an important traditional, social and economic practice among the Eastern Maar People. They continue to fish for perch, blackfish.	Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC, 2023 Wadawurrung Traditional Owners Aboriginal Corporation, 2020. Eastern Maar Aboriginal Corporation, 2015.	**Planned:** Underwater sound. Light emissions. **Unplanned:** Fauna interactions. Accidental release of fuel.	Underwater Sound (Fish), Appendix E3 Light Emissions, Appendix E9. Blackfish, eels and perch species are not identified as being potentially affected by light emissions (Appendix E9, Annex 3). Fauna Interactions, Appendix D2. Blackfish, eels and perch species are not identified as being potentially affected by fauna interactions (Appendix D2). Accidental Release of Fuel, Appendix D4 *(cited in section 9.3.3)* Blackfish are an inland river fish (VFA 2024b) and therefore outside of the Operational

Cultural Features	Description	Source	Cause and Effect Pathway	Reference to Evaluation
				and Planning Areas.
Invertebrates - General	Coastal shellfish harvested from the sea, intertidal reefs and beaches are important resources, particularly as food sources to the Gunditjmara People. They hold strong cultural value as evidenced by cultural heritage sites and current practices. Shellfish species central to ongoing connection include torbos, pipis, abalone, limpets, mussel, elephant snail, crayfish/lobster, and crabs. Several invertebrate species are identified as important resources, particularly as food sources to the Wadawurrung People. Species include barnabeel (oyster), murrabal (mussel), bam (crayfish), abalone and pipis. Invertebrate species are an important traditional, social and economic resource for the Eastern Maar People. Abalone, cockles and crayfish are collected as tucker along the coast.	Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC, 2023 Wadawurrung Traditional Owners Aboriginal Corporation, 2020. Eastern Maar Aboriginal Corporation, 2015.	**Planned:** Underwater sound. Light emissions. Diving, Surfing and Swimming **Unplanned:** Accidental release of fuel. Invasive Marine Species.	Underwater Sound (Invertebrates), Appendix E4 Light Emissions, Appendix E9 Invasive Marine Species, Appendix D3 Diving, Surfing and Swimming, Appendix E8 Accidental Release of Fuel, Appendix D4, *(cited in section 9.3.2)*
Birds - General	Short-tailed shearwaters (mutton bird) are culturally significant to the Gunditjmara People and their harvesting practice. During consultation, seabirds including shearwaters, gannets and Little Penguins are identified by the Eastern Maar people as culturally significant species.	Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC, 2023 Event ID EVT272	**Planned:** Light emissions. Underwater sound. **Unplanned:** Release of waste overboard. Accidental release of fuel.	Light Emissions, Appendix E9 Underwater Sound (Birds), Appendix E5, Release of materials or waste overboard, Appendix D1 Accidental Release of Fuel, Appendix D4 *(cited in section 9.3.4)*

Cultural Features	Description	Source	Cause and Effect Pathway	Reference to Evaluation
Kelp	Kelp forests, home to giant and bull kelps, serve as habitats and food sources for numerous marine animals. They are also habitat for food resources, such as rock lobster and abalone, and can be used to create water carriers.	Wadawurrung Traditional Owners Aboriginal Corporation, 2020.	**Planned:** Underwater sound **Unplanned:** Release of waste overboard. Accidental release of fuel. Invasive Marine Species.	Underwater Sound (Plankton), Appendix E2 Accidental Release of Fuel, Appendix D4 *(cited in section 9.4.1)* Release of materials or waste overboard, Appendix D1 Invasive Marine Species, Appendix D3
Other coastal Resources	Flint stone holds cultural value as a resource used to craft tools. Ancient shell middens, evidence of Aboriginal occupation, are important to cultural learning and connection to Country.	Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC, 2023 Eastern Maar Aboriginal Corporation, 2015.	**Planned:** Physical Presence **Unplanned:** Release of waste overboard. Accidental release of fuel.	Accidental Release of Fuel, Appendix D4 *(cited in section 9.4.2)* Release of materials or waste overboard, Appendix D1 Physical Presence, Appendix E1
Intangible				

Cultural Features	Description	Source	Cause and Effect Pathway	Reference to Evaluation
Totemic Value and Kinship	Individuals may have kinship to specific species and/or a responsibility to care for particular species. Kinship arises from totemic associations within First Nations "skin group" systems. It is forbidden for an individual to kill or eat a species who is from the same "skin group". They may also have certain obligations linked to caring for Country. For Aboriginal Peoples, plants and animals are totems and central to their cultural responsibility, providing food, health, shelter, and spiritual wellbeing. Their relationship with these species is fundamental to cultural practices and expression. Caring for plants, animals, and their habitats is a keyway of expressing culture. Indigenous ecological knowledge, passed down for tens of thousands of years, is unique to each Aboriginal clan and language group in Victoria. (AHC) In addition to this uniquity, knowledge may also be kept within Traditional Owner groups. However, the tangibles section of this table lists, describes, and references the cause-and-effect pathways, of the species identified as having cultural values.	Smyth, 2008; Juluwarlu, 2004; Muller, 2008. Aboriginal Heritage Council Victoria, 2025	*Refer to identified tangible species above*	*Refer to identified tangible species above*

Cultural Features	Description	Source	Cause and Effect Pathway	Reference to Evaluation
Sea Country Knowledge	Knowledge of and familiarity with the features of Sea Country is itself a "value". The inherent potential for restricted or secret knowledge (or information that is not wished to be shared) makes this difficult to assess even through consultation with Traditional Custodians. However, aspects such as limitations on access to sites or disruption/relocation of First Nations communities may have implications for the preservation of First Nations knowledge. Transfer of knowledge includes continuing traditional practices to pass on practical skills. This transfer of knowledge may be integral to managing a group's intangible cultural heritage.	UNESCO, 2003	Indigenous tangible and intangible values are interconnected (see section 3.16.2), relying on the health of Country, for cultural values to be maintained and passed down to future generations. Therefore, holistic assessment through the principles of ESD is appropriate.	Acceptable Levels Assessment, Intergenerational Equity Principle, Appendix F4
Songlines	Cultural knowledge, as expressed through songlines, dreaming, dance and other cultural practices, can be associated with tangible objects and physical sites that are culturally important to First Nations people. The land's physical features are instrumental in maintaining songlines because this is how ancestral spirits journeyed through, and interacted with, the physical landscape leaving shared knowledge behind.	Ardler, 2021; Bursill et al., 2007. Event ID 842 Feedback ID 4216 Appendix C3, Desktop Research: Org ID 316 & Person ID 1163	Indigenous tangible and intangible values are interconnected, relying on the health of Country, for cultural values to be maintained and passed down to future generations. Therefore, holistic assessment through the principles of ESD is appropriate. (See also the identified tangible culturally significant	Acceptable Levels Assessment, Intergenerational Equity Principle, Appendix F4 (See also the identified tangible culturally significant species in this table above)

Cultural Features	Description	Source	Cause and Effect Pathway	Reference to Evaluation
	The effects from the proposed activity lie at the interconnection between the physical and spiritual and this is where songlines become intrinsically tied to significant places across Country. As a result, geographical landforms are recorded within songlines and become sacred places. Such landforms can include inter alia: rocks, mountains, rivers, caves, and hills.	Higgins, 2021	species in this table above)	
	Physical sites that have been identified as comprising a component of a songline are important to protect to prevent the fragmenting or breaking apart of songlines and loss of sacred cultural knowledge. The region is located within the ancient landscape where prominent landscape features (e.g., rocks, mountains, rivers, caves and hills) would have been visible or used by Traditional Custodians and therefore likely to be incorporated in songlines. In Australia, songlines can stretch thousands of kilometres, making up a complex and organic network of stories containing cultural knowledge of First Nations communities across the land.	Neale and Kelly, 2020		

Cultural Features	Description	Source	Cause and Effect Pathway	Reference to Evaluation
	Songlines can also extend out to Sea Country and contain cultural knowledge that is tied to geographic features, atmospheric phenomena and marine plants and animals. Often songlines containing references to a seascape or Sea Country make mention of mythical events occurring around marine life, fishing areas, submerged rocks or coral. Songlines that embody seascapes can reflect how a group may relate to, or value, Sea Country—for example connections to nearby islands that they once inhabited in their songlines.	Smyth and Isherwood, 2016		
	Songlines can become lost, fragmented, or broken when there is a loss of Country or impact to culturally important physical features.	Neale and Kelly 2020:30		
Connection out to the continental shelf	The connection with Sea Country extends well beyond the current shoreline to the edge of the continental shelf with Songlines across the land and out to sea (Eastern Maar Aboriginal Corporation, 2015).	Eastern Maar Aboriginal Corporation, 2015.	Indigenous tangible and intangible values are interconnected, relying on the health of Country, for cultural values to be maintained and passed down to future generations. Therefore, holistic assessment through the principles of ESD is appropriate.	Acceptable Levels Assessment, Intergenerational Equity Principle, Appendix F4

Connection to Country	This describes the multi-faceted relationship between First Nations people and the landscape, which is envisioned as having personhood and spirit. It is also an aspect of personal identity for many First Nations people. In the case of Sea Country this can mean identifying as a Saltwater person, where "essence of being a 'Saltwater' person is ontological… it is about how people relate spiritually to the sea and engage with spiritual forces that created it, the marine flora and fauna and people" The proposed activity is situated in important Sea Country for the Gunditjmara people, who have enduring spiritual and cultural connections to the area and marine life that lives within it [This sentence has been updated follow public comment FN01] Nyamat Mirring is an intrinsic part of their (*Gunditjmara*) culture, law, Lore, and custom (Event ID 352) In the video 'Bunurong Land Council @ Point Nepean in HD', representatives from the Bunurong Land Council talk about their connection to Country and ancestors. Gunditjmara have a strong connection, and responsibility, to Nyamat Mirring. Wadawurrung describe the interwoven relationship they have with Dja (Country), and the connection to their past, cultural practices and stories. Country represents a deep, intrinsic connection to the land, a source of identity, nurturing individuals and communities through	McDonald and Phillips, 2021 Bunurong Land Council, 2016 Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC, 2023 Wadawurrung Traditional Owners Aboriginal Corporation, 2020. Eastern Maar Aboriginal Corporation, 2015. Event ID 352	Indigenous tangible and intangible values are interconnected, relying on the health of Country, for cultural values to be maintained and passed down to future generations. Therefore, holistic assessment through the principles of ESD is appropriate.	Acceptable Levels Assessment, Intergenerational Equity Principle, Appendix F4,

Cultural Features	Description	Source	Cause and Effect Pathway	Reference to Evaluation
	shared knowledge, stories, values, and traditions passed down through generations. For those who live away, the bond remains strong, with frequent returns to reconnect with both the land and the community, reinforcing their role in caring for and preserving Country.			

Cultural Features	Description	Source	Cause and Effect Pathway	Reference to Evaluation
	Seasonal knowledge. The Eastern Maar seasonal calendar follows six distinct seasons, Larneuk, Gwangal moronn, Petyan, Kooyang, Chinnup, and Ballambar, each marked by ecological signs that indicate changes in weather, animal behaviour, and the availability of important food resources, guide the Eastern Maar in caring for Country, aligning their activities with natural cycles rather than fixed Western seasons. The Gunditjmara follow a six-season calendar that guides their understanding of Country and informs when different natural cycles occur. The seasons are known (in English) as: Big Dry, Early Wet, Big Wet, Flowering Time, Fattening Up, and Drying Out. Changes in rainfall, water levels, wetlands, plants flowering, insect and animal behaviour guide Gunditjmara land-management, harvesting, and cultural activities. This calendar, rooted in careful observation of environmental rhythms rather than fixed dates, helps the Gunditjmara maintain a living, responsive relationship with their Country, ensuring that practices align with ecological and cultural cycles.l	Eastern Maar Aboriginal Corporation, 2015. Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC, 2023 Event ID EVT352	Traditional Owner seasonal calendars differ from the Western four-season model by using ecological cues, such as plant flowering, eel movement, whale migration, or bird nesting, to define the transitions between seasons. These seasons are specific to Country and reflect local ecological rhythms, whereas Western calendar seasons are fixed by date and do not adjust to environmental variability.	Annex 1 – 'Presence/Absence Analysis for Species within the Environment Planning Area' of the EP incorporates species "biological calendars," the distribution of their habitats, and the identification of environmentally sensitive areas, including breeding grounds, migration pathways, and resting areas.
	Access to Country is highly valued and a key aspect of cultural maintenance.	Woods (2020)	**Planned:** Physical Presence	Physical Presence, Appendix E1, *(cited in section 8.2.5)*

3.16.2 Magnitude of Effects

McConnell, et al, describes Indigenous tangible and intangible values as symbiotic and inseparable, explaining that Songlines depend upon the continued health of Country, including access and connection (McConnell, 2021). The tangible value must persist for the intangible value to continue to be maintained and passed down through future generations of Indigenous peoples. UNESCO (2003) and ICOMOS (2013) recognise that tangible and intangible cultural heritage are inseparable and mutually reinforcing: physical places, species and landscapes embody cultural memory and identity, while intangible traditions, meanings and practices give those tangible elements their significance and rely on them as the setting for their practice and transmission.

CGG's proposed management approach reflects this relationship. In CGG's impact and risk framework, cultural values and sensitivities are therefore treated as an integrated receptor. Impacts on the biophysical environment, such as changes to species behaviour, water quality or access to Sea Country, may also generate non-physical cultural impacts by affecting the meanings, practices, associations and obligations associated with those places and species. Accordingly, the impact pathways, risk evaluation and control measures consider both the potential effects on tangible cultural features and the intangible values that rely on their presence, condition and continuity. The Sea Country Protection Plan has been put in place to provide an ongoing opportunity for identification and management of any new cultural information that may emerge.

In addition, as Appendix F4 – Acceptable Levels Assessment, Section 5.10, demonstrates, the Regia MSS EP aligns with the principles of ESD. From the precautionary approach to intergenerational equity and the conservation of biological diversity, the EP process consistently reflects a commitment to safeguarding the marine environment, reducing environmental impacts and risks, and preserving the interests of future generations.

Throughout the environmental impact and risk assessment chapters, CGG established Environmental Performance Outcomes (EPOs). These EPOs act as key performance indicators to guide the activity's environmental goals. All EPO's are therefore relevant to safeguarding social, economic, and cultural features and values, ensuring protection across all areas. In addition, a specific social, cultural and economic features EPO has been put in place, reinforcing the protection and sustainability of these values.

3.16.3 Recovery Potential

There will be no interference with the knowledge of Sea Country or the practices and rituals that allow the knowledge to be shared and preserved, including access to Country. Songlines management of intangible cultural heritage can include reducing impacts and risks to environmental features that are associated with intangible cultural heritage (UNESCO 2003; ICOMOS 2013). Therefore, measures that promote the preservation of stories and songlines in the area would be suitable for managing these features. Regarding the intangible values of connection to Sea Country and the related knowledge, due to the absence of direct effects and immeasurable indirect effects, this is no recovery potential to assess.

3.16.4 Conservation Status

Conservation status of the identified tangible cultural features is described on a receptor level, within this document and the relevant impact and risk appendices (Appendix E1, E2, E3, E4, E5, E7, E9, D1, D2, D3, D4)

3.16.5 Mitigation Effectiveness

Mitigation measures are in place to protect marine fauna from the effects of elevated levels of underwater sound, minimise impacts from physical presence and artificial light, and decrease the likelihood of unplanned events. All apply to the protection of intangible cultural features and can be found in Appendix E1-E5, E7, E9. These measures are effective to ensure impacts are temporary and localised such that impacts on intangible cultural heritage values and sensitivities are not predicted.

CGG has adopted a Sea Country Protection Plan (SCPP). The SCPP is a mechanism that facilitates the identification and management of new information, relevant to the activity, through collaboration with First Nations people who decide to be part of the program.

4 Temporal Alignment of Key Environmental Values/Sensitivities

With many competing environmental values to be considered within the EP, a key approach to mitigation is to ascertain whether there are appropriate temporal windows within which disturbances could be minimised and/or avoided. To determine such windows, we ranked all identified key environmental values/sensitivities according to a 3-point scale for every month of the year.

For each individual group, taxa or sensitivity we ranked the importance of each month according to whether they were concentrated or aggregated relative to other months of the year. This was intended to capture spawning/reproductive behaviour and/or feeding behaviour that produces densities above yearly averages, including upwelling periods.

We used a 3-point ranking system;

1 - widely dispersed not displaying aggregating behaviour

2 – months surrounding peak aggregating i.e. shoulder periods

3 – months when aggregating behaviour is highest, such as spawning or upwelling

The resulting matrix was analysed to determine if there were natural patterns in the data reflecting monthly periods of high or low activity. A similarity index was calculated using the Gower coefficient for ordinal data such as ours (see Podani 1999). Clustering and non-metric multidimensional scaling (Clarke et al 2014) was then applied to the similarity matrix to produce a dendrogram and ordination. A heat map was also produced to further illustrate and clarify what groups are driving the observed temporal patterns in the data.

4.1 Results

The clustering analysis identified four distinct time periods across the year (Figure F3-25). The most heavily utilised time period was peak summer between January - March with April still significant enough to be grouped with the summer period but clearly becoming less important to a range of groups, reflecting the tail-end of the summer spawning period. November and December months while considered part of the austral summer period are more closely aligned to the larger grouping of May to October which encompasses non-summer spawners of which there are far less. These two months are shoulder months reflecting the start of the summer breeding season when environmental triggers for species to engage in aggregation behaviour have not reached peak levels.

The shade plot and ordination (Figure F3-26) together provide the detail about what species or sensitivities are linked to particular periods of the year. Twelve of the identified 15 key taxa/sensitivities are most closely aligned to the summer period between December and April. Only three are more closely aligned to the winter months. While numbers alone are not the deciding factor it is notable that in making decisions about timing of the Regia MSS there are far less of the identified groups reliant on the winter-spring-early summer period for their key reproductive and/or feeding behaviours.

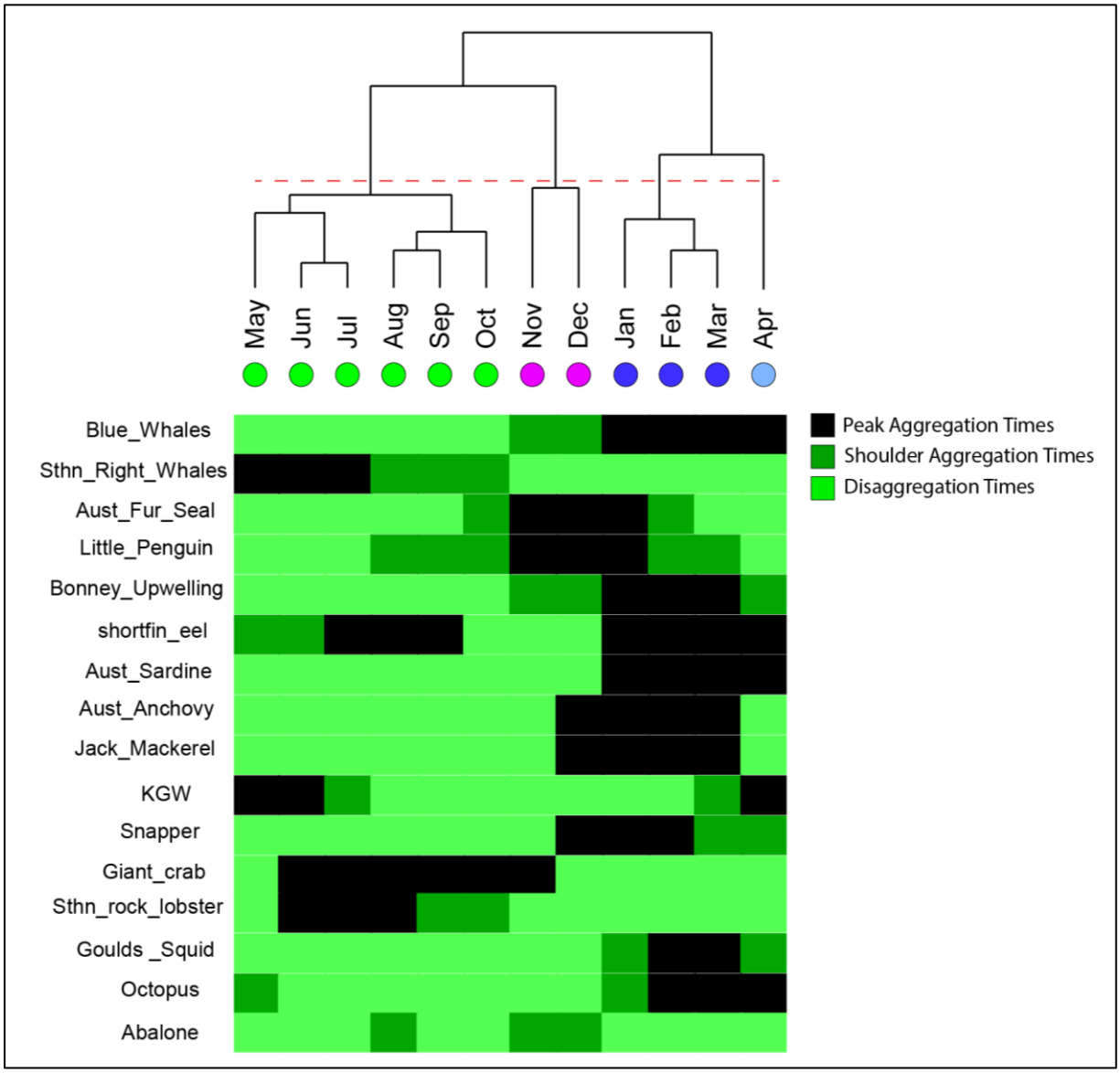


Figure F3-25 - Dendrogram from the cluster analysis indicating the grouping of months across the year according to their importance to the key sensitivities. The associated shade plot (~heat map) provides a clear visual picture of which species are influencing the groupings with the black boxes hjghlighting the most important times for each group.

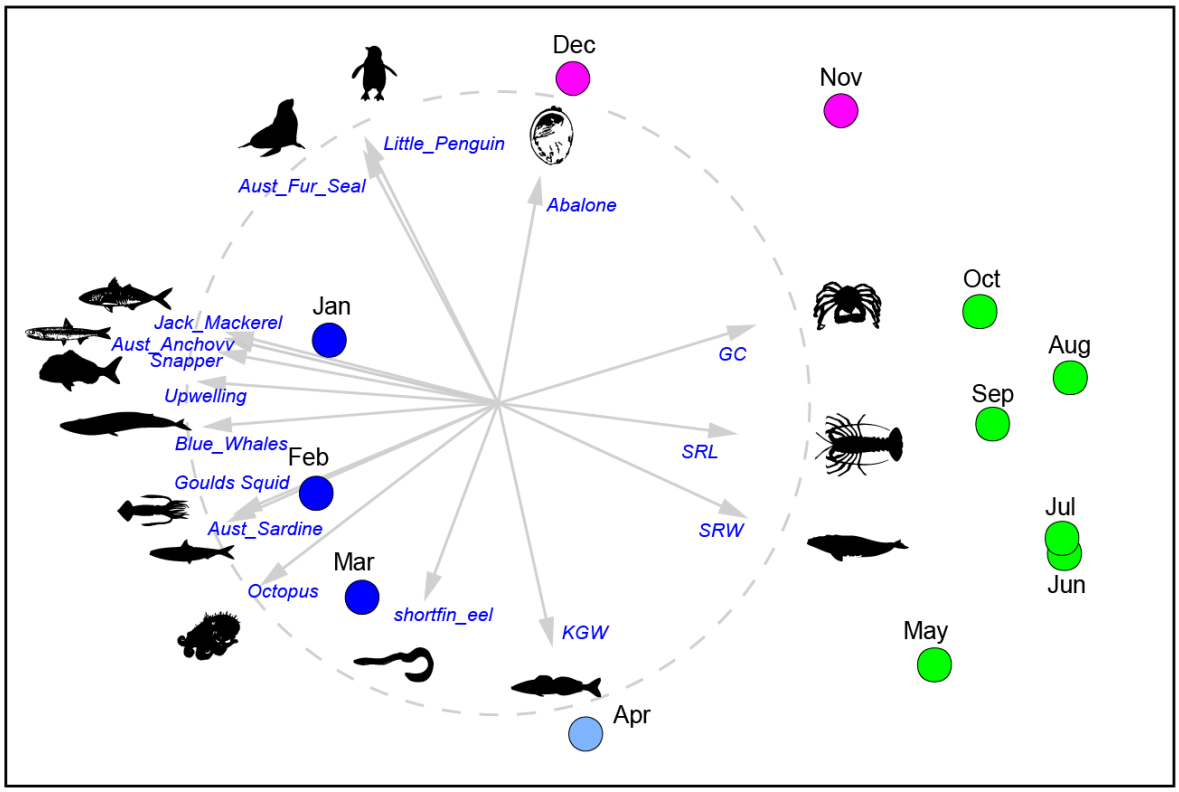


Figure F3-26 - A non-metric multidimensional scaling ordination illustrating the relationships between key values/sensitivities and months of the year. Months are coloured according to their groupings in the cluster analysis. Vectors representing the correlation with months of the year for each taxa/sensitivity are overlaid with arrows indicating the direction of strongest correlation. For example, the most important months of the year for Giant Crab (GC), Southern Rock Lobster (SRL) and Southern Right Whales (SRW) are the winter months ranging from May-October.

5 Consultation Input

CGG carried out the consultations required by the regulations to:

- Improve the predictive quality of this assessment by seeking relevant person input into the preparation of the EP.
- To verify the description of the environment that CGG produced as part of its environmental assessment process through information provided to CGG by relevant persons.
- Receive objections or claims about the adverse effects of the activity on a relevant person's functions, interests, or activities.

The information received from relevant persons can be found in each relevant person consultation report. It has been considered in the preparation of this assessment.

Objections or claims about the adverse of the effects of the activity can also be found in each relevant person's consultation report. They have been assessed for merit and CGG has written a statement of its response to each objection or claim. Any objection or claim relevant to this assessment and subsequently considered in its preparation can be found in Annex 2.

6 Environmental Assessment Modifications Required

Following completion of the further assessments in this document, in line with the iterative nature of the process followed to prepare this EP, CGG has considered whether modifications are required to the originating environmental assessments (Appendices D1-D4 and E1 – E9). This feedback loop ensures that the environment assessments remain contemporary, accurate, and reflects feedback from the regulator and relevant persons.

Further Assessment Topic	Outcome of Further Assessments
Southern Right Whales / Koontapool (*Eubalaena australis*)	Further assessment identified the uncertainty of applying simplistic thresholds to managing behavioural disturbance, particularly to critical life stage activities. Further analysis of the sound propagation modelling led to the design of activity limitations that effectively eliminate the overlap of any sound exposures thought to have any significant behavioural effects to SRW.
Blue Whales / Wuulok (*Balaenoptera musculus*)	
Australian Sea Lion (*Neophoca cinerea*)	CGG has assessed the impacts of the Regia MSS to these receptors in detail throughout this EP and is satisfied through the implementation of mitigation measures and activity limitations, impacts have been reduced to below acceptable levels. As a result, no further assessment or mitigation is recommended.
Southern Rock Lobster (*Jasus edwardsii*)	
Giant Crab (*Pseudocarcinus gigas*)	
Glass Eels / Kooyong (*Aquilla australis*)	
Gould's Squid (*Nototodarus gouldi*)	
Pale Octopus (*Octopus pallidus*)	
Blacklip Abalone (*Haliotus rubra*)	
Pink Snapper (*Chrysophrys auratus*)	
King George Whiting (*Sillaginodes punctatus*)	
Plankton Communities and the Bonney Upwelling System	
Spawning Patterns	
Budj Bim Cultural Landscape	
Cultural Features of the Environment	CGG has assessed the impacts of the Regia MSS to this receptor in detail throughout the EP and has concluded the defined acceptable levels and EPOs for this receptor were not sufficiently detailed. As such, CGG has re-assessed and added more defined acceptable levels and EPO's relating to this receptor in the impact and risk appendices (D1-D4 and E1-E9).
Little Penguin (Eudyptula minor)	CGG has assessed the impacts of the Regia MSS to this receptor in detail throughout the EP and has concluded the defined acceptable levels and EPOs for this receptor are not sufficiently detailed. As such, CGG has set additional defined acceptable levels and EPO's for each life cycle stage for little penguins in EP Appendices E5 and

	update the environmental performance commitments in Appendix G1.

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8 Revision History

Version	Date of Revision	Author/Reviewer	Summary of Changes
0.0	2 October 2023	MS	Table of contents established and commenced evaluation.
0.1	6 December 2023	MS/AH/SJ/CT	Concluded demonstration of whether environmental impacts and risks from the Regia MSS were of an acceptable level.
0.2	20 December 2023	MS	Review and update following comments.
1	5 January 2023	MS	Formatting complete and published for public comment.
2	15 May 2024	MS	Review and update following public comment
3	4 November 2024	AH/RH/CT/MS	Added further assessments of Budj Bim, cultural features, and little penguins. Updated following feedback from NOPSEMA.
4	16 April 2025	MS	Updated following NOPSEMA OMR 1 Letter
5	6 December 2025	MS/EOR	Updated following NOPSEMA OMR 2 Letter

Annex 1

Public Comment

Table F3-8 shows how the Matters raised during public comment have been incorporated into the EP in this document.

Table F3-8 - Public comment input into the preparation of the EP.

Matter	Matter ID	Changes made arising from public comment
Matter: Flawed argument regarding animals moving away	I04	CGG has considered these claims and has updated the EP Impact Assessments (Appendices E, and F where relevant) to clarify that, while some displacement is expected from mobile taxa during the Regia MSS, the survey will not preclude animals from the Operational Area in its entirety. Instead, animals are expected to temporarily move away from the active acoustic source, but once the source passes, animals will be free to move back into the habitat that they departed from.
Matter: Impacts to whales' food source	M10	CGG has undertaken further investigation and provided an additional detailed responses related to these this matter in EP Appendix F3, Section 5.2.10.1.
Matter: Limitations of MFOs/MMOs when detecting marine mammals	M43	CGG has considered these claims and has updated EP Appendix G2 (Fauna Management Plan) and Appendix F3 (Acceptability Assessment) and EP Appendix G1 (Environmental Outcomes) to include an additional MFO/ PAM operator to ensure fatigue management is appropriately addressed with allowance for 24/7 coverage.
Matter: MFOs/MMO's do not have a 360-degree view, the use of one MFO/MMO is inadequate.	M45	CGG has considered these claims and has determined that additional MFO coverage is appropriate to further mitigate the potential for whales to go undetected within the 3 km observation zone. Consequently, CGG has updated EP Appendix G2 (Fauna Management Plan), EP Appendix F3 (Acceptability Assessment) and EP Appendix G1 (Environmental Performance) to include an additional MFO/ PAM operator will be present on the vessel to support fatigue management. In addition to the two MFOs on the seismic vessel, two dedicated, trained and experienced MFOs will be always onboard a dedicated spotter vessel. In addition, officers of the watch on the attending support vessels will be trained to identify whales during daylight hours to support the visual detection of marine mammals.
Matter: The use of two PAM operators is inadequate.	M49	CGG has considered these claims and has updated EP Appendix G2 (Fauna Management Plan) and Appendix F3 (Acceptability Assessment) and EP Appendix G1 (Environmental Outcomes) to include an additional MFO/ PAM operator to ensure fatigue management is appropriately addressed with allowance for 24/7 coverage.
Matter: No modelling of impacts to zooplankton	P04	CGG has considered these claims and is satisfied that all available and relevant modelling studies on seismic effects have been included in the knowledge base used to develop the EP, and the EP has been updated to include reference to recent publications.
Matter: Extent of impacts to zooplankton	P06	CGG has considered these claims and is satisfied that the extent of seismic effects on zooplankton have been appropriately assessed, and the EP has been updated to include reference to recent publications.
Matter: Impacts of underwater sound on octopus	F11	CGG has considered these claims and to ensure that the most up-to-date assessment has been made has provided an extra Acceptability Assessment within Appendix F3 of the EP, which more clearly defines the levels of risk to Octopus from the proposed Regia MSS.

Matter	Matter ID	Changes made arising from public comment
Matter: Impacts on Fisheries (general)	F12	CGG has considered these claims and has added specific analyses of further species including Abalone, Snapper, and Octopus to the Acceptability Assessment within Appendix F3 to ensure all concerns have been investigated and the level of risk has been clarified according to the available evidence.
Matter: Impacts on spawning aggregation areas for King George Whiting	F14	CGG has considered these claims and has added specific analyses for King George Whiting to the Acceptability Assessment within Appendix F3 to ensure all concerns have been investigated and the level of risk has been clarified according to the available evidence.
Matter: Impacts on abalone fisheries	F16	CGG has considered these claims and is satisfied that through scheduling management of the proposed Regia MSS any potential interaction with abalone stocks can be minimised and has conducted a further assessment on abalone in EP Appendix F3 (Acceptability Assessment), Section 5.2.8, which provides a more detailed species-specific examination of impacts.
Matter: Impacts to dive-based fisheries	F17	CGG has considered this claim and, based on the updated secondary sound modelling, has updated EP Appendix E8 (Impact Assessment – Underwater Sound: Surfers, Divers and Swimmers), Appendix A2 (Description of the Activity) and M#01: Activity limitation, to reflect that the sound source will not be discharged at full power from areas which have been predicted to result in an exceedance of the safety criterion human health safety criterion for recreational divers, surfers and swimmers along the coastline. CGG has also made updates to modelling in Appendices (E1, E2, E3, E4, E5, E6, E7, F1 F3, G1 and G2).
Matter: Lack of detail on EPBC-listed species and enforceable measures	I17	CGG has updated EP Appendix F3 (Acceptable Levels Assessment) to include an assessment for the Australian sea lion in response to these claims.

Annex 2

Objections or claims raised through consultation

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4002	Risks to the lives of ancient marine mammals	The titleholder acknowledged the feedback, noting that impacts and risks to marine mammals are assessed in the Environmental Plan (EP) and can be found in E7 and F3. Measures to minimise adverse impacts to marine mammals are outlined in the EP in E7 and G1.	5114
4334	This statement opposes seismic blasting in areas designated as Sacred Birthing Grounds for Southern Right Whales, underlining the cultural and environmental significance of these grounds. It also expresses solidarity with the Gunditjmara Traditional Owners, acknowledging the cultural heritage and environmental stewardship of this region by Indigenous communities. The feedback emphasises the perceived risks to both marine life and Indigenous heritage in the area.	The titleholder acknowledged this concern and confirmed that CGG will not carry out the survey whilst Southern Right Whales are present in their reproductive biologically important area. Confirmed that CGG are engaging with the local traditional owners and look forward to hearing their stories, learning about their culture, and protecting sea country (Event ID 2101).	2101
4332	This statement calls for a respectful approach, urging stakeholders to engage deeply with Indigenous knowledge and perspectives, including the views of Elders and Traditional Owners. It emphasises empathy and a meaningful understanding of the environmental and cultural impact of activities on marine life.	The titleholder acknowledged this concern and confirmed that CGG will not carry out the survey whilst Southern Right Whales are present in their reproductive biologically important area. Confirmed that CGG are engaging with the local traditional owners and look forward to hearing their stories, learning about their culture, and protecting sea country.	2101
4280	The stakeholder expresses strong opposition to the exploration for gas near Deen Maar (Lady Julia Percy Island), emphasising its significance to the local Indigenous community, comparable to the cultural importance of Uluru. They highlight its unique status as Australia's only offshore volcano and assert that such an exploration would be inappropriate in a site of sacred significance, arguing against the project's alignment with respecting Indigenous heritage and environmental integrity.	We are aware of the environmental, cultural, and spiritual importance of Deen Maar and will talk with local traditional owners to learn more about Deen Maar and understand how we protect and preserve the values of this site (Event ID 2108).	2108

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4303	The stakeholder stated that they were concerned about both tangible and intangible cultural heritage, as well as submerged underwater archaeology.	Indicated that we will be performing non-invasive work in a site survey and could work with the TO's to help identify culturally significant sites (Event ID 1891).	1891
4271	The stakeholder asserts that seismic blasts will have a direct negative impact on marine life, specifically mentioning that an “exclusion zone” will not effectively prevent the effects of the blasts from travelling through the ocean.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable. The titleholder is aware of the environmental, cultural, and spiritual importance of Deen Maar and will talk with local traditional owners to learn more about Deen Maar and understand how to protect and preserve the values of this site.	2108
4216	Stated that they feel a sense of reparability to listen to the Guntijimara people and what they wish for their sea country and ancient song lines.	Titleholder responded to the individual confirming consultaiton was currently being attempted with First Nations Custodians of Country and to engage with them on the activity. Titleholder requested that the individual encourage any potentially relevant people they may know to contact the consutlation team and advised that consultation is an important aspect of the marine seismic survey planning process, community input and feedback will be considered in the planning and execution of the survey.	842
4035	Comment about the impact of human activities on wildlife habitats and calls for a halt to such destruction for profit. It emphasises the negative consequences of competing interests in the area.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	2109
4036	Comment claims that seismic activity is known to cause significant harm to marine life, arguing that the proposed project will lead to further degradation of the coastal environment and should be abandoned as a result.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	2098
4038	Commenter highlights that fish populations have been adversely affected by seismic testing over the past few years, leading to a decline in their numbers. This decline could also impact other marine species and have negative effects on whale populations.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. A fauna management plan is in place to manage whale interactions.	1432

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4356	Concerns about the harm and damage to the marine ecosystem.	Titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the marine environment within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2831
4004	Seismic blasting in our ocean so close to our beautiful home is deeply concerning given the toll will inevitably take on sea life and further unknown impacts.	The titleholder acknowledged the feedback, noting that impacts and risks to sea life are assessed in the Environmental Plan (EP) and can be found in E1 to E9 and F3. Measures to minimise adverse impacts to sea lufe are outlined in the EP in G1.	2757
4006	A call for a moratorium on seismic surveying in biologically important areas during times when whales are present, emphasizing the need to protect vulnerable species.	The titleholder acknowledged the feedback, noting that impacts and risks to marine mammals are assessed in the Environmental Plan (EP) and can be found in E7 and F3. Measures to minimise adverse impacts to marine mammals are outlined in the EP in E7 and G1.	612
4008	Acceptable levels are subjective and based mostly on limits set by proponent.	Agreed, noting the subjectivity in the process as a whole. Agreed to include more information on the acceptability argument as a whole and not just aspect-by-aspect. Provided ALARP report (Event ID 4280)	3705
4009	Activities are timed to avoid species' peak migration and foraging behaviors.	The titleholder acknowledged the feedback, noting that impacts are assessed in the Environmental Plan (EP) and can be found in E7 and F3. Measures to minimise adverse impacts to whales include: No discharge of the sound source in January, February, March (when the upwelling is in its peak month), the sound source will only be discharged in the Pygmy Blue Whale foraging BIA when low numbers of Pygmy Blue Whales and other foraging whales are in the BIA off Otway, and no discharge of the sound source within 15 km of the Southern Right Whale Reproduction BIA or Habitat Critical to Survival (HCTS) while Southern Right Whales are present in the BIA and HCTS. The full list of measures is included in E7 Section 8 and G1.	653

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4010	Activities that may prevent or displace Pygmy Blue Whales or Southern Right Whales' use of BIAs are avoided.	The titleholder acknowledged the feedback, noting that impacts are assessed in the Environmental Plan (EP) and can be found in E7 and F3. Measures to minimise adverse impacts to whales and ensures The Regia MSS does not prevent SRW and BW utilising their BIAs include: No discharge of the sound source in January, February, March (when the upwelling is in its peak month), the sound source will only be discharged in the Pygmy Blue Whale foraging BIA when low numbers of Pygmy Blue Whales and other foraging whales are in the BIA off Otway, and no discharge of the sound source within 15 km of the Southern Right Whale Reproduction BIA or Habitat Critical to Survival (HCTS) while Southern Right Whales are present in the BIA and HCTS. The full list of measures is included in E7 Section 8 and G1.	653
4012	AMCS critiques the proposed monitoring plan for detecting foraging whales and Southern Right Whales in Biologically Important Areas (BIAs), which relies on two marine fauna observers (MFOs) aboard the survey vessel during daylight hours. They note that this approach may not reliably detect whales that are submerged, in low visibility conditions, or during nighttime operations. Given the potential for seismic surveys to cause temporary and permanent injury to EPBC-listed cetaceans, AMCS requests that CGG provide a comprehensive monitoring plan that ensures reliable detection of whales in all weather conditions and throughout the entire operational schedule, rather than just during daylight or optimal visibility.	The titleholder acknowledged the feedback, noting that impacts are assessed in the Environmental Plan (EP) and can be found in E7 and F3. Measures to minimise adverse impacts to whales include: No discharge of the sound source in January, February, March (when the upwelling is in its peak month), the sound source will only be discharged in the Pygmy Blue Whale foraging BIA when low numbers of Pygmy Blue Whales and other foraging whales are in the BIA off Otway, and no discharge of the sound source within 15 km of the Southern Right Whale Reproduction BIA or Habitat Critical to Survival (HCTS) while Southern Right Whales are present in the BIA and HCTS. The full list of measures is included in E7 Section 8 and G1.	3384

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4018	Any assessment of potential mortality or injury effects on plankton must consider natural mortality rates. However, relying on natural mortality rates is irrelevant, as seismic survey-induced mortality will compound existing natural mortality, thereby increasing overall mortality rates. The Environmental Impact Assessment (EIA) does not acknowledge that this additional mortality could significantly affect plankton reproduction. The continuous nature of the blasting (every 10-15 seconds for 60 days) will likely hinder zooplankton recovery more than indicated in the EIA, which treats seismic-induced mortality as separate from natural mortality. AMCS requests that CGG explicitly evaluate the cumulative and additive impacts of continuous seismic surveys on plankton communities to provide a more comprehensive assessment of their effects on this critical trophic level and overall ecosystem health.	The titleholder acknowledged the feedback, noting that impacts are assessed in the Environmental Plan (EP) and can be found in E2 and F3. Contrary to this feedback our intent within the assessment has been to expressly consider the compounding effect that the sound emissions would have on plankton - as it is stated in the quote provided. We have provided references for our application of recovery rates (Huntley and Lopez 1992, Richardson et al 2017) and respectfully request that AMCS provide your references for the claim that "The continuous nature of the blasting (i.e. every 10-15 seconds for 60 days in a row) will affect the ability of zooplankton communities to recover beyond what is presented in the EIA" so that we can consider them.	3384
4022	Attendees voiced concerns about how seismic activities could impact the sustainability and fish-ability of the immediate and nearby areas.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1529
4023	Behavioural Response Threshold & Seismic Sound Avoidance: If CGG conducts seismic blasting within 82.8 km of any Fairy Penguin colony during the breeding season, the penguins may experience discomfort and hearing interference, leading them to alter their behavior to avoid the seismic source. This distance combines the maximum foraging range for a single day trip and the modelled distance for behavioral response thresholds.	CGG has included the study by Pichegru et al. (2017) on penguins in the EP and has referred to this study multiple times across multiple documents See specific examples below: B8 Seismic Study Report, Section 7, Birds: E5 Underwater Sound- Birds Section 6 F3 Section 4.4.1, 4.4.3 and 4.4.4.	5117

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4024	Birds and the little Penguin Colony having to travel further away for food and shelter during seismic testing times, causing stress and fatigue.	The titleholder acknowledged the feedback, noting that impacts and risks to penguins are assessed in the Environmental Plan (EP) and can be found in E5 and F3. F3 focuses on foraging capabilities in the area and the potental oerlap with the Regia MSS. There is an overlap between the foraging range of Little penguins at Deen Maar and the Regia MSS. This overlap is ~5.3 hours spread over 3.5 weeks, therefore, we do not belive little penguins will be displaced from foraging areas.	1784
4025	Bodily harm to Fairy Penguins: Fairy penguins can be harmed and killed by shock waves from underwater blasts.	The Cooper (1982) paper mentioned here is referring to injury/mortality cases with bird species as the result of underwater explosions triggered to fragment limestone. Use of an explosive charge such as dynamite does lead to significant changes in the seabed, sedimentation, and harm to marine life in close vicinity. Underwater detonations are an unconstrained, omnidirectional force of greater intensity and destructive capability than a highly controlled and directed seismic pulse (Koschinski 2011). No comparable effects can be associated with the proposed Regia MSS. CGG therefore does not believe that impacts from explosive blasting and exploratory seismic activity in the marine environment can sufficiently and accurately be compared, and CGG does not believe the threats to Little Penguins highlighted in this section have the potential to occur as a result of the Regia MSS. As a result of this relevant persons claims, CGG carried out an additional assessment on Little Penguins in F3.	5117
4026	Catch rate decreased significantly after the survey was conducted.	The titleholder acknowledged the feedback, noting that this claim was assessed in F3 where historical data was analysed for any correlation between historical seismic survey and a reduction in catch rates. No such correlation was found as shown in the analysis in F3.	5190

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4027, 4385	Central Place Foraging Limitations: All five Western Victorian Fairy Penguin colonies are likely to be directly impacted during the breeding season when adult penguins have limited foraging ranges. The Middle Island population is expected to be the most affected, as it is centrally located within CGG's Active Source Area for seismic blasting. Due to the coastline's geography, this population has the least ocean area available for foraging, with a significant portion of their range falling within the Active Source Area. Consequently, regardless of their foraging direction, the penguins will struggle to avoid the impacts of CGG's seismic activity.	When describing home ranges for feeding it is important to distinguish between maximum distances, total distance travelled and mean/median distances. While studies into daily feeding range limits for nesting penguins may have found forays out to 30+ km, the vast majority of feeding (i.e. mean distance travelled) is occurring with 15-20 km of their nesting sites. Longer distance forays are the exception not the norm and this has been confirmed across multiple studies from multiple locations (e.g. Berlincourt & Arnould 2014, Pelletier et al 2014, Philips et al 2019, Philips et al 2022). Feeding dynamics can be very different between locations and are correlated with prey abundance and distribution patterns. As we have demonstrated with references throughout the EP the Otway region is well supplied with sardines and squid, with quality of food resources correlated with nearness to upwelling areas (Norman et al. 2017). The proposed survey lines for the Regia MSS that will be closest to the coast are outside the core feeding areas for feeding penguins during nesting periods. Moreover, each successive line (lines will run parallel to the coast) will be located further and further away from the coast, hence the time spent within proximity to the coast will be small and continuously diminishing. It is anticipated that MS acquisition will occur over a total of 2-3 days in the distance range of 25-40km declining in intensity - relative to the coast - with every pass. The extent of the disturbance will be limited to a few hours each day over a maximum of 3-4 days at a distance NOT encompassing the main feeding ranges of nesting birds. The scale of such an impact is not predicted to impact on the viability of any local fairy penguin colonies.As a result of this relevant persons claims, CGG carried out an additional assessment on Little Penguins in F3.	5117
4033	Claim that seismic testing is proven to damage and kill marine life.	The titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1024
4035	Comment about the impact of human activities on wildlife habitats and calls for a halt to such destruction for profit. It emphasises the negative consequences of competing interests in the area.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	2109

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4036	Comment claims that seismic activity is known to cause significant harm to marine life, arguing that the proposed project will lead to further degradation of the coastal environment and should be abandoned as a result.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	2098
4038	Commenter highlights that fish populations have been adversely affected by seismic testing over the past few years, leading to a decline in their numbers. This decline could also impact other marine species and have negative effects on whale populations.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. A fauna managment plan is in place to manage whale interactions.	1432
4046	Concern about potential impacts to environmental assets and cultural heritage within Bunurong Country.	Titleholder acknowledged this concern and noted that potential impacts to cultural features from physical presence is assessed in E1 of the EP and in F3 Section 4 . CGG will implement a Sea Country Protection Program to ensure impacts to cultural heritage are minimised.	2371
4047	Concern about spawning activity of the Giant Crab, rather than the impact of the fishing overlap given exclusion of surveying at +200m water depths.	Titleholder acknowledged this concern andcarried out an additional impact assessment for Giant crab and spawning species has been included in F3. There is expected to be no measurable effect on giant crab populations as a result of the survey.	4076
4048	Concern about sustained noise impact on cetaceans in the area.	CGG has conducted a thorough impact assessment relating to underwater sound and marine mammals, with mitigation measures and management adopted as a result of both this assessment (which includes relevant marine mammal species) (E7) and a further assessment (which includes two key whale species: Blue Whale and SRW) (F3). A comprehensive fauna management plan was also established as part of this EP development (G2).	1835

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4050	Concern about the destruction of smaller sealife and the wounding of larger marine animals due to seismic blasting.	Regia EP has conducted thorough assessments of the literature for all relevent receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS is required to define acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Measures to minimise adverse impacts on relevant biological receptors in the region and relevent mitigation measures are outlined in the EP.	1669
4057	Concern about the long-lasting impacts of the proposed activity on marine life and coastlines, highlighting ecological and cultural repercussions.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation nor interfere with cultural practices or values. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1022
4061	Concern about the welfare of whales, seals, and birds due to the activity.	The titleholder acknowledged concerns outlined in email regarding welfare of whales, seals and birds due to the activity. Outlined approach to assessment that included demonstrating that impacts to these species will be of an acceptable level and advised that it had been determined that is acceptable to have a temporary behavioural change such as moving away from the survey vessel and that injury or long-term impacts were not acceptable.	835
4063	Concern for various birds and little penguins and the effects of sound and light.	Impacts from underwater sound and artificial light on birds, including little penguins, are assessed in the Environmental Plan (EP) and can be found in E5 and E9. Further assessment of little penguins was also undetook by CGG to demonstrate that environmental impacts and risks arising from the activity will be of an acceptable level. Measures to minimise adverse impacts on birds in the region are also outlined in the EP.	1783
4065	Concern regarding comparing spaital placement of the previous surveys	This concern has already been considered in the analysis provided to this relevant person and CGG notes that the placement of the previous surveys is not a determining factor in the assessment because of the broad spatial dispersion of fish eggs and larve associated with this fishers concern.	4639

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4066	Concern regarding the potential effects of the proposed activities on zooplankton populations and the subsequent impacts on marine ecosystems.	The only effects to zooplankton come from elevated levels of sound. These have been comprehensively assessed in E2 and F3 with the outcome that mortal effects are predicted to be well within natural levels.	2027
4067	Concern regarding the repeated seismic blasting in the area, which may have effects on marine life. Stakeholder is questioning the impact of multiple blasts and the potential for further exploration by other companies, particularly regarding the sale of seismic data.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Cumulative impacts are also assessed as negligible.	879
4069	Concerned about the harm being inflicted on oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1673
4070	Concerned about the harm to King George Whiting species and disagreement with the provided information of having no impacts on the mentioned species in the region.	The titleholder agreed to undertake further analysis noting the issues raised needed some further evidence. This analysis can be found in F3 Section 4 of the EP	4497
4071	Concerned about titleholder analysis and King George whiting advection pathway and impact of proposed activity on their business. Stated a spatial and temporal comparison is required.	The titleholder agreed to undertake further analysis noting the issues raised needed some further evidence. This analysis can be found in F3 Section 4 of the EP	4967
4074	Concerns about implications for the population of Rock Lobsters in the area going forward.	This claim has been thoroughly assessed in E1 and E5, and F3 for southern rock lobsters. The known effects to individual lobsters are not predicted to have any measurable effect on population levels or dynamics.	2773
4075	Concerns about marine life and ecosystems.	The effects of underwater sound have been extensively assessed based on the latest scientific literature. CGG has committed to a variety of protective measures for various marine fauna (see G1)	2117

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4076	Concerns about potential disturbance to the marine environment, including marine parks and areas of Biological Importance.	The titleholder acknowledged this concern and noted that potential impacts to the marine environment including marine parks and biologically important areas as a result of the Regia MSS is assessed in E1 to E9 and F3 of the EP. There will be will be no activities with Australian Marine Parks. All areas of biologic importance have been identified and assessment in the respective impact and risk assessments.	2278
4077	Concerns about potential harm to zooplankton, whales, dolphins, sharks, seals, the Bonney Upwelling, rock lobster fishery and other local fishing industries.	Titleholder has undertaken a comprehensive assessment of all available scientific literature to develop an appropriate EP. All potential risks have been identiifed with appropriate mitigation methods applied where necessary. There are no identified levels of harm that would endanger the population stability of any taxa.	722
4079	Concerns about the impact of seismic activities on the Bonny upwelling.	The Bonney Upwelling is subject to further assessment in F3 and the values (plankton) of the Key Ecological Feature have been assessed in E2. There are limitations in place to ensure there is no discharge of the sound source within the Bonney Upwelling KEF and the effects to zooplankton are well within natural mortality levels.	2997
4083	Concerns about why more seismic needed and what time of the year was the survey going to be done to minimise impacts to fishing for sharks, lobsters, squid	Titleholder acknowledged this concern and each of the species within this claim has been subject to extensive assessment in E1, E3, E4 and F3 with various measure adopted to limit the sound exposure to the lowest level possible to meet geophyiscal objectives and to protect marine fauna (see G1).	740
4084	Concerns for reduced landed catch during the survey due to displacement. Have historical data going back many years to show if changes.	The titleholder has acknowledged this concern and note that displacement is assesed in the EP E1 and F3 as a potential impact of the physical presence of the activity. Control measures to reduce impacts to commercial fishers as a result of displacement are outline in EP. The Adjustment Protocol stipulates an adjustment process will be implemented if a commercial fisher has a financial loss due to the Regia MSS. The adjustment process will be developed in consultation with the fishery associations that represent the commercial fishers that fish within the Operational Area. While onshore fish processing is not covered by NERA protocol a claim will be considered based on appropriate historical evidence.	4108
4085	Concerns of damage to the marine environment by seismic blasting and gas extraction	All available scientific evidence is used to inform the environmental assessment on seismic impacts. There are no impacts identified that will affect the population stability of any taxa.	825

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4086	Concerns raised by specific fishers about King George Whiting.	The titleholder acknowledges this concern and carried out an additional impact assessment for King George Whiting and spawning species that has been included in F3. There is expected to be no measurable effect on KGW populations as a result of the survey.	4627
4088	Condemns seismic testing, asserting that it is deadly to marine life and unacceptable for ocean ecosystems. Call for a total ban, citing the large number of marine animals harmed by the practice. Argument that the destruction of marine ecosystems and the fishing industry is unjustifiable and express frustration, telling the parties responsible to stop.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	422
4092	Do not disrupt their whale songlines.	The cultural features of the environemnt have been assessed in E1 and further in F3. The effects to physical receptors are temporary and localised and there is no interference with the practices or rituals required to maintain a spiritual connection to Country. Songlines have been explicitly considered in these assessments.	2254
4093	Doubted the effectiveness of mitigation measures, and believed the reports/information provided were absent of action /intention.	The mitigations applied by CGG are industry standard and comply with government policy. They have been proven to be as effective as reasonably practical for a number of years. The measures adopted to protect species from the aspects of the activity are found in the respective impact and risk assessments.	2830

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4096	Environmental Risk: Concerns about the environmental impact of seismic testing on marine life and the clash between business interests and environmental protection.	Regia EP has conducted thorough impact assessments for all relevent receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals, in relation to underwater sound and artifical light as aspects of the activity. Other marine users have also been considered in another impact assessment that considers physical presence as an aspect of the activity.The Regia MSS is required to define acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Measures to minimise adverse impacts on relevant biological receptors in the region and relevent mitigation measures are outlined in the EP.	2766
4102	Expresses opposition due to proximity to local fishing industries. Emphasises concern about potential risks this testing poses.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Adjustment protocol in place for fishers to seek compensation if impacted by MSS.	428
4106	Feedback raises concern for the welfare of whales that come to calve in local waters, emphasising the need to consider the impact of proposed activities on these vulnerable marine animals.	We will not survey while SRW mothers and calves are in the area. Oil and gas has successfully co-existed with wildlife in this area for 25 years and we are doing everything we can do protect the wildlife and natural beauty of the area (Event ID 1781).	1781
4112	Highlights concern for the disregard of wildlife and humans in environmental decisions, emphasising that extinction is irreversible.	The impact and risk assessments undertaken by CGG have not identified any effects that will led to extinction of any species. A search for unacceptable impacts was undertaken in F4 and found no pathway this these types of significant effects.	1781
4116	Ignoring reputable scientific studies showing harm from seismic testing	CGG refuted this claim and provided the relevant person with 44 peer review studies directly relevant to their concerns as well as a thorough assessment of the effect on spawning and recruitment to their fishery.	4551

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4118	Impact on marine animals, which are the livelihood of the community.	Regia EP has conducted thorough impact assessments for all relevent receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevent mitigation measures have been outlined in the EP.	2274
4120	Indigenous Heritage: Advocacy for the protection of the sacred Sea Country of the Otway Basin and objections to the proposal's potential destruction of indigenous cultural heritage.	The cultural features of the environemnt have been assessed in E1 and further in F3. The effects to physical receptors are temporary and localised and there is no interference with the practices or rituals required to maintain a spiritual connection to Country.	2383
4121	Indigenous Heritage: Objection to the proposal due to the potential destruction of a sacred indigenous location in the Otway Basin.	There is no physical interaction with the seabed or coastlines which would lead to destruction of any location. The cultural features of the environemnt have been assessed in E1 and further in F3. The effects to physical receptors are temporary and localised and there is no interference with the practices or rituals required to maintain a spiritual connection to Country.	2766

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4122	Indirect Impact: Changes To Prey Availability: CGG cannot assure that the proposed seismic blasting will not reduce the prey available in the breeding season foraging areas of the Fairy Penguins. Therefore, seismic blasting should be prohibited in these critical areas due to the negative impact it would have on the prey species that the penguins rely on for survival and feeding their young.	We refer you to E - Impact Assessments - E2 – Underwater Sound – Plankton, and F – Decision Making – F3 – Acceptability Assessment - Sections 4.2.7 – Goulds Squid, 4.2.12 – Plankton Communities and Bonney Upwelling, and section 4.2.13 – Spawning Patterns for a discussion on risk levels to food sources relevant to Fairy Penguins. Sardine stocks (Sardinops sagax) are in a sustainable condition having recovered well from the disease-induced mortality events of the 90's. Sardines are the dominant clupeoid in the region with Anchovy confined mainly to inshore waters (Ward et al 2020). Peak spawning period is across summer (January-April) with Figure F3-16 illustrating the spatial distribution of sardine eggs throughout the Otway region which also highlights the relative abundance of this food source across the fairy penguins feeding ranges. The southern distribution of this species is considered a single stock and the fishery off South Australia is the largest by tonnage in Australia (>47,000 tonnes in 2022), indicating how productive it is. Behaviorally, pelagic schooling species such as sardine are highly mobile in space and time which makes them highly resistant to localized and/or transient disturbances. It is also the case that Australia's less-productive pelagic ecosystems means predators are less dependent on only one prey species and can feed opportunistically across a wider variety of species. This has been seen with dietary examinations of Fairy Penguins who can switch between sardines, anchovies and squid as encountered. Fairy penguins display considerable feeding plasticity precisely because their preferred prey is highly spatially and temporally variable in their distribution (Camprasse et al 2017). When describing home ranges for feeding it is important to distinguish between maximum distances, distance travelled and mean/median distances. While studies into daily feeding range limits for nesting penguins may have found forays out to 30+ km, the vast majority of feeding (i.e. mean distance travelled) is occurring with 15-20 km of their nesting sites- Longer distance forays are the exception not the norm and this has been confirmed across multiple studies from multiple locations (e.g. Berlincourt & Arnould 2014, Hoskins et al 2008, Pelletier et al 2014, Philips et al 2019, Philips et al 2022). Feeding dynamics can be very different between locations and are correlated with prey abundance and distribution patterns. As demonstrated the Otway region is well supplied with sardines and squid with food resources likely correlated with nearness to upwelling areas (Norman et al. 2017).	5117

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4127	Lack of Acknowledgement of the Fairy Penguin Breeding Colonies in Western Victoria in CGG's Environment Plan, as well as No Acknowledgement of their Biologically Important Foraging Areas.	We believe there is some confusion here on what Biologically Important Areas are. Biologically Important Areas are regions where aggregations of individuals of a particular species are known or likely to display important behaviours such as breeding, foraging, nesting or migration. They have been identified from the literature and using expert scientific knowledge about species' distribution, abundance and behavior (Australian Marine Parks, 2024). Biologically Important Areas were established to guide decision-making under the Environmental Protection and Biodiversity Conservation Act of 1999. These areas have been designated for a specific group of protected species, selected based on their conservation status and the availability of dependable spatial and scientific data. There are two sources we would use to identify Biologically Important Areas, the Protected Matters Search Tool and the National Conservation Values Atlas website. The closest Fairy Penguin BIA is around Christmas Island (off the northeast coast of King Island), and it is a designated foraging BIA. Nonetheless, just because the colonies are not BIA's doesn't mean they don't deserve consideration in our Environmental Plan. Little Penguins are discussed in detail in E56 Section 4.5, here we have acknowledged the breeding colonies on both Middle Island and Lady Julia Percy Island. See excerpt from E5 below: "The Little Penguin was identified as breeding known to occur within the area potentially affected by underwater sound (Annex 2). Within this area, breeding occurs on Lady Julia Percy Island and Middle Island." CGG will amend the Environmental Plan to include references to fairy penguins located at London Bridge, Gibson Steps and Lawrence Rocks.	5117
4128	Lack of adequate monitoring of species present or likely to be impacted.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions regarding species that may be affected by the Regia MSS. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	3237
4130	Lasting and unrecoverable damage mentioned.	The titleholder acknowledged the feedback, noting that risks and impacts are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on marine life are outlined in the EP in G1.	4808

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4133	Mass destruction of marine populations through the blasting process.	Regia EP has conducted thorough impact assessments for all relevent receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevent mitigation measures have been outlined in the EP.	2274
4135	Mention of being heavily impacted by the whales in the tourism industry.	Title holder has undertaken a thorough analysis and assessment of all relevant literature related to Marine Mammals to inform its decisions. The MSS will not impact the population stability of marine mammals within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1244
4136	Mention of considerable damage to marine life outweighing the benefits of mapping seafloors for gas drilling.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable.	1389
4137	Mention of installing sound curtains underwater to reduce destructive sound.	Bubble curtains are not suitable for a moving activity, nor are other measures such as acoustic blankets. This has been included in the ALARP assessment.	2830

4138	Mitigation Deficiencies: CGG lacks a reliable method to consistently detect the presence of Fairy Penguins. To minimize impact, seismic blasting should occur during their breeding season when their foraging range is limited to shorter daily trips, and it should be conducted at least 82.8 km away from each colony, assuming the JASCO sound modeling is accurate for the species.	CGG has undertaken an extensive assessment of all the available scientific literature and other relevant information sourced from reports and websites. Our process is 'live', meaning we are continually checking and updating our plans if new information comes to light which is relevant to assessments. For example, we have been able to add a recent paper, Wei and Erbe (2024) Sound reception and hearing capabilities in the Little Penguin (Eudyptula minor): first predicted in-air and underwater audiograms. Royal Society Open Science 11(8): 240593 which has calculated sound threshold levels of Little Penguins and provides a more robust estimate than has previously been used. It was reassuring to then see that our modelled sound thresholds were appropriate, based on this newly published estimate. The principal aims of the environmental assessment are to ensure there is no impact to population stability and to reduce any potential impacts to "As Low as Reasonably Practicable". The assessment has concluded that there is not a significant risk to the stability and resilience of the Little Penguin population in the region. This outcome is derived from the cumulative effects of mitigation that the Regia MSS has committed to and which includes • Timing of the survey – avoiding the prime egg-laying and chick raising period • Location of survey outside core feeding areas – the majority of feeding is undertaken within 20km of nests as borne out from multiple studies cited in our EP. The seismic is occurring outside this zone with the exception of a very small section adjacent to Deen Maar which is within 17.5 km of the island. However, sum exposure for this area is 5 hours over 3 weeks which is immeasurably low exposure. • Minimal time in proximity to core feeding zones – the seismic acquisition is a continually moving process and will not ever be at full power while stationary. This provides ample opportunity for individual animals to move away from a source even as the source is also moving hence expanding the gap as quickly as possible. • Feeding is equally possible along the coast hence the area available for feeding is substantially larger than implied. • Anchovy stocks are in good health at the moment according to state fishery statistics and these are the core food source for Little Penguins. • If feeding birds are found within 500m of an active seismic line then the source will be switched to low power until outside 500m again. This measure is not expected	5117

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		to capture all penguin feeding movements however it does provides a mitigation measure to allow birds feeding to continue doing so with minimal disturbance. The total sum of mitigation measures provides a level of impact that fulfills ALARP and importantly does not provide a pathway to population impacts.	
4140	No mention of ceasing activities when whales are present in the area.	CGG has conducted a thorough impact assessment relating to underwater sound and marine mammals, with mitigation measures and management adopted as a result of both this assessment (which includes relevant marine mammal species) (E7) and a further assessment (which includes two key whale species: Blue Whale and SRW) (F3). A comprehensive fauna management plan was also established as part of this EP development (G2).	1835
4145	Opposes seismic exploration claiming it is dangerous to all marine life. Cannot ensure zero risk.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	427
4146	Opposes seismic testing, claiming it will have catastrophic effects on marine life due to high-decibel blasting sounds. States activities can harm various marine species and may cause whales to beach themselves from the pain, making them unacceptable in a whale sanctuary area.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Regia EP has found seismic impacts to cetaceans can be mitigated and managed through appropriate timing of the survey and a comprehensive fauna management plan	537
4148	Opposition to seismic blasting and frontier gas due to community and traditional custodian concerns.	The cultural features of the environemnt have been assessed in E1 and further in F3. The effects to physical receptors are temporary and localised and there is no interference with the practices or rituals required to maintain a spiritual connection to Country.	2632

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4151	Potential cumulative impacts upon species are addressed.	The titleholder responded by informing the stakeholder that the Regia MSS team were currently undertaking the cumulative impact assessment and will ensure that it covers previous and planned seismic surveys within the area and assesses impacts to cetaceans (behaviour, PTS, TTS) and their food source (krill).	653
4154	Questions a previous statement that indicated there would be no mortal effects from seismic activities.	The titleholder acknowledged the feedback, noting that impacts and risks to the marine environment are are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on the marine environment are outlined in the EP in G1.	2088
4158	Reference to the destruction and degradation of the marine environment observed during diving trips.	The titleholder acknowledged the feedback, noting that impacts and risks to the marine environment are are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts on the marine environment are outlined in the EP in G1.	2830
4160	Rejects claim that proposed survey will have immeasurably small impact on fishery, states this is not supported by the evidence in the peer reviewed paper provided	Provided further assessments and information on the methodology used. Provided stakeholder with copies of all papers referenced.	4484
4161	Related to the effects of seismic testing on various birds, in particular the Little Penguin colony at Middle and Griffith Islands.	The titleholder provided information regarding the update of the environment plan to reflect the inclusion of various seabirds, including the Little Penguin, at the location of concern, not previously accounted for in the environment plan. The titleholder responded with some summarised information from the paper the stakeholder provided about foraging penguins and its relevence to the Regia MSS (Event ID 2910).	2908
4162	Related to the effects of sesmic testing on various birds, in particular the Little Penguin colony.	The titleholder responded with a provision of a document link to the titleholders preliminary impact and risk assessment relevent to shorebirds, some information regarding light being a likely cause of effect on nesting seabirds, and the titleholder has explained the process by which they conducted the relevent impact assessment in line with government guidelines (Event ID 1792). The titleholder provided information regarding the update of the environment plan to reflect the acknowledgement of various seabirds, including the Little Penguin, not previously accounted for in the environment plan (Event ID 2910).	1783

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4167	Risks are considered too high, impacting cultural and spiritual wellbeing of the populace.	The cultural features of the environemnt have been assessed in E1 and further in F3. The effects to physical receptors are temporary and localised and there is no interference with the practices or rituals required to maintain a spiritual connection to Country.	2118
4170	Scientific evidence indicates that seismic blasting using air guns has chronic impacts on whales. These effects include the exclusion of marine mammals from crucial areas during important times, interference with migration, habitat degradation, disruption of vital behaviors, and increased stress levels. Statement that such findings underscore the unacceptable risks associated with seismic testing in marine environments.	The titleholder acknowledged the feedback, noting that impacts to whales are assessed in the Environmental Plan (EP) and can be found in E7 and F3. Measures to minimise adverse impacts to whales are outlined in the EP in E7 and G1.	2073
4175	Seismic blasting is harmful and disruptive to marine life of many species.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts ont marine life are outlined in the EP in G1.	3343
4176	Seismic blasting negatively affects not only whales but also crucial marine life, including fish, crustaceans, and zooplankton, all of which play vital roles in the marine ecosystem.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts ont marine life are outlined in the EP in G1.	2074
4177	Seismic blasting would have a significant negative effect on marine creatures and ecosystems.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts ont marine life are outlined in the EP in G1.	3343
4186	Stakeholder expressed concern about the destruction and depletion of the ocean due to the activity.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2963

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4187	Stakeholder expressed concern about the potentially devastating impact of seismic testing on ocean marine life.	The titleholder acknowledged the feedback, noting that impacts and risks to marine life are are assessed in the Environmental Plan (EP) and can be found in D1 to D4 and E1 to E9, and F3. Measures to minimise adverse impacts to marine life are outlined in the EP in G1.	3209
4189	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1653
4190	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1655
4191	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1659

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4192	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1661
4193	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1662
4194	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1663
4195	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1665

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4196	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1667
4197	Stakeholder noted concern for harm being inflicted on our oceans by unnecessary gas exploration.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1670
4200	Stakeholder noted that dolphins use clicks and whistles as a complex form of communication, with observations of bottlenose dolphins using distinctive whistles for individuals within their pod, similar to how humans use names. Claimed that blasts from seismic testing could cause temporary and permanent hearing loss in dolphins and whales, citing instance near Peru, where some 900 long-beaked common dolphins and black porpoises washed up dead along a stretch of beach, shown to have had fractures in their ear bones and signs of bleeding from their middle ears. - LINK provided.	A Preliminary Environmental Impact and Risk Assessment is undertaken during an impact assessment process (our PEIRA is available here). The PEIRA is compiled to identify environmental values and sensitivities, to provide an evaluation of the environmental impacts and risks associated with the project. The PEIRA is then used to inform the environmental assessment documents, and as above, the environmental impact and risk treatments, which are being uploaded in the document library. The draft Environmental Impact Assessments are in the document library now, for review and feedback. For transparency we are uploading the entire documents, however if there is a concern you would like a summary or specific information on, please let us know. Further information on marine mammal treatments are covered below in response to concern 6.	2886

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4203	Stakeholder outlined impacts to marine animals from seismic testing. It was noted that to communicate with other whales, humpbacks use a complex combination of noises in beautiful melodics and that seismic airguns emit a wide range of frequencies with sounds in the lower frequency ranges which can travel long distances being particularly troublesome sounds with humpback whales known to stop singing when subjected to the sound of a seismic airgun near Scotland. Ending the humpback's haunting song could impact migration, breeding and feeding. (Credit: NOAA's National Ocean Service.) LINK provided.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of dolphins ir whales within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Regia EP has found seismic impacts to cetaceans can be mitigated and managed through appropriate timing of the survey and a comprehensive fauna management plan	2886
4205	Stakeholder raised concern regarding amount of spatial placement effect from previous studies causing lag effect or reduction in catch/recruitment and noted titleholder analyses shows this may be hard to detect. Concerned if seismic study done over bulk of larval advection pathway, this could significantly impact fishery.	This concern has already been considered in the analysis provided to this relevant person and CGG notes that the placement of the previous surveys is not a determining factor in the assessment because of the broad spatial dispersion of fish eggs and larve associated with this fishers concern.	4638
4210	Stakeholder stated they were concerned at the impact the activity will have on the nearby whale nursery and marine sanctuary. We need to be protecting our oceans and marine life from further disruption and climate change not attempting to extract more gas through seismic blasting.	The Regia MSS will be undertaken in a manner that does not prevent or displace Pygmy Blue Whales or Southern Right Whales' use of BIAs. This will be done by implementing spatial and/or temporal zones and where these cannot be implemented mitigation controls will be implemented. Controls will be evaluated with expert opinion from acoustic specialists and whale researchers to ensure they are effective.	870
4211	Stakeholder stated they were extremely concerned about the risks, damage and destruction caused by exploration activities in the marine environment.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	1049

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4212	Stakeholder states studies have shown larval fish kills associated with seismic studies, with possibility of long term reduced recruitment. Requests proposed mitigations, considering concurrent weather windows for king george whiting spawn.	The factors that significantly impact KGW populations include regional climate patterns, such as decadal wind changes, sea surface temperature variations, unmanaged commercial fishing, and large-scale pollution. These influences are substantial compared to the potential effects of a 60-day seismic survey, which are negligible in the context of ongoing seismic activities in the region over decades. The dynamics of interannual KGW catch patterns are predominantly related to these larger climate events. Consequently, any effects from the Regia Marine Seismic Survey are expected to be immeasurably small and unlikely to influence population dynamics.	4355
4218	Strong opposition to seismic testing in the ocean due to its effects on both wildlife and the fishing industry. Individual firmly disapproves of the practice.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	425
4220	Table 1 indicates that there are few studies to establish threshold criteria for mortality or potential injury, relying instead on extrapolations from Popper et al. (2014). The report claims that mortality and sub-lethal injury are limited to within tens of meters of seismic sources, overlooking McCauley et al. (2017), which found a 2-3-fold increase in zooplankton mortality up to 1.2 km from the source. The exclusion of this study from the assessment of plankton injury and mortality thresholds is deemed unacceptable, and AMCS requests that this information be included and the thresholds revised accordingly.	We will remove the reference to "few studies" and reiterate that the Popper et al (2014) has been selected as the most appropriate paper upon which to base the threhold criteria. The McCauley et al (2017) paper has been considered in the chapter as a whole and it is incorrect to claim its omission from the assessment	3384

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4224	The EIA claims that impacts to the Bonney Coast Upwelling KEF and the broader Great Southern Australian Upwelling System, which the Regia MSS overlaps, are not predicted because the effects on zooplankton mortality are within natural mortality rates. However, AMCS points out that this reasoning fails to account for the cumulative and additive effects of various sources of zooplankton mortality. AMCS requests that CGG revise its impact assessment by using more conservative estimates of zooplankton mortality, such as those from McCauley et al. (2017).	We acknowledge that this statement is poorly phrased and we'll update the impact assessment to reflect that "additional mortality or mortal injury effects to zooplankton are additively insignficant compared to natural mortality rates"	3384
4225	The EIA suggests that predicted impacts to zooplankton, including krill, do not remove them from the food web, as their nutrients and energy remain within the ecosystem after death. It notes that dead zooplankton are available for scavenging before sinking to the seafloor. However, AMCS argues that the assessment overlooks the critical roles that live zooplankton play in reproduction and grazing on phytoplankton. When dead, they can no longer contribute to these processes, potentially leading to issues like hypoxia from uncontrolled phytoplankton blooms. AMCS requests that CGG fully consider the implications of lost zooplankton reproduction on higher trophic levels and model these effects using a worst-case scenario of 35% krill mortality, as indicated by Richardson et al. (2017). At a minimum, CGG should acknowledge that zooplankton mortality affects grazing rates and phytoplankton persistence, and that these impacts require further investigation before concluding that “impacts to primary production and ecosystem function are not predicted.”	We acknowledge that seismic surveys impact zooplankton, which might contribute to a minor and temporary imbalance between phytoplankton and zooplankton. In nutrient-rich conditions, if at a large enough scale, we acknowledge this could contribute to algal blooms. However, such an effect would be indirect and difficult to attribute solely to seismic activities. It's essential to note that marine environments face multiple stressors. While seismic surveys are one potential stressor, factors like pollution, overfishing, and climate change can also play a significant role. Considering the cumulative impacts of all these factors is crucial to understanding the overall health of marine ecosystems. We believe we have already assessed these factors because our baseline knowledge of the environment includes these stressors. While we acknowledge your concerns and that there are studies that show the effects of seismic surveys, there is conclusive evidence supporting that seismic surveys are unlikely to lead to large-scale phytoplankton blooms and subsequent hypoxia, as demonstrated in our impact assessment. Once again, we have provided our consideration of may papers, including Richardson et al. (2017), in our assessment and we respectfully request any references that support your concern of wider ecosystem level effects, or evidence of algal blooms in the aftermath of a seismic surveys (of which there have been 82 in the last ~60 years in this region).	3384

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4231	The feedback expresses concern that the project might disrupt blue whale migration, movements, and natural behavior due to potential interference in their habitat.	The effects of underwater sound have been extensively assessed based on the latest scientific literature. CGG has committed to a variety of protective measures for blue whales and an extensive detection area. These measures have been assessed in E7, F3 and G2.	2081
4236	The feedback questions priorities, suggesting that profit motives may overshadow environmental concerns. It calls for a reconsideration of project locations to avoid populated areas and protect wildlife.	We will not survey while SRW mothers and calves are in the area. Oil and gas has successfully co-existed with wildlife in this area for 25 years and we are doing everything we can do protect the wildlife and natural beauty of the area (Event ID 1781).	1781
4238	The feedback raises concern about the foraging distance penguins travel at night to feed themselves and their young, urging consideration of this range in seismic planning.	We are studying the little penguins and will put in place protections for them. The detail of our impact assessment of the effects of elevated levels of sound will be published shortly. We will consider all life-cycle stages of the penguin and the ecosystem effects, including those pressures on the food chain (Event ID 2079).	2079
4241	The fisher expressed concerns about the adverse effects of seismic activities on the stocks he relies on, indicating that the surveys have negatively impacted fish availability.	This claim was thoroughly assessed both in E3 and in F3. The predicted level of effects on fish availability for fishers showed some temporary behavioural effects. CGG also studies the effects to recruitment to fishers in E2 and the predicted level of impact is immeasurably small.	2026
4246	The fishing industries in Port Fairy and King Island have reported significant impacts without financial compensation.	Through our extensive research we have not found any evidence of causation between seismic survey and mortal effects on molluscs. In fact, the evidence we have found (which we will publish in full) suggests seismic and fishing can happily co-exist. Please provide references, evidence, or testimonials for your claims so that we can take them into consideration in the proper process (Event ID 2084).	2084
4250	The last time the activity was conducted, it destroyed the fishery for 2 years. I have catch history for this.	This claim was assessed in F3 where historical data was analysed for any correlation between historical seismic survey and a reduction in catch rates. No such correlation was found as shown in the analysis in F3. This fisher was asked to provide their catch history to substantiate their claim and no data has been received to date.	5190

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4253	The possible effects to marine life and ecosystmens is my primary concern	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2117
4256	The presence of other fishermen displaced by operations in the area has led to a noticeable decline in catch rates.	CGG analysed the data provided to examine this claim. The analysis shows that catch rates (catch per unit effort) was actually increasing year over year.	2037
4258	The project has the potential to impact within the RAP Area, Bunurong Country.	The titleholder has acknowledged this feedback by highlighting that impacts to cultural heritage are thoroughly assessment in E1 and F3.	2371
4259	The proposed works will harm and damage the climate and ocean life.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2256
4260	The protection of wildlife in the Otway Basin is directly affected by drilling and seismic surveying.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	1901

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4262	The random placement of animats representing Southern right whales (SRW) and pygmy blue whales (PBW) is inappropriate, as whale presence in the area is not random. SRWs and PBWs migrate significant distances for calving and feeding in the waters of the OA. Assuming a random distribution in a model meant to reflect complex animal behavior influenced by environmental factors is flawed. Additionally, the proposed spacing of four animats per square kilometer underestimates the likely higher density of SRWs, particularly in aggregation and calving areas from May to October.	We understand the concern regarding the random placement of animats in the model. The animat modelling creates a foundational understanding of potential whale response to sound emissions once they are in or near the OA. We recognize and agree that the overall migratory and behaviour patterns of the SRWs and PBWs are far from random. The decision to start with a random distribution was in fact a conservative first step to ensure we didn't inadvertently overlook potential areas of concern. Recognizing the specific migratory and behavioral patterns of SRWs and PBWs, is completed in the subsequent impact assessment. Regarding the spacing of animats at 4 per sq km, your feedback is valuable. We believe that a 4 per sq km is a significantly conservative density for the model to take given the population levels of these species and their observed behaviours.	3384

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4263	The recognition of plankton diversity in the proposed OA and EMBA, combined with the lack of comprehensive data for the area, suggests that the precautionary principle should be applied due to the crucial role of plankton in overall ecosystem function.	We acknowledge the importance of plankton in marine food webs and their pivotal role in the ecosystem. While CSIRO's Australian Ocean Data Network might not have specific data points within the Active Source Area, multiple studies have shown that plankton and zooplankton are ubiquitous in marine environments, demonstrating both abundance and resilience across diverse marine habitats. For instance, Beaugrand et al. (2019) and Hays et al. (2018) have highlighted the pervasive distribution of these organisms throughout the world's oceans, including regions similar to the Bass Strait [1,2]. Given their ubiquity, we have made prudent assumptions of high levels of abundance in the Active Source Area. It's essential to note that plankton populations experience natural mortality due to various environmental factors, predation, and other natural occurrences. Their life cycles are designed to accommodate significant fluctuations in population numbers, ensuring the sustainability of their populations over time (Kiørboe, 2008) [3]. Furthermore, one of our main considerations in altering the project timeframes was to avoid local upwelling events. We are fully aware that during these events, there's a peak abundance of plankton. Our goal is to conduct our operations during periods when potential disturbances to these vital communities are minimized. In our impact assessment, we have relied on these assumptions, understanding the significance of these organisms and their foundational role. The assessment emphasizes the consideration of potential impacts based on the known abundance and distribution patterns of plankton communities. Thus, our operational plans have been tailored to ensure minimal disruption, relying on the knowledge of their extensive presence and role in the ecosystem. References: [1] Beaugrand, G., Edwards, M., Brander, K., Luczak, C., & Ibanez, F. (2019). Causes and projections of abrupt climate-driven ecosystem shifts in the North Atlantic. Ecology Letters, 11(11), 1157-1168. [2] Hays, G. C., Richardson, A. J., & Robinson, C. (2018). Climate change and marine plankton. Trends in Ecology & Evolution, 20(6), 337-344. [3] Kiørboe, T. (2008). A Mechanistic Approach to Plankton Ecology. Princeton University Press	3384

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4264	The report states that the area of impact is predicted to extend a maximum of 230 meters from the sound source during survey acquisition, with a severity rated as Minor (2). This assessment claims that while there will be some effects on plankton and ecological function, these impacts are not significant or long-lasting, and the system can recover in days to months. AMCS challenges this conclusion, citing evidence from McCauley et al. (2017), which was excluded from the assessment. That study indicates impacts can occur at distances at least six times greater than the 230 meters cited. Therefore, AMCS requests that CGG revise its estimates of zooplankton mortality, the percentage of affected populations, recovery times, and the broader ecosystem impacts, particularly concerning food source availability for foraging whales.	We have acknowledged the findings of McCauley et al. in the assessment and it is incorrect to claim its omission from the impact assessment. There are other studies referenced in the assessment that claim lower thresholds than McCauley et al's work, and indeed some studies that show effect thresholds in much lower, in the ranges of 10's meters. In circumstances where the available science is so varied it is within reason to take into account the experimental design of the available studies and select an effect threshold we believe to be the most robust. We note also that the Popper et al. (2014) thresholds have been routinely applied by titleholders, and accepted by NOPSEMA, further emphasising that this threshold is likely the most appropriate to use.	3384
4265	The seismic process is going to affect local marine life, ecosystems, and the climate in the community.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are also in place to reduce any impacts to defined acceptable levels and as low as reasonably practicable.	1259
4267	The Stakeholder also objected to the project on the basis that it would impact every marine creature and sea bird.	Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan. Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2064

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4269	The stakeholder asserted that they have all necessary catch history data to justify the cessation of seismic, expressing concern about its impact on their fishing operations.	This claim was assessed in F3 where historical data was analysed for any correlation between historical seismic survey and a reduction in catch rates. No such correlation was found as shown in the analysis in F3. This fisher was asked to provide their catch history to substantiate their claim and no data has been received to date.	5189
4270	The stakeholder asserts seismic surveying has been proven to be harmful and disruptive to marine life of many species.	Regia EP has conducted thorough impact assessments for all relevent receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevent mitigation measures have been outlined in the EP.	3343
4272	The stakeholder asserts that the survey will have a harmful effect on millions of sea creatures.	It would be unacceptable to have long-term or permanent/unrecoverable impacts, fortunately, impacts from marine seismic surveys are short-term, temporary, and recoverable. (Event ID: 3419)	3343
4274	The stakeholder claims that seismic exploration poses a significant danger to marine life in general. This claim suggests a strong opposition to the practice due to its perceived harmful effects on the marine ecosystem as a whole.	The titleholder publically responded to this interactive map comment explaining that legislative framework in Australia permits some impact from offshore petroleum if it is managed and of an acceptable level. We believe that responsible development of gas is essential for maintaining the current quality of life we all enjoy and ensuring we pass that quality of life on to future generations. Gas is part of the Labour governments energy transition plan.	2107
4275	The stakeholder did not support the project due to the impact it will have on the significant whale nursery at Logan's Beach.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of whales within the area of operation. Mitigation plans are also in place to reduce any impacts to as low as practicable. Regia EP has found seismic impacts to cetaceans can be mitigated and managed through appropriate timing of the survey and a comprehensive fauna management plan	2250
4276	The stakeholder does not accept the blasting activity as beneficial or more important than existing marine life and structures.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	2255

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4278	The stakeholder expresses an active interest in the wellbeing of the coastline and its flora and fauna, indicating a general concern for environmental conservation.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the population stability of any taxa within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	1325
4279	The stakeholder expresses concern that the proposed seismic blasting will disrupt the travel paths of whales, particularly after efforts have been made to allow their populations to recover. They emphasise the potential harm to these animals from creating explosions in their migratory routes, arguing against any activities that threaten their sustainability.	We are working hard to design our survey so that we limit our impacts to acceptable levels. Our activity is no more than 90 days so we'll find an appropriate window to operate in. We will not destroy any wildlife habitat as a result of our activity (Event ID 2109).	2109
4284	The stakeholder noted concern regarding impacts to zooplankton and the marine ecosystem.	The only effects to zooplankton come from elevated levels of sound. These have been comprehensively assessed in E2 and F3 with the outcome that mortal effects are predicted to be well within natural levels.	1890
4286	The stakeholder noted their concern regarding short and long term effects to recruitment of King George Whiting into Corner Inlet.	An additional impact assessment for King George Whiting and spawning species has been included in F3. There is expected to be no measurable effect on KGW populations as a result of the survey.	4433
4288	The stakeholder objected to the project on the basis that it would impact the Stakeholder personally and every person in the community who love the ocean. Stakeholder noted that they do not support the activity and find it distressing to even think about the damage that could be caused for thousands of creatures and the future of herself, other people of Port Fairy and the greater community.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan.	2064
4292	The stakeholder raised concern about the sound level from the survey and its effect on marine mammals and other species.	Outlined the predicted effects of sound levels of different species of marine mammals including difference between high and low frequency cetaceans, sound propagation and modelling, and different effect level thresholds. Outlined the whale management and mitigation measures in place for Southern Right Whales and Blue Whales including timing of the activity, vessel-based monitoring (MMO's and PAM Operators), detection technology trails, and citizen science program access. Outlined the effects on zooplankton and the case for acceptability of these impacts noting the movement of the survey timing to avoid the upwelling period. (event ID 3697)	3697

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4294	The stakeholder raised concerns regarding the precautionary principle and criticised the aspect-by-aspect approach currently published and suggested that a key matters report for matters of national environmental significace would be a preferred way to review information.	Outlined why the aspect lead approach was followed and acknowledged that for species with elevated levels of protections a key matters report (or similar) that was receptor-focussed could be prepared. (Event ID 3697)	3697
4297	The stakeholder requested to know the total cost of the MSS so they could ascertain if ALARP had been reached, as a cost-benefit analysis. The information provided by the titleholder to date was deemed insufficient to know if ALARP had been achieved.	Outlined the concept of 'costs' is more than the narrow interpretation of a monetary value, it includes money, time and trouble. Outlined that the 'cost' of a control measure could be weighed against total costs of the survey for context but that this point of reference fails to consider the environmental benefit of adopting the control. Agreed that the current presentation of ALARP could be improved and that CGG would prepare a dedicated report explaining how we have reached decisions about what measures needed to be adopted (Event ID 4062).	4062
4299	The stakeholder stated that elevated sound levels are an unnacceptable impact to marine mammals.	The titleholder acknowledged the feedback, noting that impacts to marine mammals are assessed in the Environmental Plan (EP) and can be found in E7 and F3. Measures to minimise adverse impacts to marine mammals are outlined in the EP E7 and G1.	1890
4301	The stakeholder stated that the proposed activity is environmentally unsound irrespective of the assessment process and predicted environmental risk.	Petroleum activities do not operate to a no-impact standard. Instead, the Regia MSS is required to define the acceptable levels of impact and risk, and work below those levels. Acceptable levels of impact are established based on relevant up-to-date technical and scientific studies, government advice, and are considerate of the information gathered through the consultation process. This information is used to make predictions of the levels of impact we expect to occur and compares those to the previously defined acceptable levels and is presented in the Environment Plan	1747
4306	The stakeholder was concerned about potential negative impacts of gas exploration and development on Country, the marine and coastal environment, the local economy, Traditional Owners, and local communities.	The titleholder acknowledged the feedback, noting that all relevant impacts are assessed in the Environmental Plan (EP) and can be found in E1-E9. Measures to minimise adverse impacts on functions, interests and activities on relevant receptors are also adopted and can be found in G1.	3152

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4309	The stakeholder was concerned about the impact on marine life sensibilities and populations.	Regia EP has conducted thorough impact assessments for all relevant receptors including plankton, fish, invertebrates, birds, turtles, and marine mammals. The Regia MSS will not impact the population stability of any taxa within the area of operation. Measures to minimise adverse impacts on relevant biological receptors in the region and relevant mitigation measures have been outlined in the EP.	2273
4313	The statement challenges that seismic blasting will harm shellfish like scallops, citing research by Ryan Day et al. (2017) that demonstrates physiological harm and altered behavior in scallops due to exposure to seismic air gun signals.	We understand that there are impacts of seismic surveys. The findings of the paper have been used to define the distance at which some effects may occur. Our current understanding is that the effects are initially sub-lethal, that increased mortality was observed post exposure, and that increased mortality was within natural variation. Our draft assessments will be published soon (Event ID 2078).	2078
4315	The statement suggest that the significant harm caused by seismic activity to marine life and commercial fisheries, along with the existing natural gas supplies and climate change issues, renders the industrialisation of Port Fairy's coastline unacceptable. It emphasises community disapproval of allowing major oil companies to profit at the expense of the local environment and tourism.	We believe impacts from our activity can be managed to below acceptable levels. Further development of the offshore area would be subject to multiple future approvals. The visual impact from this survey would be temporary and similar to the shipping/fishing activity that already occurs in the region (Event ID 2076).	2076
4319	There are concerns regarding the potential impacts of seismic surveys on penguins, diving birds, and other marine fauna. Stakeholders are particularly worried about how the noise and disturbance from these surveys could affect the breeding and foraging behaviours of these species.	This effects of sound on birds was initially assessed in E4 and further assessments for penguins can be found in F3. Birds can also be affected by artifical light, which has been assessed in E9. The conclusion is that the measures adopted to protect foraging birds will mean that impacts are of an acceptable level.	2006
4320	There are concerns regarding the potential impacts on intangible cultural values, particularly those related to the Koontapool (Southern Right Whale) and eels.	Agreed that Sea Country, including spiritual values, should be protected. Stated that input into the design and implementation is needed from Traditional Owners to achieve this (Event ID 3678).	3678
4322	There is measurable damage done to one species which will be an an example of potential damage to others in the vicinity of King Island and surrounds	While the claim was noted the REGIA EP has conducted an extensive assessment of the literature and found no evidence of measurable damage to populations of invertebrates or fish in the vicinity of King Island and surrounds. The seismic acquisition area is also located ~100km from nearest King Island landfall.	2773

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4326	This feedback challenges a response (that was taken out of context), that there would be no mortal impacts on plankton from seismic testing. It highlights the inconsistency of this claim, given the extensive research on the adverse effects of seismic activities on plankton populations, indicating a lack of care in the statements made about their potential risks.	Titleholder acknowledged this concern and noted that potential impacts to plankton from the Regia MSS is assessed in E2 of the EP with an additional assessment carried out in F3 of the EP. Any potential mortality or permanent injury effects to plankton must be assessed in the context of natural mortality rates. Mortality and/or mortal injury impacts to plankton assemblages (including fish eggs and larvae) resulting from seismic surveys are likely to be inconsequential relative to natural daily mortality rates, which can range from 11.6% (average minimum) to 59.8% (average maximum) as reported by Tang et al. (2014). Given the rapid recovery rates of zooplankton and the fact that the Regia MSS will not be operating in the peak upwelling months, the level of impact is assessed as minor.	5210
4327	This feedback claims the negative impacts of seismic noise on marine ecosystems, including zooplankton mortality, hearing damage, physiological harm to larger marine animals, and disruptions to essential behaviors like feeding, breeding, and escape responses.	We acknowledge that there may be mortal effects on zooplankton within a few meters of the sound source. However, given natural mortality rates of 20-50% along with their abundance the population effects to zooplankton are considered negligible (Event ID 2097). There are significant protections in place for effects on large marine animals which we will detail in our full impact assessments. The acceptable levels of impacts to whale species are defined in their conservation management plans. It is unacceptable to injure a Blue Whale or displace it from its foraging area. it is unacceptable to injure or disturb a Southern Right Whale. Humpback Whales are recovering and no longer on the endangered list and we are required to protect them along with all other marine life. This project is in the early stages of exploration and the purpose of the survey is to determine if commercially viable deposits of petroleum are even present (Event ID 2097).	2097

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4327	This feedback claims the negative impacts of seismic noise on marine ecosystems, including zooplankton mortality, hearing damage, physiological harm to larger marine animals, and disruptions to essential behaviors like feeding, breeding, and escape responses.	We acknowledge that there may be mortal effects on zooplankton within a few meters of the sound source. However, given natural mortality rates of 20-50% along with their abundance the population effects to zooplankton are considered negligible (Event ID 2097). There are significant protections in place for effects on large marine animals which we will detail in our full impact assessments. The acceptable levels of impacts to whale species are defined in their conservation management plans. It is unacceptable to injure a Blue Whale or displace it from its foraging area. it is unacceptable to injure or disturb a Southern Right Whale. Humpback Whales are recovering and no longer on the endangered list and we are required to protect them along with all other marine life. This project is in the early stages of exploration and the purpose of the survey is to determine if commercially viable deposits of petroleum are even present (Event ID 2097).	2097
4329	This feedback highlights the uncertainty regarding the long-term impacts of seismic blasting on abalone populations, particularly emphasising that the effects may not be immediately observable and could depend on the juvenile stages at the time of blasting.	We have recently installed an exclusion zone down to the 40m bathymetry contour primarily as a result of discussions with abalone fishers who dive down to 30m. This will help protect early life-cycle stages of abalone. Further, seismic surveys have occurred in this region for many years and the two industries (fishing and petroleum) have successfully coexisted over time (Event ID 2095).	2095
4330	This feedback questions the accuracy of claims regarding the safe distance of seismic blasting impacts, contrasting reported effects from previous studies in Western Australia that indicated zooplankton mortality within a 1.2 km radius. It calls for real-life studies in the Southern Ocean to provide more reliable data, advocating for the adoption of the precautionary principle due to the current uncertainty surrounding the impacts of seismic testing.	Titleholder stated that the preliminary modelling results, from independent experts, have predicted our sound effect distances. For zooplankton this is 220m. Zooplankton have natural mortality rates between 20-50% and are abundant and ubiquitous in the bioregion. There are scientifically robust reports routinely critiqued and ultimately accepted by the qualified experts at NOPSEMA (Event ID 2096).	2096
4331	This feedback raises concerns about the negative impact of seismic blasting on local commercial rock lobster and scallop fishing industries.	This claim has been thoroughly assessed in E1, E5, and F3 for southern rock lobsters. There is no commercial scallop industry in the region. The known effects to individual lobsters are not predicted to have any measurable effect on population levels or dynamics.	2097

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4333	This statement expresses a strong feedback to the potential impacts of seismic activities on whale communication and hunting abilities, emphasising the unacceptable risks to marine life and local ecosystems for the sake of gas company profits. It reflects concerns about environmental responsibility and the prioritisation of corporate interests over ecological health.	The Federal Department of Environment, through the EBPC Act, protect matters of national environmental significance. Whale species have specific levels of protected enacted through legal instruments such as Conservation Management Plans. These plans often contain information about the levels of impact that is unacceptable and we must adopt them to comply with the law (Event ID 2099).	2099
4335	This statement opposes the disruption of marine habitats, migratory patterns, and cultural songlines due to perceived corporate exploitation. It reflects a strong stance against environmental harm driven by profit, emphasising the cultural and ecological importance of these areas.	The titleholder acknowledged this concern and confirmed that CGG will not carry out the survey whilst Southern Right Whales are present in their reproductive biologically important area. Confirmed that CGG are engaging with the local traditional owners and look forward to hearing their stories, learning about their culture, and protecting sea country (Event ID 2101).	2101
4339	What new technologies are CGG considering to reduce impacts?	Provided the reasons that these technologies are currently not proposed, however acknowledge that they aren't explicitly excluded and if they become viable as the design of the activity is refined they'll be considered (Event ID 4280).	3705
4342	Attendees stated that the fishery has seen significant improvement, marking its best condition in about six years, since the last seismic activity in the region. This feedback highlights concerns regarding the potential negative impacts of upcoming seismic activities on the current health of the fishery.	The titleholder acknowledged the feedback, noting that impacts are assessed in the Environmental Plan (EP) and can be found in E1 and F3. Measures to minimise adverse impacts on functions, interests and activities on fisheries are outlined in the EP.	1529
4343	Questions possibility of compensation for the abalone industry if their stocks are depleted as a result of seismic testing, drawing a parallel to the scallop industry near King Island that was adversely affected. It highlights concerns regarding accountability and the financial implications for local fisheries in the event of ecological harm.	The titleholder acknowledged this concern and noted that potential impacts to the abalone industry. It would be unacceptable to have mortal effects on any marine species from our or any marine seismic survey. We do not predict mortal effects to molluscs (including scallops, abalone, oysters, clams, mussels, limpets, squids, octopus and cuttlefish etc.). Our full assessment of predict impacts on molluscs can be found in E1 Section 8, E4 Section 8 and F3 Section 4.	2093

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4345	The stakeholder asked how we can be sure that seismic blasting will not harm penguins when conducted 60 meters away, expressing concern that this distance might be insufficient for safety.	The titleholder has acknowledged this feedback relating to underwater sound and penguins. The results from the underwater sound modelling (see E5 Section 6) show the TTS criteria was reached within 60 m of the source. This is a 24 hour cumulative result, meaning the penguin would have to remain within 60m of the sound source to experience TTS. It would be highly unlikely for a diving bird or penguin to be within that distance of the source for 24 hours. As the seismic source will be slowly ramped up to full power over 30 minutes this further reduces the risk of a diving bird or penguin being close to the seismic source at full power.	2079
4346	Requested details on the proximity of seismic blasting to Middle Island, with a specific concern for the range penguins travel offshore to forage at night.	The titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions relating to penguins. The MSS will not impact the foraging abilities of fairy penguins within the area of operation, and CGG has acknowledged breeding colonies of Fairy Penguin along the coast of Victoria (EP E7 Section 4 and 8). CGG undertook an additional assessment of Fairy Penguins in EP F3 and outlined the overlap of foraging colonies along the coast with the Regia MSS. The foraging range of the Middle Island colony does not overlap with the Regia MSS. There is a small overlap with one of the breeding colonies and the Regia MSS, the overlap equates to only ~5.3 hours spread over 3.5 weeks. Mitigation plans are in place to reduce any impacts to as low as practicable.	2079
4347	Enquired about whether the potential impacts on the Fairy Penguin colony have been evaluated, specifically regarding how far they travel to forage and the depths to which they dive. Raises concerns about the effects of seismic activity on this important wildlife species.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions relating to penguins. The MSS will not impact the foraging abilities of fairy penguins within the area of operation, and CGG has acknowledged breeding colonies of Fairy Penguin along the coast of Victoria (EP E7 Section 4 and 8). CGG undertook an additional assessment of Fairy Penguins in EP F3 and outlined the overlap of foraging colonies along the coast with the Regia MSS. There is a small overlap with one of the breeding colonies and the Regia MSS, the overlap equates to only ~5.3 hours spread over 3.5 weeks. Mitigation plans are in place to reduce any impacts to as low as practicable.	2077

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4348	Asks if the seismic blasting will occur during the breeding season of the Fairy Penguin colony, emphasising that the penguins forage after dusk, making them less visible at night. It highlights the need to consider the timing of the project to avoid disrupting this vulnerable wildlife population.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions relating to penguins. The MSS will not impact the foraging abilities of fairy penguins within the area of operation. The Regia MSS is scheduled to take place putside of the Fairy Penguin breeding season. CGG undertook an additional assessment of Fairy Penguins in EP F3 and outlined the overlap of foraging colonies along the coast with the Regia MSS. There is a small overlap with one of the breeding colonies and the Regia MSS, the overlap equates to only ~5.3 hours spread over 3.5 weeks. Mitigation plans are in place to reduce any impacts to as low as practicable.	2077
4349	Raises a concern about whether the sound levels from seismic blasting could be harmful or uncomfortable for Fairy Penguins during their foraging activities.	Title holder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the foraging abilities of fairy penguins within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2077
4353	Concerns about the impact of oil and gas exploration on the marine environment, particularly in regards to seismic testing and its harmful impacts on whales.	Titleholder responded that a detailed assessment has been completed of all available relevant scientific literature to inform the management and mitigation of MSS and their interaction with whales. Spatial and temporal zoning in conjunction with mitigation measures will ensure that interactions will minimise disturbances to whales.	612
4354	Uncertainty about the full extent of damage to the marine ecosystem.	Titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The MSS will not impact the marine environment within the area of operation. Mitigation plans are in place to reduce any impacts to as low as practicable.	2831
4359	Request for seismic blasting to be limited to 12 hours out of any 24-hour period and not carried out at night	The titleholder acknowledged this concern, however undertaking the seismic survey only in daylight hours would have a disproportionate cost without a significant environmental benefit.The survey would take twice as long, potentially resulting in cumulative effects to sensitive species.	2821
4361	Stakeholder shared concern about whales ceasing to visit the South West coast to give birth and nurture calves.	The titleholder has undertaken a thorough review of the effects of seismic on whales - see E7 Section 8 and F3 Section 4.1 and 4.2. There is no evidence to suggest whales will cease to visit, give birth and nurture their calves in the south west as a resutl of the Regia MSS.	1255

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4362	Concerns about the lack of environmental reviews of seismic surveys at necessary scales to assess, mitigate and monitor impacts.	The titleholder has undertaken a thorough analysis and assessment of all relevant literature to inform its decisions. The titleholder responded providing links to large scale studies on seismic undertaken in Australian waters and offered to provide individual with impact assessments when they became available.	1389
4363	Stakeholder noted opposition to the harmful effects on marine life and the pristine coast.	The titleholder provided information on identifying potential impacts and risks and putting mitigations in place such as, conducting survey during time of year marine mammals are less likely to be in area, reducing sound source to lowest setting and reducing number of times activated, implementing marine mammal and fish monitoring programs, exclusion zones, following strict NOPSEMA guidelines. Provided link to PEIRA and document library on website.	786
4364	Concern about the future of ocean health for children and sea life, including whale children.	Titleholder responded in Event ID: 1416, describing CGG's commitment to safeguarding marine mammals, the assessment process, regulations and measures currently in place. The stakeholder was provided with consultation information and invited to engage.	1410
4365	Concerns about the lack of definitive clarification on how seismic testing affects the marine environment and the clash between economic interests and environmental risks.	The titleholder acknowledged the feedback, noting that they have undertaken a thorough analysis and assessment of all relevant literature to inform the impact assessments conducted to assess potential impacts from underwater sound to relevant receptors, including plankton, fish, invertebrates, birds, turtles, and marine mammals in the Environmental Plan (EP). These findings can be found in E2, E3, E4, E5, E6, and E7 under Section 8: Predicted Levels of Impact. Additional assessments of key receptors was also completed to demonstrate that environmental impacts and risks arising from the activity will be of an acceptable level (F3). Titleholder also conducted an assessment to investigate potential impacts to other marine users from physical presence resulting from the activity (E1).	2383

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4377	Stakeholder claims that the lack of consultation with local experts and scientists could lead to adverse effects on the Fairy Penguin colonies and other species.	Event ID 6882 (Doc ID 9096) - CGG consulted with Parks Victoria (PV) during the planning of the proposed survey, meeting on 11/08/2023. The consultation records are available in the EP (Appendix C2). PV raised concerns about the survey's proximity to the Twelve Apostles Marine Park, leading to a refinement of the survey area. Fairy Penguins were not mentioned in this meeting. CGG also consulted with the Warrnambool Coastcare Landcare Network and their Middle Island Penguin Project. A referenced expert in scientific literature was consulted about penguin foraging ecology and at-sea movements. They advised against relying on outdated population estimates for penguins due to rapid ecosystem changes and predation pressures. CGG has sent the F3 assessment from the Regia EP to the Professor for feedback and is awaiting a response. CGG also reached out to DECCA but has not received any information. Regarding the other individuals mentioned, they were consulted, with records available on the public website. The Regia MSS EP includes extensive references to studies by blue whale (EP E7 and F3) and Southern Right Whale experts. Additionally, a professor's work on Fairy Penguins is referenced, along with the Middle Island Penguin Project. CGG based its impact assessment on peer-reviewed literature, including studies by the scientists mentioned, and disagrees with any suggestion that knowledge was bypassed or cherry-picked. The process has been fully transparent, and CGG has actively sought additional relevant literature. CGG also met with Warrnambool City Council to discuss the Middle Island Penguin Project and is looking to support efforts to gather data on penguin populations.	6412

4383	Stakeholder objects to the seismic blasting program, stating that it could negatively impact the penguins' prey base.	EVENT ID 6320- Previously responded to in Feedback ID 4122: "We refer you to Appendix E - Impact Assessments - E2 – Underwater Sound – Plankton, and Appendix F – Decision Making – F3 – Acceptability Assessment - Sections 4.2.7 – Goulds Squid, 4.2.12 – Plankton Communities and Bonney Upwelling, and section 4.2.13 – Spawning Patterns for a discussion on risk levels to food sources relevant to Fairy Penguins. Sardine stocks (Sardinops sagax) are in a sustainable condition having recovered well from the disease-induced mortality events of the 90's. Sardines are the dominant clupeoid in the region with Anchovy confined mainly to inshore waters (Ward et al 2020). Peak spawning period is across summer (January-April) with Figure F3-16 illustrating the spatial distribution of sardine eggs throughout the Otway region which also highlights the relative abundance of this food source across the fairy penguins feeding ranges. The southern distribution of this species is considered a single stock and the fishery off South Australia is the largest by tonnage in Australia (>47,000 tonnes in 2022), indicating how productive it is. Behaviorally, pelagic schooling species such as sardine are highly mobile in space and time which makes them highly resistant to localized and/or transient disturbances. It is also the case that Australia's less-productive pelagic ecosystems means predators are less dependent on only one prey species and can feed opportunistically across a wider variety of species. This has been seen with dietary examinations of Fairy Penguins who can switch between sardines, anchovies and squid as encountered. Fairy penguins display considerable feeding plasticity precisely because their preferred prey is highly spatially and temporally variable in their distribution (Camprasse et al 2017). When describing home ranges for feeding it is important to distinguish between maximum distances, distance travelled and mean/median distances. While studies into daily feeding range limits for nesting penguins may have found forays out to 30+ km, the vast majority of feeding (i.e. mean distance travelled) is occurring with 15-20 km of their nesting sites- Longer distance forays are the exception not the norm and this has been confirmed across multiple studies from multiple locations (e.g. Berlincourt & Arnould 2014, Hoskins et al 2008, Pelletier et al 2014, Philips et al 2019, Philips et al 2022). Feeding dynamics can be very different between locations and are correlated with prey abundance and distribution patterns. As demonstrated the Otway region is well supplied with sardines and squid with food resources likely	6412

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		correlated with nearness to upwelling areas (Norman et al. 2017)."	
4388	Concerned about the impacts of the seismic survey on Southern Right Whales.	Event ID 6878 - The Regia team explained in-meeting that there were multiple lines of evidence approach in relation to fauna management. Discussed that the Regia team were doing the most any titleholder had previously done for a seismic survey. Stated that there would be at least one aerial flight survey and that there would be a secondary spotter vessel. Discussed the tethered buoy experiment and that the Regia team were taking advice on what the best location would be to maximise results.	6878
4389	The relevant person was concerned about the timing of the proposed survey and impacts to the sourthern right whale.	Event ID 6878 - The Regia team provided an overview of the Regia seismic survey timings and that they were notional dates as there are criteria for whale detections. Explained that there were multiple lines of evidence approach in relation to fauna management. Also discussed the tethered buoy expriment and that they were taking advice for the best location to maximise results.	6624

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4391	Stakeholder claims there is a threat of serious harm to the regional krill population if the Regia seismic survey occurs and a lack of full scientific certainty on the effects, therefore the Precautionary Principle should be applied.	The precautionary principle needs only be applied when there is a threat of serious or irreversible harm and a lack of full scientific certainty. In relation to the effects of sound on plankton and larval krill it is CGG's view that neither of these preconditions are met. Nevertheless, we have adopted precautionary measures as evidenced by: 1. >39% reduction in acquisition area. 2. Avoidance of the key summer months despite this time providing the best conditions for survey. 3. The 60-day limitation on acquisition. (Event ID 5304) The NOPSEMA quote they have used to support their case has been misinterpreted by the stakeholder, that encourages a precautionary approach rather than describes principle: s391(2): The precautionary principle is that lack of full scientific certainty should not be used as a reason for postponing a measure to prevent degradation of the environment where there are threats of serious or irreversible environmental damage. (Event ID 6517) The Regia EP provides scientific estimates on the natural variations in plankton (including krill) communities globally and regionally, as well as mortality levels in these communities.Based on the long history of seismic surveys in the region, there is no evidence of significant harm to plankton populations, suggesting that serious harm is unlikely. These findings help define what constitutes "serious harm." The stakeholder lacks valid data to support their claim of large-scale harm to regional krill populations. (Event ID 6815)	6432
4392	Claims there will be impact to Bonney Upwelling via krill larvae originating from within the MSS zone.	The claim that some krill larvae from the proposed Regia MSS area may reach upwelling regions is acknowledged, but there is no evidence to support the idea that this area is a key source for krill in the Bonney Upwelling system. Krill larvae from across the broader region could also end up in the upwelling area. No cause-and-effect pathways have been identified that show the Regia MSS area as uniquely important for krill supply in the region. (Event ID 6815)	6432

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4393, 4409, 4411, 4413	As krill is a critical food source for whales, no seismic should be done between the months of November to April.	The claim that krill is a critical food source for whales is well-established, as whales migrate to upwelling areas to support sufficient densities of their preferred food source. However, the stakeholder provides no scientifically supported cause-and-effect pathways or evidence to justify the prohibition of seismic surveys from November to April. The Regia EP offers scientific evidence showing the fluctuating abundance of krill and its connection to whale feeding patterns. While upwelling events can occur at various times and locations, there is a clear understanding of what constitutes major upwelling events and when they occur – as has been identified clearly in the EP. Whales feed throughout the upwelling season, primarily when krill density is highest, and continue their migrations each year despite significant fluctuations in krill abundance between years. (Event ID 6815)	6432
4390, 4414	The relevant person was concerned about the evidence related to potential regional population impacts of seismically induced krill mortality within the ASA.	In the online meeting, Regia's marine scientists explained that the natural variation in the ecosystem was much larger than the potential impacts their model suggested. They also pointed out that the literature did not support the stakeholder's model and that there was no evidence of a population collapse or catastrophic effects on krill from seismic activity. The stakeholder was encouraged to refine his work, particularly regarding the historical effects of seismic surveys, and consider the scale and natural variability of the ecosystem (Event ID 6890).	6420

4394, 4412	Stakeholder claims their modelling indicates that by actively monitoring currents across the Active Source Area (ASA) and defining appropriate operational limits (no active source if mean currents across ASA (stratified) are > 0.5m/s), CGG can reduce mortality of larval Nyctiphanes australis by up to 80%, as stronger currents increase the volume of water exposed to lethal doses of seismic. This would, in turn, minimize the impacts on the blue whale feeding zone and the broader Bonney Upwelling ecosystem.	The stakeholder's model does not consider the following points: Plankton and larval krill abundance and density are not uniformly distributed in the water column either vertically or horizontally. The meso-scale biological and physical characteristics that are the more appropriate scale for investigating flow-on effects on whale populations or other relevant taxa (i.e. at the population level and not the effect to individuals). The vast differences in abundance of plankton (~krill) month-by-month and year-by-year and the significance of CGG's decisions: To avoid the peak upwelling times, where there is traditionally the highest abundance of plankton and larval krill (January, February and March). To limit the survey duration to 60 days of total acquisition. Any of the 30+ peer-reviewed scientific papers beyond the McCauley and Richardson papers about the Bonney Upwelling and the effects of impulsive sound on plankton and krill. The ecological context and purpose of zooplankton and larval krill: In primary productivity in the region regardless of the state of their physical condition, evidenced by the high levels of natural mortality. As a primary food source for Blue Whale. The ± 50% interannual variation in area extent of upwelling (~population abundance of krill) which is driven mostly by climate influences and within which whale populations continue to recover. In austral summer 2008/09 the upwelling season was constrained to the single month of February – we cannot find any scientific literature that describes this season as catastrophic for the visiting whale population. In addition, assumptions are made about krill behavior, distribution, and density, as well as how the model accounts for patchiness and current speeds. The model's treatment of water and krill as uniformly distributed contradicts scientific understanding of their distribution in space and time. The Regia EP provides evidence of the natural variability in marine systems and highlights the resilience of zooplankton communities, including krill, due to high birth, growth, and mortality rates. These communities exhibit high turnover and production-to-biomass ratios, making them resilient to disturbances. Citing the work of Hosie (1982), the EP emphasizes that Nyctiphanes species have higher turnover rates than Euphausid krill, and that similar mortality rates (88-90%) can be expected in both. The assumptions about krill mortality	6432

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
		in the EP are based on well-established scientific literature. (Event 6815)	
4395	The project is adjacent to Warrnambool's Logans Beach Whale Nursery for Southern Right Whales and upstream of the Bonney Upwelling Key Ecological Feature, which could be affected.	The titleholder acknowledges this and has spent two years preparing a comprehensive Environmental Plan (EP). This process included ongoing consultations with communities and individuals, summarizing the EP into webinars, information sheets, and holding in-person meetings. The team recognizes the Otway region's marine environment as both spectacular and dynamic and believes environmental assessments must be thorough and detailed to respect its importance. Impacts are assessed in the Environmental Plan (EP) and can be found in Appendix E7 and F3. Measures to minimise adverse impacts to whales and ensures the Regia MSS does not prevent SRW and BW utilising their BIAs include: No discharge of the sound source in January, February, March (when the upwelling is in its peak month), the sound source will only be discharged in the Pygmy Blue Whale foraging BIA when low numbers of Pygmy Blue Whales and other foraging whales are in the BIA off Otway, and no discharge of the sound source within 15 km of the Southern Right Whale Reproduction BIA or Habitat Critical to Survival (HCTS) while Southern Right Whales are present in the BIA and HCTS. The full list of measures is included in Appendix E7 Section 9 and G1. The claim that some krill larvae from the proposed Regia MSS area may reach upwelling regions is acknowledged, but there is no evidence to support the idea that this area is a key source for krill in the Bonney Upwelling system. Krill larvae from across the broader region could also end up in the upwelling area. No cause-and-effect pathways have been identified that show the Regia MSS area as uniquely important for krill supply in the region. (Event ID 6815)	6432

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4396	Stakeholder objects to Regia's dismissal of the importance of current strength in mitigating impact on krill and Bonney Upwelling biomass as both currents and krill distribution vary with depth, making monitoring at multiple depths beneficial. In the ASA, where water depth is typically less than 200m, larval krill are likely exposed to lethal seismic doses, as noted by McCauley et al. (2017). This region serves as a transport corridor for larval N. australis heading toward the Bonney Upwelling, with a westward current from November to April likely transporting larval krill into nutrient-rich upwelling zones.	The suggestion to monitor all depths lacks a clear rationale or explanation. The assumption that all krill within a specific volume of water will be killed by seismic activity is not supported by evidence. Given the lack of observed effects from past seismic surveys in the region, the model's conclusions are unsupported. If krill and currents are not uniform throughout the water column, the model's assumption of uniform distribution is flawed. The claim that some krill larvae from the proposed Regia MSS area may reach upwelling regions is acknowledged, but there is no evidence to support the idea that this area is a key source for krill in the Bonney Upwelling system. Krill larvae from across the broader region could also end up in the upwelling area. No cause-and-effect pathways have been identified that show the Regia MSS area as uniquely important for krill supply in the region. The model, which originally aimed to show massive krill mortality, takes a simplistic approach based on basic physical principles, such as the effect of current speeds, but ignores the complexity and scale of regional ecosystem dynamics. The model lacks validation and fails to account for key factors in the region's ecology. (Event ID 6815)	6432

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4397	Stakeholder objects to the idea that meso-scale biological and physical characteristics are more appropriate for assessing impacts on whale populations or other taxa at the population level, not individual effects, claiming that individual krill disturbances can scale up to affect whale foraging success and overall population dynamics, quoting Williams 2016, Lagos 2022, Guilpin et al 2020, Santora 2011, and Kampf 2024.	Williams (2016) has been used superficially by the stakeholder. A more thorough reading reveals that the paper pertains to Humpback Whales, which show minimal response to food source reductions below 50%. The paper is useful for demonstrating the variability of ecosystems, which is discussed in detail in the Regia EP. Lagos (2022) is cited by the stakeholder to support a general statement about stress, but the thesis actually focuses on ocean warming and UV radiation impacts on krill—large-scale factors, which the Regia EP identifies as primary drivers of population changes. A small-scale disturbance like the MSS does not align with these larger impacts, which the stakeholder dismisses despite citing related studies. The stakeholder also references Guilpin et al. (2020) (not included in the bibliography). This study models how changes in krill density affect blue whale foraging success, but it highlights that climate change and fishing, not seismic surveys, drive population changes. This supports the Regia EP's focus on large-scale impacts. The stakeholder's citation of Santora (2011) on California upwelling misrepresents the information. The Bonney Upwelling area is well-defined, and the stakeholder is encouraged to consult the DCCEEW website for clarification. Kampf (2024) is used by the stakeholder to suggest upwelling outside the Bonney area, a known fact. The Regia EP addresses how Blue Whale interactions with the MSS will be managed. Kampf's work builds on existing knowledge of upwelling mechanisms, and the stakeholder is encouraged to consider it as a model for understanding ocean dynamics. (Event ID 6815)	6432

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4398	Objects to CGG's actions to avoid peak upwelling (misinterpreted as January–March) and limit survey duration to 60 days, stating that krill populations do not recover linearly after intense disturbances and the life cycle of N. australis is not necessarily aligned with the phytoplankton blooms of the Bonney Upwelling.	The stakeholder cites a study by Rau (2019) to argue that even small disruptions can affect the Southern Ocean food chain. This citation is a clear example of selective use of literature. Rau (2019) is based on aquarium experiments in a freshwater lake in Berlin, and the stakeholder is invited to clarify the relevance of Lake Muggelsee to the Southern Ocean. It appears the stakeholder did not properly review the paper. The peak upwelling season for the Bonney region is well-established through various studies, as noted in the Regia EP. Upwelling is defined by sea surface temperatures (SSTs) and chlorophyll-a (Chl_a) levels, not by wind patterns, as confirmed by the cited Barlow et al. (2021). The stakeholder's assertion that krill exist before upwelling occurs is self-evident. The stakeholder's reference to the Gill (2011) study is also inappropriate, as it does not discuss the lack of synchronization with Bonney upwelling. Furthermore, the stakeholder argues that krill are not closely linked to phytoplankton blooms in the region, contrary to established scientific knowledge. Krill rely on phytoplankton as a primary food source, and upwelling conditions concentrate this food, boosting krill reproduction and survival, which is critical for baleen whales such as Blue Whales.The stakeholder also suggests that whales are not synchronized with upwelling events, despite clear evidence that whales feed in areas where localized upwelling occurs. The Bonney Upwelling is the main upwelling center, but other regions also experience upwelling, albeit less intense, as documented in the Regia EP. Recent work by Kampf (2024, 2025) has provided insights into the mechanisms behind these upwelling events. (Event ID 6815)	6432
4399	Stakeholder claims that with the potential impact on krill mortality and EPBC protected Blue Whales, the proponent excluding current modelling is not consistent with ALARP framework.	The criticism raised by the stakeholder is unfounded and reveals a misunderstanding of ALARP principles. ALARP involves assessing control measures by balancing environmental benefits with the costs of implementation. The stakeholder's arguments are flawed as they incorrectly suggest mitigation measures should be evaluated independently, only to contradict this by stating that ALARP is about layering controls to reduce risk and they assume their model is a reliable predictor of impacts, yet the model lacks credibility, and there is no justification for assuming mitigation measures will provide any environmental benefit. Timeframe limitations are not control measures but are self-imposed to comply with legislation and support coherent assessments. (Event ID 6815)	6432

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4400	The stakeholder claims that CGG's statement fails to consider cumulative effects of seismic blasting, which can push krill populations beyond their ability to recover and disrupt population dynamics. have ecosystem level impacts, disrupting the balance of an evolved system that ensures population stability.	The key point about natural mortality rates is that plankton populations can naturally endure high mortality rates, sometimes exceeding 90%, and still thrive despite large-scale environmental changes like temperature and wind variations. This is well-documented in the Regia EP. There is no evidence to suggest that a single, spatially and temporally limited seismic survey could cause ecosystem changes at the implied scale. The Regia EP explains that planktonic communities can withstand high natural mortality rates and changes in key environmental factors. The comparison of seismic impacts to other natural events, like predation is irrelevant, as predation is a natural process. While climate change and fishing are the most significant drivers of change in marine ecosystems, seismic activity does not pose a comparable threat. The claims about seismic activity's impact on breeding krill lack any relevant scientific support, along with statements about the ripple effects of localized krill reduction. (Event ID 6815)	6432
4401	Objects to CGG's claim that impacts won't be "measurable", arguing that the absence of immediate measurable effects doesn't mean there isn't significant harm.	The case for acceptability does not rely on calculated mortality and recovery levels. Instead, the case is based on the immense size and dynamic nature of the ecosystem. The effects of the seismic survey are considered negligible because they are completely overshadowed by natural variations and dynamics, making any measurable calculation impossible. This argument is further supported by the fact that the survey avoids peak upwelling times, which are when krill populations are expected to be most productive. Additionally, when considering cumulative impacts, any extra mortality caused by the survey is expected to be quickly absorbed by the natural variations and dynamics of the ecosystem, likely within days of the survey's completion. (Event ID 6514)	6432

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4402	Stakeholder claims that equating seismic mortality with natural mortality overlooks the fact that natural mortality is an inherent part of an evolved system that maintains population stability. In contrast, human-induced mortality disrupts this balance by targeting individuals indiscriminately, including those crucial for reproduction and survival.	The Regia EP does not equate seismic mortality with natural mortality. Instead, it defines the scales of natural mortality in plankton populations to provide context for seismic effects. It is clearly stated that the two are not equivalent in any way. The stakeholder seems to misunderstand marine population dynamics, espousing a view of the natural world that was debunked in the 1970s, namely the idea of a stable or climax community where any disturbance disrupts balance. As demonstrated by Connell (1978), high diversity in ecosystems like tropical rainforests and coral reefs is only maintained in a non-equilibrium state. Wu and Loucks (1995) further emphasized that the classical equilibrium view fails because equilibrium conditions are rare in nature, and stability should consider heterogeneity and scale multiplicity. Stability, in ecological terms, is better measured by the ability of a population to continue reproducing through time, ensuring its persistence. For plankton communities like krill, this stability is defined by life-history traits such as rapid population turnover rates, enabling them to withstand extreme fluctuations in numbers and persist over time. Large variations in krill biomass are a fundamental characteristic of stable populations. (Event ID 6815)	6432
4403	Claim of ecosystem impact, as any Krill killed by seismic will become unavailble to predators.	Food chain dynamics in the open ocean are primarily supported by detritus, which serves as the foundation for energy transfer up the food chain. This detritus is mainly composed of dead plankton, with krill carcasses being a significant component, including those potentially killed by seismic activity. Such organic material is consumed by bacteria and other organisms, contributing to the marine food web. However, as demonstrated scientifically, the act of krill falling as marine snow does not cause a large-scale impact. In fact, some models suggest that this process can trigger a positive feedback loop, resulting in a surge in phytoplankton and zooplankton productivity (Skartsaeterhagen et al., 2024). (Event ID 6815)	6432

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4404, 4408, 4410	Stakeholder claims that disruptions to krill populations can directly affect Blue Whale feeding, as these whales depend on dense krill aggregations for their energy requirements. Reduced prey densities may impact whale migration and breeding success.	Krill are naturally subject to mortality rates as high as 90%, and their food source fluctuates spatially and temporally, shrinking by up to 50% between and within years. The size, duration, and location of krill swarms also vary. Whales continuously feed across this dynamic space and return annually. The Regia EP argues that there is no evidence suggesting a spatially and temporally constrained MSS would cause a disturbance greater than what already naturally occurs. The stakeholder demonstrates a lack of understanding of how stability is measured in marine environments. The energy whales derive from krill fluctuates month to month and year to year due to natural dynamics in the food chain. The scale of disruption to whale feeding energy when upwelling shrinks by 30% or 50% is far greater than any MSS disturbance. The stakeholder's general statements regarding the MSS's impact lack scientific support. (Event ID 6815)	6432
4405	objects to the assertion that ± 50% interannual variation in upwelling extent, mostly climate-driven, has not constrained whale population recovery.	Whales have evolved to handle significant fluctuations in their food source, with some years yielding more biomass and others less. The Regia EP provides references to support this argument. Upon closer examination of Wiedenmann et al. (2011), which the stakeholder cites, it becomes clear that while whales can adapt to decreases in krill abundance in a particular area, the net effect on their population vital rates is negligible. Wiedenmann et al. (2011) also suggest that blue whales may adjust their foraging behaviors in response to changes in local environmental conditions, mitigating the impacts of declines in krill abundance. They note that blue whales exploit different feeding areas based on large-scale prey abundance and can concentrate in productive areas when prey is scarce, such as during El Nino years (Benson et al. 2002, Bailey et al. 2010). Furthermore, Wiedenmann et al. (2011) propose that blue whales are better equipped to cope with environmental changes than species with more restricted foraging areas, thanks to their adaptive foraging behaviors and ability to travel long distances in a foraging season. (Event ID 6815)	6432

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4406	The sender claims that the absence of a defined acceptable threshold for krill mortality in the Regia EP is a core issue.	The case for acceptability does not rely on calculated mortality and recovery levels. Instead, the case is based on the immense size and dynamic nature of the ecosystem. The effects of the seismic survey are considered negligible because they are completely overshadowed by natural variations and dynamics, making any measurable calculation impossible. This argument is further supported by the fact that the survey avoids peak upwelling times, which are when krill populations are expected to be most productive. Additionally, when considering cumulative impacts, any extra mortality caused by the survey is expected to be quickly absorbed by the natural variations and dynamics of the ecosystem, likely within days of the survey's completion. (Event ID 6514)	6507
4415	The percentage figure in Appendix E2, Section 4.1 has errors.	The Tang et al. (2014) paper was referenced to discuss non-predatory mortality in zooplankton samples from various marine environments. The stakeholder claimed that this rendered the estimated numbers used in the comparison irrelevant. However, Tang et al. provides a range estimate for non-predatory zooplankton mortality (11.6% to 59.8%) in these samples, which is relevant to the impact assessment. While CGG agree that directly extrapolating these mortality ranges to the entire Otway marine region might be overly simplistic and therefore doesn't carry significant weight in our overall argument, it is still a reasonable and relevant consideration. These ranges can be compared with the potential additional mortality resulting from factors such as predation, other anthropogenic sources, and the proposed survey. (Event ID 6518)	6890
4416	The Relevant Person was concerned that the Regia graph did not consider the spatial placement of the seismic tests relevant to the King George Whiting recruitment success, stating they are directly over the larval advection pathway .	This claim has previously been addressed in Feedback ID 4205: This concern has already been considered in the analysis provided to this relevant person and CGG notes that the placement of the previous surveys is not a determining factor in the assessment because of the broad spatial dispersion of fish eggs and larve associated with this fishers concern.	6325
4437	Relevant person was concerned about impacts of seismic to rock lobsters.	Event ID 6595 - The titleholder responded that they had undertaken a thorough assessment of potential impacts on SRL, including a further assessment on the effectiveness of the mitigations in place.	6592
4438	Relevant person was concerned about the impacts of seismic surveys on lobster populations.	Event ID 6875 - The Regia team responded in-meeting and explained that there is an impact of the seismic activity on lobster associated with their righting reflex. Discussed that they needed to look at what the resource tolerates. Discussed research boat in Tasmania and directed relevant person to recent research paper "Boom, Shake the Room."	6875

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4441	Concerned about the impacts of seismic activities on crab populations.	Event ID 6876 - The Regia team responded in-meeting that seismic can cause a physiological reaction in crab - delayed righting. Discussed that they will only go to 200m.	6876
4443	Concerned that the Regia team said there will be zero effect and that every historical seismic activity has had a worse effect.	Event ID 6876 - The Regia team responded in-meeting that they did not say there would be zero effect. Offered to analyse fishing data provided by commcercial fishers and reproduce long-term catchability analysis. An analysis is also included in Appendix F3, section 3.5.3	6876
4444	Concerned that there are no studies about the effect of seismic after adult malting.	Event ID 6786 - The Regia team responded in-meeting and discussed UTAS study which looked into effects of seismic during different stages of juvenile development. Explained that the sample size was very small. Study showed that there is a repairing period. Asked relevant person about malting seasons.	6876
4447	Asserted that non-productive catch areas are a result of seismic activity.	Event ID 6876 - The Regia team responded in-meeting that they could re-run their long-term catchability analysis with data provided by commercial fishers. Stated that they could reduce block size and make it granular.	6876

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4378	Stakeholder described the anthropogenic impacts on the Victorian Fairy Penguin populations, such as direct human interference, predation by dogs, cats, foxes and rats, trampling of burrows by humans and stock, plastic product pollution, oil spills, accidental entrapment, inundation of burrow sites from climate induced sea level rise and drowning in fishing nets and competition with fisheries. Claims that seismic blasting will be an additional pressure to these challenges and threats that marine life and the Fairy Penguins already face, and may result in local population reproduction failure or extintion if sufficient protections are not put in place.	Event ID 6882 (Doc ID 9096)- CGG agrees that predation from feral animals, particularly dog attacks, poses a significant threat. Recent research by Blamey et al. (2024) identifies dog attacks as the largest threat to Little Penguin colonies in Tasmania, and similar threats have been reported along Western Victoria (Norman et al., 2017). In response to the claim that CGG compared the potential impacts of the Regia MSS to the serious threats faced by penguins, CGG clarifies that such a comparison has never been made. CGG seeks clarification on the origin of this statement. CGG acknowledges the potential for behavioural impacts on Little Penguins but asserts that these impacts are of an acceptable level, as detailed in the EP. The justification for this conclusion includes: • Sound exposure results in only short-lived changes, which penguins can quickly habituate to. • There is no evidence suggesting a reduction in overall fitness, as demonstrated by their extensive foraging ranges and capabilities. • Breeding success and survival rates are unaffected, as breeding occurs on land and no mortal or potential injury (PTS) from sound exposure has been observed. This conclusion is based on an extensive review of scientific literature, alongside the mitigation measures implemented by CGG. While sound may act as a deterrent, CGG acknowledges that the sound source moves. To further mitigate any potential effects on Little Penguins, CGG has committed to using a low power setting if foraging flocks (which may indicate feeding penguins) are observed within 500 m of the sound source. Full power will only be employed when the seismic source is more than 500 m away from such flocks, ensuring that foraging birds are not startled and can continue to forage after the vessel has moved on.	6412

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4379	Claims that the proposed activity may cause chicks to be underfed or abandoned due to the seismic blasting activity meaning less access to food supply, leading to death and reproductive failure as Fairy Penguins can be potentially behaviourally affected up to 77km away from the airgun source, forcing them from their natural colony foraging area and impacting caring for their young during breeding season (June-February), as forced into more concentrated areas of limited breading season foraging range. This could result in eggs and chicks being abandoned due to lack of food and uncomfortable sound pressure.	Event ID 6882 (Doc ID 9096) - Previously responded to in Feedback ID 4138. Titleholder re states several studies related to penguin foraging behavior, outlining the following key points about the home range and feeding behavior of penguins, their foraging distances, and the lack of evidence suggesting seismic surveys have caused penguin chick mortality. 1. Feeding Range and Foraging Distances: o It is essential to distinguish between maximum, total, and mean/median foraging distances when describing home ranges. o Studies show that while penguins may occasionally travel distances exceeding 30 km from their nesting sites, the majority of their foraging occurs within 15-20 km of the nest (Berlincourt & Arnould 2014, Pelletier et al. 2014, Philips et al. 2019, Philips et al. 2022). o The longer foraging distances are exceptions rather than the norm, and this is consistent across multiple studies and locations. 2. Food Resources and Foraging Areas: o The Otway region is rich in sardines and squid, with food quality improving closer to upwelling areas, which are known to enhance the availability of these resources (Norman et al. 2017). o The presence of abundant food resources may allow penguins to meet their nutritional needs more efficiently without needing to travel far. 3. Penguin Condition and Foraging Effort: o Berlincourt and Arnould (2015) found that penguins breeding at the London Bridge colony did not show variation in body condition despite an increase in foraging effort. This could imply that these penguins have a greater capacity to increase foraging efforts if prey becomes scarcer. 4. Fledgling Weight: o Overeem Wallis (2003) reported that the mean fledgling weight at Middle Island was 1081.4g. Fledgling weight is an important indicator of the health and success of young penguins. 5. Seismic Surveys and Penguin Mortality: o There is no scientific literature to support the claim that seismic surveys result in the death of penguin chicks. o Despite numerous seismic surveys and other petroleum-related activities in the Otway region since the 1960s, no evidence of direct harm to penguins, including chick mortality, has been observed. o On the other hand, studies highlight that the primary threat to penguins, especially little penguins, comes from feral animal predation.	6412

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4386	objects to CGG's claim that the disturbance will be “short term” and “temporary”, stating that the seismic blasting project may disrupt the penguins' foraging behavior and potentially impact the population health of penguin colonies in the area, including increased competition and less area in which to forage.	Event ID 6882 - Whilst the Titleholder continues to acknowledge there may be some behavioural impacts to little penguins, there is no scientific evidence to support the claim that young chicks may be abandoned as a result of the survey. CGG has described the disturbance as being short term and temporary as this accurately reflects the activity relative to other disturbances, for example the continuous predation by feral animals.	6412
4387	Claims that CGG’s Environment Plan needs to be updated to the correct normal breeding season commencement time of June/July for the Fairy Penguins of Western Victoria.	Event ID 6882 - CGG agrees to amending the EP to reflect this: During consultation with relevant persons, it was noted that as referenced by the Middle Island Project (Event ID 6412) there were instances of breeding cycles beginning as early as June.	6412
4445	Concerned that divers had noticed a reduction in marine activity after a seismic activity.	Event ID 6876 - The Regia team responded in-meeting and went through their box plot analysis. Explained that the data used was landed catch data each month from 2016 - 2023. Also went through CPUE data set and stated that the analysis showed although landed catch was lower, CPUE was still in range in 2020. Explained the Regia team are looking at recruitment of the fishery. Explained that the fishers take 30% of the fishery. Stated there was evidence there was no stock level effect.	6876
4446	Raised concern that catch will drop off 5 years after seismic activity.	Event ID 6876 - The Regia team responded in-meeting and went through their box plot analysis. Explained that the data used was landed catch data each month from 2016 - 2023. Also went through CPUE data set and stated that the analysis showed although landed catch was lower, CPUE was still in range in 2020. Explained the Regia team are looking at recruitment of the fishery. Explained that the fishers take 30% of the fishery. Stated there was evidence there was no stock level effect.	6876

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4382	Claims that the 20km halo is insufficient for the penguin populations to forage without direct impact disturbance and questions the intent behind the 20km seismic-free halos around each Fairy Penguin colony apart from the Deen Maar colony which does not have the same exclusion buffer.	As described in Appendix F3, section 3.4, studies have shown that while little penguins can forage up to 30 km from their nesting sites, the majority of feeding during the nesting season occurs within 15–20 km. This pattern has been confirmed across multiple locations and studies. Research also shows that little penguins are highly adaptable foragers. Tagging studies at London Bridge revealed changes in foraging effort in response to sea conditions, yet body condition remained stable, suggesting the capacity to increase effort as needed. A tagging study confirmed that little penguins are shallow divers and forage close to shore. The study found that while individual penguins showed some consistency in foraging behaviour over short periods, their foraging locations varied across days, suggesting they adapt to shifting prey availability. There was no long-term consistency in their foraging patterns, indicating an ability to respond to prey that is unpredictable over time. Overall, the findings highlight little penguins' high behavioural plasticity and flexibility, with variation in foraging behaviour influenced by location, year, breeding stage, and clutch (Camprasse et al. 2017).	6412
4452	Stakeholder claims that potential impacts on World Heritage Values of Budj Bim and the life-cycle of Kooyang have not been properly assessed or addressed.	Regia team responded by referencing the relevant impact assessments in the Environment Plan (EP) (EVT070), this information was also provided in Event ID 7363. Previously provided in Event ID 2521, 2356, 2357, 2358, 2359, 2360, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417.	7136
4453	Stakeholder claims that potential impacts on World Heritage Values of Budj Bim and the life-cycle of Kooyang have not been properly assessed or addressed.	Regia team responded by referencing the relevant impact assessments in the Environment Plan (EP) (EVT070), this information was also provided in Event ID 7363. Previously provided in Event ID 2521, 2356, 2357, 2358, 2359, 2360, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417.	EVT070
4460	Claims that seismic blasting adds cumulative pressure to Fairy Penguins, leading to additional adverse effects beyond existing threats that could lead to population declines or local extinction, and that this cumulative impact has not been considered.	Species sensitivity, including threats from existing predation and robustness of food stocks, was included in Appendix F3, section 3.4, as per previous feedback (FB ID 4378).	7135
4461	Objection to the acceptability of behavioural impacts and displacements of Fairy Penguins from core foraging areas caused by seismic noise.	Assessment using up to date and relevant science has concluded that any impacts would be temporary and short-term with no population level impacts, as per previous feedback (FB ID 4386).	7135

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4462	Objection to claim that breeding and chick rearing is unaffected due to being on land, emphasing the need for adult penguins to forage at sea.	Assessment using up to date and relevant science has concluded that any impacts would be temporary and short-term with no population level impacts and no scientific evidence to support the claim, as per previous feedback (FB ID 4386).	7135
4463	Claims that mitigation measures for Fairy Penguins are insufficient to protect breeding success and health.	That the justification for the mitigation measures has been outlined in prior feedback (IDs 4027, 4119 and 4138). The environmental assessment aims to ensure population stability is not affected and that impacts are reduced to ALARP. The assessment concludes that the Little Penguin population is not at significant risk, based on the combined effect of the mitigation measures. These include scheduling the survey outside the core egg-laying and chick-rearing period, locating the survey outside primary feeding areas (typically within 20 km of nests), and exposure near Deen Maar to just five hours over three weeks. Because the seismic vessel is always moving, penguins have continuous opportunity to avoid the sound source. Feeding grounds extend widely along the coast, and anchovy stocks—the main food source—are currently healthy. In addition, if feeding flocks are observed within 500 m of an active seismic line, the source will be reduced to low power until the vessel is again beyond this distance. Collectively, these measures reduce impacts to ALARP and avoid any pathway to population-level effects.	7135
4464	Objection to proceeding with seismic surveys in the absence of published studies, based on precautionary principle.	The precautionary principle requires action to prevent environmental degradation even when full scientific certainty is lacking, but only where there is a threat of serious or irreversible harm. CGG states that the Regia EP demonstrates that, with the measures applied, the Regia MSS does not pose such a threat. Therefore, in CGG's view, uncertainty does not trigger the precautionary principle in this case, making debates about the extent of uncertainty irrelevant to its legal application.	7135
4465	Claims insufficient assessment of indirect effects on penguin food supply (Cluepid fish) from seismic activity.	This assessment has been undertaken and provides the EP reference, Appendix F3, section 3.4.1. States that the outcome (impacts are of an acceptable level) has previously been shared with the stakeholder (Feedback IDs 4378 & 4122). Confirms that the core food stocks for Little Penguin (Anchovy) are in good health, as confirmed via state fishing statistics.	7135
4466	Claims the EP does not provide consideration of how penguins, both chicks and adults, may be directly or indirectly affected during the guard and post-guard stages of the breeding season.	The guard and post-guard stage is already considered in assessment Appendix F3, section 3.4, quoting Berlincourt and Arnould's 2015 paper, as per previous feedback (FB ID 4228).	7135

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4467	Claims the EP underrepresents the early onset of egg-laying at colonies beyond Middle Island, despite previously provided evidence showing that breeding at other locations, such as the London Bridge colony, regularly begins as early as June or July. The stakeholder suggests that CGG has omitted relevant scientific data already shared with them, resulting in an incomplete picture of the species' breeding phenology in the region.	This is in the EP, as per the following reference in App F3, section 3.4.1, from Event ID 6412: During consultation with relevant persons, it was noted that as referenced by the Middle Island Project (Event ID 6412) there were instances of breeding cycles beginning as early as June.	7207
4468	Objection to claim that breeding and chick rearing is unaffected due to being on land, emphasizing the need for adult penguins to forage at sea.	Assessment using up to date and relevant science has concluded that any impacts would be temporary and short-term with no population level impacts and no scientific evidence to support the claim, as per previous feedback (FB ID 4386).	7207

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4469	Objects to the negative effects of seismic testing on the short-finned eel.	CGG undertook scientific assessment for underwater sound impacts on Fish (Appendix E3 and F3), including short-finned eels. Short-finned Eels possess a swim bladder and were grouped with other fish having swim bladders for acoustic impact analysis, following the guidance of Popper et al. (2014). For fish in general, and eels in particular, the key impact mechanisms considered were potential for hearing damage or physiological injury from intense sound close to the source, and behavioural disturbance (e.g. startle responses or avoidance movement) at various distances. The EP concluded that no fish, including eels, would be close enough to the seismic source to suffer mortality or physical injury, with measures in place such as soft-starts the free-swimming fish are able to move away from the sound source, and that they anticipate no direct fatalities or lasting injuries to adult eels in the water. The titleholder acknowledges that fish may exhibit behavioural reactions to seismic noise and they assumed a conservative scenario where fish might show avoidance responses at substantial distances. In the worst case, an eel migrating through the area might detect the seismic pulses at distance and alter its course or depth to avoid the highest sound levels. The EP considered such avoidance to be a temporary and localised effect and that any diversion would likely be on the scale of hundreds of meters to a few kilometres at most. Given that migrating eels travel thousands of kilometres to reach spawning grounds, a short detour or a brief pause is not expected to jeopardize their overall journey. The EP's finding was that behavioural changes would be temporary and would not have long-term impacts on individuals or the population. (Responded to in EVT346)	EVT178
4470	Objects to the insufficient consideration of the physical presence and migration interference caused by seismic activities in eel migratory pathways.	Appendix E3, and additional species-specific assessment in F3, provides a thorough summary of short-finned eel biology, aligned with the best available science and fisheries data. The titleholder acknowledged that the Regia MSS Operational Area is offshore in the Otway Basin (south-west of Vic), which is adjacent to, with some limited overlap, to the potential migration corridor for these eels heading toward the western Tasman Sea. Appendix E3 identified "Eels (Anguilla spp.)" as a receptor in the environment that could be affected by underwater sound (section 4.1.6), precisely because Short-finned Eels are present in coastal catchments adjacent to the survey area and undertake marine migrations. (Responded to in EVT346)	EVT178

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4471	Objects to the insufficient consideration of daily vertical migrations of the short-finned eel.	Appendix E3, and additional species-specific assessment in F3, provides a thorough summary of short-finned eel biology, aligned with the best available science and fisheries data. CGG recognises that Short-finned Eels spend most of their life in freshwater/estuarine environments and undertake a once-in-a-lifetime spawning migration to the ocean. Specifically, the EP notes that mature adults (typically 8–20 years old, depending on sex) depart their rivers in late summer to autumn to migrate to oceanic spawning grounds. The EP also describes the return journey of the progeny: eggs hatch into larvae that drift southward on currents, metamorphose into “glass eels” and eventually enter coastal estuaries (with peak recruitment in winter–spring), which is consistent with established literature and references cited by the stakeholder (e.g. Gooley et al. 2002 , Jacoby et al. 2015). Appendix E3 incorporated the latest research on eel migration behaviour, notably Koster et al. (2021). The EP explicitly references Koster et al. and confirms the phenomenon of diel (daily) vertical migration in migrating eels: tagged eels from the Hopkins and Fitzroy Rivers exhibited a pattern of surfacing at night and diving deeper during the day while at sea. CGG acknowledges that this is a crucial behavioural detail that the EP does acknowledge. (Responded to in EVT346)	EVT178

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4472	Objects to the insufficient consideration in Regia MSS Environment Plan's of the cultural value of the short-finned eel in South-West Victoria and South Australia beyond Budj Bim.	The Regia MSS EP was prepared and assessed under an objective based regulatory regime, which requires the titleholder to consider a broad definition of the environment which may be affected, including cultural heritage. The EP recognises the intangible cultural or spiritual connections to Sea Country and undertook research and assessment, including consultation with Traditional Owner groups, within the relevant Sea Country. While no significant impact is predicted, they remain committed to respectful ongoing engagement with Indigenous stakeholders regarding any spiritual or cultural concerns. Cultural heritiage to the eels is stated in Appendix E3 section 4.6.1, Appendix F3 section 3.7 and 3.16. Titleholder also explained that the EP contains a dedicated assessment of the Budj Bim Cultural Landscape (World Heritage Site) and its connection to Short-finned Eels and directed the stakeholder to Appendix F3 (Section 3.15). They stated that the conclusion of that assessment was that no threat or damage to Budj Bim's heritage values is expected from the proposed activity and that the cultural practices and eel stocks that underpin Budj Bim's value will not be materially affected. They stated that the EP goes further to acknowledge that beyond formally listed World Heritage values, there may be intangible cultural or spiritual connections to Sea Country that are difficult to quantify and that the Titleholder has regognised these and consulted Traditional Owner groups to better understand them.	EVT178

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4473	Objects to the inadequate consideration of the habitat and lifecycle of the short-finned eel as their habitat includes all the areas essential to its lifecycle.	Appendix E3, and additional species-specific assessment in F3, provides a thorough summary of short-finned eel biology, aligned with the best available science and fisheries data. The titleholder acknowledged that the Regia MSS Operational Area is offshore in the Otway Basin (south-west of Vic), which is adjacent to, with some limited overlap, to the potential migration corridor for these eels heading toward the western Tasman Sea. Appendix E3 identified "Eels (Anguilla spp.)" as a receptor in the environment that could be affected by underwater sound (section 4.1.6), precisely because Short-finned Eels are present in coastal catchments adjacent to the survey area and undertake marine migrations. The EP outlines the broad geographic distribution of Anguilla australi, extending from Queensland through Victoria, Tasmania, South Australia, and New Zealand, to demonstrate that eels from various regions may pass through or near the survey area. Accordingly, the EP did not overlook the potential for eels originating from rivers west of the survey area (such as the Glenelg River, Coorong, and Murray River) to travel along the continental slope. Instead, it treated the Short-finned Eel as a wide-ranging species and assessed it on that basis. The EP did not list each river individually because it considered the species at a regional population level. The evidence and conclusions therefore apply to all Short-finned Eels in the area, irrespective of origin, as their marine behaviour and sensitivities are expected to be consistent across populations. The EP also includes detailed description of lifecycles, referencing the latest science, including the migrations in these lifecycles. (Responded to in EVT346)	EVT178

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4474	Claims that seismic sounds can cause sublethal and lethal impacts on short-finned eels, such as disorientation, reduced energy budgets, stress or mortality.	Appendix E3, and additional species-specific assessment in F3, provides a thorough summary of short-finned eel biology, aligned with the best available science and fisheries data. The titleholder acknowledged that the Regia MSS Operational Area is offshore in the Otway Basin (south-west of Vic), which is adjacent to, with some limited overlap, to the potential migration corridor for these eels heading toward the western Tasman Sea. Appendix E3 identified "Eels (Anguilla spp.)" as a receptor in the environment that could be affected by underwater sound (section 4.1.6), precisely because Short-finned Eels are present in coastal catchments adjacent to the survey area and undertake marine migrations. The EP outlines the broad geographic distribution of Anguilla australi, extending from Queensland through Victoria, Tasmania, South Australia, and New Zealand, to demonstrate that eels from various regions may pass through or near the survey area. Accordingly, the EP did not overlook the potential for eels originating from rivers west of the survey area (such as the Glenelg River, Coorong, and Murray River) to travel along the continental slope. Instead, it treated the Short-finned Eel as a wide-ranging species and assessed it on that basis. The EP did not list each river individually because it considered the species at a regional population level. The evidence and conclusions therefore apply to all Short-finned Eels in the area, irrespective of origin, as their marine behaviour and sensitivities are expected to be consistent across populations. The EP also includes detailed description of lifecycles, referencing the latest science, including the migrations in these lifecycles. (Responded to in EVT346)	EVT178
4475	Objects to the inconsistent consideration of short-finned glass eels arriving during April to October as they have been recorded to arrive throughout the year.	The EP describes the Short-finned Eel migration from Victoria largely occurring during late summer through autumn consistent with prevailing scientific theory. (Responded to in EVT346)	EVT178

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4476	Objects to the lack of consideration of glass eel feeding, or the potential of having to 'swim out of the way' of seismic testing on energy budgets.	The Environment Plan (EP) fully considered potential effects of seismic activity on Short-finned Eels, particularly in relation to their ability to detect, avoid, and respond to underwater sound while migrating. The assessment followed internationally recognised scientific frameworks (e.g., Popper et al. 2014) and incorporated conservative sound-modelling to determine thresholds for injury and behavioural disturbance. The assessment concluded that no eels would be close enough to the seismic source to suffer injury or mortality, as eels are free-swimming and capable of moving away from noise. A soft-start procedure will also allow animals to detect and avoid the source gradually. Behavioural responses such as temporary avoidance or course adjustment were acknowledged and assessed as the most likely effect. Any such diversion would be localised and short-term, on the scale of hundreds of metres to a few kilometres, and would not meaningfully affect the eels' long-distance migration or energy reserves, given their natural capacity for endurance. The EP therefore determined that behavioural changes would be temporary, reversible, and of low intensity, with no population-level consequences. Supporting evidence from global studies shows no recorded cases of eel mortality or population decline linked to seismic surveys, including in the Otway Basin, where over 80 surveys have occurred in the past six decades. The assessment concludes that Short-finned Eels may move away from the survey area when exposed to sound, but will resume migration without harm or delay, and that predicted impacts are minor, transient, and not significant at individual or population scales. (Responded to in EVT346) Appendix E3 section 4.1.6 has been updated to include: It has been noted by Van Wichelen, et al (2022) that glass eels feeding during their migration is highly restricted, therefore when discussing impacts to glass eels, this has been considered.	EVT178

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4477	Objection about the lack of adequate recognition and consideration of non-lethal, cumulative, and long-term impact of seismic noise on short finned eel.	Short-finned Eels possess a swim bladder and were grouped with other fish having swim bladders for acoustic impact analysis, following the guidance of Popper et al. (2014). For fish in general, and eels in particular, the key impact mechanisms considered were potential for hearing damage or physiological injury from intense sound close to the source, and behavioural disturbance (e.g. startle responses or avoidance movement) at various distances. The assessment concluded that no fish, including eels, would be close enough to the seismic source to suffer mortality or physical injury, with measures in place such as soft-starts the free-swimming fish are able to move away from the sound source, and that they anticipate no direct fatalities or lasting injuries to adult eels in the water. The titleholder also acknowledged that fish may exhibit behavioural reactions to seismic noise and that they assumed a conservative scenario where fish might show avoidance responses at substantial distances. In the worst case, an eel migrating through the area might detect the seismic pulses at distance and alter its course or depth to avoid the highest sound levels. The EP considered such avoidance to be a temporary and localized effect and that any diversion would likely be on the scale of hundreds of meters to a few kilometres at most. Given that migrating eels travel thousands of kilometres to reach spawning grounds, a short detour or a brief pause is not expected to jeopardize their overall journey. The EP's finding was that behavioural changes would be temporary and would not have long-term impacts on individuals or the population. The Titleholder noted that the EP acknowledges the existing pressures on the Short-finned Eel population and was developed to demonstrate that the proposed seismic survey would not materially increase the cumulative impact on the species. The cumulative impact assessment concluded that, even when accounting for other regional activities, the incremental effect of the survey on overall conservation values would be neutral to negligible. (Responded to in EVT346)	EVT178

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4478	Objection to CGG's statements of 'no predicted mortality' on short finned eels is not supported.	This conclusion is supported by conservative modelling, peer-reviewed scientific research, and a precautionary evaluation of worst-case scenarios. No new scientific information was identified in the submission that had not already been considered in the Environment Plan. References such as Koster et al. (2021) were already incorporated into the EP, which includes the IUCN listing of near threatened. CGG notes that while Jacoby et al. (2015) raised conservation concerns for the species, the EP's findings are consistent with ensuring that the proposed activities do not exacerbate those concerns. (Responded to in EVT346)	EVT178
4479	Objection to CGG's statements about proposed mitigation measures in relation to the short finned eel.	The Environment Plan (EP) adopts an evidence-based, risk-weighted, and precautionary approach, consistent with both the letter and spirit of the precautionary principle in Australian law. The EP concludes that the impacts and risks to Short-finned Eels have been reduced to As Low As Reasonably Practicable (ALARP) and remain acceptable, meeting the requirements for EP acceptance under Regulation 34. While recognising that NOPSEMA's independent review will make the final determination on the EP's adequacy, CGG's view is that the document meets the regulatory acceptance tests, including demonstrating no unacceptable impacts on World Heritage values and consistency with the principles of Ecologically Sustainable Development (ESD). (Responded to in EVT346)	EVT178
4480	Objection to CGG's frequency range of 0-200Hz on migrating eels, stating the EP minimises how seismic testing may affect the eels.	Short-finned Eels possess a swim bladder, though it is not primarily used for hearing, and were therefore grouped with other fish possessing swim bladders for the purpose of acoustic impact assessment. The Environment Plan (EP) applied the internationally recognised framework of Popper et al. (2014) to establish scientifically validated thresholds for potential injury and behavioural disturbance. The assessment considered possible hearing damage, physiological effects from intense sound near the source, and behavioural responses, such as avoidance or startle reactions, at varying distances. As no specific audiograms exist for Short-finned Eels, the EP adopted a conservative approach, assuming they would respond similarly to other fish with comparable anatomy. (Responded to in EVT346)	EVT178

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4481	Claims that content provided in the Regia Environment Plan is inconsistent, incomplete, misleading and has multiple errors in logic and critical thinking and does not accurately represent the evidence about the life cycle of the short-finned eel.	The version of the EP referenced by the stakeholder (June 2024) had been substantively updated with multiple iterations during NOPSEMA's assessment and following public comment which addresses all scientific and policy related claims. Titleholder also explained that the Regia MSS EP was prepared and assessed under an objective based regulatory regime, which requires the titleholder to consider a broad definition of the environment, including cultural heritage and social values, not just the immediate onshore operational area.	EVT178
4482	Claims the inadequacy of the Regia MSS Environment Plan in applying the precautionary principle and using transparent, comprehensive evidence for impact assessment.	The claim that the process lacked transparency is not supported by record as the project ran an unusually open process where the EP and appendices were published on the Consultation Hub, and the public were provided with updates at every revision. The EP's approach is fully consistent with Australian regulatory requirements for EP's which demand evidence-based assessment and precaution in the face of uncertainty and that the Regia MSS EP applied conservative assumptions and safety margins wherever scientific uncertainty existed. CGG are confident that the EP's evidence-based, risk-weighted approach – supplemented by precautionary, worst-case scenarios – meets both the letter and spirit of the precautionary principle in Australian law. The EP applies precaution through conservative assumptions, rigorous modelling, and layered safeguards, while also ensuring that conclusions remain scientifically defensible and evidence based. CGG have taken precautionary measures without abandoning accuracy or overstating unverified threats.	EVT178
4483	Claims insufficient monitoring and need for application of conservation recommendations and the IUCN's ongoing monitoring advice.	The EP applies the precautionary principle and ESD, using a conservative risk assessment that predicts negligible impact and is consistent with avoiding any deterioration in the species' conservation status. The EP acknowledges the conservation concerns highlighted in scientific literature, noting that the Short-finned Eel is classified as Near Threatened on the IUCN Red List. However, this classification is attributed primarily to freshwater habitat issues, not marine threats. The EP did not propose species-specific monitoring for eels because the predicted impacts were deemed so low (minor, transient disturbances with no lasting harm to individuals or the population), however would be open to assisting researchers.	EVT178

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4484	Claims that the Regia MSS assessment on mortality of eels shows a critical thinking error, confirmation bias, logical fallacy and exaggerated language.	CGG maintains that the EP contains no fundamental logical flaws and expresses confidence that NOPSEMA, as the independent regulator, would identify any such issues in fulfilling its statutory role. The EP applies a structured weight-of-evidence approach, drawing on multiple lines of scientific information rather than selectively minimising impacts; where uncertainty was identified, the EP adopts precautionary assumptions. CGG states that the EP meets all regulatory requirements by describing the activity and environment, identifying all credible impacts and risks, and demonstrating that they are reduced to ALARP and acceptable levels. Regarding eel mortality, CGG notes that the EP explicitly predicts no mortality or injury based on modelled sound levels. Acoustic modelling shows the distance at which injury could occur is limited (60–230 m), and because eels are mobile, combined with the soft-start procedure, the likelihood of harm is extremely low. In response to concerns about confirmation bias or minimising language, CGG explains that terms such as “low risk” and “no measurable impact” are technical descriptors supported by evidence, not value judgments. They state that contextual information—such as the species’ resilience and broader existing pressures—is provided to ensure accuracy rather than diminish concerns. CGG also acknowledges minor typographical errors in species names but clarifies that these do not affect the scientific assessment.	EVT178
4485	Claims the activity will exacerbate existing pressures on freshwater eel.	The EP directly acknowledges the conservation concerns identified in the scientific literature and states that its impact conclusions are designed to ensure the proposed activity does not exacerbate those threats. It contextualises the Short-finned Eel’s resilience by noting that the species faces far greater long-term pressures, such as overfishing, river barriers, drought, and climate-driven changes to ocean currents, and that its Near Threatened status on the IUCN Red List is primarily due to freshwater habitat issues rather than marine impacts. Within this broader context, the EP concludes that the Regia MSS survey will not materially add to the cumulative pressures on the eel population. The cumulative impact assessment predicts the survey’s incremental effect to be neutral to negligible, and that any impacts will be minor and temporary, with no risk of jeopardising migration success or the species’ viability.	EVT200

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4486	Claims that the overall ecological health of systems is impacted by stressors affecting the short finned eel.	The EP recognises the ecological significance of the Short-finned Eel within the wider system. It notes that the species plays an important dual role in aquatic food webs, as both predator and prey, and is an ecologically connected component of marine and freshwater ecosystems. The EP describes the species' resilience, highlighting that Short-finned Eels are broadly distributed, migratory, and have persisted through natural environmental fluctuations over millennia. The EP assesses whether any predicted impacts could translate into population-level or ecosystem-level consequences. It concludes that Short-finned Eels are expected to experience only minor and temporary behavioural disturbance from the seismic survey, with no lasting harm to individuals or the population. Because abundance and function are predicted to remain intact, the species' ecological roles are not expected to change. Consistent with defined acceptable impact criteria, the assessment finds that effects will be temporary, reversible, small-scale, and low intensity at the population level. On this basis, the EP concludes there will be no ripple effects on predators, prey, or ecosystem processes. The document further supports this conclusion by noting that more than 80 seismic surveys have taken place in the Otway Basin over six decades, with no recorded decline in Short-finned Eel populations attributable to seismic activity.	EVT200

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4487	Claims that CGG's proposed activities are inconsistent with the Recovery Plans made under the EPBC Act, the Southern Right Whale Recovery Plan and the Blue Whale Recovery Plan. GMTOAC states that these activities pose known physical and behavioural risks to the Eastern Population of Southern Right Whales and to Pygmy Blue Whales. These risks include impacts from anthropogenic underwater noise, particularly seismic noise, vessel strikes, climate-driven changes in prey availability, and the cumulative effects of these pressures, all of which have the potential to injure or kill individuals and affect populations. GMTOAC notes that under the EPBC Act Program and NOPSEMA's decision-making guidelines, an Environment Plan cannot be accepted if it is inconsistent with a recovery plan. It emphasises that both Recovery Plans contain "Very High" importance actions requiring that Blue Whales and Southern Right Whales must be able to continue using their Biologically Important Areas (BIAs) without auditory impairment, injury, or displacement. The plans also call for preventing disruption and displacement of Karntubul (Southern Right Whales) from BIAs due to anthropogenic noise such as seismic surveys.	CGG maintains that its approach aligns with statutory obligations and industry best practice. It asserts that all regulatory requirements under Regulation 34 have been met, and that its environmental performance outcomes and control measures are grounded in the best available science and tailored to the ecological and cultural sensitivities revealed through consultation. The Regia MSS Environment Plan (EP) was designed to ensure impacts and risks are reduced to As Low As Reasonably Practicable (ALARP) and to an acceptable level. Regarding whale protection, CGG highlights that the EP includes specific mitigation measures for culturally and ecologically significant marine fauna, including species noted in relevant Recovery Plans. Early correspondence in February 2023 identified Southern Right Whales and Pygmy Blue Whales as key sensitivities, and the EP commits to spatial and temporal avoidance measures, sound-source shutdowns, and exclusion zones to protect them. These measures explicitly consider cultural significance, such as timing restrictions to avoid the Karntubul (Southern Right Whale) birthing period. The whales, Karntubul and Wuuloc, are identified in the EP as sensitive receptors with dedicated protective measures. CGG confirms that these cultural and ecological sensitivities were incorporated into the environmental assessment. The EP acknowledges the sacred cultural status of Koontapool (Southern Right Whale) and Wuuloc (Pygmy Blue Whale) for the Gunditjmara people and includes them in impact and cumulative risk assessments. Appendix F3 references the Nyamat Mirring Plan 2023–2033 and recognises Gunditjmara spiritual connections, including to Karntubul. CGG substantively addresses the relevant issues, including underwater noise, vessel interactions, and cumulative effects. The EP sets out noise-management frameworks, timing restrictions, and cumulative impact analyses consistent with the concerns raised.	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4488	Claims that CGG has not incorporated effective control measures to reduce impacts and risks to ALARP or to ensure those impacts will be acceptable. It maintains that several control measures in the Environment Plan (EP) are inconsistent or conflicting, making them difficult or impossible to implement. GMTOAC further contends that CGG has weakened its mitigation framework compared with the November 2024 EP by replacing required sound-source shutdowns with an undefined "low power zone" when Karntubul (Southern Right Whales) are present. Also, that CGG has not ensured its activity will avoid unacceptable impacts on Koorn Moorn, which feed in Nyamat Mirring waters extending 200 m around Deen Maar Island. It claims CGG has not used the best available science in its noise modelling and has relied on comparative analyses rather than updated models, making results difficult to interpret. Additionally, GMTOAC argues that the revised ALARP assessment methodology introduced in the April 2025 EP, intended to address flaws in the November 2024 version, is inadequate, less systematic, and less defensible than the earlier approach.	CGG maintains that the Environment Plan (EP) incorporates effective control measures and satisfies the legal requirements for demonstrating that impacts and risks have been reduced to As Low As Reasonably Practicable (ALARP) and to an acceptable level. It asserts compliance with Regulation 34 and emphasises that its environmental performance outcomes and controls are grounded in the best available science and tailored to the identified ecological and cultural sensitivities. Culturally significant species and features, including Karntubul and Koorn Moorn, are included in impact and cumulative risk assessments using a methodology intended to reflect both scientific evidence and cultural. CGG argues that GMTOAC's objections substitute personal disagreement for the regulatory test, noting that the legislation does not require stakeholder agreement or grant veto powers over EP design decisions. While GMTOAC criticises the revised ALARP assessment methodology (April 2025 EP), CGG reiterates that its approach satisfies the regulatory criteria. In response to claims that mitigation measures have "weakened", particularly the shift from sound-source shutdowns to a "low power zone", CGG characterises these changes as part of a normal, adaptive, and consultation-driven refinement process. It describes the evolution of the activity as a progressive reduction in operational footprint, increasingly targeted controls, and strengthened performance-based measures, noting that core protections such as timing restrictions to avoid Karntubul birthing seasons remain in place. CGG states that cultural and ecological sensitivities associated with Karntubul, Wuuloc, and Koorn Moorn have been integrated into the assessment, with Appendix F3 acknowledging their cultural significance and informing mitigation commitments. CGG reiterates that its control measures are based on contemporary scientific evidence and incorporate cultural and ecological sensitivities throughout the EP.	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4489	Claims that CGG cannot determine what constitutes an "acceptable" level of impact or risk to Gunditjmara cultural values in Nyamat Mirring. States the April 2025 Environment Plan contains flawed cumulative impact assessments due to this lack of consultation. GMTOAC identifies several shortcomings: CGG's interpretation of potential impacts to Gunditjmara and other First Nations cultural heritage is too narrow; CGG wrongly assumes that acceptable ecological impacts equate to acceptable cultural impacts; and CGG's cumulative impact assessment for Karntubul (Southern Right Whale), previously criticised by NOPSEMA in its February OMR, remains unchanged.	CGG rejects GMTOAC's claim that inadequate consultation prevents CGG from determining "acceptable" levels of cultural impact, asserting that it fully met its consultation obligations. CGG argues that the legal test is whether the Environment Plan demonstrates impacts and risks are reduced to ALARP and to an acceptable level. It maintains that GMTOAC's critiques conflate subjective opinion with the regulatory standard under Regulation 34 and emphasises that the law does not grant stakeholders a veto over design decisions. In response to the assertion that its interpretation of cultural heritage is too narrow, CGG maintains that GMTOAC has already articulated its cultural values clearly and extensively through published materials and received during consultation. These values, encompassing ceremony, obligations, kinship systems, spiritual relationships, and ecological connections are thoroughly integrated across the EP. The EP references the Nyamat Mirring Plan 2023–2033, incorporates cultural values and sensitivities into Appendix F3, and identifies culturally significant species and places as sensitive receptors with tailored management measures, for example, timing restrictions to avoid birthing seasons. CGG states that it has incorporated analysis of cumulative effects on Sea Country, including those arising from the survey in combination with other activities. It confirms that Karntubul is included in cumulative risk assessments with corresponding mitigation commitments.	EVT352
4490	CGG has failed to adequately assess the impacts of its proposed activity on the Budj Bim World Heritage Cultural Landscape. GMTOAC further states that CGG did not sufficiently evaluate impacts on Kooyang, a culturally significant species whose lifecycle and migration underpin the world heritage values of the Budj Bim Cultural Landscape and extend well beyond its physical boundaries.	Culturally significant features, including the Budj Bim landscape, were included in both impact and cumulative risk assessments using a methodology that blends scientific evidence with cultural narratives. Regarding Kooyang (Eel), CGG maintains that this culturally important species, whose lifecycle is central to the world heritage values of Budj Bim, was addressed within the EP's impact and cumulative assessments. These assessments include both Kooyang's cultural significance and ecological role. CGG reiterates that its EP is consistent with statutory obligations, based on best-available science, and tailored to the cultural and ecological sensitivities identified. CGG maintains that the Budj Bim Cultural Landscape and Kooyang have been incorporated into the EP and that this inclusion meets regulatory standards for demonstrating ALARP and acceptable levels of impact.	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4491	Claims about the SRW and BW BIAs. States proposed activity will cause unacceptable impacts to all Karntubul species, including temporary & permanent hearing loss, displacement from BIAs, vessel strike, prey depletion during peak feeding/migration period, calving interruption, and impact to ecosystems and cultural landscapes as a result of the cumulative impact of these.	CGG has identified all Biologically Important Areas (BIAs) relevant to blue whales (BWs) and southern right whales (SRWs) and incorporated seasonal BIA use into the survey design through substantial temporal and spatial restrictions detailed in the EP. Predicted underwater-sound impacts on these Karntubul species, along with mitigation measures presented in Appendices E7 and F3, demonstrate impacts will remain acceptable and will avoid auditory impairment or displacement from BIAs or Habitats Critical to Survival (HCTS). CGG further notes that vessel-strike risk is already extremely low during seismic surveys and that additional controls in Appendix D2 ensure this risk is prevented and acceptable. It concludes that no changes to ecosystem structure, diversity, or function are expected from the one-off survey, with sound exposure too limited in extent and duration to affect prey, food webs, or predator–prey relationships. A cumulative impact assessment found residual cumulative effects to be low, reduced to ALARP, and acceptable, with no impacts predicted for regional marine parks. CGG also asserts consistency with the National Recovery Plan for Southern Right Whales and the Blue Whale Conservation Management Plan, stating that their objectives and recommended measures have been incorporated. Finally, CGG maintains that all marine mammal species likely to occur in the region have been adequately assessed using up-to-date EPBC Protected Matters data, and that mitigation measures ensure impacts to all listed species will remain acceptable and not inconsistent with EPBC Act protection provisions.	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4492	Claims that the eastern population of the Southern Right Whale, estimated at only 200–300 individuals, is at particularly high risk because its migration and reproduction Biologically Important Areas (BIAs) overlap directly with CGG's Operational Area and sound propagation footprint. According to the Southern Right Whale Recovery Plan, these whales use the affected region for reproduction between May and September and for migration between April and October. The Recovery Plan also notes that Southern Right Whales do not feed in coastal waters but are expected to feed, and possibly conceive, within the Australian Whale Sanctuary—an area entirely overlapped by the proposed Regia MSS activity. As a result, the seismic survey could occur within, or affect, conceiving, calving, and feeding grounds for this critically endangered sub-population. The species is particularly vulnerable to human impacts due to its low reproductive rate, long lifespan, and strong site fidelity to key habitats. The submission therefore emphasises the relevance of underwater noise, habitat degradation, and vessel-strike risks in the context of the proposed seismic activities.	The Recovery Plan explains that BIAs can be designated for key behaviours such as reproduction, foraging, migration, and resting. While Southern Right Whale BIAs in the Plan cover reproduction and migration, the Plan notes that foraging occurs across a much broader offshore latitudinal range (30°S–65°S) and is not linked to these BIAs. Because the Regia MSS is not located in Antarctic waters, it will not affect cetaceans that forage there. CGG states the survey will avoid peak SRW abundance in the mapped BIA and apply mitigation measures to ensure no SRWs are harmed, injured, or interfered with.	EVT352

4494	The claim highlights guidance from the Blue Whale Recovery Plan, which stresses the need for a precautionary approach when assessing threats at the population level. It notes that blue whales may continue feeding despite disturbance if alternative feeding grounds are limited, meaning that anthropogenic noise may still present significant risk even when behavioural responses are subtle. Drawing on the Recovery Plans, the submission identifies key threats relevant to assessing potential impacts of the Regia MSS activity: underwater anthropogenic noise, climate change, habitat degradation, vessel strikes, prey depletion, and the cumulative effects of these pressures. GMTOAC argues that CGG has not adequately assessed these threats, either individually or cumulatively, given that consultation on these matters remains ongoing. The submission states that, based on CGG's own impact metrics, the proposed seismic activities may result in moderate to major impacts from underwater noise, major risks of vessel strikes, major impacts associated with climate change, and potentially more severe cumulative impacts. It references the Commonwealth's Significant Impact Guidelines, which define significant impact and list criteria for determining when an action may threaten an endangered species' survival or recovery. GMTOAC concludes that moderate to major impacts, especially when cumulative effects are considered, meet the threshold of significant impacts and are therefore unacceptable. Finally, the submission notes that both Recovery Plans and EPBC Act Policy Statement 2.1 emphasise that seismic surveys should avoid biologically important areas during biologically important times and assess 3-4 years of baseline data. GMTOAC argues that this principle is not met in the timing and location of the proposed Regia MSS survey,	The EP is consistent with the Blue Whale Conservation Management Plan, which identifies seismic noise as a threat, by implementing measures that ensure blue whales can continue using the area without injury or displacement. This includes using MFOs and PAM, shutting down the seismic source if whales enter behavioural, or TTS-impact ranges, and complying with EPBC vessel-operation requirements such as maintaining a 300-metre caution zone. CGG states it will also avoid peak-abundance periods by commencing the survey after most SRWs have left the BIA and during months when blue whale numbers are low. Drawing on current scientific literature, the recovery plans, and detailed impact assessments, CGG maintains that all risks and impacts have been reduced to acceptable levels. While Appendix E7 initially identifies major impacts for SRWs and BWs due to their threatened status, CGG notes that both species were reassessed in Appendix F3, which added further measures for SRWs; Appendix F3 concludes that residual impacts to both species are reduced to an acceptable level.	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
	increasing the potential for displacement from critical habitats essential to whale survival and recovery.		
4496	GMTOAC objects to CGG removing a previous control measure limiting seismic discharge in the Pygmy Blue Whale foraging BIA during periods of low whale presence, replacing it with a vague condition requiring CGG to determine whether whale presence is "compatible" with proceeding. GMTOAC argues this new measure lacks detail on how whale presence or "unacceptable disturbance" will be assessed, and that it fails to reference Recovery Plans which define unacceptable impacts. GMTOAC warns that the proposed survey timing (April–June 2026) coincides with peak Pygmy Blue Whale foraging season and Southern Right Whale migration and calving periods, meaning the seismic survey is likely to occur when both species are using their BIAs. Preventing whales from accessing these areas, or exposing them to injury while they remain, would constitute unacceptable impacts inconsistent with Recovery Plan objectives.	CGG has further reduced the likelihood of interactions with marine mammals by excluding the April–June period and commencing the survey only after 15 September. Because blue whales typically do not arrive from Western Australia until November, CGG argues that most of the survey will occur when blue whales are absent from the area. It adds that sighting data show very few blue whales in November and December, with peak abundance occurring later, from January to March during the Bonney Upwelling.	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4501	GMTOAC objects that the EP sets out CGG's own "Defined Acceptable Levels" for cultural impacts arising from underwater sound on marine mammals, concluding that any such impacts would be short-term, temporary, and recoverable. GMTOAC and Gunditjmara reject this assessment, emphasising that CGG did not properly consult them on what levels of harm to cultural values, including impacts to culturally significant species such as Karntubul, would be acceptable. As these standards were developed unilaterally, GMTOAC and Gunditjmara do not accept CGG's conclusions regarding cultural impacts.	PROPOSED RESPONSE SUMMARY - CGG applied a comprehensive, transparent, ISO 31000:2009-aligned risk-assessment methodology, drawing on peer-reviewed literature and approaches accepted in numerous Environment Plans, to determine acceptable levels of environmental impacts and risks on both tangible and intangible values. Environmental aspects were systematically identified, impact severity and duration were assessed, and mitigation measures were evaluated using evidence and consultation. Acceptable impact levels (Appendix B1) and the assessment method (Appendix B9) were publicly released in May 2023. CGG concluded that impacts and risks are acceptable because risks were fully identified, lower-level risks were eliminated or controlled, major risks were examined in detail, activity limitations constrain operations, predictions were assessed against defined acceptable levels, uncertainty was considered, and the activity complies with the EPBC Act and ecologically sustainable development principles. CGG also relied on relevant sources, including peer-reviewed studies and UNESCO guidance describing the deep interdependence of tangible and intangible values, to inform acceptable levels where Traditional Owner input has not yet been provided. GMTOAC and Gunditjmara have been invited to contribute to cultural-value management, and the EP includes an Implementation Strategy embedding a Sea Country Protection Plan to support ongoing engagement and adaptive management. The Regulations (Regs 17–18) further ensure that any significant new cultural or environmental information must trigger revision of the EP. CGG remains ready to continue collaboration with GMTOAC and Gunditjmara throughout the activity.	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4502	GMTOAC objects to the seismic survey's potential impacts on krill populations, including larval krill, which form a foundational part of the marine food web in Nyamat Mirring and are a critical food source for culturally significant species such as Pygmy Blue Whales and Southern Right Whales. They state that CGG's EP downplays potential impacts by comparing them to natural fluctuations in krill abundance, a framing GMTOAC considers inappropriate because it subsumes an anthropogenic disturbance within natural variability rather than assessing it cumulatively. GMTOAC emphasises that Nyamat Mirring and the broader oceanic system are already under significant stress from climate change and other human impacts. They point to the catastrophic Karenia mikimotoi algal bloom in South Australia as an example of how cumulative pressures can destabilise marine ecosystems. GMTOAC also references the recent failure of the Panama Upwelling, the first such event recorded in over 40 years, as further evidence that natural oceanographic processes are increasingly vulnerable to cumulative stressors. They argue that these examples undermine CGG's assumptions about the robustness of the system and highlight the need for a more precautionary, cumulative-impact-focused assessment.	CGG undertook an extensive review of the scientific literature to understand regional upwelling systems and their dynamics, assessing more than 65 publications to support the confidence of its analysis. Detailed assessments of upwelling and krill are provided in Appendices E2 and F3 of the EP. CGG does not agree with the suggestion that the assessment is trivial and remains confident in the robustness of its findings. CGG also remains open to receiving questions or new relevant information. Additionally, CGG notes that references to Panama upwelling processes are not applicable to the Regia MSS assessment and maintains confidence in the supporting literature base.	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4506	GMTOAC claims that NOPSEMA has repeatedly raised concerns about deficiencies in CGG's noise modelling, first in August 2024, and again in its February and June 2025 OMRs. Despite this, the April 2025 EP appears to rely on noise models last updated in May 2023 and June 2024, and GMTOAC notes that it is unclear how these outdated models could address NOPSEMA's concerns. NOPSEMA specifically found that CGG's modelling was not based on the best available science because it failed to incorporate the updated 2024 US NMFS noise-injury thresholds. Rather than rerunning its full acoustic models using the updated criteria, CGG instead hired a consultant to compare the new NMFS thresholds with its older modelling. NOPSEMA criticised this approach, stating it was unclear whether such a comparison could reliably be applied to historical model outputs, particularly since the consultant did not provide the underlying input data used to generate the new results. GMTOAC argues that under the precautionary principle, CGG should adopt whichever modelling outputs predict the greatest potential harm, rather than relying on older, less precautionary models. They express serious concern that foundational flaws in the noise-modelling approach mean the impacts to marine mammals may be significantly underestimated, calling into question the accuracy of the EP's impact conclusions and the adequacy of its proposed protective measures for Nyamat Mirring and its species and ecosystems.	CGG notes that how the titleholder responds to NOPSEMA's information requests is a matter between the titleholder and the regulator. CGG has completed updated acoustic modelling using the latest science, including NMFS 2024 guidance, and has refined the Regia MSS design to be more environmentally conservative. These updated results are included in the current EP, which remains robust and based on the best available information. CGG notes that GMTOAC may be relying on an outdated EP version or may not have fully considered the updated material.	EVT352

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4508	GMTOAC claims inadequate assessment of noise on culturally important Kooyang. GMTOAC notes that CGG's EP groups Kooyang with other fish possessing swim bladders, and acknowledges that fish with swim bladders may be more susceptible to physiological trauma from seismic noise. However, while the EP claims no studies have demonstrated direct mortality of adult fish from seismic emissions, GMTOAC highlights that it has repeatedly requested an independent study on Kooyang specifically, a request CGG has refused. Across multiple appendices, CGG's assessment appears inconsistent. Some sections state that eels fall within the category of fish whose hearing directly involves a swim bladder, while other parts of the EP fail to mention this heightened sensitivity or cross-reference relevant acoustic impact studies. GMTOAC argues these inconsistencies obscure the true risk profile and hinder meaningful evaluation of proposed controls. Finally, GMTOAC challenges CGG's conclusion that risks to adult Kooyang will be "extremely low" and indistinguishable from natural population variation. GMTOAC notes that this claim lacks scientific justification and appears to rely on the eel's behavioural avoidance or instinctual drive to migrate rather than on concrete control measures to prevent harm.	CGG recognises kooyang as a profoundly important Gunditjmara cultural value and not just an ecological species. The Environment Plan explicitly protects kooyang by applying culturally defined acceptability criteria, including ensuring no material reduction in kooyang abundance, recruitment, or sustainable harvesting that could impact Budj Bim practices or World Heritage values. This cultural framing underpins the entire assessment. CGG rejects claims that its underwater-noise assessment is inadequate, noting that it is detailed, conservative, peer-reviewed, and fully compliant with best-practice standards. Kooyang are assessed using the highest-sensitivity category under EPBC Policy 2.1, and predicted noise-effect zones are extremely small. The survey timing has been shifted to September–December, avoiding: peak adult silver-eel migration (Feb–May), most glass-eel recruitment (Oct–Feb), and juveniles that would already be inside river/estuary systems. This means minimal temporal or spatial overlap with key life stages. There is no credible pathway for population-level or culturally significant effects, and global evidence shows no seismic survey has ever been linked to effects on anguillid eel recruitment. Overall, the assessment is precautionary, culturally informed, and reduces risks to ALARP. CGG remains open to incorporating additional Gunditjmara knowledge or scientific evidence, but based on current information, no material impact on kooyang is credible.	EVT352

4509	GMTOAC claims that CGG's approach to assessing impacts on Kooyang is inconsistent with the precautionary principle under the EPBC Act, especially given Kooyang's cultural significance and its central role in the World Heritage–listed Budj Bim Cultural Landscape. GMTOAC states that CGG has repeatedly asserted, without scientific evidence, that juvenile eels will not be near the seismic activity, despite the absence of data tracking their migration from the Coral Sea to Gunditjmara Sea Country. They outline the well-established seasonal migration patterns of adult and juvenile Kooyang and state that these movements directly link the open ocean to the Budj Bim aquaculture systems. UNESCO inscribed Budj Bim as a World Heritage property because of Gunditjmara's long-standing eel aquaculture, which relies on the uninterrupted migration of Kooyang. GMTOAC highlights that published research, co-authored by Gunditjmara Elders and scientists, shows adult eels travel through areas that overlap with CGG's Operational Area and EMBA, meaning migrating Kooyang are likely to encounter the seismic survey if undertaken in April 2026. GMTOAC also raises concerns regarding CGG's framework for assessing impacts on World Heritage values. They argue that CGG wrongly limits its definition of "direct effects" to the physical boundaries of the property, failing to recognize that Kooyang moving through the marine environment outside the site are essential to the World Heritage values themselves. GMTOAC rejects CGG's categorisation of impacts to Kooyang and Gunditjmara cultural practices as merely "indirect," and notes the EP provides no explanation for its claim that such impacts are "immeasurable."	CGG affirms the deep cultural importance of kooyang to the Gunditjmara People and agrees that any activity causing a population-level decline in kooyang that recruit into the Budj Bim wetland systems would be unacceptable. However, the claims in paragraphs 118–132 are based on legal and factual misunderstandings. The World Heritage property is strictly limited to the freshwater Budj Bim wetlands on the lava flow and does not include estuarine, coastal, or oceanic waters. Under UNESCO rules, World Heritage protection applies only within the fixed site boundaries and cannot extend to migratory species outside them. No World Heritage site has ever been interpreted the way GMTOAC suggests. CGG clarifies that the OUV attribute "ecology and life-cycle of kooyang" refers specifically to the parts of the life cycle occurring within the engineered aquaculture systems inside the property, not the entire oceanic migration. International precedents—such as the Monarch Butterfly Reserve, the Yellow Sea Migratory Bird Sanctuaries, and the Wadden Sea, show that impacts outside property boundaries are not considered direct impacts on World Heritage values. Scientifically, the EP uses best-practice criteria, with predicted noise effects on kooyang limited to very small distances (<300 m), and the survey timing (Sept–Dec) avoids overlap with major migration and recruitment periods. No tracking data show a kooyang migration corridor through the survey area, and the contribution of one 60-day survey to cumulative pressures is negligible. Appendix F3 confirms alignment with relevant management plans, which only consider impacts inside the property's boundaries. CGG states it remains open to further Gunditjmara knowledge and evidence, and has updated the EP to consider the provided management plans, but concludes that no credible pathway exists for material impact on kooyang abundance within the Budj Bim wetlands or on the property's Outstanding Universal Value. The EP is therefore lawful, scientifically robust, and compliant with Australia's World Heritage and EPBC Act obligations.	EVT352

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	Further, GMTOAC states that CGG has only referenced one of the required Budj Bim management plans and has not demonstrated engagement with the others. They contend that CGG has not shown how the proposed activities align with or avoid contravening the management goals, especially those aimed at restoring healthy Kooyang populations. GMTOAC concludes that CGG's failure to properly account for the cultural, ecological, and World Heritage significance of Kooyang is unacceptable to Gunditjmara, whose stewardship of Budj Bim spans millennia and underpinned the site's World Heritage listing.		
4510	GMTOAC claim that CGG's proposed seismic survey would elevate chronic ambient noise levels and disrupt acoustic-dependent functions such as reproduction, feeding, navigation, predator avoidance and maintaining social structures. While CGG has acknowledged that an ambient noise assessment may be required to inform its impact analysis, GMTOAC contends that such a baseline must begin with an understanding of the natural, pre-industrial soundscape before incorporating existing anthropogenic sources such as shipping and offshore petroleum activity. GMTOAC suggests that this assessment could form part of a Gunditjmara Cultural Values Assessment (CVA). However, in the absence of a comprehensive baseline and analysis of how CGG's operations would contribute to cumulative noise levels, GMTOAC remains concerned that the Environment Plan does not adequately describe the affected environment, as required by the Regulations, and cannot reliably assess or reduce impacts on Nyamat Mirring, including chronic noise exposure, to acceptable or ALARP levels.	CGG acknowledges GMTOAC's concerns about acoustic impacts on Nyamat Mirring but notes that the EP already includes a rigorous, science-based assessment of underwater sound and its interaction with culturally and ecologically significant species. The assessment incorporates five years of ambient noise data, current international scientific guidance, calibrated sound-field modelling, and real-time acoustic monitoring during operations. CGG has also committed to additional pre-survey ambient noise monitoring in sensitive nearshore areas, such as Southern Right Whale nursery habitat. The EP demonstrates that the survey's noise contribution will be temporary, spatially limited, and tightly managed through shutdowns, PAM, exclusion zones, and adaptive scheduling. Overall, CGG maintains that GMTOAC's suggestion that the EP lacks adequate baseline information or understanding of acoustic impacts is incorrect, and that the approach integrates strong science, cultural input, and real-time validation to ensure responsible management of any acoustic effects.	EVT352

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4511	GMTOAC claims that, without proper consultation and completion of a Gunditjmara Nyamat Mirring Cultural Values Assessment (CVA), CGG cannot legitimately determine what constitutes an "acceptable" level of impact on Gunditjmara cultural values. They highlight deficiencies in CGG's cumulative impact assessment, which adopts an unduly narrow definition of First Nations cultural heritage. In the EP, CGG limits cultural impacts largely to obligations to maintain spiritual connections and care for culturally significant species, despite having access to far broader definitions through documents it relied upon, such as the Gunditjmara Nyamat Mirring Plan and native title determinations. These sources make clear that Gunditjmara cultural responsibilities encompass Country, Ceremony, Lore, language, relationships, and rights to use and manage resources. GMTOAC also challenges CGG's unsubstantiated assumption that ecological acceptability equates to cultural acceptability, noting that this equivalence has never been expressed or endorsed by Gunditjmara.	CGG has relied on peer-reviewed literature, management plans, policy documents, and guidance to define acceptable levels for cultural values, including sources such as McConnell et al., which outlines the interdependence of tangible and intangible cultural values. CGG emphasises that it does not claim these values are equal in weight, and has repeatedly invited GMTOAC and the Gunditjmara to contribute directly to how their cultural values should be managed. The EP includes an Implementation Strategy with a Sea Country Protection Plan to ensure ongoing involvement of Traditional Owners and to enable adaptive management if new information emerges. Regulations 17 and 18 require CGG to revise the EP if any new or increased cultural or environmental impacts arise, ensuring that future cultural information can be formally incorporated. Appendix F3 (section 3.16) draws on documents such as the Nyamat Mirring Plan and native title determinations to describe cultural features and assess related impacts and risks. CGG remains willing to continue collaborating with GMTOAC and the Gunditjmara in ongoing consultation and environmental management.	EVT352

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4512	GMTOAC claims significant concerns about CGG's definition of "acceptable levels" of impact on Blue Whales and Southern Right Whales. CGG maintains that impacts are acceptable so long as each offshore operator conducts activities in a manner consistent with relevant Conservation and Recovery Plans, ensuring whales can continue using the area without injury or displacement. However, NOPSEMA has already criticised this approach, noting that measures designed for individual projects cannot simply be assumed to prevent cumulative impacts from overlapping noise fields without a clearer understanding of combined exposure regimes. Despite this critique, CGG appears to have carried this same rationale forward from its November 2024 EP into the April 2025 version, without addressing the deficiencies identified by NOPSEMA. GMTOAC argues that this is inadequate, especially in light of current environmental pressures affecting Nyamat Mirring.	CGG notes that GMTOAC appears to have referenced an outdated version of the Environment Plan. In the current EP, acceptable impact levels for Blue Whales and Southern Right Whales are defined using each species' Recovery Plan, and these levels are assessed through rigorous, literature-supported impact assessments in Appendices E7 and F3. In response to NOPSEMA's advice, the cumulative impact assessment was updated to include the sound sources and timing of all future and reasonably foreseeable activities. This added detail ensures that any potential cumulative impacts from additive sound exposure are assessed with appropriate contextual information.	EVT352

4514	GMTOAC objects to CGG refusing to address how its seismic survey, being the first step in a chain of petroleum exploration and production, will contribute to climate change impacts on Nyamat Mirring. When asked about future gas extraction or data purchasers, CGG dismissed these questions as "speculation" or commercially irrelevant, but GMTOAC argues that such information is essential for assessing indirect risks arising from the activity, as required by the Regulations. GMTOAC emphasises that Gunditjmara, not CGG, will live with the long-term consequences of industrialisation, environmental degradation, and climate impacts. They highlight that climate change already disrupts Gunditjmara cultural obligations, seasonal knowledge systems, native title rights, and their broader responsibilities to Country. Because seismic surveys are the initiating step enabling gas expansion, GMTOAC argues that CGG must evaluate the indirect environmental risks associated with likely future production and emissions. GMTOAC notes that international legal developments, including the recent ICJ Advisory Opinion on climate obligations, support the need to consider how exploration licensing contributes to harmful downstream emissions. They argue that CGG's refusal to disclose who it plans to sell seismic data to undermines transparency and prevents informed assessment by Traditional Owners in accordance with UNDRIP and Gunditjmara's Consultation & Negotiation Protocol. GMTOAC also challenges CGG's claim that exploration aligns with intergenerational equity under the principles of ESD. They assert that expanding gas fields contradicts both the EPBC Act's definition of intergenerational equity and	CGG explains that the Environment Plan (EP) is legally required to assess only the environmental impacts of the seismic survey itself, not hypothetical future emissions from possible gas developments by other parties. The Regulations and NOPSEMA's guidelines confirm that downstream combustion emissions, occurring years later, at unknown locations, by unknown proponents, are outside the scope of a non-production seismic survey EP. CGG's activity will not extract hydrocarbons, will not emit industrial greenhouse gases beyond normal vessel operations, and cannot predict whether any future development will occur. GMTOAC's request for CGG to quantify emissions from future gas fields is scientifically impossible, as it depends on unknown variables such as reserve size, technology, production emissions, market conditions, policy settings, and end-use combustion pathways. Producing such an assessment would be speculative and indefensible. Australia already regulates climate impacts through national GHG accounting, the Safeguard Mechanism, fuel and emissions policies, and export regulations—frameworks designed for activities that actually produce emissions, not exploration surveys. CGG also refutes the idea that the ICJ's 2025 climate advisory opinion applies to seismic surveys. The opinion concerns State obligations regarding global greenhouse gas emissions and does not mention seismic activities. It is nonbinding and cannot override Australia's existing regulatory framework. Where courts have restricted seismic surveys, they have done so under marine biodiversity law, not climate law. Similarly, GMTOAC's claim that ESD (ecologically sustainable development) blocks the survey is incorrect. ESD guides how development proceeds, not whether it is allowed. CGG has transparently assessed its impacts, addressed vessel-related emissions, and applied all practicable mitigation, consistent with ESD principles. Finally, the demand that CGG disclose future seismic data purchasers is both legally baseless and irrelevant to environmental risk. Such information is unknowable, commercially sensitive, and has no bearing on the impacts of the survey. Any future project would require its own approvals and environmental assessments. Overall, CGG concludes that GMTOAC's claims misinterpret the law, expand the EP scope beyond what the Regulations allow,	EVT352

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	scientific consensus requiring rapid emissions reductions. In GMTOAC's view, presenting exploration as beneficial to future generations is misleading, particularly when climate change is the primary threat identified in the Gunditjmara Nyamat Mirring Plan. They add that providing information about data purchasers would be essential for enabling future generations of Gunditjmara to make informed decisions about resource use in Nyamat Mirring.	and rely on speculative links that have no legal or scientific basis. Appendix F3, section 3.16.1 has been updated to include First Nations seasonal calendar.	