Salsa 3D Marine Seismic Survey Environment Plan: Public Summary

This summary of the Salsa 3D Marine Seismic Survey Environment Plan (EP) has been submitted to the Western Australia Department of Minerals and Petroleum (DMP) to comply with Regulations 11(7) and 11(8) of the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations (2009).

1. Introduction

Shell Development (Australia) Pty. Ltd (Shell) is proposing to undertake a marine geophysical survey ('Salsa 3D marine seismic survey') within Permit Area WA-384-P and a small portion of open acreage waters located in the Southern Exmouth Basin, offshore Western Australia (WA) (Figure 1). The proposed survey Operational Area is located in Commonwealth waters at depths in excess of 1,200 m and covers a 300 km^2 area. Including a 380 km^2 buffer zone surrounding the survey, the total Operations Area is approximately 680 km^2 (Figure 2). Coordinates of the survey area are also presented in Figure 2.

Figure 1: Salsa 3D Marine Seismic Survey Location. Survey Boundary denotes extent of operational area

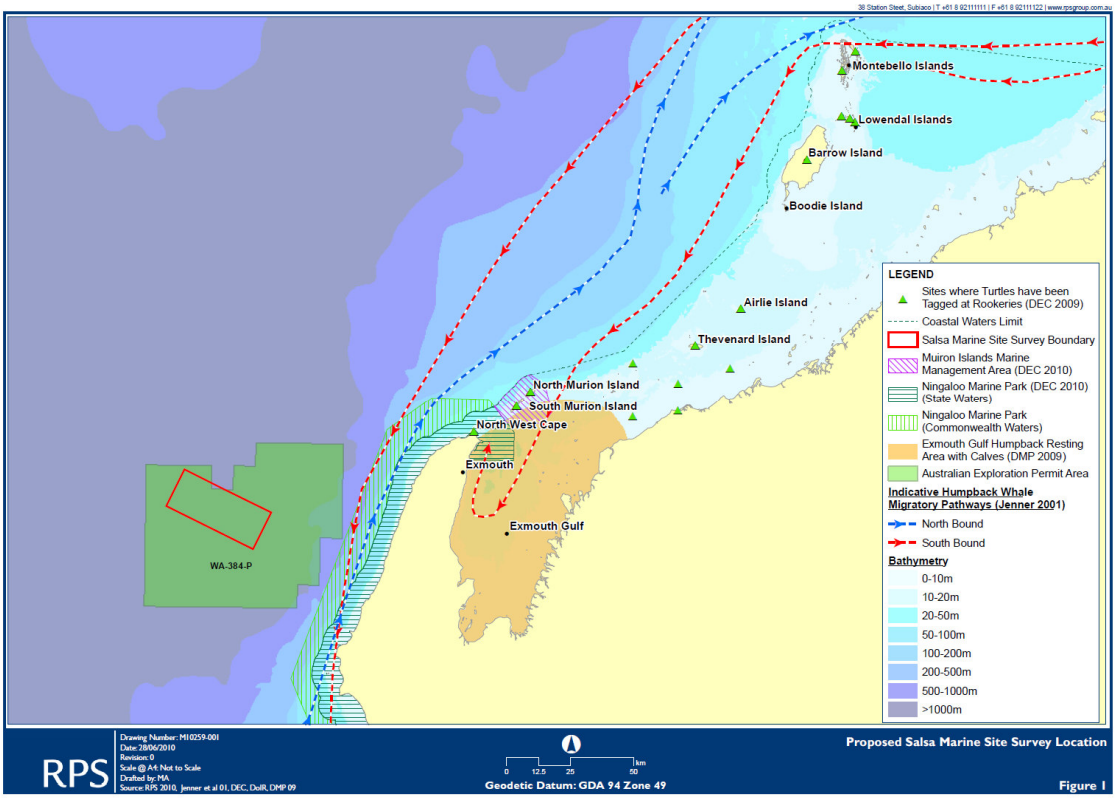
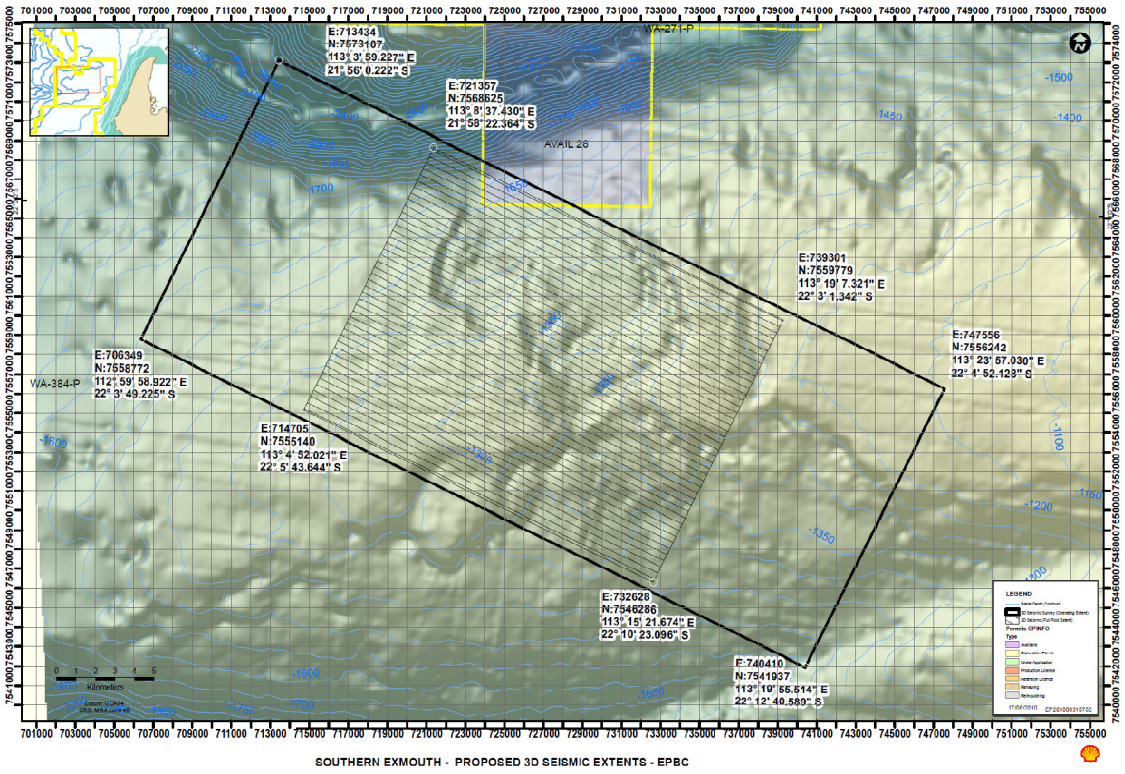


Figure 2: Salsa 3D Marine Seismic Survey Operational Area



2. Description of the Activity

The seismic survey will map sub-surface geology to ascertain the potential sub-surface oil and gas deposits of the survey area using conventional 3D seismic techniques. The vessel to be used for the Salsa 3D Marine Seismic Survey is the 'MV Pacific Explorer' operated by PGS and supported by a chase vessel. The seismic energy source will be provided by an airgun array, towed astern of the vessel at a depth of 5-8m and discharged at 18.75 to 25 m shot point intervals. Seismic reflections from subsurface layers will be detected by hydrophones mounted inside 4 to 8 neutrally buoyant solid streamers between 5 and 6 km in length. The volume of the airgun arrays will be approximately 3,000 to 4,000 cubic inches, each with a signal intensity of approximately 260 dB re1µPa-m, within a few meters of the source, with frequencies up to approximately 220 Hz.

The timing of the proposed Salsa 3D Marine Seismic Survey was chosen to minimise interaction with cetaceans by avoiding the peak Humpback whale southern migration period. The proposed survey will take place over a 17-27 day period commencing no earlier than November 2010. Note that the current indication is that the survey will actually commence in the second week of December, though this is subject to change.

3. Description of the Receiving Environment

3.1. Physical Environment

The survey area is located on the continental slope of north-western Australia in water depths in excess of 1000 m, with the eastern most point of the survey Operational Area approximately 50 km west of mainland Western Australia. The oceanic habitat is characterised by relatively warm, low nutrient waters. The seabed typically consists of fine, muddy or silty sediments.

A search of DEWHA's protected matters database (DEWHA, 2010a) identified that the Salsa 3D Marine Seismic Survey area is not located in any Marine Conservation Areas. The closest Marine Conservation Area to the Salsa 3D Marine Seismic Survey area is the Ningaloo Marine Park some 30 km to the west from the closest point of the bufferzone boundary. The proposed Operational Area is located in the Gascoyne 'Area for Further Assessment' currently being investigated as part of the Australian Government's Marine Bioregional Planning Process for the North-west Marine region.

3.2. Biological Environment

The proposed survey area is characterised by waters approximately 1,300 to 1,400 m deep with warm, relatively low nutrient waters and a seabed consisting of fine, muddy or silty sediments (Shell, 2008; Environment Australia, 2002). Large marine migratory species with broad distributions such as fish, sharks, seabirds and marine mammals may traverse the proposed survey area, at least on occasion but the area is not expected to represent habitat of particular significance for any fauna. The EPBC Protected Matters Database (DEWHA, 2010a) lists ten threatened species, nine of which are also listed as migratory species that could occur in the area. Six additional migratory species were also listed as potentially occurring in the area. These species are listed below in Table 1.

Table 1: Threatened and Migratory Species that May Occur Within the Proposed Salsa 3D marine seismic survey Area

Scientific Name	Common Name	Status
Birds		
Macronectes giganteus	Southern giant petrel	Endangered, migratory
Pterodroma mollis	Soft-plumaged petrel	Vulnerable
Mammals - Cetaceans		
Megaptera novaeangliae	Humpback whale	Vulnerable, migratory
Balaenoptera musculus	Blue whale	Endangered, migratory
Eubalaena australis	Southern right whale	Endangered, migratory
Balaenoptera bonaerensis	Antarctic minke whale	Migratory
Balaenoptera edeni	Bryde's whale	Migratory
Orcinus orca	Killer whale	Migratory
Physeter macrocephalus	Sperm whale	Migratory
Reptiles – Turtles		
Chelonia mydas	Green turtle	Vulnerable, migratory
Dermochelys coriacea	Leatherback turtle	Endangered, migratory
Natator depressus	Flatback turtle	Vulnerable, migratory
Caretta caretta	Loggerhead turtle	Endangered, migratory
Fish - Sharks		
Isurus oxyrinchus	Shortfin mako	Migratory
Isurus paucus	Longfin mako	Migratory

3.2.1. Cetaceans

A wide range of cetaceans occurs in the area and all are protected under Commonwealth legislation, including several species of whales listed as migratory and threatened on the EPBC Act.

Blue whales are widely distributed throughout the world's oceans and have been recorded in waters off all states excluding the Northern Territory. Their migration paths are quite widespread, not clearly following coastlines or particular oceanographic features. Most of the current information on blue whale distribution in Australian waters is derived from aerial surveys, which suggests that blue whales' migratory patterns are dynamic and shift according to prey availability. Blue whales are rarely present in large numbers outside recognised aggregation areas. The migratory paths of blue whales are generally associated with waters deeper than the depths of the continental shelf (Branch et al. 2007). The apparent preference of blue whales for deeper water means that there is the potential for these cetaceans to occur in the vicinity of the Salsa 3D Marine Seismic Survey area. However, abundance is likely to be low based on records collected during previous surveys (including seismic) in the region (Woodside Energy Limited, 2010).

Humpback whales also have a wide distribution and have been recorded from the coastal areas off all Australian states and the Northern Territory (Bannister et al, 1996). The west coast humpback whale population migrates north along the coast within the 500 m bathymetry with numbers peaking in the vicinity of North West Cape in late July to early August (Jenner et al. 2001). The southern migration route is located predominately within the 200 m bathymetry, with numbers peaking in mid-September (Jenner et al. 2001) at North West Cape. The 200m depth contour is located approximately 43 km from the eastern boundary of the Operations Area. The proposed survey area is located within water depths ranging between 1,300 m and 1,400 m and therefore, based on these abundance studies, the number of humpback whales passing through the proposed survey area is expected to be very low. Also, the proposed Salsa 3D marine seismic survey is scheduled to start at the earliest in early December to avoid overlap with the end of the southern humpback whale migration (including cow and calf southbound migration) period.

3.2.2. Sharks

Two species were listed as migratory species under the EPBC Act, the shortfin mako (*Isurus oxyrinchus*, also commonly known as the mako shark) and the longfin mako shark (*Isurus paucus*). Based on their distribution, it is likely that small numbers of theses sharks may traverse the proposed survey area. In addition, a number of other shark species are known to inhabit the region, including the whale shark (*Rhincodon typus*), great white shark (*Carcharodon carcharias*) and the grey nurse shark (*Carcharias taurus*).

3.2.3. Turtle

Four species of marine turtles may occur in the permit area: green (*Chelonia mydas*), leatherback (*Dermochelys coriacea*), flatback turtles (*Natator depressus*) and loggerhead (*Caretta caretta*). All species are listed as threatened, migratory species under the EPBC Act. The loggerhead and leatherback are listed as endangered and the green, flatback and hawksbill are listed as vulnerable.

The proposed Salsa 3D Marine Seismic Survey area does not contain any emergent land or shallow subtidal features. At closest point the proposed Operation Area is located approximately 30 km west of boundaries of the Ningaloo Marine Park (Commonwealth waters). Given the distance from emergent land and the proposed survey area and water depths of more than 1,000 m within the proposed survey area, it is expected that only low numbers of transient marine turtles may occur in the proposed survey area during the proposed survey.

3.2.4. Birds

Two threatened migratory bird species, i.e. the southern giant-petrel (*Macronectes giganteus*) and soft plumaged petrel (*Pterodroma mollis*), may pass through or near the survey areas in transit to resting and feeding areas. Other foraging groups of seabirds could also pass through the proposed survey area, although seabirds in the north-east Indian Ocean typically aggregate in areas adjacent to islands and there are no islands or other areas of seabird breeding significance, or important feeding grounds for seabirds, known within or in close proximity of the proposed survey area.

3.3. Socio-Economic Environment

The North West Cape region is subject to existing petroleum exploration and production activities, shipping, commercial (small) and recreational fishing, and tourism activities centred around the inshore waters of Ningaloo Marine Park and onshore.

There area four Commonwealth commercial fisheries that overlap with the survey area, namely the Western Deepwater Trawl (WDWTF), Southern Blue Fin Tuna Fishery (SBFTF), Western Tuna and Billfish Fishery (WTBF) and Western Skipjack Fishery (WSF). Due to the low level of fishing effort in the survey area, the timing and transient nature of the survey it is unlikely that the survey will conflict with these activities.

Commercial vessels travelling along the shipping lane that parallels the WA coastline may pass through the survey area. However, shipping traffic is unlikely to be affected as the survey area is located in open waters and the survey vessel will be well lit at night and during times of poor visibility.

4. Major Environmental Hazards and Controls

Risk analysis has been used to characterise risk likelihood and severity and to evaluate the environmental risks and effects, as summarised for key aspects in Table 2 below.

Table 2: Summary of main Environmental Risks and the Management Approach for the Key Aspects of the Survey

Potential Impact	Risk Rating	Management Approach
Acoustic pollution from vessel movements and from airguns	Low	Survey timing delayed until November at earliest to avoid Humpback Whale migration Standard Management Procedures as described within *EPBC Act Policy Statement 2.1 – Interaction between Offshore Seismic Exploration and Whales* (DEWHA, 2008) to be applied
Collision with marine fauna	Low	Survey timing delayed until November at earliest to avoid Humpback Whale migration Standard Management Procedures described within *EPBC Act Policy Statement 2.1 – Interaction between Offshore Seismic Exploration and Whales* (DEWHA, 2008).
Interaction/ displacement of other users of marine environment	Low	Notice to Mariners issued. Ongoing liaison with AMSA, AFMA, fishermen and other commercial mariners to minimise conflict. Vessels equipped with sophisticated navigation aids and competent crew maintaining 24 hour visual, radio and radar watch for other vessels and supported by a

		chase vessel.
Accidental hydrocarbon spill as a result of ruptured fuel tanks or refuelling incident	Low	Approved Oil Spill Contingency Plan (OCSP). Notice to Mariners issued, liaison with AMSA, AFMA, fishermen and other commercial mariners to minimise the potential for vessel collisions which may result in fuel tank ruptures. Vessels equipped with sophisticated navigation aids, navigational lighting and competent crew maintaining 24 hour visual, radio and radar watch for other vessels and supported by a chase vessel. At sea refuelling unlikely given the short duration of the survey but if required will occur only within the Operational Area (30km from the Ningaloo Marine Park) and with strict adherence to vessel refuelling procedure including: • Operation restricted to daylight and favourable wind and sea conditions as determined by the Master of the vessels. • Reinforced hoses with dry break couplings and fail-safe fittings Oil Spill Modelling Assessment for all seasons indicates spilt hydrocarbons travel away from Ningaloo Reef.
Discharge of high risk ballast water – breach of quarantine procedures	Low	All vessels will comply with C'wlth and WA quarantine requirements including: Australian Ballast Water Requirements Biofouling Management Protocols

5. Management Approach

The survey will be conducted in accordance with all legislative and regulatory requirements, including requirements of the EPBC Act 1999 Referral decision (EPBC **2010/5629**) and commitments in the DMP approved Environment Plan. Shell's environmental management strategies and procedures include responsibilities, training, reporting framework, mitigation and response activities, monitoring and auditing procedures which are intended to reduce environmental risk to as low as reasonably practicable (ALARP) and to ensure that environmental performance objectives are met.

6. Consultations

Shell recognises that its proposed Salsa 3D Marine Seismic Survey is located adjacent to an environmentally sensitive region, and is committed to a full and open public consultation process. Shell identified key stakeholders and undertook extensive consultation for the Guacamole 2D Marine Seismic Survey. An update will be provided to the stakeholders below before commencement of the Salsa 3D marine seismic survey.

- DMP;
- DEWHA;
- Australian Fisheries Management Authority (AFMA);
- Department of Fisheries WA;
- Department of Environment and Conservation;
- Shire of Exmouth;
- WA Fishing Industry Council;
- Conservation Council of WA;
- World Wildlife Fund;

- Cape Conservation Council;
- The Wilderness Society;
- Marine Conservation Society;
- Centre for Whale Research (C Jenner);
- Australian Conservation Foundation; and
- Adjoining permit holders
- AMOSC

7. Further Details

For further information about the Salsa 3D marine seismic survey please, contact:

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