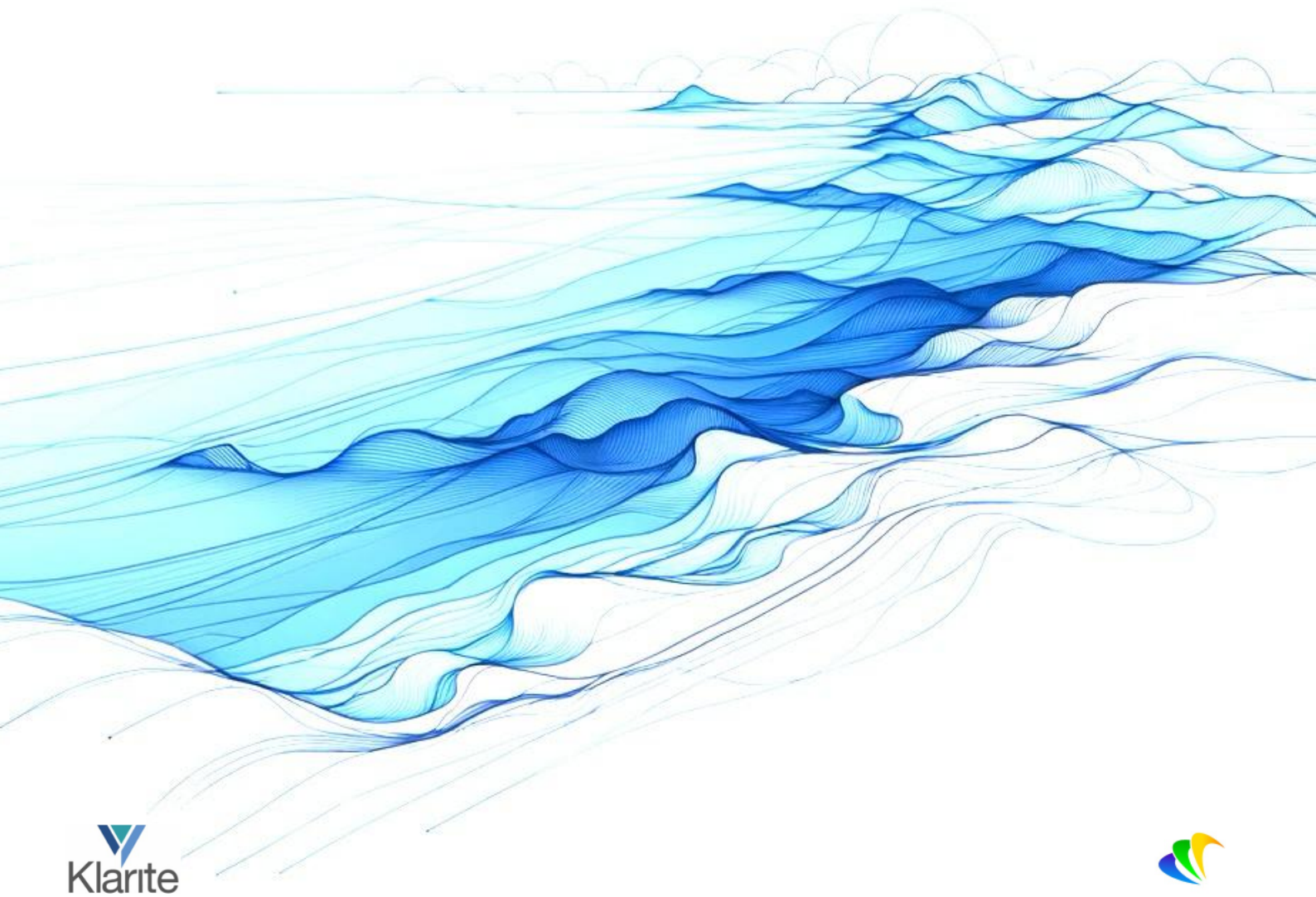
REGIA
Marine Seismic Survey

Acceptable Levels Assessment

Appendix F4: REG-EP-033-F4

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Klarite

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1 Introduction

This document is a collection of demonstrations that the Regia Marine Seismic Survey (**Regia MSS**) is an activity that can be carried out in a manner:

- In which the environmental impacts and risks of the proposed activity will be of an acceptable level.
- Consistent with the principles of ecologically sustainable development (**ESD**).

The principles of ESD play an important role in responsible decision-making. ESD encompasses the integration of economic, social, and environmental considerations in pursuit of a shared goal: meeting the needs of the present without compromising the ability of future generations to meet their own needs. Although ESD lacks a precise, accepted definition, it is generally recognised as an important concept as it ensures environmental factors and future generations are considered in assessing a current development, in this case the Regia MSS.

Readers of this document are encouraged to have read and understood the following documents at a minimum which provide important context to this assessment and underpinning evidence.

1. Description of the Activity (Appendix A2)
2. Environmental Assessment Process (Appendix B3 – Implementation Strategy)
3. Environmental Performance (Appendix G1)

The remaining documents that make up the Regia MSS Environment Plan (**EP**) also provide context to this assessment.

2 Purpose and Scope

This document was prepared prior to first submission of the EP, and has been updated for each new submission to address any new information, changes in assessment outcomes and feedback from relevant persons and the regulator. This document assesses the Regia MSS EP preparation process, through multiple methods to demonstrate how this activity will have environmental impacts and risks that will be of an acceptable level and can be carried out in a manner consistent with the principles of ESD.

3 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 1.

4 Defining Acceptable Levels

This section outlines the framework for defining acceptable levels of environmental impact and risk for the Regia MSS. Our approach aligns with best practices and regulatory requirements. Figure F4-1 is a copy of the conceptual framework for defining acceptable levels and establishing levels of environmental performance from NOPSEMA guidance documents. CGG has adopted this framework in application to the Regia MSS EP.

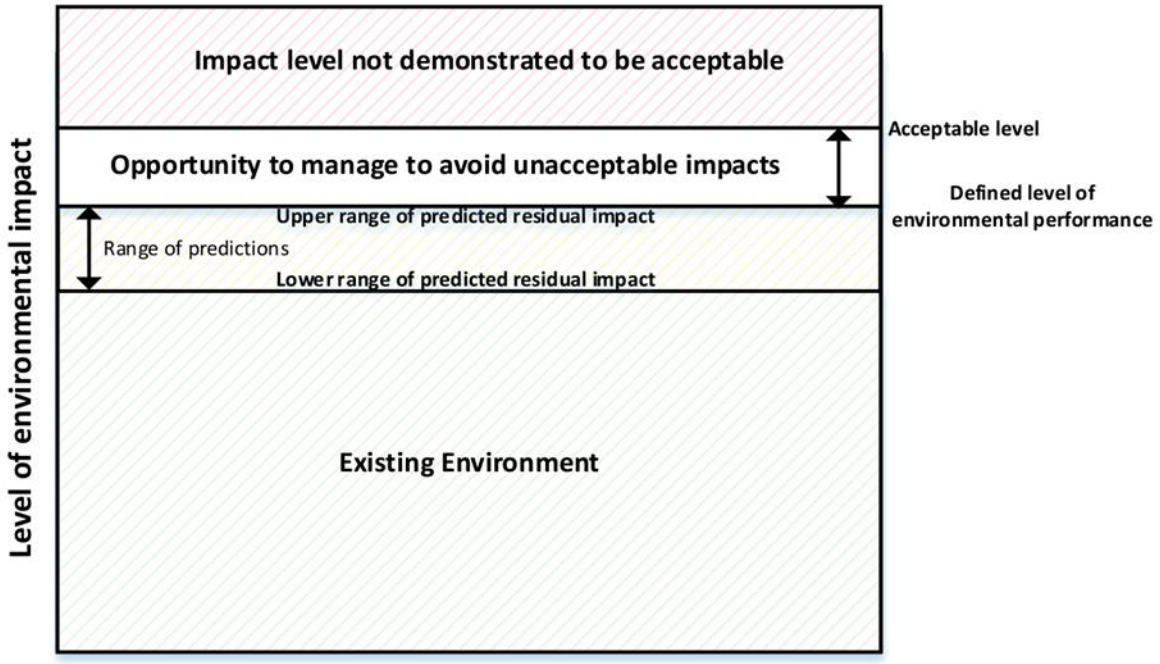


Figure F4-1 - Framework for defining acceptable levels of impact and associated levels of environmental performance (N-04790-GN1663).

In Figure F4-1, the terms used have the following meaning:

- ***Existing environment*** is the condition of the existing environment before the implementation of the project.
- ***Range of predictions*** illustrates that impact prediction processes can result in a range of residual impacts after the implementation of control measures due to a degree of uncertainty attributed to limitations in impact prediction tools, shortfalls in knowledge in the way that the environment responds to pressures.
- ***Opportunity to manage*** is the window that the titleholder must undertake responsive management measures to prevent the impact exceeding the defined acceptable level.
- ***Defined level of environmental performance*** is a level of performance of a proponent in relation to environmental performance outcomes (and environmental performance standards in EPs).
- ***Acceptable level*** is the maximum level of change in environmental parameters before the environmental effects become unacceptable.

- ***Unacceptable impact*** is the change in the environment that has exceeded the acceptable level and usually indicates that a change has occurred that is not acceptable from a socio-economic, ecological, biological, or cultural values perspective.

This conceptual framework considers the defined acceptable level, accounts for limitations in the impact and risk analysis undertaken (Appendices D1 – D4 and E1 – E9) and helps to establish levels of environmental performance in a manner that enables management response to prevent the acceptable level of impact from being exceeded. This framework highlights the opportunity for titleholders to manage their activities to prevent environmental impacts from becoming unacceptable by setting levels of environmental performance such that they represent a level that is better than or at least equivalent to the 'acceptable level' and therefore a precursor to unacceptable impact. By applying this approach, inaccuracies in the impact prediction process and uncertainties in the effectiveness of management controls can be accounted for using responsive management to avoid exceeding the acceptable level.

Table F4-1 establishes five parts of the framework used in this EP as the basis of defining acceptable levels. CGG used specific, defined acceptable levels of impact and risk for the Regia MSS based on these contexts. These levels are tailored to the unique aspects of our project, ensuring a responsible and well-informed approach to environmental management.

Table F4-1 - Framework for defining acceptable levels.

Acceptable Levels Framework	Description
Principles of ESD	We considered the principles of ESD, as set out in the Environment Protection and Biodiversity Conservation Act (EPBC Act), into our impact and risk assessment processes. These principles guide our efforts to manage environmental impacts and risks responsibly, ensuring long-term sustainability. The assessment of the consistency of CGG's decision making with the principles of ESD can be found in Appendix F4 Section 5.11.
Environmental Context	We considered the biological, ecological, economic, social, and cultural features relevant to the Regia MSS in each impact and risk assessment (Appendices D1-4 & E1-9). This comprehensive approach allows us to understand and respect the environment's inherent values and sensitivities.
Legislative Context	Our acceptable levels are consistent with legislation and other regulatory requirements, including relevant policy documents, guidelines, and conservation plans. This ensures our activities align with national standards and objectives.
Company (Internal) Context	Management of the activity is aligned with CGG's impact and risk assessment process and implementation strategy. This internal alignment ensures consistency and reliability in our environmental management practices.
External Context	We assess, respond to, and adopt measures in response to objections and claims received from relevant persons, attempting to satisfactorily address concerns in our environmental management strategies.

CGG applied a comprehensive and transparent methodology in defining acceptable levels of impacts and risks for the activity. CGG's impact and risk management method is grounded in the principles, framework, and processes defined by ISO 31000:2009 Risk Management. The method included steps for:

- Identifying and analysing environmental aspects associated with the activity for environmental impacts and risks.
- Predicting the extent, duration, and severity of those environmental impacts and risks.
- Assessing mitigation and management measures.

This process was systematic and evidence-based, incorporating consultation at all stages. Furthermore, the methodology placed a significant emphasis on establishing the context of assessments, incorporating both internal and external environmental factors. This included a detailed examination of the activity description, as well as preliminary information gathered through

independent assessments and relevant person feedback. This ensured that acceptable levels of environmental impact and risk are not only in line with legislative requirements but also consider the specific environmental, social, and economic contexts of the Otway Basin.

The defined acceptable levels in Appendix B1 were published in May 2023 on the Consultation Hub alongside our environmental assessment process (Appendix B9) to provide an opportunity to the community and relevant persons to understand the assessment process and influence the criteria used in the assessment process. The opportunity to comment was open for 60 days.[1]

5 Acceptable Level Demonstrations

The environmental impacts and risks of the activity are of an acceptable level because:

1. All environmental impacts and risks have been identified and assessed.
2. Lower order impacts and risks have been screened and eliminated or managed.
3. Higher order impacts and risks have been assessed by:
    a. Gathering knowledge about relevant environmental values and sensitivities.
    b. Defining acceptable levels for relevant environmental values and sensitivities.
    c. Predicting the levels of impact and risk.
    d. Evaluating the effectiveness of measures that protect the environment.
4. Activity limitations comprehensively bound the activity and environmental assessment.
5. Predicted impacts and risks of the activity have been compared to acceptable levels of impact and risk.
6. The titleholder has considered predictive uncertainty in the environmental assessments.
7. The environmental assessments are appropriate to the nature and scale of the activity.
8. Once managed, no pathways to unacceptable impacts were identified.
9. The proposed activity will comply with the requirements of the EPBC Act.
10. The proposed activity is consistent with the principles of ecologically sustainable development.

Each of these reasons is explained below, in detail, to demonstrate that environmental impacts and risks arising from the proposed activity are of an acceptable level.

5.1 Identification of all Impacts and Risks

CGG commissioned a Preliminary Environmental Impact and Risk Assessment (**PEIRA**) to identify all impacts and risks of the activity. Appendix B4 documents this first stage of the environmental assessment process and demonstrates that all environmental impacts and risks of the activity will be of an acceptable level because:

- Proper identification allows for a thorough assessment of the impacts and risks. This includes understanding both direct and indirect impacts, ensuring that all potential pathways to marine life, ecosystems, and socio-economic factors are considered.
- Identifying all impacts enables the development of targeted mitigation measures reduces the likelihood of unforeseen consequences that could exceed acceptable impact levels.
- Accurate identification of environmental impacts supports the analysis of the legislative and other requirements that apply to the activity. Demonstrating compliance with environmental

[1] Appendices B1 and B9 have since been merged into Appendix B3.

laws, regulations, and guidelines, which often specify that impacts must remain within acceptable limits. This has been completed in Appendix B2.

- Proper identification of impacts increases transparency and builds trust among relevant persons, including local communities, Traditional Owners, and environmental groups. This helps prevent conflicts and ensures that all concerns are addressed before the survey begins.
- Identifying all impacts allows for data-driven decisions regarding when, where, and how to conduct seismic activities to minimise impacts and risks. This includes selecting appropriate survey timings (e.g., avoiding breeding seasons) and using technologies that reduce sound intensity or directionality.

5.2 Screening and Control of Lower Order Impacts and Risks

The PEIRA also performed a screening of all impacts and risks to understand those that were negligible and those which required further assessment. Benthic disturbance, atmospheric emissions, and planned discharges were identified as lower order environmental aspects that could be treated with legislative requirements and industry standards. These required no further assessment because:

- By categorising impacts and risks into higher-order and lower-order, it becomes easier to prioritise the most critical issues. This ensures that efforts and resources are focused on managing and mitigating impacts that have the greatest potential to cause significant harm.
- Environmental assessments often involve limited resources in terms of time, budget, and manpower. Screening helps in allocating resources efficiently by focusing more detailed studies and mitigation efforts on higher-order impacts, while lower-order impacts can be managed with simpler, standardised measures.
- Screening helps organise the environmental assessments by breaking down complex interactions into manageable components. This separation makes it clearer to relevant persons and decision-makers which impacts and risks are more pressing, allowing for better understanding and informed decision-making.
- Higher-order impacts typically require more stringent, tailored mitigation strategies, while lower-order impacts may be managed with generic or standard procedures. This differentiation allows for more precise and effective mitigation planning, reducing unnecessary measures for minor risks.
- Environmental systems can be highly complex, with numerous interacting variables. Screening simplifies the assessment by categorising impacts, which makes the analysis more manageable and reduces the cognitive load on assessors. It helps break down the assessment into bite-sized pieces that are easier to evaluate.
- Without screening, assessments can become bogged down by minor details that detract from significant issues. Screening filters out lower-order impacts from intensive analysis, ensuring that the assessment remains focused and concise, without overwhelming readers with excessive details on low-significance data.

5.3 Higher Order Impacts and Risks have been Comprehensively Assessed

CGG then commissioned experts to undertake specific analysis of the higher order impacts and risks, including quantitative modelling and analysis to underpin the understanding of the environment and reinforce a demonstration that environmental impacts and risks will be of an acceptable level. The higher order assessments found in Appendix D1 to D4 and E1 to E9 are comprehensive because:

- Comprehensive baseline data was relied upon to establish the existing environmental conditions. This data served as a reference point for predicting and assessing the potential magnitude and significance of higher-order impacts. High-quality data on species, habitats, ecosystem functions, and socio-economic factors demonstrate a robust foundation for assessment.

- A combination of quantitative (e.g., modelling, statistical analysis) and qualitative (e.g., expert judgment, relevant person input) methods have been employed to assess higher-order impacts. This ensures that complex interactions are examined from multiple perspectives, providing a thorough understanding.
- Experts in relevant fields (e.g., marine biology, ecology, geology, socio-economic) have been employed during the assessment process to provide insights into the significance of higher-order impacts. Their expertise helps identify the most significant impacts and risks and supports evidence-based conclusions.
- Recognised frameworks and methodologies have been applied to categorise, rank, and analyse higher-order impacts. This provides a structured and reproducible approach to assessing the risks and impacts of the proposed activity.
- A cause-effect analysis has been conducted to identify the pathways through which activities may lead to significant environmental changes. Understanding the chain of events that link project activities to environmental outcomes shows that potential higher-order impacts have been explored in depth.
- Worst-case scenarios have been considered to evaluate the most severe potential outcomes of higher-order risks. Assessing worst-case scenarios helps ensure that even rare but high-consequence impacts are accounted for and appropriately mitigated.
- Relevant persons, including local communities, Traditional Owners, regulatory authorities, and industry experts, have been consulted throughout the assessment process. Their input provided insights into perceived higher-order impacts and ensure that all significant concerns were addressed.
- Best available science, industry standards, and technological tools have been used to evaluate higher-order impacts. This includes advanced modelling, simulations, and remote sensing technologies, demonstrating that the assessment is based on cutting-edge and reliable information.
- Specific, measurable, and enforceable mitigation measures for higher-order impacts have been developed. The presence of well-defined management plans, including monitoring programs, contingency plans, and adaptive management strategies, shows that potential impacts and risks have been fully evaluated and prepared for.
- A comprehensive monitoring plan has been established to track higher-order impacts during and after the activity. This includes baseline comparisons, performance indicators, and triggers for adaptive management, demonstrating a commitment to monitoring and managing risks over time.
- The assessment has included a detailed cumulative impact analysis that considers other existing and potential future projects in the area. This demonstrates that the evaluation is not limited to isolated impacts but addresses the broader environmental context.
- Clear and transparent documentation, including methodologies, assumptions, data sources, and limitations, has been provided in the assessment report. This demonstrates that the process is rigorous, unbiased, and subject to scrutiny, supporting the credibility of the conclusions about higher-order impacts and risks.
- The assessment has been conducted in accordance with local, national, and international regulatory requirements, guidelines, and best practices. Meeting or exceeding these standards provides confidence that higher-order impacts have been assessed comprehensively and responsibly.
- Independent peer reviews or third-party verifications have been conducted to validate the findings of the assessment. External validation ensures that higher-order impacts have been evaluated from multiple perspectives and meet scientific and regulatory standards.

- The assessment has evaluated alternative project designs, locations, and technologies to avoid or reduce higher-order impacts and risks. Applying the mitigation hierarchy - eliminate, minimise, administrate - demonstrates a commitment to managing higher-order impacts and risks responsibly.
- A focused assessment of impacts on sensitive and vulnerable environmental receptors (e.g., endangered species, critical habitats, protected areas) has been conducted. This ensures that the most ecologically and socially significant aspects have been given appropriate attention.

The assessment explicitly addresses uncertainties and the level of confidence in the predictions. This includes sensitivity analysis, consideration of data gaps, and conservative assumptions to account for uncertainty, showing that higher-order impacts have been carefully evaluated even in the face of unknowns.

5.4 Activity Limitations Comprehensively Bound the Activity and the Environmental Assessment

CGG has adopted several activity limitations that provide the scope and boundaries of the proposed activity. Activity limitations also provide the scope and boundaries of the environmental assessment. They eliminate or substitute environmental impacts and risks and are the most effective way of management environmental aspects.

The adoption of activity limitations was for one or more of the following reasons:

1. To design an activity that fulfilled the geophysical objectives of the survey.
2. To reduce an impact or risk because of the findings from the environmental assessments.
3. Required because of meritorious objections or claims raised by a relevant person.

Activity limitations proposed through consultation or identified through the NOPSEMA assessment process were identified and assessed with some being discarded and others being included to bound the activity.

Crucially, compliance with these activity limitations is a significant part of managing environmental impacts and risks of the activity to an acceptable level. As such, they are included in the Environmental Compliance Register and form part of the ongoing audit and inspection program in the Implementation Strategy (Appendix B3).

5.5 Predicted Impacts and Risks are of an Acceptable Level

Throughout the preparation of the EP, CGG reviewed and reassessed whether the impacts and risks of the proposed activity could be managed to an acceptable level. That process can be found in Appendix B3 and included:

- Publishing defined acceptable levels at the beginning of the consultation and preparation process.
- Sharing with the public the assessment process we would undertake and how impacts and risks would be quantified.
- Publishing draft impact and risk assessments and inviting input.
- Creating additional assessments so that more detail could be assessed and communicated with relevant persons.
- Detailing the scientific literature being relied on.
- Considering all EPBC Act literature, policies, advice, and plans and demonstrating that the activity (action) is consistent with them.
- Comparing the predicted levels of impact with the defined acceptable level (general and aspect-specific).

- Adopting environmental performance outcomes and control measures that ensure all impacts and risks will be of an acceptable level.

There is evidence in each assessment (Appendix D1-4 and E1-E9) that this process was followed and with each submission, an opportunity to improve the content, context, and decision-making associated with environmental management of the activity was taken to improve environmental outcomes.

The further assessments undertaken in Appendix F3 evaluated the quality of the previous assessments with a focus on levels of predictive certainty. Those assessments either resulted in confirmation of the adequacy of the original assessment or the adoption of further improvements in environmental management of the activity. Any necessary modifications were subsequently incorporated into the original assessments. This feedback loop demonstrates the iterative process that was followed.

5.5.1 Release of materials or fuel overboard

Category	Predicted Level of Risk
Principles of ESD	An accidental release of materials or waste is not predicted.
	Available literature and government management plans, recovery plans and conservation advice were used to inform the risk assessment. There is high confidence in the prediction of risks to environmental components that are at risk from an accidental release of materials or waste.
	Management of the activity is consistent with EPBC Act Management Plans and Recovery Plans as detailed in Appendix B2.
Biological	The risks of an accidental release of materials or waste to biological features would be temporary and small scale and would not result in environmental damage at population levels.
Ecological	The risks of an accidental release of materials or waste to ecological features is not predicted.
Economic	The potential risks of an accidental release of materials or waste is predicted to be confined to a one-off event that would not result in affected persons being worse off because of the activity. As per the Adjustment Protocol an adjustment process will be implemented in the event there is a financial loss to marine users from an accidental release of materials or waste.
Cultural	The risks of an accidental release of materials or waste is predicted to be confined to a one-off event that would have a temporary / reversible, small scale, and low intensity risk to cultural values.
Company	All reasonably practicable measures have been adopted to reduce environmental risks as detailed in the following section.
	The predicted risk level is medium.
	The adopted measures will be implemented and monitored as detailed in the implementation strategy to ensure they are effective in managing the risk.
Social	Measures have been adopted based on the consultation process to address relevant objections and claims of relevant persons as per the following stakeholder feedback; - We want to be assured that your activities out at sea will not result in increased rubbish washing up. The dominant form of rubbish we collect is from ocean sources such as rubbish discarded from international shipping and fishing boats. We would like to see your waste management plan and have assurances that you will commit to zero rubbish disposed of at sea. - A whale and seal and bird watch for pelagic and shorebirds along the southwest coast of Victoria and are concerned about their welfare in relation to the Regia MSS. The CGG Marine Assurance System will be implemented to ensure no waste material is disposed of overboard and all vessels used for the Regia MSS will be required to have a Garbage Management Plan. The risk assessment undertaken predicted that if an accidental release of materials or waste did occur and impacted marine fauna, it would be restricted to an individual and not affect the

	species at a population level. Thus, impacts to marine fauna watching along the southwest coast of Victoria is not predicted to be affected.
	No public comments have been received in relation to an accidental release of materials or waste.

5.5.2 Collisions with marine fauna

Category	Predicted Level of Risk
Principles of ESD	Predicted risks are low intensity environmental damage as risks would be restricted to individual fauna and will not affect the species at a population level.
	Available literature and government management plans, recovery plans and conservation advice were used to inform the risk assessment. Serious or irreversible environmental damage is not predicted as risks would be restricted to individual fauna and will not affect the species at a population level. There is high confidence in the prediction of risks to species that are at risk from vessel collisions.
	Management of the activity is consistent with EPBC Act Management Plans and Recovery Plans.
Biological	Predicted risks are low intensity environmental damage as risks would be restricted to individual fauna and will not affect the species at a population level.
Ecological **Economic**	Predicted risks to ecological features associated with marine fauna are temporary / reversible, small scale, as risks would be restricted to individual fauna and will not affect the species at a population level.
Cultural	Predicted risks to cultural features associated with marine fauna are temporary / reversible, small scale, as risks would be restricted to individual fauna and will not affect the species at a population level.
Company	All reasonably practicable measures have been adopted to reduce environmental risks as detailed in the following section.
	The predicted risk level is medium.
	The adopted measures will be implemented and monitored as detailed in the implementation strategy to ensure they are effective in managing the risk.
Social	To date no objections or claims in relation to fauna and vessel collisions have been made by relevant persons. A relevant person raised that they whale and seal watch along the southwest coast of Victoria and are concerned about their welfare in relation to the Regia MSS. A collision with a whale or seal is a rare event and has not been reported during seismic surveys. The implementation of the Fauna Management Plan will ensure that fauna collision risk is as low as reasonably practicably. The risk assessment undertaken predicted that if a collision did occur with marine fauna, it would be restricted to an individual and not affect the species at a population level. Thus, risks to marine fauna watching along the southwest coast of Victoria is not predicted to be affected.
	To date there have been no views from the public in relation to fauna and vessel collisions.

5.5.3 Introduction of marine pest species

Category	Predicted Level of Risk
Principles of ESD	The introduction and establishment of marine pests is not predicted.
	Available literature and government management plans, recovery plans and conservation advice were used to inform the risk assessment. The introduction and establishment of marine pests is not predicted. There is high confidence in the prediction of risk to environmental components that are at risk from the introduction of marine pests.
	Management of the activity is consistent with EPBC Act Management Plans and Recovery Plans.
Biological **Ecological**	The introduction and establishment of marine pests could lead to reduced native species diversity, displacement and shifts in ecosystem dynamics. The likelihood of a marine pest being present on a Regia MSS vessel and becoming established is assessed as rare due to the implementation strategy. The predicted level of risk is assessed as low. The introduction and establishment of marine pests is not predicted.
Economic	The introduction and establishment of marine pests could lead to reduced native species diversity, displacement and shifts in ecosystem dynamics impacting commercial fisheries. The likelihood of a pest being present on a Regia MSS vessel and becoming established is assessed as rare due to the implementation strategy. The predicted level of risk is assessed as low.
Cultural	The introduction and establishment of marine pests could lead to reduced native species diversity, displacement and shifts in ecosystem dynamics. If the potential ecological impact or risk to a culturally important species is deemed acceptable, it is likely that the corresponding impact on cultural heritage will also be considered acceptable, as the physical presence and health of these species are key for preserving their cultural significance. The likelihood of a marine pest being present on a Regia MSS vessel and becoming established is assessed as rare due to the implementation strategy. The predicted level of risk is assessed as low.
Company	All reasonably practicable measures have been adopted to reduce the risk of introducing a marine pest as detailed in the following section.
	The predicted risk level is medium.
	The adopted measures will be implemented and monitored as detailed in the implementation strategy to ensure they are effective in managing the risk.
Social	To date no objections or claims in relation to marine pests have been made by relevant persons.
	To date there has been no views from the public in relation to marine pests.

5.5.4 Accidental release of fuel

Category	Predicted Level of Risk
Principles of ESD	A vessel oil spill is not predicted to occur but if it occurred impacts would be temporary / reversible, small scale, and/or low intensity environmental damage due to the low volumes and light nature of marine diesel.
	Available literature and government management plans, recovery plans and conservation advice were used to inform the risk assessment. A vessel oil spill is not predicted. There is high confidence in the prediction of risks from a vessel oil spill.
	Management of the activity is consistent with EPBC Act Management Plans and Recovery Plans.
Biological **Ecological** **Economic** **Cultural**	A vessel oil spill is not predicted to occur but if it occurred risks would be temporary / reversible, small scale, and/or low intensity environmental damage due to the low volumes and light nature of marine diesel.
Company	All reasonably practicable measures have been adopted to reduce the risk of a vessel oil spill.
	The predicted consequences range from Minor to Moderate depending on the report with the likelihood of a vessel collision considered rare as it would only occur in exceptional circumstances. Thus, the risk level ranges from Low to Medium.
	The adopted measures will be implemented and monitored as detailed in the implementation strategy to ensure they are effective in managing the risk.
Social	Some relevant persons reported finding oily residues and tar balls on beach walks along the Otway coastline. This information has been included in this risk assessment and is expected given the hydrocarbon prone geology of the area. From relevant person consultation, objections and claims have been made regarding: Impacts to beaches and shorebird nesting areas. This risk assessment shows that impacts to beaches and shorebird nesting area would be temporary / reversible, small scale, and/or low intensity environmental damage due to the low volumes and light nature of marine diesel. Balls of crude oil along beaches and how these will be disposed. Diesel being a light fuel is not prone to forming crude oil balls. Notification to the DNP in the event of oil/gas pollution incidences which occur within a marine park or are likely to pose a risk to a marine park as soon as possible. This requirement is covered in the Regia MSS Implementation Strategy and Oil Pollution Emergency Plan.
	To date there has been no views from the public in relation to a vessel oil spill.

5.6 Predicted impacts are of an acceptable level

In evaluating the proposed activity against acceptable levels of environmental impact and risk, CGG has followed its Decision-Making Criteria as outlined in its environmental assessment process.

Category	Defined Acceptable Level
Principles of ESD	The petroleum activity results in temporary / reversible, small scale, and/or low intensity environmental damage.
	The impact and risk assessment process are based on sufficient information to understand if: Serious/irreversible environmental damage is predicted; or The application of the precautionary principle is applied in the presence of scientific uncertainty.
	Environmental management of the activity must not be inconsistent with EPBC Act Management Plans and Recovery Plans.
Biological	Impacts and risks to biological features will be temporary / reversible, small scale, and/or low intensity environmental damage at population levels.
Ecological	Impacts and risks to ecological features will be temporary / reversible, small scale, and/or low intensity damage to the overall health, diversity, or functioning of the ecosystem.
Economic	Affected persons will not be worse off because of the activity.
Cultural	Impacts and risks to cultural features including cultural values, traditions, or practices, will be temporary / reversible, small scale, and/or low intensity.
Company	All reasonably practicable measures have been adopted to reduce environmental impacts and risks.
	Environmental impacts and risks are consistent with the CGG impact and risk assessment process such that for an impact or risk the effect/ consequence rating is medium or below.
	The implementation strategy includes specific measures to ensure that measures adopted continue to be effective in managing the impact or risk.
Social	Measures have been adopted based on the consultation process to address relevant objections and claims of relevant persons.
	The views of public have been considered in the impact and risk assessment.

Comparing the predicted levels of impact or risk from the environmental assessments with the pre-defined acceptable levels was completed for each aspect and carried significant weight in CGG determining whether the activity complied with its corporate policies and the Regulations. These comparisons are shown in the below sections using the category as the link to the defined acceptable level.

5.6.1 Physical presence

This table provides a self-assessment of the predicted levels of impact assessed in Appendix E1 against the defined acceptable levels in the table above.

Category	Predicted Level of Impact
Principles of ESD	Predicted impacts are temporary, reversible, and small-scale. The predicted impacts from physical presence are 90 days, absent when the activity is concluded and limited to the moving geographic footprint of the survey. Therefore, the impacts confirm to be below the defined acceptable level.
	Available literature and government data were used to inform the impact assessment. Serious or irreversible environmental damage is not predicted. There is high confidence in the prediction of impacts to marine users.
Biological	Not applicable.
Ecological	Not applicable.
Economic	Predicted impacts are temporary and in most cases avoidable. A compensation process will be implemented in the event displacement cannot be avoided and there is a financial loss to the marine user.
Cultural	Impacts to cultural features including cultural values, traditions, or practices, are not predicted. This distance of the activity offshore means that no Traditional Owners will be excluded from Sea Country. No indirect impacts to connection to Country is predicted as no displacement or affects to species at populations levels, to ecosystem integrity, or biodiversity preservation.
Company	All reasonably practicable measures have been adopted to reduce environmental impacts as detailed in Appendix F2.
	The predicted effect level is moderate.
	The adopted measures will be implemented and monitored as detailed in the implementation strategy to ensure they are effective in managing the impact.
Social	Measures have been adopted based on the consultation process to address relevant objections and claims of relevant persons as per the stakeholder feedback of: Ensure continued liaison with the Australian Hydrographic Service (AHS) for Notices to Mariners (NOTMAR), ensure that the AHS is notified three weeks prior to the actual commencement of activities. This information is critical to maritime safety and reduces negative impacts on other maritime users. This is addressed in the Consultation Plan. CCG have adopted an adjustment protocol that will ensure that no fisher will be worse off because of the Regia MSS and that reasonable, evidence-based claims will be paid.
	No public comments have been received in relation to the physical presence of the vessels and equipment in relation to impacts to marine users.

5.6.2 Underwater sound – Plankton

Category	Predicted Level of Impact
Principles of ESD	Predicted impacts to zooplankton will be temporary, reversible, small-scale, and/or within natural variations in mortality.
	Available literature was used to inform the impact assessment. Serious or irreversible environmental damage is not predicted. There is high confidence in the prediction of impacts which is based on peer reviewed and published literature.
	No EPBC Act Management Plans and Recovery Plans were identified relevant to plankton.
Biological	Predicted impacts to zooplankton are temporary, reversible, small-scale, and within natural variations in mortality.
Ecological **Economic** **Cultural**	If the potential ecological impact or risk to a culturally important species is deemed acceptable, it is likely that the corresponding impact on cultural heritage will also be considered acceptable, as the physical presence and health of these species are key for preserving their cultural significance. As predicted impacts to zooplankton are temporary, reversible, small-scale, and within natural variations in mortality, impacts to primary production and ecosystem function are not predicted.
Company	All reasonably practicable measures have been adopted to reduce environmental impacts as detailed in Appendix F2.
	The predicted effect level is minor.
	The adopted measures will be implemented and monitored as detailed in the implementation strategy to ensure they are effective in managing the impact.
Social	From relevant person consultation the following objections and claims have been made: Impact of the survey on the Bonney Upwelling. - The impacts of the noise on marine ecosystems, can kill zooplankton. - Seismic blasting will kill zooplankton which have a fundamental role for ecological integrity as food for krill and subsequently krill are food for whales. Impacts to zooplankton and the Bonney Coast Upwelling and the role they both play in ecosystem function and productivity, are not predicted as: • Impacts to phytoplankton are not predicted. • Mortality or injury effects to zooplankton will be well within natural mortality rates. Upwelling systems in the region are highly dynamic with large variations in biomass a normal process. Zooplankton communities demonstrate high rates of turnover and will be constantly replenishing even as the seismic survey occurs. • Mortality or mortal injury effects to zooplankton, including krill, do not impact on marine fauna being able to feed on them as they will still be available within the water column.

5.6.3 Underwater sound – Fish

Category	Predicted Level of Impact
Principles of ESD	Predicted impacts to EPBC Act listed fish species are temporary / reversible and small-scale behavioural response or recoverable temporary threshold shift. Predicted impacts to fish are low intensity damage at population levels and within currently accepted levels of impact to these species as applied by the commercial fishing industry.
	Available literature was used to inform the impact assessment. Serious or irreversible environmental damage is not predicted. There is high confidence in the prediction of impacts which is based on peer reviewed and published literature.
	No EPBC Act Management Plans and Recovery Plans identified for fish identified underwater sound as a threat and no actions relevant to the seismic survey were identified.
Biological	Predicted impacts to fish are low intensity damage at the population level and within currently accepted levels of impact to these species as applied by the commercial fishing industry.
Ecological	Impacts to ecological features are not predicted.
Economic	Via stakeholder consultation commercial fishers have raised concerns in relation to seismic impacts to commercial fisheries and the Otway Adjustment Protocol will be implemented to ensure that affected fishers will not be worse off because of the activity.
Cultural	If the potential ecological impact or risk to a culturally important species is deemed acceptable, it is likely that the corresponding impact on cultural heritage will also be considered acceptable, as the physical presence and health of these species are key for preserving their cultural significance. Via consultation, impacts to the Budj Bim Cultural Landscape World Heritage Area eel traps and *kooyang* (Short-finned Eel) from the seismic survey has had been raised. The eel traps are protected under the World Heritage Area listing, the eels themselves are not. No impacts to the World Heritage Area are predicted. The predicted impacts to eels are low intensity at a population level and within current accepted levels of impact as applied to the commercial fishing industry.
Company	All reasonably practicable measures have been adopted to reduce environmental impacts as detailed in the following section.
	The predicted effect level is minor.
	The adopted measures will be implemented and monitored as detailed in the implementation strategy to ensure they are effective in managing the impact.
Social	From relevant person consultation the following objections and claims have been made: - Commercial fishers and some other marine users have raised concerns about the impacts to fish populations and the long-term effects of seismic on the sustainability of the fisheries. The impacts of the Regia MSS have been assessed and the predicted levels of impact to each commercial fish species are all sub-lethal and mostly behavioural. There is no evidence of reduced fecundity nor developmental effects in any fish species, so long-term effects over multiple fishing seasons are not predicted. This has been communicated to the individuals who raised these concerns.

5.6.4 Underwater sound – Invertebrates

Category	Predicted Level of Impact
Principles of ESD	Of the invertebrates known to be present within the Operational Area and predicted to be impacted by seismic sound, individual Southern Rock Lobster within close proximity to the seismic may suffer permanent injury and individual Giant Crab may suffer similarly. However, there is no evidence for scaling of effects to population levels. Impacts to molluscs are not predicted while impacts to octopus and squid are predicted to be behavioural only. Whilst the impacts may be irreversible for individual Southern Rock Lobsters and Giant Crabs the extent of impacts will not affect population levels. Fishing removes up to 30% of adult standing stock each year and the population is resilient to this. The impacts to molluscs, octopus, and squid are predicted to be negligible.
	Available literature was used to inform the impact assessment. Serious or irreversible environmental damage is not predicted. There is high confidence in the prediction of impacts which is based on peer reviewed and published literature.
	No EPBC Act Management Plans and Recovery Plans were identified relevant to invertebrates.
Biological	Predicted impacts to molluscs, octopus, and squid are temporary, reversible, and small-scale. Predicted impacts to Giant Crab and Southern Rock Lobster are low intensity damage at population levels and well within currently accepted and sustainable levels of impact to these species as applied by the commercial fishing industry.
Ecological	Impacts to ecological features are not predicted.
Economic	Through consultation commercial fishers have raised concerns in relation to seismic impacts to commercial fisheries and the Otway Adjustment Protocol will be implemented to ensure that affected fishers will not be worse off because of the activity.
Cultural	If the potential ecological impact or risk to a culturally important species is deemed acceptable, it is likely that the corresponding impact on cultural heritage will also be considered acceptable, as the physical presence and health of these species are key for preserving their cultural significance. Predicted impacts to molluscs, and squid are temporary, reversible, and small-scale. Predicted impacts to Giant Crab and Southern Rock Lobster are low intensity damage at population levels and well within currently accepted and sustainable levels of impact to these species. From consultation to date no cultural features including cultural values, traditions, or practices have been identified associated with invertebrates that may be impacted.
Company	All reasonably practicable measures have been adopted to reduce environmental impacts as detailed in the following section.
	The predicted effect level is minor.
	The adopted measures will be implemented and monitored as detailed in the implementation strategy to ensure they are effective in managing the impact.
Social	From relevant person consultation the following objections and claims have been made: - Some fishers have raised a claim that they will be worse off because of the activity either through direct displacement, loss of gear, through knock-on effects, or through long-term effects to stock levels. A compensation process will be adopted to pay reasonable, evidence-based claims. - Local businesses and interested individuals have claimed unacceptable levels of impact to fish stocks and the ripple effects that this would have to the coastal developments of the Otway.

	Local businesses once removed from the fisher (i.e., fish markets or point of sale handlers) will be able to submit claims under the compensation process.

5.6.5 Underwater sound – Birds

Category	Predicted Level of Impact
Principles of ESD	Predicted impacts to diving birds and penguins are temporary / reversible and small-scale behavioural responses that are likely to be within natural variation of foraging behaviours.
	Available literature was used to inform the impact assessment. Serious or irreversible environmental damage is not predicted. There is high confidence in the prediction of impacts which is based on peer reviewed and published literature.
	No EPBC Act Management Plans and Recovery Plans identified for birds identified underwater sound as a threat and no actions relevant to the seismic survey were identified.
Biological	Predicted impacts to diving birds and penguins are temporary / reversible and small-scale behavioural response that are likely to be within natural variation of foraging behaviours.
Ecological	Impacts to ecological features are not predicted.
Economic	Impacts to economic receptors are not predicted.
Cultural	If the potential ecological impact or risk to a culturally important species is deemed acceptable, it is likely that the corresponding impact on cultural heritage will also be considered acceptable, as the physical presence and health of these species are key for preserving their cultural significance. Predicted impacts to short-tailed shearwaters with implemented controls are temporary / reversible and small-scale behavioural responses or recoverable temporary threshold shifts, with no impacts at a population level are predicted. Impacts to cultural receptors are not predicted.
Company	All reasonably practicable measures have been adopted to reduce environmental impacts.
	The predicted effect level is minor.
	The adopted measures will be implemented and monitored as detailed in the implementation strategy to ensure they are effective in managing the impact.
Social	From relevant person consultation the following objections and claims have been made: - Behavioural disturbance impacts to Little Penguin colony at Middle Island resulting in further distance to forage and impacting breeding success. The active seismic area will be at least 25km distant from Middle Island at its closest point and ever further away after that. Key foraging habitat and access to regular food sources will not be affected.

5.6.6 Underwater sound – Turtles

Category	Predicted Level of Impact
Principles of ESD	Predicted impacts to EPBC Act listed turtle species are temporary / reversible and small-scale behavioural response or recoverable temporary threshold shift. No impacts at a populations level are predicted.
	Available literature was used to inform the impact assessment. Serious or irreversible environmental damage is not predicted. There is high confidence in the prediction of impacts which is based on peer reviewed and published literature.
	Management of the activity is consistent with EPBC Act Management Plans and Recovery Plans as detailed in Annex 1 of this document.
Biological	Predicted impacts to EPBC Act listed turtle species are temporary / reversible and small-scale behavioural response or recoverable temporary threshold shift. No impacts at a populations level are predicted.
Ecological	Impacts to ecological features are not predicted.
Economic	Impacts to economic features are not predicted.
Cultural	If the potential ecological impact or risk to a culturally important species is deemed acceptable, it is likely that the corresponding impact on cultural heritage will also be considered acceptable, as the physical presence and health of these species are key for preserving their cultural significance. Predicted impacts to EPBC Act listed turtle species are temporary / reversible and small-scale behavioural response or recoverable temporary threshold shift. Impacts to cultural features are not predicted.
Company	All reasonably practicable measures have been adopted to reduce environmental impacts as detailed in the following section.
	The predicted effect level is minor.
	The adopted measures will be implemented and monitored as detailed in the implementation strategy to ensure they are effective in managing the impact.
Social	From relevant person consultation no objections and claims have been made regarding underwater sound and turtles. A single individual raised awareness about the presence of marine turtles in the Otway region and this information was included in this impact assessment.

5.6.7 Underwater sound – Marine Mammals

Category	Predicted Level of Impact
Principles of ESD	Predicted impacts to marine mammals with implemented controls are temporary / reversible and small-scale behavioural responses or recoverable temporary threshold shifts. No impacts at a population level are predicted.
	Available literature was used to inform the impact assessment. Serious or irreversible environmental damage is not predicted. There is high confidence in the prediction of impacts which is based on peer reviewed and published literature. There is medium confidence in the prediction of when foraging whales and Southern Right Whales are present in BIAs and thus monitoring will be undertaken to validate the presence and/or absence of whales.
	Management of the activity is consistent with EPBC Act Management Plans and Recovery Plans.
Biological	Predicted impacts to marine mammals with implemented controls are temporary / reversible and small-scale behavioural response or recoverable temporary threshold shift. No impacts at a populations level are predicted.
Ecological	Impacts to ecological features are not predicted.
Economic	Impacts to economic features are not predicted.
Cultural	Impacts to cultural features are not predicted. If the potential ecological impact or risk to a culturally important species is deemed acceptable, it is likely that the corresponding impact on cultural heritage will also be considered acceptable, as the physical presence and health of these species are key for preserving their cultural significance. Predicted impacts to marine mammals with implemented controls are temporary / reversible and small-scale behavioural responses or recoverable temporary threshold shifts. No impacts at a population level are predicted. Via stakeholder consultation the cultural value of Deen Maar (Lady Julie Percy Island) has been raised, hence, an activity limitation has been implemented such that no acquisition will occur (i.e. full power discharge of the sound source) within 17 km of Deen Maar. [Distance updated in response to Matters M31, M32, M33 and F17].
Company	All reasonably practicable measures have been adopted to reduce environmental impacts as detailed in the following section.
	The predicted effect level is minor to moderate.
	The adopted measures will be implemented and monitored as detailed in the implementation strategy to ensure they are effective in managing the impact.
Social	From relevant person consultation, objections and claims have been made regarding underwater sound and marine mammals. These have been addressed by changing the Regia MSS temporal and spatial boundaries to: Avoid the period when Blue Whale and other foraging whales are present in the Blue Whale foraging BIA in significant numbers. Not operating the sound source within 17 km of Deen Maar. Distance updated in response to Matters M31, M32, M33 and F17. Not operating the sound source within 42 km of the SRW Reproduction BIA when SRW's are present in the BIA, ensures the activity does not affect calving, resting, nursing, or any other biologically important behaviour for calf-cow pairs No discharge of the sound source in the Southern Right Whale reproduction BIA at any time.

5.6.8 Underwater Sound – Divers, Swimmers & Surfers

Category	Predicted Level of Impact
Principles of ESD	Impacts to divers, surfers and swimmers are not predicted as the Regia MSS has been redesigned so that the received sound level at 13 representative coastal locations and at Deen Maar is below the human health safety criterion for divers and swimmers of 145 dB re 1 µPa.
	Available literature was used to inform the impact assessment. There is high confidence in the prediction of impacts which are based on peer reviewed and published literature. The sound modelling was revisited with a deliberate effort to assess received sound levels at 13 representative coastal locations and at Deen Maar adjacent to the Survey Acquisition Area. The outcomes showed that the survey could not exceed the safety criterion on the coastline except from a small area. This area has now been removed from the acquisition area where the sound source would operate at full power.
	No EPBC Act Management Plans or Recovery Plans were identified that are relevant to divers, surfers or swimmers.
Biological	Impacts to biological features are not predicted.
Ecological	Impacts to ecological features are not predicted.
Economic	Impacts to economic receptors are not predicted. The sound source will not be discharged at full power in areas from where it is determined that exceedances of the human health safety criterion may occur.
Cultural	Impacts to divers, surfers and swimmers are not predicted as the Regia MSS has been redesigned so that the received sound level at 13 representative coastal locations and at Deen Maar is below the human health safety criterion for divers and swimmers of 145 dB re 1 uPa. The distance of the activity offshore means that no Traditional Owners will be excluded from Sea Country. Impacts to cultural receptors are not predicted.
Company	All reasonably practicable measures have been adopted to reduce environmental impacts as detailed in the following section.
	The predicted effect level is negligible.
	The adopted measures will be implemented and monitored as detailed in the implementation strategy to ensure they are effective in managing the impact.
Social	From relevant person consultation the following objections and claims have been made: - Impacts to divers and surfers from underwater acoustic impacts. A second modelling report was commissioned which deliberately assessed whether exceedances of the human health safety criterion could be realised on the coastline adjacent to the Survey Acquisition Area or at Deen Maar. The discharge of the sound source at full power has been constrained and the Survey Acquisition Area will not include the area from where exceedances on the coastline were predicted.

5.6.9 Artificial light

Category	Predicted Level of Impact
Principles of ESD	Predicted impacts are temporary, reversible, small-scale, and light emissions will be reduced to minimum levels for safe operations and navigation.
	Available literature and government management plans, recovery plans and conservation advice were used to inform the impact assessment. Serious or irreversible environmental damage is not predicted from light emissions. There is high confidence in the prediction of impacts to light sensitive receptors.
	Management of the activity is consistent with EPBC Act Management Plans and Recovery Plans.
Biological	Predicted impacts to biological receptors (fish, invertebrates, birds, turtles) are temporary, reversible, small-scale, and light emissions will be reduced to minimum levels for safe operations and navigation.
Ecological	Predicted impacts to ecological receptors (e.g. zooplankton) are temporary, reversible, small-scale, and light emissions will be reduced to minimum levels for safe operations and navigation.
Economic	Predicted impacts to economic receptors (e.g. squid) are temporary, reversible, small-scale, and light emissions will be reduced to minimum levels for safe operations and navigation, thus commercial squid fishers will not be worse off as a result of the activity.
Cultural	If the potential ecological impact or risk to a culturally important species is deemed acceptable, it is likely that the corresponding impact on cultural heritage will also be considered acceptable, as the physical presence and health of these species are key for preserving their cultural significance. Predicted impacts to biological receptors (fish, invertebrates, birds, turtles) are temporary, reversible, small-scale, and light emissions will be reduced to minimum levels for safe operations and navigation. Light emissions are not predicted to impact cultural receptors.
Company	All reasonably practicable measures have been adopted to reduce environmental impacts as detailed in the following section.
	The predicted effect level is minor.
	The adopted measures will be implemented and monitored as detailed in the implementation strategy to ensure they are effective in managing the impact.
Social	To date no objections or claims in relation to light emissions have been made by relevant persons. - A relevant person raised that they bird watch for pelagic and shorebirds along the southwest coast of Victoria and were concerned about their welfare in relation to the Regia MSS. The impact assessment undertaken identified several pelagic and shorebird species, including BIAs, that occur within the area potentially affected by light. Some of the species identified are threatened or migratory species with a subset of species identified as undertaking biologically important behaviour such as breeding and/or foraging/feeding. As such the CGG Marine Assurance System will ensure that vessels implement a Vessel Lighting Management Plan to ensure light emissions do not impact on pelagic and shorebirds. Thus, impacts to bird watching for pelagic and shorebirds along the southwest coast of Victoria are not predicted.
	To date there has been no views from the public in relation to the activity's light emissions.

5.7 Consideration of Predictive Uncertainty

In any environmental impact assessment process, predictive uncertainty plays a pivotal role in shaping our understanding and management of potential impacts. This section delves into the complexities and inherent uncertainties associated with predicting environmental effects on sensitive marine species and habitats.

It outlines our methodologies for quantifying and managing these uncertainties, emphasising the limitations of current predictive models. By transparently addressing these uncertainties, we aim to enhance the robustness of our environmental assessments and decision-making processes, ensuring a responsible and adaptive approach to environmental management.

Each impact analysis (Appendix E1 – E9) explicitly considered the levels of uncertainty in our predictions of impact in accordance with the process outlined in Appendix B9. Through this consideration it has been possible to identify areas where uncertainty is highest, or confidence in the predictions is low. In such circumstances there has been a further consideration of whether the uncertainty levels can be reduced prior to the proposed commencement of the activity, during the activity, of afterward.

Application of the precautionary principle is required when there are threats of serious or irreversible environmental damage and a lack of full scientific certainty. There are examples in the analysis where a lack of full scientific uncertainty was identified, however, there were no instances where threats to environmental values and sensitivities were serious or irreversible. Despite this CGG routinely applied precaution in its assessment; selecting conservative effect thresholds for sound, adjusting the activity design to avoid overlap with sensitive species protected areas (e.g. KEFs), and implementing buffers around marine protected areas.

Ultimately, the Implementation Strategy in Appendix B3 is how all uncertainties are managed adaptively. Appendix B3 discusses various parts of the environmental management system that facilitate adaptive management strategies to ensure there is a dynamic approach to manage and mitigate environmental impacts and risks effectively. Adaptive management is pivotal in this context, allowing for flexible responses to changes and uncertainties identified during the survey. It involves continuous monitoring, evaluation, and modification of management strategies based on real-time data and feedback.

5.8 Quality of the Environmental Assessments

The analysis completed in Appendices D1 – D4 and E1 – E9 are appropriate to the nature and scale of the activity because they:

- Cover all environmental aspects, and all environmental components including air, water, land, flora, fauna, and human health including the social, economic, and cultural features of these.
- Follow a structured methodology to identify environmental impacts and risks.
- Clearly document the assessment process and findings for relevant person review and they have been publicly available for months prior to submission.
- Apply caution in uncertainty, preferring preventative measures and properly applying the hierarchy of controls concept.
- Will be maintained in a ‘live’ status throughout the duration of the EP to enable the incorporation of new data and adjust management and mitigation measures as needed.
- Have applied greater effort to analysis of impacts and risks with lower predictive confidence and higher effect/consequence meaning the EP has prioritised actions based on the severity of impacts and risks.
- Comply with relevant laws and regulations.
- Address the social and cultural impacts on local communities.

The analyses completed derive their credibility through evidence gathered from peer-reviewed scientific literature, utilisation of high-quality and verifiable data (e.g. fisheries), use of rigorous and

established scientific methodologies, and full transparency regarding methods and data sources. Thus, ensuring reproducibility of results. It also exercises objectivity, avoiding any conflicts of interest by using qualified external experts, and follows international standards for environmental impact assessments. Comprehensive documentation throughout the assessment process further underpins its scientific integrity.

5.9 Compliance with the EPBC Act

The primary environmental legislation within Australia is the *Environmental Protection and Biodiversity Conservation Act* 2002 (**EPBC Act**). NOPSEMA's authorisation processes have a Part 10 approval that applies to offshore petroleum activities as per the NOPSEMA EPBC Act Program. This program ensures that impacts on matters protected under Part 3 of the EPBC Act are not unacceptable.

Matters protected by the EPBC Act that have been considered in this EP include:

- World Heritage properties
- National heritage values of declared National Heritage Places.
- Wetlands of international importance.
- Listed threatened species and ecological communities.
- Listed migratory species.
- Commonwealth marine environment.

CGG maintains a register of all legislation, including all EPBC Act materials, which has been provided in Appendix B2 of the EP. This appendix has been reviewed prior to each submission and will be updated in accordance with the requirements in the Implementation Strategy (Appendix B3).

Each impact and risk analyses has considered relevant matters from Appendix B2 and provides evidence backed by appropriate primary information sources, that the proposed activity is not in conflict with any recovery plans or threat abatement plans for listed threatened species or ecological communities. It respects the management plans in place for Commonwealth reserves, such as Australian Marine Parks, and upholds the Australian IUCN Reserve Management Principles. It shows that the activity will not have unacceptable impacts on the values of these protected areas.

Moreover, the EP content confirms that the proposed activity does not contravene any management plans for World Heritage properties, National Heritage places, or Ramsar wetlands. In the absence of specific management plans, the EP shows that all reasonable steps have been taken to ensure consistency with the Australian World Heritage Management Principles, National Heritage Management Principles, Australia Ramsar Management Principles, and Commonwealth Heritage Management Principles.

The EP also demonstrates due regard for relevant policy documents, guidance, bioregional plans, wildlife conservation plans, management plans, gazettal instruments under the EPBC Act, conservation advice, marine bioregional plans, and other pertinent information, including spatial data, available on the DCCEEW website.

Objectives and values of the relevant south-east marine parks, presented in the South-east Marine Parks Network Management Plan (DNP 2025) are described and discussed in Table F4-2 and Table F4-3 below – to demonstrate that the activity is not inconsistent with the relevant management plan, and that impacts will be of an acceptable level.

Table F4-2 - Demonstration that the activity is not inconsistent with the objectives of the South-east Marine Parks Network Management Plan

Goals/Visions/Objectives – *South-east Marine Parks Network Management Plan (DNP 2025)*	**Demonstration of Consistency with this Goal/Vision/Objective within the Regia MSS EP**
Management program goal: Respect and support the ongoing cultural responsibilities and connections of First Nations people to care for and manage Sea Country in marine parks	The following activity limitation is set: • No activities within a designated Australian Marine Park (State and Commonwealth).
Management program goal: Reduce the impacts of pressures and environmental changes on marine species, habitats and ecosystems	
Vision: The South-east Marine Parks are healthy and resilient for current and future generations	The methodology applied for all impact and risk analyses (Appendices D1-D4 and E1-E9) involved the consideration of all relevant matters protected by the EPBC Act. This process also involved providing evidence that the proposed activity is not in conflict with any recovery plans or threat abatement plans for listed threatened species or ecological communities. It respects the management plans in place for Commonwealth reserves, including Australian Marine Parks. It shows that the activity will not have unacceptable impacts on the values of these protected areas.
Objective (a): To protect and conserve biodiversity and other natural and cultural values	The following Environmental Performance Outcomes are set: • No death or injury to fauna, including listed threatened or migratory species, from the activity. • No disruption to critical life-cycle behaviours. • Biologically important behaviours within a BIA or outside a BIA can continue while the activity is being undertaken.
	The Regia MSS EP is assessed under a Part 10 approval under the EPBC Act, and an endorsed Program implemented by NOPSEMA.
	Appendix F2 demonstrates that all reasonably practicable measures to protect relevant receptors have been adopted and therefore minimised.
	Where potential impacts or risks relating to cultural features have been identified, these potential impacts/risks including cultural values, traditions, or practices, will be temporary / reversible, small scale, and/or low intensity.

Goals/Visions/Objectives – *South-east Marine Parks Network Management Plan (DNP 2025)*	**Demonstration of Consistency with this Goal/Vision/Objective within the Regia MSS EP**
	The following points include relevant legislation and other requirements that currently apply to environmental management of the proposed activity (full list available in Appendix B2): • Underwater Cultural Heritage Act 2019 - The act provides for the protection of underwater cultural heritage, which may be affected by the activities associated with seismic surveys. • National Parks Act 1975 - This act establishes a framework for the protection and management of national parks in Australia. It provides for the conservation of natural and cultural resources, the provision of recreational opportunities, and the management of park use. • Victorian Marine National Parks and Sanctuaries Management Plan - The management plan provides guidance on the management of marine national parks and sanctuaries in Victoria, including the protection and conservation of marine environments that may be impacted by seismic surveys. • EPBC Act Policy Statement 1.1 – Significant Impact Guidelines – Matters of National Environmental Significance - The policy statement provides guidance on the assessment and management of activities that may have a significant impact on matters of national environmental significance, including marine habitats and species. • All conservation and listing advice, and management and recovery plans for relevant EPBC Act-listed receptors were considered to inform and identify actions required for conservation and recovery of the threatened species or ecological community.
Objective (b): Ecologically sustainable use and enjoyment of the natural resources within marine parks, where this is consistent with objective (a) (above)	The proposed Regia MSS activity is consistent with the principles of Ecologically Sustainable Development as assessed in Section 5.11.

Table F4-3 - Demonstration that the activity is not inconsistent with the values of the South-east Marine Parks Network Management Plan.

	Apollo Marine Park Values	Franklin Marine Park Values	Nelson Marine Park Values	Zeehan Marine Park Values	Justification for why the activity will not have unacceptable impacts on the values of AMP values
Ecosystems, habitats, communities, and notable features	The park contains habitats, species and ecological communities associated with the 2 provincial bioregions – Western Bass Strait Shelf Transition and Bass Strait Shelf Province – and the Central Bass Strait mesoscale bioregion.	The park contains habitats, species, and ecological communities associated with 2 provincial bioregions – Tasmanian Shelf Province and Western Bass Shelf Province – and the Otway and Franklin mesoscale bioregions.	The park contains habitats, species and ecological communities associated with the West Tasmanian Transition provincial bioregion.	The park contains habitats, species, and ecological communities associated with 3 provincial bioregions – the West Tasmania Transition, the Western Bass Strait Shelf Transition, and the Tasmania Province – and the Otway mesoscale bioregion.	There are no pathways for direct impact to ecosystems, habitats, communities, or notable features within AMPs that are permanently located within the boundaries of the park, given their sessile/permanent nature. Relevant predicted impacts to these in the greater region are assessed and discussed in Appendices E1-E9.
		Ecklonia radiata kelp forests, brown and red macroalgae, sponges, gorgonians, hard bryozoans and tube worms.		Benthic communities of fan worms, sponges, sea whips, and hard bryozoans, diverse sessile fauna and associated mobile fauna, including giant crabs, ascidians (sea squirts), corals, hydroids, crustaceans, sea stars, brittle stars, molluscs and fish.	
				The biodiversity and productivity in the park are influenced by the southward-flowing Zeehan Current (an extension of the Leeuwin Current from Western Australia) interacting with the canyons.	

	Apollo Marine Park Values	Franklin Marine Park Values	Nelson Marine Park Values	Zeehan Marine Park Values	Justification for why the activity will not have unacceptable impacts on the values of AMP values
Biologically Important Areas	Shy albatross, Black browed albatross, Campbell albatross, Indian yellow nosed albatross, Wandering albatross, Bullers albatross, Common diving petrel, Wedge-tailed and short-tailed shearwaters - Foraging	Antipodean albatross, Black browed albatross, Campbell albatross, Indian yellow nosed albatross, Wandering albatross, Bullers albatross, White faced storm petrel, Common diving petrel, Little penguin, Australasian gannet, and Short-tailed shearwater - Foraging	None identified	Antipodean albatross, Black browed albatross, Campbell albatross, Indian yellow nosed albatross, Wandering albatross, Bullers albatross, Common diving petrel, Wedge-tailed and short-tailed shearwaters - Foraging	No direct impacts to this species or its BIA within the AMP are predicted due to absence of any overlap with relevant EMBAs. Relevant predicted impacts to these in the greater region are assessed and discussed in Appendices E1-E9.
	Pygmy Blue Whale - Foraging	Pygmy Blue Whale - Foraging		Pygmy Blue Whale - Foraging	
	Southern Right Whale - Migration	Southern Right Whale - Migration		Southern Right Whale - Migration	
	White Shark - Foraging	White Shark - Foraging		White Shark - Foraging	
Key Ecological Features	Shelf rocky reefs and hard substrate – includes the mesophotic and rariphotic reefs in the north-west corner of the park.	Shelf rocky reefs and hard substrate – includes the mesophotic and rariphotic reefs in the north, east and south sections of the park.	None identified	West Tasmanian canyons • shelf rocky reefs and hard substrate – includes the rariphotic reefs on the mid and outer shelf.	There are no pathways for direct impact to KEFs within AMPs that are permanently located within the boundaries of the park, given their sessile/permanent nature.

	Apollo Marine Park Values	Franklin Marine Park Values	Nelson Marine Park Values	Zeehan Marine Park Values	Justification for why the activity will not have unacceptable impacts on the values of AMP values
Species and key behaviours	Benthic communities dominated by sponges, with some octocorals, bryozoans and encrusting macroalgae, and southern rock lobsters.	The park is a core foraging area for early incubating Tasmanian Shy albatross from the nearby Albatross Island breeding colony.	Many whales migrate through the park when travelling between the cold food-filled southern waters and the warmer waters north where they breed.	The park is a core foraging area for early incubating Tasmanian Shy albatross from the nearby Albatross Island breeding colony.	No direct impacts to these species or their key behaviours within AMPs are predicted due to the absence of any overlap with relevant EMBAs. Predicted impacts to relevant species and associated behaviours in the greater region are assessed and discussed in Appendices E1-E9.
	Fish communities are dominated by velvet leatherjackets, Degen's leatherjackets, six spine leatherjackets, jackass morwong, rosy wrasse, butterfly perch, bluethroat wrasse, pink snapper, common gurnard perch, barracouta, sand flathead, draughtboard shark, spikey dogfish, and gummy shark.				
Native Title, Sea Country, and Cultural Heritage	The MV City of Rayville shipwreck, an American freighter, lies near the western boundary of the park in a depth of 80 m.	None identified	None identified	None identified	There are no pathways for impacts to this shipwreck due to its fixed location within an AMP that is not predicted to be directly impacted by the activity.

	Apollo Marine Park Values	Franklin Marine Park Values	Nelson Marine Park Values	Zeehan Marine Park Values	Justification for why the activity will not have unacceptable impacts on the values of AMP values
Other marine park users, including other planned or existing offshore petroleum activities	Commercial fisheries operating in the park include: • South-east Scalefish and Shark Fishery – gillnet, hook and trap sector • Southern Bluefin Tuna Fishery • Victorian Rock Lobster Fishery • Victorian Ocean General Fishery • Victorian Wrasse (Ocean) Fishery • Victorian Commercial Permit and Small Sales Commercial Permit Fishery.	Commercial fisheries operating in the park include: South-east Scalefish and Shark Fishery – gillnet, hook and trap sector • Tasmanian Octopus Fishery • Tasmanian Rock Lobster Fishery • Tasmanian Giant Crab Fishery • Tasmanian Scalefish Fishery.	None identified	Commercial fisheries operating in the park include: • Tasmanian Rock Lobster Fishery • Tasmanian Giant Crab Fishery	There are no pathways for direct impact to commercial fisheries operating within AMPs due to the absence of any overlap with relevant EMBAs. Predicted impacts to relevant targeted species and fisheries in the greater region are assessed and discussed in Appendices B6 and E3.
	Commercial shipping routes into and out of Melbourne			Six existing petroleum titles (exploration permits at the commencement of this DNP (2025) plan) overlap the northern section of the park.	There are no pathways for direct impact to shipping routes operating within AMPs due to the absence of any overlap with relevant EMBAs. Relevant predicted impacts to other marine users are assessed in Appendix E1.

Under the EPBC Act, a National Recovery Plan exists for the endangered Southern Right Whale (*Eubalaena australis*). This plan identifies anthropogenic underwater noise as a Very High priority threat and sets out Action Areas designed to meet recovery targets, address key pressures, and guide species-specific conservation efforts. Action Area A5, also identified as Very High priority, focuses on the need to *"assess, manage, and mitigate impacts from anthropogenic underwater noise."*

This threat is classed as likely and a moderate consequence for the eastern portion of the population. The Recovery Plan also states that the behavioural impacts of sound to southern right whales is largely unknown and, therefore, a precautionary approach should be taken to the management of potential impacts, particularly in the context of cumulative impacts.

As detailed in Appendix E7 and shown in Map 085 (MAP-REG-EPM-085_C), the acquisition area overlaps a migratory BIA for SRWs. SRWs are likely to migrate through this area from April through October. Pregnant cows may pass through early in the season as they travel to aggregation areas, while cows with calves are likely to pass through later in the season as they depart for summer foraging grounds. Isolated individuals may be present outside this period. The acquisition area does not overlap the reproduction BIA; however, sound propagation may overlap this area when acquiring. Consequently, actions have been considered below based on effects to reproduction and effects to migration.

Only those actions within Action Area A5 that are applicable to the Regia MSS and within CGG's sphere of influence have been considered in this assessment. CGG has evaluated each relevant action and demonstrated that the Regia MSS is not inconsistent with these actions, as outlined below.

Action 1: CGG will improve baseline understanding of southern right whale acoustic communication to better inform potential impacts from anthropogenic underwater noise because:

1. The survey will deploy hydrophones, PAM systems, and fixed buoys that may detect low-frequency SRW calls, generating a spatially resolved dataset of SRW vocal activity in the western Otway region.
2. These systems will record ambient noise, sufficient to attempt identification and measurement of communication space, natural variability in noise levels, and in-situ signal-to-noise ratios relevant to mother–calf communication (if present and detected).
3. By analysing SRW calls (if present and detected) alongside environmental and oceanographic conditions, CGG will collect data to support an understanding of when and where SRWs are acoustically active and possibly how well calls propagate under local conditions.
4. Collected data will reduce uncertainty in the assessment of masking, disturbance thresholds, and the reliability of detection systems, strengthening future ALARP decisions and allowing more precise mitigation tailored to SRW acoustic ecology.
5. All data collected will be used to calibrate and assess the effectiveness and appropriateness of current models of sound transmission in the region. Filling data gaps with empirically derived location specific data will improve the quality of such models.

This monitoring will be published to contribute to the Recovery Plan priority to improve understanding of SRW communication and interactions with anthropogenic noise, providing empirical data to support regional cumulative assessments and future protection measures.

Action 2: This EP has demonstrated that the Regia MSS does not prevent any southern right whale from utilising the migration BIA nor the reproduction BIA or cause auditory impairment because:

1. The activity will not occur during April – August, avoiding the period when mothers and calves are most likely to arrive in and utilise coastal habitats and hence are most sensitive to disturbance.
2. While the Regia MSS overlaps with the final six weeks of the SRW presence window (mid-September–October), the activity is not predicted to prevent any southern right whale from utilising the Reproduction BIA because:

a. By the final six weeks of the season, most biologically important behaviours relevant to presence within the Reproduction BIA are expected to have already occurred, as approximately 75% of the reproduction season will have already elapsed by the time the Regia MSS commences.
    i. Arrival, initial migration into the BIA, calving, early calf-cow bonding, and the early developmental period for calves are all more likely to take place earlier in the season, as per the SRW National Recovery Plan.
    ii. Very late in the season in the latter stages of September, most SRW calf-cow pairs have completed the most sensitive life-stages and are departing the Reproduction BIA.
    iii. Migration from the reproduction BIA can occur at any time and a 10,500 km^2 shutdown zone is in place for SRW during this movement, with significant detection capability deployed such that detection is likely before threshold effect distances for PTS and TTS are reach and behavioural disturbance may occur.

b. Acquisition will commence in deeper waters, greater than 42 km from the reproduction BIA, and will not progress into shallower waters where sound may overlap the reproduction BIA until SRW's have been confirmed to not be present in the relevant section of the reproduction BIA. SRWs within the BIA will not be exposed to levels that would cause auditory injury or displacement. Modelling for deeper waters >42 km from the reproduction BIA shows:
    i. No exceedance of SRW injury thresholds within the reproduction BIA, and
    ii. Received levels within the reproduction BIA remain below a conservative behavioural disturbance threshold of 140 dB SPL.

    In addition, shutdown measures are in place if there is detection of an impulsive sound signature above an ultra-conservative threshold of 120 dB in the reproduction BIA in September or October.

c. As outlined in the National Recovery Plan, SRWs using the Reproduction BIA in late season predominantly engage in resting, nursing, and preparing for offshore departure.
    i. These behaviours occur in shallow, nearshore habitats (<20 m depth).
    ii. The seismic survey will be conducted in deep offshore water, spatially separated from the Reproduction BIA, while calf-cow pairs are present in this area.

    Therefore, utilisation of the reproduction BIA is predicted to continue unimpeded, as the survey will not alter habitat quality, accessibility, or suitability while SRW are present.

d. Calves later in the season are larger, more mobile, resilient and capable of accompanying their mothers into deeper waters, reflecting reduced reliance on the highly sheltered conditions required during the early weeks post-birth, as described in the Recovery Plan.

e. SRWs can continue to ulitise the migration BIA as the Regia MSS does not overlap the period when SRWs begin arriving from April onwards. The survey area overlaps less than 1% of the migration BIA, and 24-hour shutdown and relocation procedures are in place should a migrating whale be detected. The Reproduction BIA remains entirely undisturbed due to the activity limitations and control measure in place. Accordingly, the activity does not:
    i. prevent SRWs from utilising the migration BIA, and to arrive and enter the reproduction BIA.

ii. prevent SRWs from remaining within or utilising the reproduction BIA during calving and nursing.

iii. prevent SRWs from undertaking reproductive behaviours within the reproduction BIA.

iv. cause auditory impairment to SRWs within either the migration or reproduction BIAs.

v. cause displacement from HCTS or the reproduction BIA; or

vi. prevent SRWs from utilising the migration BIA to depart the region at the end of the season.

3. The sound source will not operate within 42 km of the SRW Reproduction BIA when SRW's are present in the BIA, ensuring the activity does not affect calving, resting, nursing, or any other biologically important behaviour for calf-cow pairs given:

    a. Auditory injury effects may begin to occur within 59 m of the sound source.

    b. TTS effects may begin to occur within 2.9 km of the sound source, assuming the whale remains within that distance for 24 hours.

    c. Behavioural responses may occur within:

        i. 3.15 km of the sound source at the 160 dB SPL threshold used in the NMFS guidance.

        ii. 12.43 km of the sound source at the more precautionary effect threshold of 140 dB SPL.

        iii. 30.97 km of the sound source at the ultra-precautionary effect threshold of 120 dB SPL.

    Multiple effective methods in place to detect SRWs before these distances are reached and will trigger immediate shutdown of the sound source. None of the predicted effect distances overlap with the SRW reproduction BIA when the survey is >42 km from the reproduction BIA.

4. Regarding underwater sound effects within the migration BIA, real-time monitoring (MFOs, spotter vessel, towed PAM, sound source verification, and aerial observations) ensures high detection probability, enabling shutdowns prior to migrating whales encountering distances associated with auditory impairment.

5. Shut down measures will occur if any SRW is detected anywhere within a 10,500 km^2 (Map 193). This ensures shutdowns occur well before auditory injury or TTS could occur whether the SRW is utilising the migration or reproduction BIA.

Based on independent expert modelling, underwater sound from the Regia MSS is not predicted to result in a deviation of natural soundscape within the reproduction BIA, to an extent that would prevent biologically important reproduction behaviours, as defined in the SRW Recovery Plan from occurring (courtship, mating, birthing, nursing or accompanying a dependent young). Therefore, SRW are not predicted to be prevented from utilising the BIA or be exposed to auditory impairment.

Action 3: The Regia MSS EP has demonstrated that the risk of behavioural disturbance is minimised because:

1. The required actions contained within the National Recovery Plan were used as the defined acceptable levels of impact, along with other levels in the impact assessment, ensuring all efforts and environmental performance outcomes were aligned with the National Recovery Plan from the commencement of the environmental assessment.

2. The survey footprint, timing and operating envelopes have been substantially reduced through iterative design, and extensive consultation, resulting in far less overlap with the migration BIA and peak biological periods than originally proposed.

3. The sound source will never operate within 17 km of the SRW reproduction BIA nor within 42 km of it while SRW are expected to be present, eliminating potential impacts during the most sensitive life-cycle stages.
6. Independent expert sound modelling predicts that PTS/TTS thresholds for SRW are not exceeded within the reproduction BIA, and shutdowns will occur well beyond the predicted ranges within the migration BIA noting that:
    a. A conservative approach has been taken in the modelling, such that the received sound levels and effect distances are likely to be lower than those predicted. The modelled outputs will be verified throughout the survey.
    b. The impact assessment has been informed by contemporary peer-reviewed literature and internationally accepted, conservative effect thresholds.
    c. The shutdown procedures are based on even more conservative effect threshold distances.
7. The shutdown zones applied for migrating SRWs are highly conservative, far exceeding EPBC Act requirements.
8. A multi-layered detection system (involving MFOs, spotter vessel, PAM, sound source verification, aerial surveillance, and external PAM detections) maximises detection probability across visual and acoustic ranges, materially reducing the likelihood of undetected close approaches. A full list of control measures and associated environmental performance standards can be found in Appendix G1.
9. A dedicated PAM-enabled spotter vessel will operate in dynamic 'sentry' and 'scouting' modes, targeting SRW movement pathways by adjusting positions based on real-time detections.
10. Adaptive management, with oversight from a Whale Expert Panel, applies real-time expert judgement to detections, trends, environmental cues, and uncertainty, increasing the reliability of behavioural protection measures.
11. Soft-start and low-power modes will prevent sudden introduction of sound into the environment, giving migratory SRW the opportunity to avoid the source voluntarily.
12. Night-time operations are managed by acoustic monitoring and extended shutdown periods, reducing residual uncertainty in low-visibility conditions.
13. Capped speed limits (up to 6 knots) reduce the risk of vessel-related disturbance and allow more time for detection and shutdowns.
14. Pre-survey seasonal acoustic and visual monitoring validates presence/absence expectations and ensures environmental conditions match predictive modelling.
15. The activity's acoustic impacts are temporary, reversible, and spatially limited, with modelling showing that behavioural responses would be short-lived and not sustained.
16. Cumulative impacts have been assessed as low, owing to staggered timing of other Otway Basin activities, minimal temporal overlap, and industry-wide mitigation commitments.
17. The EP incorporates relevant requirements of Recovery Plans, Conservation Advice, and the Australian National Guidelines, ensuring species are not prevented from utilising BIAs or subjected to auditory impairment.
18. Mitigation measures have been taken through ALARP and other 'acceptable level' assessments, demonstrating that no reasonably practicable additional measures are available that would further reduce behavioural disturbance.

Collectively, the points above demonstrate that this EP ensures the Regia MSS has minimised the risk of behavioural disturbance (as defined in the SRW National Recovery Plan) to SRWs within the reproduction BIA.

Action 4: CGG has ensured its environmental assessments associated with underwater noise generating activities include consideration of national policy (e.g., EPBC Act Policy Statement 2.1) and guidelines related to managing anthropogenic underwater noise and implement appropriate mitigation measures to reduce risks to southern right whales to the lowest possible level because:

1. CGG has adopted a 10,500 km^2 shutdown area (Map 193) well in excess of the shutdowns that must occur at a minimum of 5 km for PTS, TTS, and behavioural disturbance. These far exceed EPBC Act Policy Statement 2.1, which recommends a 500 m shutdown zone for all whales.
2. CGG's assessment relies on detailed numerical sound modelling calibrated to site-specific bathymetry, propagation, and species-specific thresholds rather than the generic source-level assumptions in Policy Statement 2.1, providing a more accurate, conservative prediction of exposure risk. Additionally, CGG has committed to in-field sound source verification of the modelling predictions and adaptive management should these distances have been underestimated.
3. CGG applies multi-platform detection (including MFOs, spotter vessel, PAM, sound source verification, aerial surveillance, and external PAM detections), exceeding the minimum single-platform visual monitoring described in Policy Statement 2.1, thus reducing the probability of undetected close approaches. A full list of control measures and associated environmental performance standards can be found in Appendix G1.
4. Shutdown procedures are triggered earlier, under more conservative conditions, and for a wider set of effects than required under Policy Statement 2.1, ensuring SRW are protected long before exposure to thresholds that could cause disturbance or auditory impairment.
5. By employing ambient noise monitoring and multiple detection systems, CGG can adjust mitigation beyond the approaches contemplated by Policy Statement 2.1.

The combination of spatial exclusions, ultra-conservative shutdown zones, multi-layered detection, and timing limitations results in a risk profile that is substantially lower than that assumed under Policy Statement 2.1.

Action 7: CGG will 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 environment because:

1. CGG will deploy a network of hydrophones, a PAM network capable of long-duration, broadband (including low-frequency) acoustic monitoring, generating a spatially and temporally detailed soundscape within and adjacent to the SRW reproduction BIA in southwest Victoria.
2. These systems measure ambient (~baseline) noise, biological noise, and anthropogenic noise allowing CGG to characterise the soundscape, including diel, weather-driven, and seasonal variability across the SRW communication band.
3. The hydrophone array enables source separation, allowing CGG to distinguish seismic pulses, other anthropogenic sources, biological signals, and natural geophysical sounds, which is important for quantifying the proportion of anthropogenic noise in the wider soundscape.
4. Sensors will operate before and during, the survey, so that CGG can quantify changes in soundscape composition attributable to the activity, enabling assessment of incremental anthropogenic noise contributions relative to baseline conditions.
5. The monitoring locations are positioned to capture propagation into the SRW reproduction BIA, meaning the resulting data will improve understanding of how offshore noise transmits toward SRW calving and migration habitats.
6. The integrated dataset (ambient noise metrics, PAM detections, species-call presence, and vessel activity logs) will support the development of empirical noise budgets, quantifying anthropogenic contributions across frequencies important for SRW communication.

The Recovery Plan identifies improved understanding of anthropogenic noise in SRW habitats as a priority, and the baseline and impact-related acoustic information required will be published to meet support meeting this objective.

Rationale for why a biological response is consistent with the SRW National Recovery Plan

The National Recovery Plan for the Southern Right Whale (2024) defines an impact as "*a biologically significant effect that reflects a change whose direction, magnitude and/or duration is sufficient to have consequences for the fitness of individuals or populations*" (Glossary, p.1). The Plan further explains that, due to the species' life-history traits, "*any long-term response to disturbance and impacts… are unlikely to be detectable, or even reliably identified to a specific threat, over short timescales (i.e. 1 to 3 years*)" (p.13). Accordingly, only effects that alter fitness or population trajectory, or disrupt biologically important behaviours within key habitats, constitute impacts relevant to recovery planning. The National Recovery Plan identifies that the risk from anthropogenic underwater noise is greatest "*within or close to southern right whale reproductive BIAs and HCTS, where whales… are resident for long periods… and young calves are present*" (Action A5, p.71).

The Regia MSS:

- Temporally overlaps with 2 weeks of SRW's likely presence in the reproduction BIA at the end of the reproduction season.
- Occurs entirely outside the reproduction BIA and will come no closer than 42 km during SRW utilisation months.
- Has shown sound propagation will be verified to be below 120 dB (an ultra-precautionary threshold).

Therefore, the Regia MSS cannot interfere with calving, nursing, or the prolonged residency behaviours that define reproduction BIAs. Action A5 requires that proponents "*demonstrate that [the action] does not prevent any southern right whale from utilising the area or cause auditory impairment*" (A5.2, p.71), and independent expert modelling confirms that received levels within the reproduction BIA remain below thresholds for auditory injury or behavioural disruption of biologically important behaviours.

Disturbance is separately defined as "*behavioural changes in response to an activity that can result in disruption to biologically important behaviours (i.e., reproduction, foraging, migration, resting)*" (Glossary, p.1).

The EP has put in place stringent measures to ensure that behaviours that meet this definition will not occur because of the Regia MSS. Any remaining behavioural responses observable may or may not be attributable to the Regia MSS. Hypothetically, if a behavioural response below 'disturbance' were attributable to the Regia MSS these effects are still consistent with the National Recovery Plan because they don't meet the definition of 'disturbance' and therefore cannot met the definition of 'impact'. On a strict reading of the Recovery Plan, a biological response to the Regia MSS (if one were to occur) does not constitute an impact, because it does not affect fitness, does not occur or emit sound at unacceptable levels within the reproductive BIAs or HCTS where sensitive behaviours occur, does not prevent use of critical habitat, does not cause auditory impairment, and does not disrupt reproduction, calving, nursing, or resting. Accordingly, the activity remains fully consistent with the Recovery Plan's objectives and specific actions relating to anthropogenic underwater noise.

While the Regia MSS EP conservatively acknowledges behavioural changes may occur at received levels below 120 dB SPL, this does not imply such responses are ecologically or regulatorily meaningful. Based on the best available evidence, and consistent with the behavioural variability typical of large mysticetes, any such responses are unlikely to constitute disruption to biologically important behaviours as defined by the National Recovery Plan. Moreover, where behavioural response probabilities have already been incorporated into impact predictions through conservative modelling and empirical thresholds, invoking residual uncertainty in the absence of demonstrable harm is neither necessary nor proportionate because:

- It is impossible to show or measure the point at which a behavioural change becomes a behavioural disturbance. The permissible behavioural changes under the National Recovery

Plan are those behaviours that do not result in disruption to biologically important behaviours.

- The following studies indicate that the transition between a behavioural change (i.e. within the expected behavioural repertoire) and a behavioural disturbance likely occurs somewhere between the ~110 dB SPL and >160 dB SPL thresholds. Behavioural changes in response to sound exposures below 120dB SPL are unlikely to be distinguishable from the normal range of biological behaviours as demonstrated by numerous scientific studies:
  - In an early field study, Malme et al. (1984) exposed gray whales to industrial sounds during migration and feeding. Migrating gray whales avoided a single airgun in their path starting around 164 dB re 1 µPa (rms), with about half deflecting course by ~170 db. In feeding areas, playbacks of continuous drillship noise suggested a much lower disturbance threshold. Whales showed no clear avoidance below ~110 dB and only began to possibly move away as levels approached ~119 dB. Malme et al. recommended 120 dB re 1 µPa as the received level at which there is a 50% probability of feeding gray whales interrupting feeding and leaving the area. This study, albeit with limited sample size, became a key benchmark for regulation, implying that sound below ~120 dB is unlikely to cause noticeable disturbance in baleen whales. For Southern Right Whales, which are also large mysticetes, these findings support the idea that maintaining received levels under 120 dB would avoid significant behavioural disruption (though the 120 dB criterion is recognized as a precaution based on sparse data). It must also be pointed out that the 120 dB level only applied to continuous noise with the same 50% probability estimate for seismic noise set at 170dB, some 50dB or 41% louder.
  - A series of studies in the 1980s and 1990s observed bowhead whale reactions to airgun noise in the Alaskan Beaufort Sea. In controlled exposure trials with a single airgun, migrating bowheads began orienting away from the approaching source at distances ~7–8 km (received levels roughly in the 120+ dB range) and all whales showed clear avoidance by 2 km, where received levels were at least 134 dB re 1 µPa. In contrast, no overt responses were detected when whales were exposed to distant seismic operations (received levels 107–158 dB) that were not directly in their path. During playbacks of airgun sounds, normal behaviour was observed at 3–5 km from the source (118–133 dB) until some whales finally moved away at ~124–134 dB (at closer ranges ~0.2–4 km). These studies show that bowheads can tolerate moderate noise if not directly confronted, but individuals will actively avoid an oncoming source once levels exceed roughly 120–130 dB. These studies concluded that contextual factors (whether the whale is feeding or migrating, and the nature of the approach) mediate the response threshold. In effect, 120 dB re 1 µPa was a conservative lower bound for disturbance. Most bowheads were unperturbed below this level, though a few sensitive individuals might react slightly above it. Applied to Southern Right Whales, this suggests sound under ~120 dB is unlikely to cause disturbance, especially if the noise source is not closing distance (which it is not), supporting the use of 120 dB as a precautionary criterion (Richardson 1985, 1986, 1999). It must also be pointed out that Richardson et al 1986 concluded the following: On 21 occasions in the summers of 1980–84, general activities of bowheads exposed to pulses of underwater noise (107–158 dB re: 1 μ Pa) from seismic vessels 6–99 km away were observed. Activities were indistinguishable from those without seismic noise; there was no detectable avoidance. In general, bowheads exhibit avoidance reactions when they receive seismic pulses stronger than about 160 dB re: 1 μ Pa. Evidence of reactions to lower received levels remains inconclusive.
  - Nowacek et al (2004) conducted playback experiments on North Atlantic right whales (*Eubalaena glacialis*) and revealed that the nature of the sound can be as important as its level. Tagged right whales were exposed to three stimuli – an approaching ship noise, a conspecific social call, and an artificial “alert” signal – all at similar received levels (~130–140 dB range). Strikingly, the whales did not show any significant avoidance or interruption of normal diving when they heard the actual ship noise (or the social sounds). In contrast, 5 out of 6 whales exposed to the alert signal (a complex tone designed to get their attention) dramatically changed behaviour: they prematurely aborted their foraging dives, rapidly ascended at shallow angles with increased fluke

strokes, and then stayed near the surface abnormally long. This response, which represents a disturbance (cessation of feeding and atypical surfacing), occurred at received levels around 133 dB re 1 µPa, statistically indistinguishable from the ship noise levels that produced no reaction. The authors concluded that right whales tend to ignore continuous low-frequency noise from vessels even when they can hear it, yet a novel or alarming sound can trigger an immediate disturbance response at similar or even lower levels. A limitation is the small sample size and the fact that the "alert" sound was not a typical environmental noise. Nonetheless, the study highlights that received level alone (e.g. 120 vs 130 dB) is not the sole predictor of behavioural disturbance and sound characteristics matter. In terms of management, the science supports the position that most low-level anthropogenic noises (<120 dB) are unlikely to disturb Southern Right Whales. The lack of response to ship noise around 130 dB supports the notion that sub-120 dB noise would rarely cause disturbance in right whales.

- Controlled exposure work on migrating humpback whales exposed to airguns has reported startle or brief orienting responses at received levels around 110–120 dB SPL, with more consistent avoidance or changes in movement patterns becoming evident at ≥130 dB SPL when animals were within a few kilometres of the source. These studies also reported no "abnormal" behaviours such as abandoning migration or sustained high-speed flight, highlighting that responses were modest adjustments within the normal behavioural repertoire (McCauley et al., 2000, Dunlop et al., 2018).
- Bowhead and grey whale studies further illustrate this pattern and the importance of context. Migrating bowheads have shown avoidance and course deflection at approximately 120–130 dB SPL, whereas feeding bowheads tolerated substantially higher levels (~158–170 dB SPL) before showing comparable displacement, indicating that the same species can respond quite differently depending on behavioural state (Weilgart 2013). Similarly, migrating grey whales altered course in response to airgun exposures around 110–130 dB SPL but continued their migration and did not abandon the area altogether (Gomez et al., 2016). Western gray whale studies off Sakhalin also detected changes in movement and respiration associated with higher received levels, while emphasising that detecting population-level effects requires very large sample sizes and that many responses remain within natural variability (Gailey et al 2016).
- McCauley et al., (2000) conducted a controlled study in Western Australia that tracked migrating humpback whales during exposure to a single airgun. Avoidance behaviour (deflection of course and/or increased speed) was observed once whales experienced about 140 dB re 1 µPa (rms) – for example, at 1.3 km from the source (received ~143 dB) whales consistently veered away. Notably, when the airgun was first fired, some humpbacks showed a startle or sudden dive response at relatively low levels (~112 dB), but they did not flee at that level. Mother–calf pairs resting near the surface were more sensitive. They avoided the source at greater distances (up to 7–12 km away, corresponding to received levels still on the order of 140 dB). A key limitation is that the vessel could not approach closer than 1.2 km for ethical reasons, so true threshold distances were estimated by extrapolation. McCauley et al. (2000) concluded sustained avoidance in humpbacks begins around 140 dB, with lower-level reactions limited to brief startle responses. This finding indicates that humpbacks (and by analogy, right whales) are unlikely to be disturbed by received levels below ~120 dB; indeed, the whales in this study showed no lasting displacement at such low exposures. In the Regia MSS context, McCauley's results reinforce that a 120 dB cutoff is very conservative – well below the ~140 dB level where humpbacks altered course. It must also be pointed out that the methodology of McCauley et al (2000) did not use soft-start procedures for the seismic tests. It is unlikely that an initial startle response would have been observed under a soft-start procedure, which is now an entrenched part of seismic survey methodology.
- Gailey et al (2016) found a gray whale changed its behaviour from feeding/travelling in a northeast direction to travelling in a northwest direction and increased its swim speed at received sound levels ranging from 127 to 139dB SEL. The authors noted the response was observed in conjunction with other factors such as direction of the sound source relative to the whale's position combined with increasing sound exposure levels. This

study was part of a seismic survey in Russia which implemented an extensive monitoring program to examine the effects of a 4D seismic survey on an endangered gray whale population. The authors theorised the lack of evidence that the whales responded to seismic survey sound and vessel traffic by changing either their movement or respiration patterns could indicate that the mitigation strategy was effective. This study used linear modelling to try and quantify the contribution of seismic amongst other variables to behavioural patterns in grey whales. After considering natural variation, none of the response variables were significantly associated with seismic survey or vessel sounds. A whale's distance from shore and its orientation relative to the closest vessel were found to be significantly influenced by vessel proximity, which suggested some non-sound related disturbance.

- Wood et al. (2012) provided an expert review and updated recommendations on noise impact criteria, building on studies like Malme (1980s) and Southall et al. (2007). For behavioural disturbance, they advocated a dual-threshold approach that many regulators (e.g., NOAA) had adopted: for impulsive noise (such as seismic airguns), use ~160 dB re 1 µPa (rms) as the threshold for potential disturbance in baleen whales, whereas for continuous or non-impulsive noise, use ~120 dB re 1 µPa. These values were not derived from new field experiments but rather from the consensus of earlier data – notably the 120 dB level traces back to Malme et al.'s findings for gray whales response to continuous noise only, and 160 dB to observations that pulses above that tend to provoke avoidance in various species. Wood et al. noted that the 120 dB criterion had become a de facto standard despite the "paucity of our knowledge" about its precision. They treated it as a conservative, broadly protective threshold to trigger mitigation, given the uncertainties. The authors' conclusion was essentially to retain these precautionary thresholds for management until better species-specific data are available. Legally and scientifically, this positions <120 dB exposures as unlikely to cause more than minor or transient behavioural changes in low-frequency cetaceans. In the context of the Regia MSS and Southern Right Whales, the Wood et al. (2012) guidance supports the assertion that keeping noise below 120 dB will avoid disturbances. It is in line with international best practice and provides a defensible, although ultra-conservative rule for protecting whale behaviour in the absence of more refined data.
- Blackwell et al. (2013) monitored calling behaviour of bowhead whales during seismic surveys in the Arctic, providing insight into gradual behavioural responses over a range of sound levels. They discovered two behavioural response thresholds in calling rates. At lower noise exposures, bowheads increased their call output – reaching a plateau of elevated calling when 10-minute cumulative sound exposure level (CSEL) was around 94 dB re 1 $\mu Pa^2 \cdot s$ (a likely reaction to mild noise by calling more). However, once noise exposure exceeded an upper threshold (approximately 127 dB re 1 $\mu Pa^2 \cdot s$ CSEL, over 10 minutes), the whales' calling rates began to drop significantly. At the highest exposure levels (CSEL >160 dB), bowheads almost fell silent, indicating a strong avoidance or cessation of normal communication. This study, based on extensive acoustic monitoring, links biologically significant behaviour (calling associated with migration and socialising) to received levels. A key point is that the initial adverse effect – reduced calling – corresponded to moderate received levels (the 127 dB SEL threshold likely equating to SPL on the order of 115–125 dB for the intermittent airgun pulses). The authors suggest that the drop in calling reflects disturbance (whales either left the area, stayed silent, or both), which could impact breeding or migration if prolonged. One limitation is that calling rate changes are an indirect measure of disturbance, but in bowheads vocal silence is strongly associated with area abandonment. Blackwell et al. (2013) conclusions support the idea that responses can initiate at low exposure levels, in this case, well below traditional 160 dB criteria for impulses. For Southern Right Whales, which are also vocal baleen whales, this implies that subtle behavioural changes (like altered calling or listening behaviours) could begin at or below 120 dB in some cases. However, the more overt disturbance (ceasing calls and presumed avoidance) occurred at higher levels (on the order of >120 dB). In practice, this study underscores using caution: while prolonged sound below 120 dB is unlikely to drive whales away, even mild noise can have small effects. It overall does not contradict the 120 dB threshold adopted for the Regia survey

for avoiding clear disturbance and indeed supports using it as a conservative threshold to protect normal communication in right whales.

- Pirotta et al. (2022) provide one of the most sophisticated mechanistic models to date linking individual behavioural responses in marine mammals to population-level consequences. Using blue whales exposed to sonar in the eastern North Pacific as a case study, the authors integrated multi-year biologging data, prey density, controlled exposure experiments, and simulations of disturbance scenarios. They demonstrated that while behavioural responses such as feeding interruptions were frequently observed during exposure to mid-frequency sonar, these did not translate into measurable reductions in survival or reproductive success under the current sonar regime. Their findings reinforce that observable behavioural change is not inherently indicative of biological significance, and that the spatial-temporal overlap between sound exposure and biologically sensitive activity is a more critical driver of population-level effect than received level alone. Importantly, Pirotta et al. (2022) emphasise the need to quantify cumulative energy loss, recovery capacity, and prey availability to assess fitness impacts, rather than if any behavioural response constitutes disturbance. In the context of the Regia MSS, where exposures within SRW BIAs remain below the 120 dB SPL behavioural threshold and spatial-temporal overlap is limited, these findings support the conclusion that any behavioural responses, if they occur, are unlikely to have population-level consequences or meet the definitions of impact or disturbance under the National Recovery Plan.
- Southall et al. (2023) provide the most comprehensive synthesis to date of behavioural response studies in marine mammals exposed to anthropogenic sound, including seismic airguns. Their review confirms that behavioural responses are highly variable and context-dependent, influenced by factors such as behavioural state, prior exposure history, group composition, environmental setting, and proximity to important habitat. Crucially, they highlight that while received sound level is one of many contributing factors, it is not a reliable predictor of behavioural outcome on its own. The authors caution against over-reliance on single-value thresholds, such as the frequently cited 120, 140, or 160 dB re 1 µPa SPL values, which they note have often been "erroneously applied as step-change indicators of biological effect." Instead, Southall et al. (2023) advocate for probabilistic, dose–response approaches that acknowledge uncertainty, individual variability, and the importance of response severity and duration when assessing ecological significance. With respect to low-frequency cetaceans, they summarise evidence that the probability of any behavioural response begins to increase above ~120 dB re 1 µPa SPL, with stronger or more sustained reactions becoming more likely above 140 dB. Responses at or above 160 dB are more consistently observed but remain variable in type and consequence. Most importantly, Southall et al. (2023) distinguish between observable responses (e.g. slight changes in orientation, surfacing intervals, or dive behaviour) and biologically significant disturbance stating clearly that not all responses constitute disturbance, and that significance must be evaluated in terms of whether the response disrupts biologically important behaviours such as calving, resting, or migration.

  In the context of the Regia MSS, the findings of Southall et al. support the use of 120 dB SPL as an ultra-conservative, precautionary threshold for managing the risk of behavioural disturbance to Southern Right Whales. When considering the small temporal overlap, the modelled sound levels within the reproduction BIA, the shutdown rules, and spatial exclusions, Southall et al. (2023) conclusions reinforce the assessment that any potential behavioural response would be minor, reversible, and highly unlikely to meet the National Recovery Plan's definition of disturbance.
- 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. Although this study did not include calf-cow pairs, the authors suggested mother-calf pairs more likely to elicit more adverse, and quicker responses to sound sources than their conspecifics. As the Regia MSS has adopted a precautionary 140 dB threshold for October and an ultra-precautionary threshold of 120

dB for September, extended shut down measures, and excluding 75% of the calving season, CGG is confident a behavioural response (if any) experienced by a SRW would not result in *disturbance* or *impact* as per the National Recovery Plan.

While numerous behavioural response studies have been conducted on mysticetes exposed to seismic and other underwater sound sources, none demonstrate a direct causal relationship between received noise levels and biologically significant disturbance. These studies rely on inference rather than proof, using observed patterns of movement, dive behaviour, or vocalisation as proxies for disruption. However, whale behaviour is naturally variable, driven by a complex mix of environmental, social, and physiological factors that make attribution to a single source of noise inherently complex (Southall et al., 2007, Nowacek et al., 2007, Ellison et al., 2012, National Academies of Sciences 2017, Southall et al., 2023, Darias-O'Hara et al., 2025). As a result, the evidence base depends on constructs such as probability curves, threshold estimates, and expert elicitation. These are tools which help identify patterns but also increase epistemic uncertainty. This makes it difficult to determine the biological relevance of observed responses with confidence. The work of Pirotta et al (2022) comes closest to addressing the biological relevance of disturbance to whales. By utilising multiple sources of data on environmental parameters, food source dynamics and military sonar they were able to model the predicted effects on female blue whale vital rates and whether this translated into effects on the fitness of individuals and populations. They found environmental changes (~disturbances) were able to severely affect long term health while sonar activities did not. This type of study provides a more insightful analysis of what constitutes a disturbance that translates into an impact. Clearly there can be multiple disturbance scenarios around sound that do not translate to changes in fitness.

Despite this, at the precautionary exposure levels adopted for the Regia MSS, there is evidence of a decreased probability of behavioural changes equating to a disturbance noting that such responses are context-dependent, typically short-lived and reversible, and unlikely to constitute biologically significant disturbance as defined by the National Recovery Plan. Given the extensive control measures and temporal exclusions implemented by CGG, any behavioural change from a SRW can confidently be said to be unlikely to constitute a disturbance as defined by the National Recovery Plan.

In short, the Regia MSS EP has demonstrated that any behavioural changes observed during the Regia MSS will fall within the normal behavioural repertoire of the species such that the Regia MSS:

- is not an impact as defined by the National Recovery Plan.
- is not disturbance as defined by the National Recovery Plan.

This is further evidence that the environmental impacts of the Regia MSS will be of an acceptable level.

Table F4-4 below describes how acceptable levels for impacts to SRWs is being met regarding the Regia MSS.

Table F4-4 - Demonstration that behavioural impacts to SRW from underwater sound are consistent with the SRW National Recovery Plan.

Action (Acceptable Levels)	Environmental Context	Activity Context	Supporting Facts and Evidence	Residual Uncertainty	Management of Uncertainty	Conclusion/Claim
Actions within and adjacent to southern right whale BIAs and HCTS should demonstrate that it does not prevent any southern right whale from utilising the area or cause auditory impairment (Commonwealth of Australia 2024).	SRW migrate from Antarctica to Southern Australia, starting in May. SRW migrate from Southern Australia to Antarctica ending in October. Between May and October, SRW utilise the reproduction BIA/HCTS for courting, breeding, birthing, and rearing. Data shown in Figure F3-1 confirms that sightings are significantly lower in October, and zero in the last 6 years. Ambient sound levels are variable between 90 dB and 158 dB, with a 110 dB mean.	The Regia MSS will not occur in May, June, July, August or the first 2 weeks of September. This leaves the last 2 weeks of September and October as the only months of potential overlap. The survey overlaps with <1% of the migration BIA with overlap expected on SRW departure from the reproduction BIA, likely in September/October. The survey does not overlap with the reproduction BIA and is never closer than 41 km in September of October.	75% of the temporal overlap with the known presence of SRW in the BIA/HTCS has been avoided. The survey is never closer than 23 km from the reproduction BIA. The survey will acquire lines 30-67 in September and October, resulting in a minimum 41 km separation from the reproduction BIA. Modelling results predict SRW behavioural effects at 13 km (140 dB).	No activity proposed from April to August, therefore no uncertainty during this period. Remaining uncertainty about SRW presence in September and October. Sound modelling is a predictive process which, may have errors. Effects that prevent utilisation behaviours may occur below 140 dB (see Appendix F3 for details).	Received sound level monitoring acquired in near real-time through SSV buoys, and if statistically significant increase from stated threshold is exceeded, then implementation of shut down procedures or relocation of survey in September and October. Monitoring of the SRW reproduction BIA/HCTS from May to end-August to estimate total numbers, estimate calf/cow pairs, track patterns of movements of SRW, monitor residency to inform/confirm departure from reproduction BIA.	There is no uncertainty about being able to meet the acceptable level in the months of April, May, June, July, August or the first half of September. In later September, the Regia MSS will not prevent any SRW from utilising the migration or reproduction BIAs and that behavioural response is not attributable to the survey. It has been demonstrated that the Regia MSS will not have impacts of an unacceptable level to SRW.

Action (Acceptable Levels)	Environmental Context	Activity Context	Supporting Facts and Evidence	Residual Uncertainty	Management of Uncertainty	Conclusion/Claim
Actions within and adjacent to southern right whale BIAs and HCTS should demonstrate that it minimises behaviour disturbance.	SRW migrate to Southern Australia starting in May. Common reproductive behaviours in the absence of impulsive sound are known and documented in Southall 2023 (though they are not tied to received level thresholds). SRW residency/ high site fidelity, is a common assumption in the literature. NMFS 2024 recommends activities use a 160 dB SPL as the starting point for management.	The Regia MSS may result in elevated sound levels in the SRW migration BIA and HCTS for the southern migration only. The Regia MSS may result in elevated sound levels in the SRW reproduction BIA and HCTS between Cape Otway and Cape Bridgewater, which is <2% overlap with the reproduction BIA.	Peak sound levels above 120 dB may be exceeded within the reproduction BIA between Cape Otway and Cape Bridgewater. Peak sound levels above 140 dB may be exceeded within the reproduction BIA between Logans Beach and Portland Port. Peak sound levels above 160 dB are not predicted to reach the reproduction BIA. Preliminary results from monitoring in 2025 have returned 1 resident cow/calf pair at Logans Beach with 8 days of detections for the season to date. (Detections between July 16 to Aug 7).	Behavioural responses can occur below the recommended NMFS threshold of 160 dB SPL. There is no consensus on a relationship between any threshold of impulsive sound and a nominated behavioural response. Therefore, any sound above ambient levels may cause a behavioural disturbance. SRW presence in the reproduction BIA at commonly observed sites is insufficient to monitor behavioural disturbance. Observed behaviours in ambient noise settings are difficult to distinguish from disturbed behaviours. Therefore, an in-situ behavioural monitoring program with appropriate shut down procedures cannot be feasible implemented.	In-field sound source verification through the SSV buoys to confirm predicted attenuation. Position of SSV buoys near entry to BIA to monitor received sound levels and implement shutdown/relocation procedures if exceedance triggers are met within September and October. As a result, sound levels within the reproduction BIA are not predicted to exceed baseline levels	As the monitoring focus is now using pre-determined and ultra-conservative threshold levels for ambient sound levels, sound exposures within the reproduction BIA will not exceed statistically significant levels, and if exceedance did occur, the source of sound will be eliminated, thus ensuring no behavioural response attributable to the Regia MSS. This meets the requirement to ensure behavioural disturbance is minimised.

5.10 Search for Unacceptable Environmental Impacts

Whilst all the impacts arising from the Regia MSS have been evaluated looking at the cause-effect pathways to environmental components, it is also important to evaluate impacts from the survey more holistically to understand if there are unacceptable impacts. This search looked for unacceptable impacts by considering whether the Regia MSS maintains biological diversity and ecosystem integrity.

5.10.1 Maintenance of Biological Diversity

Biological diversity underpins resilient and durable ecosystems. High biodiversity is closely linked to ecosystem functions and services, with more diverse systems being seen as more resilient to change (Oliver et al 2015 and references therein). A primary mechanism allowing species to endure and thrive in complex environments is heterogeneity. This occurs in a multi-dimensional framework as reflected in the spatial and temporal differences that exist in all aspects of a species' environment (Wu & Loucks 1995).

Preferred habitat is usually never uniformly available and will be shared and competed for by other species and individuals. For invertebrates and fish with a planktonic larval stage, recruitment back to a location is highly variable in space and time with usually weak stock-recruitment relationships (e.g. Cury et al 2014). Strength of recruitment pulses are often correlated with better-than-usual environmental conditions during their larval phase resulting in more food and greater survival. These conditions are themselves highly variable in space and time. For marine mammals that aggregate to feed on concentrations of krill, these food sources are equally variable in space and time with strong intra and inter year variations in the upwelling systems that drive the production of krill.

The environmental assessments considered all key organisms likely to interact within the Operational Area and Survey Acquisition Area and have indicated that these areas are not primary habitat within the ecosystem. There is no evidence to support the Survey Acquisition Area as either a major source-or-sink for species inhabiting the greater area. This heterogeneity is key to population stability with minimal reliance on the Survey Acquisition Area as a key provider to the greater population of species in the region.

Direct disturbance to those species that are site attached within the Active Source Area is the most likely manifestation of impact from use of seismic. However, there has been no experimental evidence of mortality to fishes and invertebrates from this type of activity. Seismic surveys have been conducted across the greater region for many years however existing long-term datasets on key species within the area have not been able to identify impacts that can be unequivocally linked to seismic activity. While some individuals may suffer permanent injury as discovered in experimental work, these effects will be highly variable in space and time due to changes in habitat across areas and the continual movement of the seismic array. The size of impacts will be negligible at a population level and will be virtually impossible to quantify once natural variations and other anthropogenic effects, primarily from fishing, are accounted for.

5.10.2 Maintenance of Ecosystem Integrity

Maintenance of biological diversity leads naturally to an expectation that ecological integrity will be maintained. At its most fundamental, ecological integrity means the ability of all species within an ecosystem to survive and reproduce such that the overall health of their ecosystem is maintained. Population structures should persist, supported by processes such as connectivity and dispersal that are key to sustaining systems. Associated habitat must also remain capable of supporting critical population levels.

By looking for ecosystem vulnerabilities and comparing these to impacts from the Regia MSS it may be possible to identify unacceptable impacts. Table F4-5 identifies the potential ecosystem vulnerabilities were considered in the context of the Regia MSS.

Our assessments have identified that no measurable changes to ecological integrity or population structures are likely because of the Regia MSS. Any potential changes to standing stock will not be measurable relative to the scale of changes that are manifest through fishing, or relative to the degree

of uncertainty that already exists around quantifying abundance and health of large highly mobile marine animals. The one-off, "spatially constrained", and highly mobile nature of the survey will not by-definition cause population level impacts. The highly connected nature of stocks along the south coast ensures a regular supply of new recruits will be available to settle into habitat that has been surveyed by sonar arrays. Stocks are historically limited by recruitment levels rather than habitat shortages. Seismic surveys will not damage habitat given there is no interaction with the seabed proposed by this activity.

Table F4-5 - Potential ecosystem weaknesses and unacceptable impacts.

Potential Ecosystem Vulnerabilities	Description of potential unacceptable impacts
Low Biodiversity	Ecosystems with few species lack ecological redundancy, meaning there are fewer species that can perform similar roles. This makes the ecosystem more susceptible to disturbances because the loss of any single species can have disproportionate effects on the ecosystem's overall functionality.
Simplified Food Webs	Simple food webs have fewer connections among species, which means energy and nutrients have fewer paths to flow through the ecosystem. This simplicity can lead to instability if a link in the chain is disrupted, as there are fewer alternative pathways to compensate for the loss.
Non-native or Invasive Species	The introduction of species from other ecosystems can create weaknesses by disrupting established relationships among native species. Invasive species often have no natural predators in the new ecosystem, allowing them to outcompete and displace native species, which can lead to reduced diversity and altered ecosystem functions.
Degraded or Fragmented Habitats	Damage to or division of habitats can isolate species populations, limit resource availability, and disrupt the interactions necessary for ecosystem processes. This can weaken the ecosystem's ability to support species diversity and maintain ecological functions.
Overexploited Resources	Overexploitation occurs when the rate of resource use exceeds the ecosystem's capacity to regenerate. This can lead to a decline in species, as well as a decrease in the ecosystem's ability to provide goods and services, such as food and clean water.
Climate Change Vulnerabilities	Ecosystems that are particularly sensitive to temperature changes, sea-level rise, or alterations in weather patterns may struggle to adapt to the rapid pace of climate change. This can lead to shifts in species distributions, loss of habitat, and increased susceptibility to diseases.
Limited Genetic Diversity within Species	When species have limited genetic variability, they may not have the necessary traits to adapt to changing environmental conditions or to resist diseases and parasites, making the species and the ecosystem more vulnerable.
Lack of Keystone Species	Keystone species have a disproportionate influence on their ecosystem. Their removal can lead to significant changes in ecosystem structure and function, which may not be easily reversible and could lead to ecosystem collapse.
Over-dependence on Keystone Species	Heavy reliance on a single keystone species makes the ecosystem vulnerable to any changes that affect that species. If the keystone species declines or goes extinct, there may not be another species that can fill its role, leading to ecosystem degradation.
Insufficient Regenerative Capacity	If an ecosystem cannot recover from disturbances such as natural disasters or human activities, it can become stuck in a degraded state (often known as a phase-shift), losing its ability to support a diverse community of organisms and provide ecological services.
Overfishing and Unsustainable Fishing Practices	Overfishing reduces populations of key species to below sustainable levels, disrupting the balance of the marine food web. Practices like bottom trawling can also cause irreversible damage to marine habitats, further weakening the ecosystem.
Narrow Timing of Important Life-Cycle Events	Species that rely on specific environmental cues for timing critical life-cycle events, such as breeding or migration, can be thrown off by changes in climate or habitat conditions. This can lead to mismatches in timing that disrupt reproduction and survival rates.
Areas of Concentrated Abundance	Regions with high densities of organisms are critical for the ecosystem but can become points of vulnerability if conditions supporting these concentrations change or if these areas are disproportionately affected by human activities.

Potential Ecosystem Vulnerabilities	Description of potential unacceptable impacts
Narrow Distribution or Ranges	Species with limited geographical distribution are at a higher risk of extinction due to habitat loss or environmental changes that directly affect their small living area.
Sensitive Life-Cycle Stages of Species	Certain life-cycle stages may be more vulnerable to environmental stresses and impacts on these stages can affect the survival and recruitment of individuals into the population, thereby affecting the overall health of the ecosystem.

5.11 Consistency with the Principles of ESD

ESD is a foundational concept in environmental decision-making and management, with its principles deeply rooted in international agreements and enshrined in Australian legislation. The core tenet of ESD is to ensure that the needs of the present generation are met without compromising the ability of future generations to meet their own needs. Several key principles guide the application of ESD:

1. **Precautionary Principle:** In cases where there are threats of serious or irreversible environmental damage, a lack of full scientific certainty should not delay measures to prevent environmental degradation. This principle acknowledges the inherent limitations of scientific knowledge and encourages a proactive approach to environmental protection.
2. **Inter-generational Equity:** ESD mandates that the current generation acts as stewards of the environment, maintaining or enhancing its health, diversity, and productivity for the benefit of future generations. It underscores the moral obligation to preserve the planet's natural wealth for those to come.
3. **Conservation of Biological Diversity and Ecological Integrity:** Biodiversity, including ecosystem, species, and genetic diversity, forms the foundation of social and economic systems. The conservation of biological diversity and ecological integrity should be fundamental considerations in all environmental planning and decision-making processes.
4. **Valuation, Pricing, and Incentives:** Environmental factors should be included in the valuation of assets and services. The "polluter pays" principle holds that those responsible for pollution should bear the costs of containment, avoidance, or abatement. Pricing should reflect the full life cycle of costs, including natural resource use and waste disposal. Moreover, environmental goals should be pursued through cost-effective incentive structures and market mechanisms.
5. **Integration of Considerations:** ESD emphasizes the effective integration of social, economic, environmental, and equitable considerations in decision-making processes. It recognizes that decisions must balance both short-term and long-term perspectives.

These principles are integral to Australia's environmental legislation, including the federal Environment Protection and Biodiversity Conservation Act 1999 (**EPBC Act**). They guide the evaluation of projects, ensuring that they align with the principles of ESD, protect biodiversity, and promote sustainable development. Consistent adherence to these principles is essential for responsible and sustainable environmental management in Australia. There follows and assessment of each principle of ESD having regard to the Regia MSS and the preparation process of the EP.

5.11.1 Precautionary Principle

The precautionary principle is an approach in environmental management that suggests taking proactive action to prevent harm to the environment when there is scientific uncertainty about potential negative impacts. It is often invoked as a guiding principle in decision-making processes for various activities that have the potential to affect the environment adversely. However, the application of this principle is not always straightforward or appropriate, particularly when considering the impacts of a single activity within a larger environmental context.

Consider, for instance, the case of a minor activity whose potential impact on marine biodiversity is not fully understood. The principle might dictate that in the absence of clear evidence of

harmlessness, action should be taken to prevent the activity or mitigate its potential impacts. However, when the levels of natural variation in the marine environment are demonstrably high - such as variations in salinity, temperature, and currents that can have significant effects on marine life - the effects of a single, limited-duration activity may be demonstrably low, even when the uncertainties are factored in.

In such scenarios, the baseline environmental variability can often dwarf the impact of a single activity. For example, the migration patterns and breeding cycles of marine life may be subject to greater influence from natural seasonal changes than from the noise generated by a seismic survey. The introduction of noise into the marine environment from a survey may be a minor addition to the existing soundscape, which includes not only anthropogenic sources like shipping traffic but also natural sources like storms or the vocalizations of marine animals.

It is crucial to clarify that the precautionary principle does not equate to preparing for the worst-case scenario. The precautionary principle advocates for measures that are proportional to potential harm and the level of scientific uncertainty, not necessarily the most extreme outcomes. It is based on examination of the full corpus of relevant literature and aligning with the scientific consensus whilst acknowledging the extremes (or the range) of scientific outcomes.

Conceiving of the worst-case scenario involves planning or making decisions based on the most severe possible outcome in each situation, often regardless of the probability of such an outcome occurring. This method is typically used in contexts where the cost of failure is exceedingly high, such as in emergency preparedness or nuclear safety, and may lead to measures that go beyond what the precautionary principle would dictate.

There are clear examples of this in the context of the Regia MSS. There has been much conjecture about which effect threshold distance to use as the basis for the impact assessment for underwater sound effects to plankton. Relevant persons have advocated for application of McCauley et al (2017) which would have seen adoption of a 1.2 km effect distance when most other scientific papers have a reduced distance, in some cases down to meters from the sound source. Applying the precautionary principle does not mean one should take a scientific outlier and manage to that outcome. Rather, having considered the range of outcomes across the body of relevant research, application of a consensus or modal outcome is the appropriate and proportionate position to take.

Similarly, for protection of Southern Right Whales, one could take a view that behavioural disturbances to low frequency cetaceans have been observed at levels below the adopted behavioural effect threshold of 160 dB re 1 μPa^2 SPL (i.e. HESS 1999 and McCauley 2003). However, doing so in isolation would ignore Southall et al (2007) findings that behavioural response from sound exposure below 160 dB re 1 μPa^2 SPL “would almost certainly not constitute biologically significant disturbance.” This matter is discussed in detail in other parts of the Regia MSS EP and serves in this instance to show that the starting point of any impact assessment is to select and justify the use of appropriate (i.e. consensus or modal) scientific outcomes as the starting point for later considering whether a threat may result in serious or irreversible harm.

In this context, it is essential to consider the proportionality aspect of the precautionary principle. The principle should not be applied in isolation but rather in consideration of the relative scale of impact. If the contribution of an activity to the overall environmental impact or risk is minimal and the natural resilience and variability of the ecosystem are high, the application of the precautionary principle may not be warranted. This is particularly relevant when there is an absence of significant threat or when the threat is negligible compared to the baseline environmental variability.

The principle is most relevant when there is a possibility of serious or irreversible damage, and the activity in question contributes significantly to that impact level. When the activity's impact is minimal and the environmental system exhibits high levels of inherent variability, applying the precautionary principle without the context of the significance of the harm would be disproportionate and could potentially divert resources from addressing more significant environmental threats.

Thus, the application of the precautionary principle should be calibrated to the scale and significance of potential impacts in relation to the broader environmental context. This ensures that environmental management remains focused on significant threats and does not become an

impediment to activities with lower order impacts, especially when these activities are conducted responsibly.

The Regia MSS EP preparation process is consistent with the Precautionary Principle because:

1. The EP preparation process recognised the presence of environmental impacts and risks associated with the activity, particularly in terms of underwater sound impacts, atmospheric emissions, and accidental fuel releases. It acknowledged that these impacts and risks, if unmitigated, could lead to serious or irreversible environmental harm.
2. In response to the identified impacts and risks, the process took proactive measures to minimise and mitigate potential harm. It did not rely solely on full scientific certainty before acting but instead acted in anticipation of possible adverse effects.
3. The EP preparation process resulted in the implementation of robust monitoring and evaluation strategies (Appendix B3). It recognised that ongoing assessment and monitoring were essential to detect any unforeseen impacts or changes in environmental conditions promptly.
4. Acknowledging the uncertainty surrounding certain impacts and risks, the process kept flexibility in its mitigation strategies. It is shown through evolution of the activity design and through the consultation process that CGG was prepared to adapt and adjust its survey objectives and proposed mitigation measures based on emerging information and changing circumstances.
5. The process implemented a range of safeguards and best practices to ensure that environmental impacts and risks, particularly underwater sound emissions, were kept within acceptable levels of impact and risk. It recognised that taking precautionary steps was appropriate in preventing potential harm to marine ecosystems and species.
6. The EP preparation process engaged with scientific experts and researchers to assess environmental impacts and risks. It sought advice from specialists who could provide insights into the best available science and mitigation technologies related to the project's environmental aspects (Appendices B4, B5, B6, B7, B8, and F5).
7. To uphold the Precautionary Principle, the process kept transparency in its decision-making and reporting. It ensured that relevant persons, regulatory authorities, and the public were informed about the identified impacts and risks, the measures taken, and any updates regarding the project's environmental impact.
8. In line with the Precautionary Principle, the EP preparation process prioritised the prevention of irreversible harm to the marine environment. It recognised that some environmental damage, once done, might be impossible to reverse or remedy, and therefore acted prudently to avoid such scenarios.

In summary, the Regia MSS EP preparation process aligned with the Precautionary Principle by acknowledging the presence of environmental impacts and risks associated with the proposed activity. CGG has proactively taken steps to prevent harm, monitor environmental conditions, and remaining flexible in its approach. It prioritized the protection of the marine environment whilst meeting enough of the original geophysical objectives to ensure a viable project. CGG has acted to appropriately to avoid serious or irreversible environmental damage, even in the face of scientific uncertainty.

5.11.2 Intergenerational Equity Principle

The Regia MSS EP preparation process adhered to the Inter-generational Equity Principle through the key actions and considerations described below:

1. The process acknowledged that the marine environment, including its ecological and biological diversity, is a shared resource. It recognised the responsibility to manage and conserve these resources for the benefit of both present and future generations (Appendix B1).

2. During its decision-making and planning, a long-term perspective was adopted, ensuring that actions taken today would not compromise the ability of future generations to enjoy the same environmental benefits. It considered the consequences of activities on a multi-generational timescale (Appendix B1).
3. To protect the health, diversity, and productivity of the marine environment, the process implemented a range of safeguards and mitigation measures (Appendix G1). These measures were designed to minimise negative impacts of the Regia MSS on the environment, ensuring that it will remain intact and functional for future generations.
4. The EP preparation process engaged with scientific experts and conducted comprehensive assessments to understand associated environmental impacts (Appendices B4, and E1 to E9) and environmental risks (Appendices B4, and D1 to D4). The EP provided robust scientific evidence, essential for informed decision-making to safeguard the environment for generations to come.
5. Consistent with inter-generational equity, the process prioritised identifying and preventing irreversible environmental damage. CGG understood that once certain ecological harm occurred, it might be impossible to rectify or restore, disproportionately affecting future generations. Consequently, there is no irreversible environmental damage predicted from the Regia MSS.
6. The process actively consulted with indigenous communities, other marine users, policy and regulatory authorities, and the public, regarding environmental values and sensitivities and protection measures. CGG put no restrictions on who could self-identify as a relevant person recognising that the voices and perspectives of current and future generations needed to be heard and considered in shaping the EP.
7. The process kept transparency in its actions, decisions, and reporting, demonstrating accountability to current and future generations. The EP documents CGG's commitment to preserving environmental values and ensuring that actions taken today will benefit those who come after.
8. Recognising that unforeseen circumstances and new information might emerge over time, the process incorporates a mean of adapting to changing circumstances in its environmental management system (Appendix B3). This approach allows for the ongoing adjustment of strategies and actions to align with the evolving understanding of environmental impacts.
9. The process implemented mitigation strategies to minimise the environmental footprint of the Regia MSS. It actively sought ways to reduce ecological harm, particularly in sensitive areas and habitats, with a view to preserving these areas for the enjoyment of future generations.
10. Impacts to marine plants, animals and other cultural features associated with culturally important non-tangible values might impact the intergenerational transmission of knowledge of Sea Country, including connection to Country and songlines when individuals can no longer witness or interact with the cultural features tied to Country. Therefore, managing tangible cultural features required mitigation to protect species at a population level, including songline related migratory routes. Physical features 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. This was achieved through identification and assessment of values and adoption of the Sea Country Protection Plan to allow ongoing consideration of cultural values.

In conclusion, the Regia MSS EP preparation process prioritised responsible management and ecological conservation, demonstrating commitment to the Inter-generational Equity Principle by safeguarding the marine environment, actively engaging with the community, and ensuring that actions taken today promote the well-being and environmental quality of future generations.

5.11.3 Conservation of Biological Diversity and Ecological Integrity Principle

Ecological integrity refers to the ability of an ecosystem to maintain its structure, functions, and processes, including its biodiversity, dynamics, and resilience. It is important in environmental assessments because it is crucial to understand how proposed activities might affect the natural balance and health of ecosystems. The Regia MSS EP preparation process consistently upheld the Conservation of Biological Diversity and Ecological Integrity Principle through various actions and considerations as described below:

1. Throughout the EP preparation process, there was a clear commitment to preserving the biodiversity of the marine environment. This included changing the economically preferred timing of the activity to move to a time of the year when biodiversity will be lower (Appendices A2 and G1). The process recognised the intrinsic value of diverse ecosystems and species, understanding that they contribute to ecological integrity and overall environmental health.
2. Detailed ecological assessments and studies were conducted to evaluate the impacts of the activity on marine biodiversity. These assessments aimed to identify sensitive habitats, critical species, and potential threats to ecological integrity (Appendices D1 – D4 and E1 – E9).
3. The process incorporated protection measures to safeguard key biological diversity and maintain ecological integrity. These measures included activity limitations (Appendix A2) and control measures (Appendix G1) designed to minimize any disturbances to marine habitats, breeding grounds, and migratory routes of sensitive species. Further commitments have been made to the protection of cultural heritage and other key receptors.
4. Areas of high ecological significance, including critical habitats and migration corridors, were identified and marked for additional attention. The process recognized the importance of these areas in maintaining ecological integrity and prioritised their protection. Further scientifically justified impact management zones were adopted because of consultation and to eliminate scientific uncertainty.
5. To mitigate potential harm to biodiversity, the process implemented a range of mitigation measures (Appendices A2 and G1). These measures aimed to reduce the footprint of the seismic survey in sensitive zones, minimise disruption to marine life, and prevent significant adverse effects on species and ecosystems.
6. The process engaged with experts in marine biology, ecology, and conservation to inform decision-making. This collaboration ensured that the EP's provisions were aligned with the best available scientific knowledge regarding biodiversity and ecological integrity.
7. The process sought to avoid activities that could harm biological diversity and ecological integrity wherever possible. This included planning the survey timing, sail lines and other operations to avoid critical areas and sensitive habitats.
8. Acknowledging the dynamic nature of ecosystems, the process incorporated an adaptive management approach to both the management of the activity holistically and to key receptors. This approach will allow for real-time adjustments during the survey to respond to unexpected ecological conditions and ensure minimal disruption to biodiversity.
9. Comprehensive monitoring and reporting systems have been put in place to assess the survey's impact on biological diversity and ecological integrity. This data-driven approach will track changes, identify potential issues, and support the implementation of corrective actions as needed.
10. The process engaged with relevant authorities and environmental agencies to align its efforts with broader conservation goals and regulations aimed at preserving biodiversity and ecological integrity.

In conclusion, the Regia MSS EP preparation process demonstrated a strong commitment to the Conservation of Biological Diversity and Ecological Integrity Principle. It proactively addressed potential impacts on marine biodiversity, incorporated protective measures, and relied on scientific expertise to ensure that the seismic survey is conducted with minimal harm to ecosystems, species, and overall ecological health.

5.11.4 Valuation, Pricing, and Incentives Principle

The Valuation, Pricing, and Incentives Principle has reduced relevance within the context of the Regia MSS EP preparation process. However, it is important to emphasise that the process remains consistent with this principle, albeit to a lesser degree because of the nature of the activity. Several factors contribute to this alignment:

- The primary goal of the Regia MSS project is to identify gas reserves beneath the seabed. While the immediate emphasis is on scientific exploration rather than commercial exploitation, the project's success in locating potential gas reserves is inherently linked to the future valuation and pricing of these resources. Thus, the EP preparation process indirectly contributes to the long-term considerations associated with this principle.
- The Regia MSS project acknowledges the importance of inter-generational equity, recognising that present actions must consider the well-being of future generations. By responsibly exploring and identifying potential gas reserves, the EP preparation process ensures that future generations can make informed decisions regarding the utilisation of these resources. This aligns with the principle's objective of protecting natural and human capital for the benefit of future generations.
- The project's commitment to ecological sustainability and environmental protection indirectly addresses the Valuation, Pricing, and Incentives Principle. By safeguarding the marine environment and adhering to precautionary measures, the EP preparation process contributes to maintaining the natural capital that underpins any future valuation or pricing of ecosystem services.
- In cases where the Regia MSS project may unavoidably interfere with commercial fishing activities, it incorporates a compensation protocol. This protocol ensures that any potential financial impacts on fishing communities are addressed through calculated and negotiated agreements. While not directly related to traditional pricing mechanisms, it reflects a commitment to fair compensation and social considerations.

In summary, while the Valuation, Pricing, and Incentives Principle may hold reduced relevance in the specific context of the Regia MSS EP preparation process, the approach taken is consistent with the principle to the extent possible. The focus on responsible exploration, inter-generational equity, environmental stewardship, and fair compensation aligns with the broader goals of ensuring that ecological and social values are adequately considered, even though immediate valuation and pricing mechanisms are not central to the project's current phase.

5.11.5 Integration Principle

The Regia MSS EP preparation process demonstrates consistency with the Integration Principle of ESD as described below:

1. The Regia MSS EP preparation process included a thorough impact assessment considering economic, environmental, and social impacts. It identified and assessed potential positive and negative consequences of the seismic survey on these dimensions, ensuring that decision-makers had a comprehensive understanding of the project's implications.
2. The EP preparation process actively engaged with relevant persons, including indigenous communities, environmental organizations, and local communities. It sought their input and considered diverse perspectives, ensuring that relevant persons were given the opportunity to have their say in the decision-making process, and their concerns were considered.
3. In cases where uncertainties or risks were identified regarding potential environmental harm, the Regia MSS EP preparation process adopted a precautionary approach. It took proactive measures to prevent harm, even in the absence of full scientific certainty, aligning with the precautionary principle.
4. The process assessed how the seismic survey impacted future generations. It ensured that the decisions made did not compromise the ability of future generations to meet their needs and enjoy a healthy marine environment.

5. The EP preparation process integrated the conservation of biological diversity and ecological integrity into decision-making. It involved detailed environmental assessments and implemented measures to protect biodiversity within the operational area.
6. Environmental and social factors were incorporated into economic analyses. The process considered the costs and benefits of the seismic survey, considering its impact on the environment and society, thus fulfilling economic integration (Appendix F2).
7. The EP preparation process maintained clear documentation of the decision-making process. It transparently outlined how economic, environmental, social, and equitable considerations were integrated into the planning and execution of the Regia MSS, ensuring transparency and accountability. This was primarily achieved by using the Environmental Assessment Method (Appendix B9) and the Decision-Making Criteria (Appendix B1).
8. Mechanisms for ongoing review and monitoring of the seismic survey decisions were established in the Implementation Strategy (Appendix B3). This ensures the project will continue to align with ESD principles, with adjustments made as new information becomes available or circumstances change.
9. The process provided transparent and comprehensive reporting on how economic, environmental, social, and equitable considerations were integrated into the decision-making process. This information was shared with relevant persons through the Regia MSS website to uphold transparency and foster trust.

By addressing these aspects, the Regia MSS EP preparation process has demonstrated its commitment to and consistency with the Integration Principle of ESD. This approach ensured that the seismic survey will be conducted in a manner that balances economic, environmental, and social factors, ultimately contributing to ecologically sustainable development.

6 Conclusion

In conclusion, the assessment of the Regia MSS EP preparation process against the principles of ESD demonstrates a strong commitment to responsible and sustainable offshore petroleum activities in Australian waters. The adherence to ESD principles, as enshrined in the Regulations, underscores the importance of integrating economic, social, and environmental considerations into the decision-making processes surrounding petroleum operations.

Throughout this assessment, it becomes evident that the Regia MSS EP preparation process aligns with these principles. 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. While the valuation, pricing, and incentives principle may have reduced relevance within this context, the focus remains on ensuring that the cost of protecting natural and human capital is adequately considered.

This document has provided a comprehensive assessment of the Regia MSS EP preparation process, incorporating iterative updates based on evolving information, feedback, and regulatory requirements. Through the application of multiple assessment methods, it has been demonstrated that the activity can be undertaken in a way that manages environmental impacts and risks to an acceptable level, and ensures that the EP is robust, responsive, and fit for purpose across all stages of its implementation.

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8 Document Control

Version	Date of Revision	Author/Reviewer	Summary of Changes
0.0	2 October 2023	MS	Assessment completed.
0.1	20 December 2023	RH/CT	Reviewed and updated.
0.2	29 December	MS	Reviewed and updated.
1	4 January 2024	MS	Accepted changes and formatted ready for public comment.
2	15 May 2024	MS/AH	Updated following public comment.
3	21 October 2024	MS/AH	Updated to broaden the scope from the ESD assessment to be the demonstration that acceptable levels of impact and risk have been met. Content taken from other parts of the EP to remove duplication and improve clarity of message.
4	16 April 2025	MS	Updated following NOPSEMA OMR 1 Letter
5	December 2025	MS/CT	Updated following NOPSEMA OMR 2 Letter

Annex 1

Objections and Claims Raised from Consultation

During the consultation process relevant persons were invited to raise objections and claims about the adverse effects of the activity. An assessment of merit of each objection or claim has been made by CGG which can be found in the consultation report using the Feedback ID number shown in Table F4-6 If an objection or claim had merit and was relevant to this assessment it has been included in the table below.

Table F4-6 - Objections and Claims raised from consultation.

Feedback ID	Objection or Claim Summary	Titleholder Response	Event ID
4078	Concerns about seismic testing and drilling rigs impacting marine life and fishing activities.	Titleholder has undertaken a comprehensive assessment of all available scientific literature to develop an appropriate EP. All potential risks have been identified with appropriate mitigation methods applied where necessary. There are no identified levels of harm that would endanger the population stability of any taxa.	917
4254	The precautionary principal needs to apply, due to lack of evidence of damage.	A full assessment of the precautionary principle will be undertaken outside of the aspect-by-aspect approach currently taken. Noted that the preconditions for the precautionary principles are two-fold and there need to be evidence of a serious or irreversible threat to the environment which is not present once control measures have been applied to the Regia MSS. However, precaution has been routinely used in the activity design.	3415
4254	The precautionary principal needs to apply, due to lack of evidence of damage.	A full assessment of the precautionary principle will be undertaken outside of the aspect-by-aspect approach currently taken. Noted that the preconditions for the precautionary principles are two-fold and there need to be evidence of a serious or irreversible threat to the environment which is not present once control measures have been applied to the Regia MSS. However, precaution has been routinely used in the activity design.	3415
4439	Concerned about impacts to squid, octopus and scallops.	Event ID 6875 - The Regia team responded in-meeting with a discussion about the assessment work undertaken on impacts to squid, octopus and scallops.	6875
4381	Even though the months April/May/June have the least ecological impact, it does not mean the impact is acceptable.	Event ID 6882 (Doc ID 9096)- CGG has always acknowledged that this is not a 'no impact' activity, and this is not what the environmental assessment is intended to achieve. Rather ensuring impacts are of an acceptable level (meaning that overall ecosystem integrity and resilience is not irreparably damaged) while also reducing impacts to as low as reasonably practicable. Timing has been selected in an effort to avoid the time of year when the ecosystem is most active and the majority of animals are breeding, which is the summer months. It is not appropriate to cease the activity, which occurs at a minimum 20km offshore, for animals laying eggs onshore.	6412

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