



Imperial Multiclient 2D Marine Seismic Survey

Environment Plan Summary

CGG Multiclient and New Ventures



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1 INTRODUCTION

1.1 Scope

The scope of the Environment Plan (EP) covers 2D seismic data acquisition activities within a defined survey area (Imperial MC2D MSS) (Figure 1-1). This EP does not cover transfer of the survey or support vessels to and from the survey area as they will fall under normal maritime requirements.

Controls and mitigation measures have been summarised for the survey in Section 4. The implementation of these controls and mitigation measures will provide CGG with the required level of assurance that its activities are being managed in an environmentally responsible manner.

The overall purpose of this EP is not only to comply with statutory requirements of the Commonwealth Offshore Petroleum and Greenhouse Gas Storage (Environment) regulations 2009 (OPGGs (E) Regulations) but also to ensure that the seismic acquisition is planned and conducted in line with CGG environmental policies and standards, including the corporate Environmental Policy. The EP has been reviewed and accepted by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) on the 28th October 2014. This EP summary has been prepared in accordance with the requirements of regulation 11 (7) and (8) of the OPGGS (E) Regulations.

1.2 Timing

Data acquisition will take approximately four months to complete. The preferred commencement date for the survey is Q4 2014 with completion occurring before the end of Q1 2015. However, due to current restrictions on vessel availability it may not be possible to acquire data during this period and therefore the activity may occur at any time from Q4 2014 to Q4 2015. The survey vessel may return to port during the survey for the purpose of refuelling or crew changes, although refuelling and crew changes may also occur at sea.

1.3 Location

Data acquisition will occur along approximately 10,000 km of predetermined sail lines, spaced ~25 km apart within the survey area, covering approximately 168,000 km² (Figure 1-1). The exact location of sail lines is yet to be finalised, however, all activities ancillary to the full fold acquisition (line run-outs, run ins, soft starts and vessel turns) will occur within the survey area. The survey area covers Petroleum Exploration Permits WA-481-P, WA-493-P, WA-492-P, WA-385-P and adjacent open acreage areas.

Boundary coordinates for the survey area are shown in Table 1-1. At the closest point the survey polygon is located ~100 km from Exmouth, ~90 km from Carnarvon and 25 km from Geraldton. The water depths in the survey area are in the range of ~40 to >1,000 m with the shallowest water depths located along the eastern boundaries of the survey area.

The seismic vessel will not operate within 20 km of land across the entire survey area. Since the Abrolhos Fish Habitat Protection Area (AFHPA) lies within the 3nm (5.5 km) State water boundary, by operating at least 20 km from land, a buffer is created of more than 14 km from the AFHPA. The survey area also excludes all State waters. In addition to the spatial restrictions, the survey vessel will not enter water depths less than 40 m at any point during the survey.

Table 1-1: Boundary co-ordinates of the survey area¹

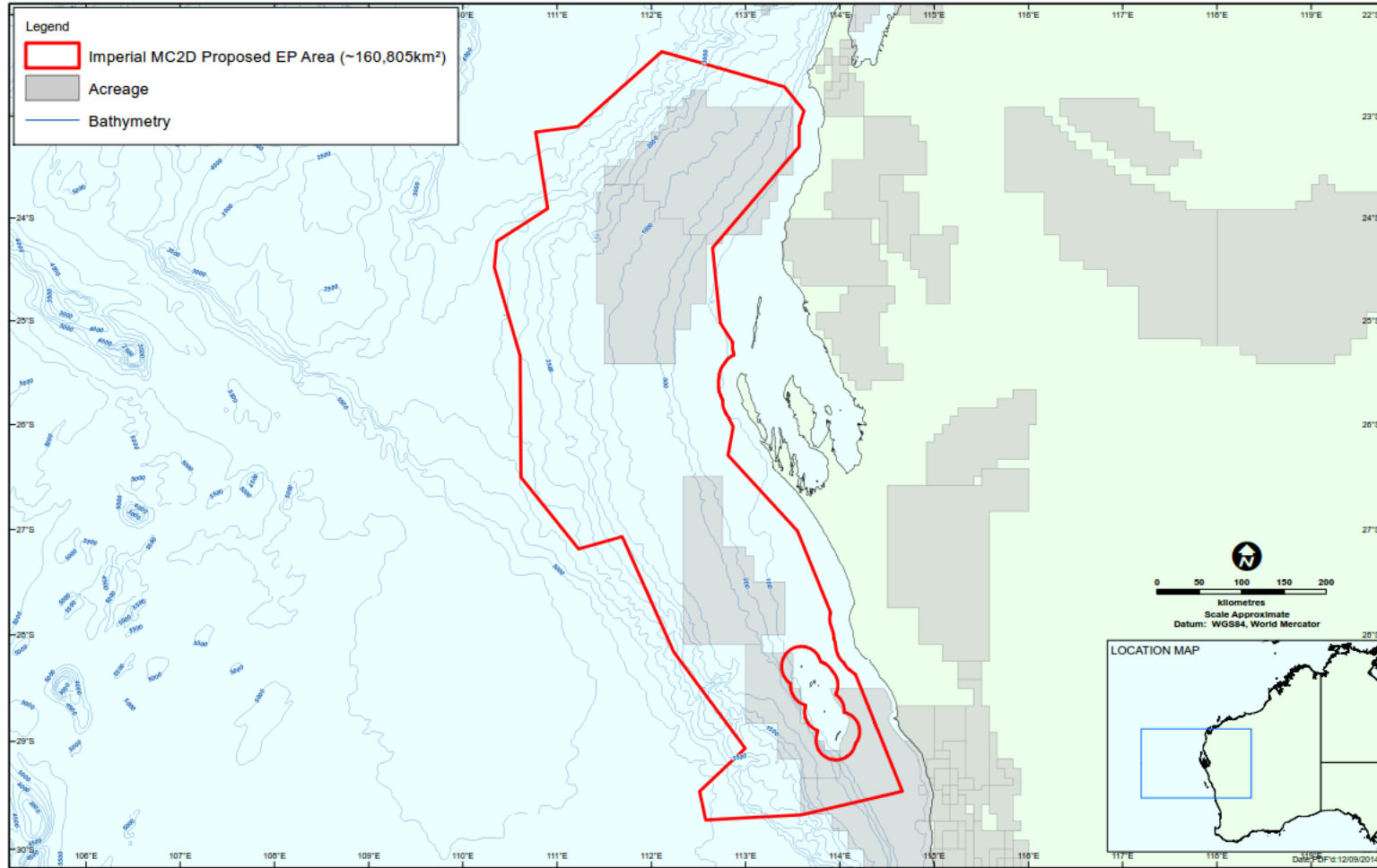
Longitude	Latitude
112.1107	-22.3663
113.4135	-22.7125
113.7507	-23.1043
112.6482	-24.2887
112.7302	-25.0176
112.9671	-25.3547
112.8122	-26.2931
113.5502	-27.0129
114.6618	-29.4638
113.5958	-29.6824
112.5753	-29.728
112.5116	-29.4638
112.9944	-29.0629
112.2382	-28.1609
111.6916	-27.0676
111.2269	-27.186
110.6165	-26.5027
110.6074	-25.3365
110.334	-24.4801
110.3614	-24.225
110.8989	-23.9061
110.7714	-23.159
111.2178	-23.1043
112.1107	-22.3663

¹ Note: These co-ordinates represent the outer boundary of the survey area and do not include the excluded area around the Abrolhos Islands; refer to Figure 1-1)



Figure 1-1: Location of the survey area

CGG Multi Client and New Ventures
... Imperial MC2D Proposed EP Area



2 DESCRIPTION OF THE ACTIVITY

2.1 Survey Parameters

The marine seismic survey proposed is a conventional 2D survey similar to most others conducted in Australian waters in terms of technical methods and procedures. No unique or unusual equipment or operations are proposed. The survey will be conducted using a purpose built seismic vessel.

During the proposed activities, a survey vessel will traverse a series of pre-determined sail lines within the survey area at a speed of approximately 8-9 km/hr. As the vessel travels along the sail lines a series of sound pulses (approximately every 10 seconds) will be directed down through the water column and seabed. The sound is attenuated and reflected at geological boundaries and the reflected signals are detected using sensitive pressure sensors (hydrophones) arranged along a solid cable (known in the industry as a streamer) towed behind the survey vessel. The reflected sound is then processed to provide information about the structure and composition of geological formations below the seabed in an attempt to identify potential hydrocarbon reservoirs.

Given the type of geology and depth of targets of interest, it is considered that the most suitable operating pressure of the seismic energy source will be approximately 2,000 pounds per square inch (psi) with the source deployed in two arrays firing alternatively, each with an intended volume of 4,230 cubic inch (cui).

The seismic receiver array will comprise a single streamer with a length of approximately 10 km and will be towed at a depth of between 6 m at the head and 50 m at the tail, depending on water depth. In the case of water depths less than 60 m, the streamer will be raised so that a minimum 10 m separation between the streamer and the sea floor is maintained. A summary of the seismic survey parameters is provided in the table below.

Table 2-1- Intended survey acquisition parameters

Parameter	Value
No. of streamers	1
Streamer length	10 km
Streamer depth	~ 6 m to ~50 m
Intended size of seismic energy source array	4,230 cui
Operating pressure	2000 psi
Frequency range	~ 5- 120 Hz

2.2 Vessels

2.2.1 Seismic survey vessel

A purpose built seismic survey vessel, such as the *Binh Minh 02*, will be used throughout the survey.

The survey vessel will have all necessary certification/registration and will be fully compliant with all relevant MARPOL and SOLAS convention requirements for a vessel of this size and purpose.

2.2.2 Support vessels

At least one support vessel will accompany the survey vessel during the activity to maintain a safe distance between the survey array and other vessels and manage interactions with shipping and fishing activities if required. The support vessels are yet to be decided, however, they will use marine diesel fuel only and will be of smaller size compared to the proposed survey vessel.

The support vessels will also re-supply the seismic survey vessel with logistical supplies refueling the survey vessel as required. At sea refueling will only take place during daylight hours, and will not take place within a distance of 19 km from any emergent land or shallow water features (<20 m water depth), or any protected area.

3 DESCRIPTION OF THE ENVIRONMENT

The environmental values and sensitivities considered relevant to the planned activities scheduled to occur within the survey area boundaries and within the wider environment, defined as a 25 km buffer around the survey area outside which impacts from planned or unplanned activities are not expected to occur.

3.1 Physical Environment

The proposed survey area lies entirely in Commonwealth marine waters spanning the North West Marine Region (NWMR) and the South West Marine Region (SWMR) in the north Perth Basin and southern Carnarvon Basin.

3.1.1 Temperature and Salinity

The Perth Basin has a Mediterranean climate, with warm dry summers and cooler, wet winters. Mean air temperatures range from 8 °C to 19.5 °C in July (winter) and from 19.1 °C to 32.4 °C in February (summer). Further north in the Carnarvon Basin the climate becomes more arid and subtropical with tropical cyclone activity from November to April. Mean air temperatures offshore are 28°C in summer and 23°C in winter.

3.1.2 Currents

The most dominant current within the survey area is the Leeuwin current. The Leeuwin current originates at the narrowing of the continental shelf around the North West Cape, just north of the survey area. The Leeuwin current flows south along the shelf break and is shallow (less than 300 m deep) and narrow (50–100 km wide). This current flows all year round, but is strongest during the southern hemisphere winter. During summer, strengthening south-westerly winds counter the alongshore pressure gradient and weaken the southward flow of the Leeuwin Current, allowing the generation of the northward flowing Ningaloo Current. Maximum annual current speeds in upper regions of the water column (surface to 100 m deep) are expected to range from 0.33 to 0.8 m/s in non-cyclonic conditions and may occasionally approach 1.1 m/s under extreme storm conditions.

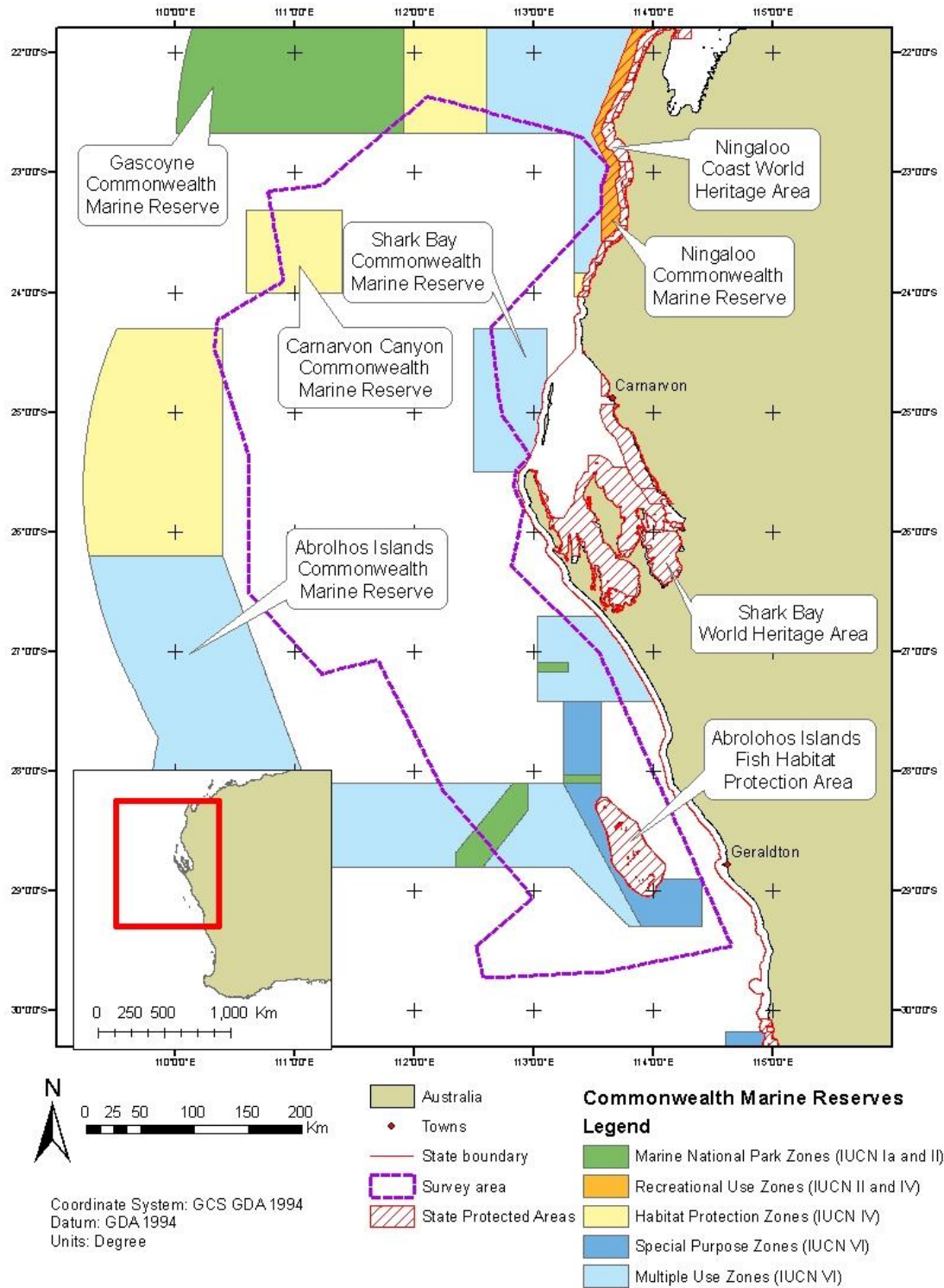
3.1.3 Protected Areas and Key Ecological Features

Given the high level of biodiversity and environmental value of the region within the survey area an extensive network of existing and proposed marine conservation reserves exists; along with a number of marine habitats that are valued for their biodiversity or productivity, called Key Ecological Features (KEFs). Commonwealth Marine Reserves (CMRs), State managed protected areas and KEFs overlapping with the survey area or wider environment is given in Table 3-1 below.

Table 3-1: Protected Areas (CMRs) and Key Ecological Features with survey area and the wider environment

Feature	Within area	survey	Wider environment
<i>Commonwealth Marine Reserves</i>			
Ningaloo	✓		✓
Shark Bay	✓		✓
Abrolhos Islands	✓		✓
Carnarvon Canyon	✓		✓
Gascoyne	✓		✓
<i>State Manage Protected Areas</i>			
Ningaloo Marine Park, World Heritage Area and National Heritage Property	x		✓
Shark Bay World Heritage Area and National Heritage Property	x		✓
Abrolhos Islands Fish Habitat Protected Area	x		✓
<i>Key Ecological Features</i>			
Commonwealth waters adjacent to Ningaloo Reef	✓		✓
Canyons linking the Cuvier Abyssal Plain and the Cape Range Peninsula	x		✓
Wallaby Saddle	x		✓
Ancient Coastline 90-120 m isobath	✓		✓
Commonwealth marine environment surrounding the Houtman Abrolhos Islands	✓		✓
Commonwealth marine environment within and adjacent to the west coast inshore lagoons	✓		✓
Perth Canyon and adjacent shelf break	✓		✓
Western demersal slope and associated fish	✓		✓
Western rock lobster	✓		✓

Figure 3-1: The proposed survey area in relation to Commonwealth (and State) managed protected areas



3.2 Biological Environment

A review of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) database (Protected Matters search tool) held by the Department of Environment (DoE) was conducted on 23rd May 2014 for the survey area polygon described by the boundary coordinates provided in Table 1-1. The majority of the marine species identified are likely to transit through the area, and it is unlikely that the habitats within the survey area are critical to the survival of these species. Biologically Important Areas (BIAs) as identified by the Conservation Values Atlas which overlap with the proposed survey area. A summary of the species identified, their likely presence in the area and details of BIAs is provided in Table 3-2.

Table 3-2: EPBC Act Protected Species that may occur in the survey area

Scientific name	Common name(s)	Status	Presence	Biologically Important Areas
Marine mammals				
<i>Balaenoptera musculus</i>	Blue whale	Endangered; Migratory	Species or species habitat may occur within area	BIA for migration overlaps
<i>Eubalaena australis</i>	Southern right whale	Endangered; Migratory	Species or species habitat likely to occur within area	None
<i>Balaenoptera borealis</i>	Sei whale	Vulnerable; Migratory	Species or species habitat may occur within area	None
<i>Balaenoptera physalus</i>	Fin whale	Vulnerable; Migratory	Species or species habitat may occur within area	None
<i>Megaptera novaeangliae</i>	Humpback whale	Vulnerable; Migratory	Congregation or aggregation known to occur within area	Overlap with BIA for migrating humpback whale
<i>Balaenoptera bonaerensis</i>	Antarctic minke whale	Migratory	Species or species habitat may occur within area	None
<i>Balaenoptera edeni</i>	Bryde's whale	Migratory	Species or species habitat may occur within area	None
<i>Lagenorhynchus obscurus</i>	Dusky dolphin	Migratory	Species or species habitat may occur within area	None
<i>Orcinus orca</i>	Killer whale	Migratory	Species or species habitat may occur within area	None
<i>Physeter macrocephalus</i>	Sperm whale	Migratory	Species or species habitat may occur within area	None

Scientific name	Common name(s)	Status	Presence	Biologically Important Areas
<i>Sousa chinensis</i>	Indo-Pacific Humpback Dolphin	Migratory	Species or species habitat known to occur within area	None
<i>Dugong dugon</i>	Dugong	Migratory	Breeding known to occur within area	None
<i>Neophoca cinerea</i>	Australian sea lion	Vulnerable; Migratory	Breeding known to occur within area	Male and female foraging BIA overlaps
Fish				
<i>Carcharodon carcharias</i>	White shark	Vulnerable; Migratory	Foraging, feeding or related behavior known to occur within area	Foraging BIA overlap
<i>Carcharodon Taurus</i> (west coast population)	Grey nurse shark	Vulnerable; Migratory	Species or species habitat may occur within area	None
<i>Rhincodon typus</i>	Whale Shark	Vulnerable; Migratory	Species or species habitat may occur within area	None
<i>Isurus oxyrinchus</i>	Shortfin mako	Migratory	Species or species habitat likely to occur within area	None
<i>Isurus paucus</i>	Longfin mako shark	Migratory	Species or species habitat likely to occur within area	None
<i>Lamna nasus</i>	Porbeagle, mackerel shark	Migratory	Species or species habitat likely to occur within area	None
<i>Manta birostris</i>	Giant manta ray	Migratory	Species or species habitat known to occur within area	None
<i>Milyeringa veritas</i>	Blind gudgeon	Vulnerable; Migratory	Species or species habitat likely to within area	None
Reptiles				
<i>Aipysurus apraefrontalis</i>	Short-nosed sea-snake	Critically endangered; Migratory	Species or species habitat likely to occur within area	None
<i>Caretta caretta</i>	Loggerhead turtle	Endangered; Migratory	Species or species habitat likely to occur within area	Interesting BIA overlaps
<i>Dermochelys coriacea</i>	Leatherback turtle	Endangered; Migratory	Species or species habitat likely to occur within area	None

Scientific name	Common name(s)	Status	Presence	Biologically Important Areas
<i>Chelonia mydas</i>	Green turtle	Vulnerable; Migratory	Species or species habitat known to occur within area	None
<i>Eretmochelys imbricate</i>	Hawksbill turtle	Vulnerable; Migratory	Species or species habitat likely to occur within area	Interesting BIA overlaps
<i>Natator depressus</i>	Flatback turtle	Vulnerable; Migratory	Foraging, feeding or related behavior likely to occur within area	None
Birds				
<i>Diomedea dabbenena</i>	Tristan albatross	Endangered; Migratory	Species or species habitat may occur within area	None
<i>Diomedea exulans amsterdamensis</i>	Amsterdam albatross	Endangered; Migratory	Species or species habitat may occur within area	None
<i>Diomedea sanfordi</i>	Northern royal albatross	Endangered; Migratory	Species or species habitat likely to occur within area	None
<i>Diomedea epomophora (sensu stricto)</i>	Southern royal albatross	Vulnerable; Migratory	Foraging, feeding or related behavior likely to occur within area	None
<i>Diomedea exulans (sensu lato)</i>	Wandering albatross	Vulnerable; Migratory	Species or species habitat likely to occur within area	None
<i>Thalassarche carteri</i>	Indian yellow-nosed albatross	Vulnerable; Migratory	Foraging, feeding or related behavior may occur within area	None
<i>Thalassarche cauta cauta</i>	Shy albatross	Vulnerable; Migratory	Species or species habitat may occur within area	None
<i>Thalassarche melanophris</i>	Black-browed albatross	Vulnerable; Migratory	Species or species habitat may occur within area	None
<i>Thalassarche impavida</i>	Campbell albatross	Vulnerable; Migratory	Species or species habitat may occur within area	None
<i>Thalassarche steadi</i>	White-capped albatross	Vulnerable; Migratory	Foraging, feeding or related behavior likely to occur within area	None
<i>Macronectes giganteus</i>	Southern giant petrel	Endangered; Migratory	Species or species habitat may occur within	None

Scientific name	Common name(s)	Status	Presence	Biologically Important Areas
			area	
<i>Macronectes halli</i>	Northern giant-petrel	Vulnerable; Migratory	Species or species habitat may occur within area	None
<i>Pterodroma mollis</i>	Soft plumaged petrel	Vulnerable; Migratory	Foraging, feeding or related behavior likely to occur within area	Overlap with foraging BIA (in high numbers) and breeding sites
<i>Puffinus carneipes</i>	Flesh-footed shearwater	Migratory	Foraging, feeding or related behavior likely to occur within area	None
<i>Puffinus pacificus</i>	Wedge-tailed shearwater	Migratory	Breeding known to occur within area	Overlap with foraging BIA (in high numbers) and breeding sites
<i>Anous stolidus</i>	Common Noddy	Migratory	Breeding known to occur within area	Overlap with foraging BIA (provisioning young) and breeding sites
<i>Anous tenuirostris melanops</i>	Australian lesser noddy	Vulnerable; Migratory	Breeding known to occur within area	Overlap with foraging BIA (provisioning young) and breeding sites
<i>Sternula nereis nereis</i>	Australian fairy tern	Vulnerable; Migratory	Species or species habitat known to occur within area	Overlap with foraging (in high numbers) BIA and breeding sites
<i>Sterna anaethetus</i>	Bridled tern	Migratory	Breeding known to occur within area	Overlap with foraging BIA (in high numbers) and breeding sites
<i>Sterna bengalensis</i>	Lesser crested tern	Migratory	Breeding known to occur within area	Overlaps breeding BIA
<i>Sterna caspia</i>	Caspian tern	Migratory	Breeding known to occur within area	Overlap with foraging BIA (provisioning young) and breeding sites
<i>Sterna dougallii</i>	Roseate tern	Migratory	Breeding known to occur within area	Overlap with foraging BIA (provisioning young) and breeding sites
<i>Apus pacificus</i>	Fork-tailed swift	Migratory	Species or species habitat likely to occur within area	None

Source: DoE Protected Matters Search Tool; DoE Conservation Values Atlas

Due to the overlap of the survey area with BIAs of endangered or migratory species, spatial restrictions were implemented to avoid peak activity at these locations. Table 3-3 below provides clarification of the sensitivity locations, buffers and temporal restrictions for areas where data

acquisition will not occur.

Table 3-3: Location of sensitivity, buffer to sensitivity boundary, temporal restriction within which acquisition will not occur and figure number providing spatial representation of acquisition exclusions.

Location of sensitivity	Buffer	Temporal restriction
Whale shark foraging BIA boundary	25 km	20 March – 31 July
Hawksbill turtle internesting BIA boundary	25 km	1 October– 31 Dec 31
Loggerhead turtle internesting BIA boundary	25 km	1 November – 28 February
Humpback whale resting BIA boundary	25 km	1 June – 30 September
Traditional scallop fishing grounds boundary	0 km	1 August – 31 January

3.2.1 Western Rock Lobster

While not listed as threatened or migratory, the Western rock lobster is a species of commercial significance in the Perth Basin. In general, the western rock lobster is found in temperate waters off the west coast of Western Australia where juveniles populate shallow inshore reefs (<40 m depth) and adults (>80 mm carapace length) populate deep-water offshore habitats (>40 m depth) including coral reefs at the Abrolhos Islands.

The western rock lobster tends to spawn in shallow waters <80 m. Following spawning, the larvae drift offshore (between 400 and 1,000 km) and spend 9 to 11 months in a planktonic state and grow in a series of moults. The majority die, but the survivors are eventually carried by winds and currents back towards the continental shelf where they settle and develop.

3.3 Socio-Economic Environment

3.3.1 World and National Heritage properties

The survey area does not overlap with any world heritage properties, however it does overlap one National Heritage Place, the Batavia Shipwreck Site and Survivor Camps Area 1629 – Houtman Abrolhos, Wallabi Group.

3.3.2 Petroleum Exploration and Production

The survey area covers parts of blocks WA-385-P and WA-481-P, and the entirety of blocks WA- 492-P and WA-493-P. Eleven wells have been drilled within Permit area WA-481-P in the Perth basin and two appraisal wells. Production License WA-31-L, lease by Roc Oil, is directly adjacent to WA-481-P, hydrocarbons have been produced here since 2006. Blocks WA-492-P and WA-493-P in the Carnarvon basin, on the continental shelf and slope of the Cuvier margin have been awarded to Total E&P Australia. .

3.3.3 Commercial Fishing

Both the offshore and coastal waters in the Perth and Carnarvon Basins support a valuable and

diverse commercial fishing industry. Several commercial fisheries operate out of Carnarvon, Kalbarri, Geraldton and Port Denison. The fisheries are managed by either the WA Department of Fisheries (State) or the Australian Fisheries Management Authority (Commonwealth).

Commonwealth Fisheries that have the potential to be impacted by the proposed activities include:

- Western Tuna and Billfish Fishery
- Western Deepwater Trawl Fishery
- Western Skipjack Fishery
- Small Pelagic Fishery

State Fisheries that have the potential to be impacted by the proposed activities include:

- WA Charter Boat Industry
- WA Mackerel Fishery
- WA West Coast Demersal Gillnet and Demersal Longline Fishery
- WA West Coast Deep Sea Crustacean Fishery
- WA Specimen Shell Fishery
- WA Marine Aquarium Fishery
- Bech-de-mer fishery
- WA Abrolhos Islands and Mid West Trawl Fishery
- WA West Coast Demersal Scalefish Fishery
- Rock Lobster Zone A and B, Big Bank Area
- Octopus Fishery
- Roe's Abalone Fishery Area 8
- Gascoyne Demersal Scalefish Fisheries
- Shark Bay Prawn
- Shark Bay Scallop

3.3.4 Ports and Commercial Shipping

Medium levels of shipping are expected to occur within the proposed survey area due to adjacent port destinations and shipping channels.

3.3.5 Tourism and Recreation

Tourism and recreation is more likely to occur in the east of the survey area in proximity to the coast and in waters surrounding the Abrolhos Islands. Tourism and recreation will be limited elsewhere due to the distances offshore that the majority of the survey will occur. Activity is likely to be concentrated around known tourism and recreation hotspots such as whale watching snorkeling/diving and recreational fishing.



3.3.6 Defence Activities

The survey area overlaps with restricted Airspace R861A-B, R863A-B and R864A-B. As such, unexploded ordnance (UXO) may be present on and in the sea floor. Furthermore, aviation activities may occur in the airspace of the survey area.

4 ENVIRONMENTAL RISK ASSESSMENT

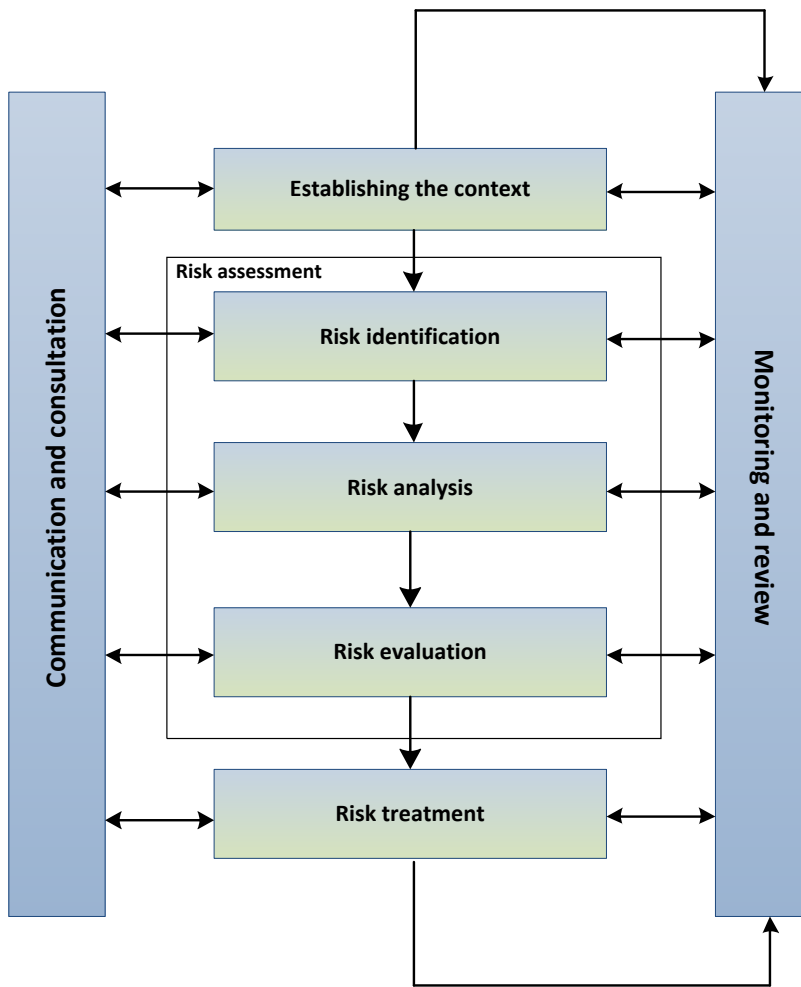
An environmental risk assessment has been undertaken to understand and manage the environmental risks associated with the proposed survey to a level that minimises impacts on the environment and meets the objectives of the survey.

4.1 Environmental Risk Assessment Methodology

The risk assessment methodology applied is consistent with the Australian/New Zealand Standard AS/NZS ISO 31000:2009 Risk management – Principles and guidelines, Handbook HB 203:2012 Managing environment – related risk, and Handbook HB 89-2012 Risk management – Guidelines on risk assessment techniques. The risk assessment has been undertaken to identify the sources of risk (aspects) and potential environmental impacts associated with the activity and to assign a level of significance or risk to each impact. This subsequently assists in prioritising mitigation measures to ensure that the environmental impacts are managed to as low as reasonably practicable (ALARP). The risk has been measured in terms of likelihood and consequence, where consequence is defined as the outcome or impact of an event, and likelihood as a description of the probability or frequency of the identified consequence occurring. Following identification of practicable mitigation measures, the residual risk of each impact is reassigned and assessed for environmental acceptability.

The key steps used for the risk assessment are shown in Figure 4-1 below.

Figure 4-1: Key steps used for risk assessment



Source: modified from AS/NZS ISO 31000:2009 Risk management



The environmental risks associated with the proposed seismic survey operations have been assessed by a methodology (Table 4-1) that:

- Identifies the activities and the environmental aspects associated with them;
- Identifies the values/attributes at risk within the survey area and wider environment;
- Defines the potential environmental effects of the activities;
- Identifies the likelihood of occurrence and potential consequences; and
- Determines overall environmental risk levels using a likelihood and consequence matrix.

The likelihood of occurrence for the key potential environmental impacts from the survey has been estimated based on industry incident reporting (Table 4-1). Table 4-1 also includes a qualitative description of environmental effects assigned to each category of consequence.

Table 4-1: Definitions for qualitative assessment of likelihood and environmental effects

Likelihood	Qualitative description of likelihood
Unlikely	Impact has not occurred in the past and there is a low probability that it will occur in exceptional circumstances.
Possible	Impact may have occurred in the past and there is a moderate probability that it will occur at some time.
Likely	Impact has occurred in the past and there is a high probability that it will occur at some time.
Highly Likely	Impact has been a common problem in the past and there is a high probability that it will occur in most circumstances.
Routine	Impact will occur, is currently a problem in the area or is expected to occur in almost all circumstances.
Consequence	Qualitative description of environmental effects
Slight	Possible incidental impacts to flora and fauna in a locally affected environmental setting. No ecological consequences.
Minor	Reduction of the abundance/biomass of flora and fauna in the affected environmental setting. No changes to biodiversity or ecological system.
Moderate	Reduction of abundance/biomass in the affected environmental setting. Limited impact to local biodiversity without loss of pre-incident conditions.
Severe	Substantial reduction of abundance/biomass in the affected environmental setting. Significant impact to biodiversity and ecological functioning. Eventual recovery of ecological systems possible, but not necessarily to the same pre-incident conditions.



Catastrophic	Irreversible and irrecoverable changes to abundance/biomass in the affected environmental setting. Loss of biodiversity on a regional scale. Loss of ecological functioning with little prospect of recovery to pre-incident conditions.
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Table 4-2 shows the overall environmental risk assessment matrix that compares the likelihood and consequences of potential environmental impacts arising from the survey and assigns a level of risk.

Table 4-2: Generic environmental risk assessment matrix

Consequence	Likelihood					
	Unlikely	Possible	Likely	Highly Likely	Routine	
Catastrophic	High	High	High	High	High	High Risk Level: Apply strict precautionary principle, and industry best practice to reduce to ALARP.
Severe	Medium	Medium	Medium	High	High	
Moderate	Medium	Medium	Medium	Medium	Medium	Medium Risk level: Apply standard cost-benefit approach to reduce risk to ALARP.
Minor	Low	Low	Medium	Medium	Medium	
Slight	Low	Low	Low	Low	Low	Low Risk level: Apply normal business management practice to avoid impact.

4.1.1 Demonstrating ALARP and Acceptability

Determination that an impact or risk is reduced to ALARP is a process which factors in a range of environmental and operational considerations. The key stages in determining ALARP are as follows:

- Application of design and construction codes and standards and good industry practice;
- Early identification of hazards and implementation of the recommendations to eliminate risk through design, procedures and practices;
- Identification of the key risk drivers qualitatively or quantitatively;
- Identification of all possible risk reduction (control) measures; and

- Assessment of the practicability and cost benefit of each risk reduction measure (see below).

To demonstrate that an ALARP assessment has been undertaken for each of the environmental hazards identified, the 'Hierarchy of Control', commonly used in safety systems, has been adopted. In descending order of effectiveness, the hierarchy of control criteria is:

- Eliminate – remove the risk;
- Substitute – change the risk for a lower risk;
- Engineering – engineer out the risk;
- Isolation – isolate people or the environment from the risk ;
- Administrative – provide instructions or training to people to lower the risk; and
- Protective – use of protective equipment.

4.1.2 Practicability Assessment

While reducing potential impacts associated with a particular risk, implementation of a specific control measure may require additional costs or effort, may lead to timing or operational restraints, or potentially pose different risks to another aspect of the environment. In assessing practicability of control measures, these negative aspects (cost, effort, timing/ operational restrictions and additional environmental risks) are weighed against the environmental benefits of implementation. Should the benefits outweigh the negatives, the control measure is implemented.

4.1.3 Demonstrating Acceptability

Following assessment of control measures for practicability, the risk will be ALARP and assigned a residual risk ranking. The residual risk is then assessed to determine whether it is at an environmentally acceptable level. In determining acceptability, factors such as stakeholder interest / concern, industry standards, laws and CGG's company policies and practices are considered.

4.2 Summary of Pre-Mitigated Risk Assessment

The environmental risks and potential environmental impacts of the proposed survey have been determined on the basis of CGG's previous seismic survey experience in Australian waters and the outcomes of a risk assessment.

A summary of the aspects and hazards relating to the proposed activity, the potential impacts they pose, control measures implemented and outcomes of the risk assessment is provided in Table 4-3.

Table 4-3: Environmental hazards, aspects, impacts, control measures and residual risk ranking

Hazard	Environmental Aspect	Potential impacts	Controls and Mitigation Measures	Residual risk level
Disturbance to Marine Fauna	Discharge of Underwater Seismic Pulses	Behavioural and physiological effects on cetaceans, turtles and fish Physiological effects on benthic invertebrates and plankton	<p>EPBC Act Policy Statement 2.1 – Part A Standard Management Procedures:</p> <ul style="list-style-type: none"> • Continuous watch <ul style="list-style-type: none"> ➤ Precaution zones: observation zone: 3 km+, low power zone: 2 km, shutdown zone: 500 m • Use of soft-starts on every occasion • Low visibility / night time restrictions including: • Recommencement procedures (adapted from EPBC Act Policy Statement 2.1) • Survey vessel will not operate at night or during low visibility if three or more shutdowns or power downs have occurred in the preceding 24 hours due to sightings of blue, humpback, southern right or sperm whales • EPBC Act Policy Statement 2.1 – Part B Additional Management Procedures (Two dedicated MFOs on survey vessel for duration of survey) • Vessel will not operate within 25 km of humpback whale resting BIA during the period June 1 to September 30 • Vessel will not operate within 25 km of whale shark foraging and aggregation BIA during the period 20 March to 31 July • Vessel will not operate within 25 km of hawksbill turtle internesting BIA during the period 1 October– 31 Dec 31 • Vessel will not operate within 25 km of loggerhead turtle internesting BIA during the period 1 November – 28 February 	Low



Hazard	Environmental Aspect	Potential impacts	Controls and Mitigation Measures	Residual risk level
			<ul style="list-style-type: none"> Vessel will not operate at night time or in low visibility if three or more blue, humpback, southern right or sperm whale shutdowns or power downs (no acquisition) occurred in the preceding 24 hours Environmental induction for survey vessel crew Use of 4,230 cui source size (considered to be the lowest possible in order to meet objectives of survey) 	
	Light Generation	Behavioural effects on dolphins, turtles, fish and seabirds	<ul style="list-style-type: none"> Vessel lighting procedures adhered to which include ensuring lighting kept to minimum required for navigation and occupational safety Environmental induction for survey vessel crew 	Low
	Vessel Movements	Behavioural and physical effects (i.e. injury or mortality) on cetaceans and turtles	<ul style="list-style-type: none"> Australian National Guidelines for Whale and Dolphin Watching adhered to, to manage vessel-whale and vessel-whale shark interaction and avoid collisions Environmental induction for survey appropriate survey vessel crew including MFOs, marine, deck and bridge crew to ensure awareness of potential risks 	Low
Disturbance to Benthic Habitats	Anchoring	Localised physical damage to benthic habitats	<ul style="list-style-type: none"> Anchoring only occurs in event of an emergency 	Low
	Equipment Dragging or Loss		<ul style="list-style-type: none"> Dropped objects/ lost in water equipment recovered where possible and records maintained Data acquisition will not occur in State waters Self-inflating cables (if dropped) Survey vessel will not operate in water depths <40 m 	Low



Hazard	Environmental Aspect	Potential impacts	Controls and Mitigation Measures	Residual risk level
			<ul style="list-style-type: none"> A minimum 10 m separation between the seismic cable and the seafloor at all times 	
Reduced Air Quality from Atmospheric Emissions	Operation of Machinery and Vessels	Localised reduction air quality Greenhouse gas emissions	<ul style="list-style-type: none"> Optimisation of fuel use to increase efficiency and minimise emissions through: <ul style="list-style-type: none"> planned maintenance of engines maintenance of steady speed and course of vessels course plotting to minimise survey duration / emissions helicopter routing optimised by service provider to minimise flight times; use for essential activities e.g. crew change Emissions managed by implementation of a PMS (records available), i.e. regular engine maintenance Use of a MARPOL certified (Annex IV) incinerator Use of low sulphur fuel (where possible) to minimise emissions from combustible sources 	Low
Introduction of Invasive Marine Species	Ballast Water	Introduction and establishment of IMS and displacement of native marine species	<ul style="list-style-type: none"> Vessel will only discharge ballast water in line with a Vessel Ballast Management Plan Vessel Ballast Management Plan will be compliant with Australian Ballast Water Management Requirements (e.g. ballast changes in open ocean >200m deep) 	Medium
	Biofouling		<ul style="list-style-type: none"> Prior to survey commencing, both survey and support vessels have all necessary DoA clearances to operate unrestricted anywhere in Australian waters 	Medium



Hazard	Environmental Aspect	Potential impacts	Controls and Mitigation Measures	Residual risk level
			<ul style="list-style-type: none"> • National biofouling management guidance for the petroleum production and exploration industry is adhered to including: <ul style="list-style-type: none"> ➢ Risk assessment of vessel to determine risk of introducing IMS ➢ If deemed moderate or high risk hull/submerged equipment will be subject to in-water inspection ➢ If IMS species suspected or confirmed, vessel will be dry docked for cleaning ➢ Anti-foulant paint will be applied in line with manufacturers guidance • Reporting of known or suspected introduced species to FishWatch with 24 hours 	
Marine Pollution from Routine Discharges	Sewage, Grey and Putrescible Wastes	Localised reduction in water quality due to nutrient enrichment	<ul style="list-style-type: none"> • Sewage treated as per MARPOL Annex V requirements including: <ul style="list-style-type: none"> ➢ Sewage and putrescible wastes macerated prior to disposal ➢ Sewage and putrescible waste treatment systems and holding tanks fully surveyed prior to survey commencement ➢ Sewage discharged >3 nm from land for treated sewage; >12 nm from land for untreated sewage • Adherence to Marine Orders – Part 96: <ul style="list-style-type: none"> ➢ discharge of sewage and putrescible waste will be of short duration with high dispersion and biodegradability; ➢ all sewage and putrescible waste treatment systems and holding tanks are to be fully surveyed prior to survey commencement; and survey on-board sewage treatment plant approved by the International Maritime Organisation (IMO). 	Low



Hazard	Environmental Aspect	Potential impacts	Controls and Mitigation Measures	Residual risk level
			<ul style="list-style-type: none"> All discharge of sewage and waste is recorded Use of biodegradable soaps and detergents where possible if support vessel is unable to treat/store grey water 	
	Bilge Water	<p>Acute toxicity effects on marine fauna and flora</p> <p>Localised reduction in water quality</p>	<ul style="list-style-type: none"> Compliance with PSPPS Act and Marine Orders – Part 91: Marine Pollution Prevention – Oil Discharge restrictions for bilge water with oil content >15 ppm, or bilge water contaminated with toxic chemicals Provision of appropriate segregation facilities on survey and support vessel, including tanks for storage of bilge water Bilge water contaminated with chemicals must be contained and disposed of onshore, except if the chemical is demonstrated to have a low toxicity (as determined by the relevant Material Safety Data Sheet [MSDS]) 	Low
Marine Pollution from Accidental Discharges	Solid Wastes	<p>Toxic effects on marine fauna and flora</p> <p>Localised reduction in water quality</p> <p>Indirect effects on commercial fisheries</p> <p>Disturbance to marine fauna or habitats</p> <p>Physical impacts on marine fauna i.e. from plastics</p>	<ul style="list-style-type: none"> No discharge of plastics or plastic products of any kind from vessels No discharge of domestic wastes (i.e. cans, glass, paper or other wastes from living areas) and no maintenance wastes (i.e. paint sweepings, rags, deck sweepings, oil soaks, machinery deposits, will be disposed of overboard) from vessels All solid, liquid and hazardous wastes (other than sewage, grey water and putrescible wastes) incinerated or compacted (if possible), stored in designated areas and sent ashore for recycling, disposal or treatment (consignment manifests available) Correct segregation of solid and hazardous wastes / good housekeeping evident 	Low



Hazard	Environmental Aspect	Potential impacts	Controls and Mitigation Measures	Residual risk level
			<ul style="list-style-type: none"> All waste receptacles aboard survey and support vessels covered with tightly fitting, secure lids to prevent any solid wastes from blowing overboard Incinerators used compliant with MARPOL including maintenance in accordance with manufacturers specifications and operation only by trained personnel 	
	Hazardous Materials		<ul style="list-style-type: none"> Correct segregation of solid and hazardous wastes / good housekeeping evident All waste receptacles aboard survey and support vessels covered with tightly fitting, secure lids to prevent any solid wastes from blowing overboard Incinerators used compliant with MARPOL including maintenance in accordance with manufacturers specifications and operation only by trained personnel SOPEP implemented and tested for survey and support vessels prior to commencing the survey. This test will involve a vessel based drill and testing of communications for notifying the RCC, at or near the survey location prior to the activity. At least one additional vessel based drill will be undertaken during the survey. Spill response bins/kits located in close proximity to hydrocarbon storage areas and replenished if required Personnel trained and competent in spill response procedures 	Low
	Fuel and Oil Spills		<ul style="list-style-type: none"> SOPEP implemented and tested for survey and support vessels prior to commencing the survey. This test will involve a vessel based drill and testing of communications for notifying the RCC, at or near the survey location prior to the activity. At least one additional vessel based drill will be undertaken 	Medium



Hazard	Environmental Aspect	Potential impacts	Controls and Mitigation Measures	Residual risk level
			<p>during the survey</p> <ul style="list-style-type: none"> • Spill response bins/kits located in close proximity to hydrocarbon storage areas and replenished when required. Personnel trained and competent in spill response procedures. • Refueling will not occur within 19 km of any emergent feature (<20 m water depth) or protected area • Vessel navigational equipment, procedures are utilised to prevent risk of spills e.g. Vessels equipped with multiple means of communication, bathymetric charts, vessel detection; daily notification of position to RCC; vessel exclusion zone applied, survey and support vessels will use approved navigation systems and depth sounders. • Use of marine diesel only, no HFO on board survey or support vessels • Hydrocarbons located above deck with secondary containment • All crew must attend an environmental induction containing basic information on spill response measures. • Vessel will not operate within 20 km of coastline 	
	Oil Spill Response	<p>Additional vessel and helicopter traffic</p> <p>Increased emissions, exhaust gases, noise and light</p> <p>Generation of waste contaminated with diesel</p> <p>Inappropriate management of oil contaminated flora,</p>	<ul style="list-style-type: none"> • Survey vessel SOPEP in place on-board vessel • Trained personnel to follow SOPEP • Spills >10 tonnes are reported to AMSA without delay (within 30 minutes) • Implementation of NATPLAN by AMSA • Management of wastes in compliance with the NATPLAN document Management and Disposal of Oil Spill Debris 	Low

Hazard	Environmental Aspect	Potential impacts	Controls and Mitigation Measures	Residual risk level
		fauna and surfaces	<ul style="list-style-type: none"> • Oil spill drills completed as per procedures • Vessel Operations Manager liaises (at intervals commensurate with the nature and extent of the incident) with parties involved in emergency response to evaluate effectiveness of response (and determine the occurrence of any impacts); these may include: <ul style="list-style-type: none"> ➤ Site Representative ➤ AMSA • Post-incident review conducted to identify lessons learned • Consultation undertaken prior to the survey and notices issued (where applicable) with relevant stakeholders including: <ul style="list-style-type: none"> ➤ Commercial fisheries ➤ Management agencies ➤ Industry bodies and ➤ Individual companies • Insurance policies in place to cover any post spill monitoring or clean-up (outlined in EP) 	
Disturbance to Social, Community and Conservation Values	Commercial Fisheries	Disruption to commercial fishing vessels Potential noise impacts on target species Restriction of access to fishing grounds, loss/damage to gear Recreational take of finfish	<ul style="list-style-type: none"> • Vessel navigational equipment and procedures are utilised to prevent risk of spills, e.g. Vessels equipped with multiple means of communication, bathymetric charts, vessel detection; daily notification of position to RCC; vessel exclusion zone applied. • Use of support vessel to prevent / manage vessel interactions; multiple means of communication available • Avoidance of traditional scallop fishing grounds during spawning periods 	Low



Hazard	Environmental Aspect	Potential impacts	Controls and Mitigation Measures	Residual risk level
		species	<p>(August to January) (see Section 1) Consent to move lobster pots ahead of survey vessel by support vessel</p> <ul style="list-style-type: none"> • Lost equipment retrieved where possible • No recreational fishing from survey or support vessels • Trained and competent personnel to ensure communication between vessels during survey • Initial consultation undertaken and additional consultation undertaken one month prior to any activity commencing in each phase. Notices issued (where applicable) with relevant stakeholders including: <ul style="list-style-type: none"> ➤ Commercial fisheries, including (but not limited to): • Dongara Professional Fishing Association • Geraldton Professional Fishing Associations <ul style="list-style-type: none"> ➤ Management agencies ➤ Industry bodies ➤ Individual companies • Notification letters sent to all stakeholders at least four weeks prior to survey commencement • Survey-specific website providing daily updates of vessel location and look ahead for 24 and 72 hours • Engagement with Fisheries Liaison Officer 	
	Shipping	Disruption to shipping activities	<ul style="list-style-type: none"> • Lost equipment retrieved where possible 	Low



Hazard	Environmental Aspect	Potential impacts	Controls and Mitigation Measures	Residual risk level
			<ul style="list-style-type: none"> • Vessel navigational equipment, procedures are utilised to prevent risk of collision/interaction with other users, e.g. vessels equipped with multiple means of communication, bathymetric charts, vessel detection; daily notification of position to RCC; vessel exclusion zone applied. • Initial consultation and additional consultation undertaken one month prior to any activity commencing in each phase. Notices issued (where applicable) with relevant stakeholders including AMSA to determine level of commercial shipping in vicinity of survey area. • At least one support vessel remains with the survey vessel at all times to manage interactions with other shipping • Trained and competent personnel to ensure communication between vessels during survey 	
	Defence	Disruption to aviation activities	<ul style="list-style-type: none"> • Consultation with defence stakeholders prior to the survey commencing to determine the level of defence activities in the vicinity of the survey area • Department of Defence will be notified at least 2 weeks prior to any planned aviation activity 	Low
	Heritage and Conservation Values	Disturbance to heritage and conservation values	<ul style="list-style-type: none"> • Survey and support vessel personnel have participated in pre-survey HSE induction that included description of environmental sensitivities and conservation values of survey area and surrounding waters • Data acquisition will not occur in State waters • Lost equipment retrieved where possible • Vessels equipped with navigational aids such as bathymetric charts and depth sounders 	Low



Hazard	Environmental Aspect	Potential impacts	Controls and Mitigation Measures	Residual risk level
			<ul style="list-style-type: none"> Site Representative monitors compliance with the commitments in this EP including outcomes and performance standards e.g. through audits, inspections, and observation of working practices 	

5 IMPLEMENTATION STRATEGY

CGG will implement an Environmental Management System (EMS) for this EP is consistent with the Australian/New Zealand Standard AS/NZS ISO 14001 Environmental Management Systems – Requirements with guidance for use.

Table 5-1: Description of EMS elements

Environmental policy	Environment Policy
Planning	Environmental aspects associated with the survey have been identified and potential impacts assessed and evaluated
	Control measures, including performance standards and measurement criteria, to reduce impacts and risk have been identified
	Legislation relevant to the survey has been identified
Implementation and Operation	Roles and responsibility to ensure compliance with environmental commitments have been outlined
	Competence and training requirements have been identified
	Information to be monitored and recorded during the survey identified
	Emergency preparedness and response arrangements (including OPEP) have are identified
Checking	CGG undertakes scheduled audit/s of the activity to ensure: <ul style="list-style-type: none"> • Opportunities for improvement and suggested remedial actions are provided • Non-conformances are effectively acted upon and closed out • Relevant control measures are in place • Environmental commitments, detailed in this environmental plan, are used as the basis to the audit.
	Arrangements detailed in Emergency Response plans will be tested at intervals commensurate with the nature and scale of the activity
Management review	Annual and Post Survey Environmental Reports will review achievement of the environmental performance outcomes for the survey to determine if they have been met.
	Any identified actions and lessons learnt will be included in the environmental management of the on-going activity as soon as practicable via a Management of Change, and their application considered for other CGG activities.

5.1 Roles and Responsibilities

It is the responsibility of all for CGG’s employees and contractors to ensure that the requirements of

the corporate Environment Policy are applied in their areas of responsibility and that the personnel are suitably trained and competent in their respective roles.

5.2 Training and Competencies

All personnel required to work on the survey and support vessels will be given an HSE induction prior to the commencement of the survey. Furthermore, only appropriately experienced MFOs (as determined by a review of their CVs) will be utilised for the survey.

5.3 Monitoring and Record Keeping

The following environmental and other information will be monitored and recorded during the survey and reported to NOPSEMA and/or others where applicable. The reporting requirements for routine events and environmental incidents (recordable and reportable) and reporting on overall compliance of the activity are also detailed in the EP.

Table 5-2- Monitoring, recording and reporting requirements for the survey

Monitoring	Record keeping
Discharge of underwater seismic pulses	Start-up delays, power downs or stop work procedures instigated as a result of whale sightings
	Cetacean sighting records (DoE CSA database) Whale shark and turtle sightings
Light generation from survey vessel	Records of periodic assessments by Vessel Master
Vessel and towed equipment interactions with marine fauna	Support vessel/towed equipment and marine fauna interaction records (bridge daily logs & MFO records)
Deployment and retrieval of anchors	Vessel daily logs
Vessel grounding	Vessel daily logs
Equipment damage, dragging or loss	Vessel daily logs
Operation of machinery and survey vessel powered by internal combustion engines	Maintenance records (engine room logs) Fuel specification data Daily fuel consumption
Discharge of ballast water from survey vessel	Engine room logs
Biofouling of survey or support vessel hulls and other niches	IMS inspection records and anti-foulant treatment details for survey and support vessels Records of survey and support vessel movements
Discharge of sewage, grey water and putrescible wastes	Engine room logs
Discharge of bilge water	Engine room logs
Treatment/disposal of other wastes i.e. garbage, oily sludges	Engine room logs Garbage Record Books Oil Record Books
Accidental discharge of hazardous materials	Vessel daily logs
Fuel and oil spills	Vessel daily logs
Vessel collisions	Vessel daily logs
Interaction with commercial fisheries	Vessel daily logs

Monitoring	Record keeping
Interaction with shipping	Vessel daily logs
Operation of survey and support vessels within protected areas or heritage places	Vessel daily logs
Training	Induction record sheets
Incident reporting	CGG HSE incident reports
Compliance reporting	Completed environmental inspection / audit check sheet

5.4 Auditing

Environmental performance of the survey is evaluated and reviewed in a number of ways. These reviews are undertaken to:

- Ensure all significant environmental aspects of the activity are covered (and continue to be covered) by the EP
- Ensure that environmental management measures to achieve EPO and EPS are being implemented, reviewed and where necessary amended
- Identify potential non-conformances and opportunities for continuous improvement
- Ensure that all EPO and EPS have been met in carrying out the activity
- Ensure that all environmental commitments outlined in the EP have been fulfilled

5.5 Management of Non-conformance

CGG employees and contractors are required to report all environmental incidents and non-conformance with performance objectives detailed in the EP. Incidents are reported using an Incident and Hazard Report Form that includes details of the event, immediate action taken to control the situation, and corrective actions to prevent reoccurrence.

Detailed investigations will be undertaken by CGG for all high potential environmental incidents, and these investigations will include the Client Site Representative.

In the event of an environmental incident, crew members and relevant shore based personnel will consult both the vessel specific environmental systems as well as the survey EP to determine the appropriate action.

5.6 Environment Plan Review

Management of changes to scope (e.g. likely timing, location or survey details described in this EP) are the responsibility of the Technical Operations Manager. A risk assessment will be undertaken for all changes in scopes to assess potential impacts of the change. If the change represents a significant modification that is not provided for in the accepted EP in force for the activity, a revision of the EP will be conducted in accordance with Regulation 17 of the Environment Regulations. The revised EP will be submitted to NOPSEMA in accordance with the requirements of Regulation 17, and the proposed change to the activity will not commence until the revised EP has been accepted by NOPSEMA.

Notification to other government authorities, where required, will be undertaken by the Technical Operations Manager. Notifications will include details of the change and procedures that will be put in place for managing or mitigating the additional or modified risks.

6 EMERGENCY RESPONSE

Survey specific Emergency Response procedures for the survey are included in the Project HSE Plan. The Project HSE Plan contains instructions for vessel emergency, medical emergency, search and rescue, reportable incidents, incident notification and contact information. Other relevant emergency plans and procedures in place during the survey will be:

- Oil Pollution Emergency Plan (OPEP)
- Scientific Monitoring Programme (SMP)
- Extreme Weather Procedure

6.1 Oil Pollution Emergency Plan

The Oil Pollution Emergency Plan (OPEP) for the survey comprises components of the survey vessel SOPEP that manage the environmental impacts of a spill, supported as required by applicable established, statutory Oil Spill Contingency Plans (OSCPs). In summary, the following plans are in place as a contingency in the unlikely event of an oil spill, which together form the OPEP for this activity:

- Survey vessel SOPEP – deals with spills which are either contained on the vessel or which can be dealt with from / by the vessel;
- National Plan to Combat Pollution of the Sea by Oil (NATPLAN): Australian Maritime Safety Authority (AMSA); and
- WestPlan-MOP and MOSCP: WA Department of Transport

The survey vessel SOPEP, which has been prepared in accordance with the IMO guidelines for the development of shipboard oil pollution emergency plans, includes emergency response arrangements and provisions for testing the OSCP (oil pollution drills), as required under Regulations 14(8AA) and 14(8A) of the OPGGS(E) Regulations.

Priority actions in the event of a fuel or oil spill are to make the area safe and to stop the leak and ensure that further spillage is not possible. Deployment of small absorbent booms and other materials will be undertaken so as to maximise recovery of spilled material. All deck spills aboard the survey vessel will be cleaned-up immediately, using appropriate equipment from the onboard spill response kits (e.g. absorbent materials etc.) to minimise any likelihood of discharge of spilt hydrocarbons or chemicals to the sea.

For Commonwealth waters, initial actions will be undertaken by the survey vessel with subsequent actions determined in consultation with the regulatory authorities (AMSA) under NATPLAN. AMSA is the designated Combat Agency for oil spills from vessels within the Commonwealth jurisdiction. Upon notification of an incident, AMSA will assume control of the incident (AMSA, 2012). The assessment of appropriateness of response strategies, and their implementation, also lies with AMSA as Combat Agency. If surface slicks appear likely to enter WA State waters, then subsequent actions will be determined in consultation by AMSA with the WA Department of Transport (DoT) under the State Emergency Management Plan for Marine Oil Pollution (WestPlan – MOP).

Costs will be recovered by AMSA for any services they provide in responding to a hydrocarbon spill. CGG has insurance policies in place to cover the cost of environmental monitoring or clean-up post spill.

6.2 Scientific Monitoring Programme

The aim of the Scientific Monitoring Programme (SMP) is to provide data to assess and verify predicted impacts of a marine diesel spill on key habitats and sensitive receptors as identified by operational monitoring.

Operational monitoring will be undertaken by the Combat Agency. In the event of a hydrocarbon spill, the objective of operational monitoring is to monitor the trajectory and extent of any hydrocarbon spill during the Imperial MC2D MSS and inform the scientific monitoring.

The objectives of the SMP are to:

- Identify sensitive receptors requiring monitoring and under what circumstances (initiation and termination criteria);
- Interpret information received during operational monitoring and implications for initiation criteria for scientific monitoring;
- Measure the level of presence of sensitive receptors in the observed trajectory of a spill where appropriate; and
- Measure the level of impact of hydrocarbons on sensitive receptors, or their habitat, where appropriate.

7 CONSULTATION PROCESS

In formulating the consultation process, key steps were identified, each requiring discrete tasks (described further in Table 7-1):

- Preparatory consultation
 - Initial consultation
 - Incorporate feedback into survey plans
- Ongoing consultation
 - Confirmation notification to relevant stakeholders
 - Website
 - Fisheries Liaison Officer



Table 7-1: Key steps identified for the consultation process

Phase	Step	Task	Timing	Details	Implementation strategy
Preparatory	1	Initial consultation	During preparation of EP	Provide overview of survey plans including indicative survey area, sail lines, start date and timing.	Letters sent to all stakeholders identified as relevant outlining proposed activity.
	2	Incorporate feedback into survey plans	During preparation of EP and in preparation for survey	Assessment of feedback regarding proposed activity, e.g. proposed timing and location.	Where feedback is received, the merits of feedback are assessed and evaluated. Where appropriate and practicable, commitments have been identified accordingly.
Ongoing	3	Confirmation notification	After survey plans have been confirmed, at least 4 weeks prior to survey start date	Provide detailed information regarding: <ul style="list-style-type: none"> • Survey and support vessel name • Expected start date • Refined survey area and sail lines • Order in which survey lines are acquired • Details of survey specific website • Contact details of the local Fisheries Liaison Officer (see below). 	Once survey plans have been finalised a notification will be sent to stakeholders identified as high relevance.
		Website		Provides overview of the survey plans including the confirmed: <ul style="list-style-type: none"> • Survey and support vessels • Survey area and sail lines • Anticipated start date and location • Contact details for Perth based CGG personnel and local Fisheries Liaison Officer 	



Phase	Step	Task	Timing	Details	Implementation strategy
				<ul style="list-style-type: none"> • Current location of survey vessel (displayed on map) • Proposed sail lines to be acquired (including direction) in next 24 and 72 hours. 	<ul style="list-style-type: none"> • Once survey has commenced the website will be updated daily with vessel location and proposed sail lines to be acquired.
		Fisheries Liaison Officer		Provides a focal point, based in Dongara, for continual communication with members of the rock lobster fishing industry throughout the survey.	<ul style="list-style-type: none"> • Contact details available on the survey website and provided in the notification letter. • Based in Dongara and available for face to face meetings with stakeholder where appropriate to discuss issues and identify options to resolve issues. • The feedback received and potential options will be assessed supported by CGG Perth based personnel. • Any changes to survey plans will be communicated back to stakeholders via the Fisheries Liaison Officer to ensure agreement is met. • The website will be updated to reflect any changes. • This will ensure that risks and impacts to socioeconomic values are continually reduced to ALARP.

7.1.1 Preparatory consultation

The identified stakeholders are commercial fishers in the region, fishing bodies, federal departments and regulators. Relevant stakeholders identified asked for comment in regards to the proposed activity based on the defined operational area included:

- A Raptis and Sons
- Australian Fisheries Management Authority (AFMA) - Policy, Economics, Environment and Research
- Australian Hydrographic Service
- Australian Institute of Marine Science
- Australian Marine Mammal Centre
- Australian Maritime Safety Authority
- Australian Southern Bluefin Tuna Industry Association
- Border Protection Command
- Centre for whale research
- City of Geraldton
- Coastwatch
- Commonwealth Fisheries Association
- Department of Defence Air Command HQ
- Department of Defence Property Management Branch
- Department of Environment
- Dongara Professional Fishermen's Association
- FESA volunteer marine rescue services
- Gascoyne Demersal scalefish fisheries – all licence holders
- Geraldton and District Offshore Fishing Club
- Geraldton Port Authority
- Geraldton Professional Fishermen's Association and Geraldton Fishermen's Co-operative
- Jurien Charters
- Mid West Development Commission
- National Native Tribunal
- Northern Fishing Companies Association, Austral Fisheries Pty Ltd
- Octopus Fishery – all licence holders
- Recfishwest
- Rock Lobster Zone A and B, Big Bank Area – all licence holders
- Roe's Abalone Fishery Area 8 – all licence holders
- Seasport Tackle Fishing Charters
- Shark Bay Prawn – all licence holders
- Shark Bay Scallop – all licence holders
- Shire of Carnarvon
- Shire of Chapman Valley
- Shire of Exmouth
- Shire of Greenough
- Shire of Irwin
- Shire of Northampton
- Shire of Shark Bay
- WA Abrolhos Islands and Mid-West Trawl Fishery – all licence holders
- WA Charter Boat Industry – all licence holders
- WA Conservation Council
- WA Department of Environment Regulation (formerly Department of Environment and Conservation, DEC)
- WA Department of Fisheries
- WA Department of Mines and Petroleum
- WA Department of Parks and Wildlife

- WA Department of Transport
- WA Dongara Professional Fishermen's Association
- WA Environmental Protection Authority
- WA Mackrel Fishery – all licence holders
- WA Marine Aquarium Fishery – all licence holders
- WA Specimen Shell Fishery – all licence holders
- WA West Coast Deep Sea Crustacean Fishery – all licence holders
- WA West Coast Demersal Gillnet and Demersal Longline Fishery – all licence holders
- WA West Coast Demersal Scalefish Fishery – all licence holders
- WAFIC
- Western Australian Northern Trawl Owners Association (WANTOA)
- Western Rock Lobster Council
- WestMore Seafoods

Up to the date of submission of the EP, responses had been received from 11 stakeholders; five of which raised no concerns regarding the proposed survey. Stakeholder feedback was assessed and integrated into the EP as summarized in Table 7-2.

Table 7-2: Stakeholder submissions

Organisation	Response	Action
AFMA	<p>AFMA identified the following fisheries overlapping with the survey area:</p> <ul style="list-style-type: none"> • Small Pelagic Fishery • Western Tuna and Billfish Fishery • Western Deep Water Trawl Fishery 	<p>These fisheries were previously identified and impacts to fisheries discussed in the EP.</p>
AMSA	<ul style="list-style-type: none"> • Further information in regards to the survey requested • Concerns raised in regards to communications between the proposed survey and other commercial vessels in the area, especially across shipping tracks • Further notifications required 	<ul style="list-style-type: none"> • At least one support vessel will accompany the survey vessel throughout the survey. Communication systems on board the vessels will ensure communication with other vessels will be maintained • Survey lines will planned taking into account the shipping traffic, reducing the potential for impacts to arise where practicable • Appropriate navigational aids will be employed by CGG throughout the survey area • Further notifications will be adhered to
Deep sea crustacean fishery	<ul style="list-style-type: none"> • Fishery highlighted that fishing gear will be deployed in the survey area all year round 	<ul style="list-style-type: none"> • CGG note the fisheries concerns, and have committed to updating relevant personnel on the location of sail lines

Organisation	Response	Action
	<ul style="list-style-type: none"> Request sail lines and coordinates to reduce potential interaction 	<p>and dates once confirmed.</p> <ul style="list-style-type: none"> Communication will be ongoing prior to and during the survey to ensure potential interactions are managed.
Farwest scallops	Expressed concern regarding the potential impact of seismic activity on the Abrolhos Island scallop fishery, in particular larvae development	<ul style="list-style-type: none"> CGG changed survey lines to avoid fishery area (see Table 3-3)
Recfishwest	Requests that all potential impacts to fisheries, fish and fish habitat described in this email are acknowledged, and strategies undertaken by the proponent to mitigate or minimise these impacts are defined in the final Environment Plan	<ul style="list-style-type: none"> Potential impacts to fish, including eggs larvae and spawning behaviour, and commercial fisheries, were considered in the impact assessment and relevant mitigation measures outlined in Table 4-3.
WA Department of Fisheries	<ul style="list-style-type: none"> DoF listed fisheries that occur within the West Coast and Gascoyne Coast Bioregion DoF request that CGG include strategies in the EP to minimise impacts on fish spawning. A list of species and spawning/aggregation times was provided. DoF also require that vessel managers minimise the risk of translocating pests and diseases into or within WA. DoF request that the suspected or confirmed presence of any marine pest or disease is reported to FishWatch 	<ul style="list-style-type: none"> All fisheries which have boundaries overlapping with the survey area or wider environment are included in the EP Mitigation measures to reduce impacts to marine fauna, including fish are included in the EP Mitigation measures, including reporting to Fishwatch, to reduce the likelihood and risk of introduction of invasive marine species are included in the EP (see Table 4-3)
Department of Defence	<ul style="list-style-type: none"> Advised that the area proposed is within Restricted Airspace R861A-B, R863A-B and R864A-B, as such, unexploded ordnance (UXO) may be present on and in the sea floor. Advises CGG must inform itself of the risks associated with conducting exploration activities in the area. 	<ul style="list-style-type: none"> No contact with the seafloor is planned during this activity

7.1.2 Ongoing consultation

As described in Table 7-1, relevant stakeholders will be notified at least 4 weeks prior to the survey commencing once survey timing is confirmed and further details will be available. The notification will also provide details of the website and Fisheries Liaison Officer.

CGG will continue to engage with relevant stakeholders, including the fishing industry, during the preparation and execution of the survey. Any comments received following the acceptance of the EP will be appropriately assessed and where necessary further discussions with the stakeholder will

occur. This will provide transparent engagement with stakeholders and ensure that impacts and risks to stakeholders are continually reduced to ALARP.

8 DETAILS OF NOMINATED LIAISON PERSON

For further information about the proposed Imperial MC2D MSS, please contact:

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