

## CEDUNA 3D MARINE SEISMIC SURVEY, GREAT AUSTRALIAN BIGHT

### ENVIRONMENT PLAN PUBLIC SUMMARY

This Environment Plan (EP) public summary for the Ceduna three dimensional (3D) marine seismic survey has been submitted to the Department of Primary Industries and Resources South Australia (PIRSA) to comply with Regulations 11(7) and 11(8) of the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009* (OPGGGS (E) Regulations).

#### INTRODUCTION

BP Exploration (Alpha) Limited (BP) plans to conduct a 3D marine seismic survey in Commonwealth marine waters of the Ceduna sub-basin, in the Great Australian Bight (GAB) (Figure 1). The survey will be undertaken in four adjacent petroleum exploration permits (EPP 37, EPP 38, EPP 39 and EPP 40) located offshore South Australia.

#### DESCRIPTION OF THE ACTIVITY

The survey area encompasses approximately 17,780 km<sup>2</sup>, including 12,500 km<sup>2</sup> for data acquisition and a 15 km buffer zone at the north-west and south-east ends to allow for activities such as vessel turns and soft-starts. On any given day the vessel will cover approximately 67 km<sup>2</sup> of the total survey area, sailing back and forth within predetermined zones typically no more than 20 km wide.

The northernmost point of the survey area is approximately 200 km south of the Head of Bight and approximately 400 km west of Port Lincoln (Figure 1). Water depths within the survey area range between approximately 1,000 and 3,000 m (chart datum).

The survey area partially overlaps the Benthic Protection Zone (BPZ) portion of the Great Australian Bight Marine Park (GABMP). There are no islands or other emergent landforms in the survey area.

The coordinates of the survey area are provided in Table 1 and shown in Figure 1.

The seismic survey will be operated by PGS Australia Pty Ltd and conducted using a specialised survey vessel, the *Ramform Sterling*. The seismic energy source will be provided by a dual Bolt 1900 LLXT array, totalling 4,130 cubic inches and operating at 2000 psi.

The vessel will be towing seismic equipment in a predetermined pattern within the survey area. The array will be towed at a depth of approximately 7 m with the energy source discharged at intervals of approximately 10 seconds. Seismic reflections from subsurface layers will be detected by a series of hydrophones in 12 solid hydrophone streamers. The streamers will be 8,100 m in length and will be towed behind the survey vessel at a depth of 9 m.

Two support vessels will be used for logistic, safety and equipment management support.

There will be no vessel-to-vessel refuelling during the proposed survey.

The seismic survey is scheduled to start no earlier than October 2011 and conclude no later than the end of May 2012. This timing coincides with periods when the GAB weather conditions are most likely to meet survey operations criteria, which are largely influenced by wave height for the GAB region.

**Table 1: Coordinates of the Survey Area (GDA94)**

Location Point	Latitude	Longitude
1	35°22'15.815"S	130°48'50.107"E
2	35°11'50.810"S	131°02'16.061"E
3	35°02'37.061"S	131°02'15.972"E
4	35°24'55.520"S	131°30'41.981"E
5	35°14'38.653"S	131°42'16.982"E
6	35°00'47.460"S	131°41'40.052"E
7	34°30'09.196"S	131°02'44.991"E
8	34°06'27.572"S	131°02'11.557"E
9	33°41'24.007"S	130°31'04.931"E
10	33°41'25.575"S	130°15'22.936"E
11	34°08'47.552"S	130°12'34.972"E
12	34°09'16.169"S	129°41'03.591"E
13	34°18'22.970"S	129°29'32.951"E

## DESCRIPTION OF THE RECEIVING ENVIRONMENT

### Physical Environment

The survey area is located in Commonwealth marine waters, on the continental slope and along the abyssal plain of the GAB. Water depths vary from 1,000 m to 3,000 m within the survey area. The continental slope features mid-slope terraces and numerous deep submarine canyons. These canyons are associated with enhanced productivity resulting from upwellings, which provide food sources for marine fauna. One canyon coincides with the southern edge of the proposed survey area.

Further offshore at the foot of the continental slope, the Australian abyssal plain is a flat, relatively featureless expanse of seabed, with average depths of 4,000 m.

The climate in the GAB region is described as Mediterranean, with mild wet winters and hot dry summers. It is influenced by mid-latitude anticyclones or high-pressure systems which move from west to east across the region. In summer, the climate is influenced by northerly to north-westerly winds, while in winter, southerly to south-easterly winds and low pressure systems bring rainfall. Four distinct currents occur within the GAB region, namely the Leeuwin, Central Bight, West Wind and Flinders currents.

### Biological Environment

There is limited information regarding the deeper benthic environment of the continental slope and abyssal plain. Habitat type and benthic biota present in the survey area are likely to be broadly homogenous and similar over extensive areas of the GAB where similar water depths occur, due to the relatively undisturbed conditions of the seabed.



Some marine migratory species with broad distributions such as fish, sharks, seabirds and marine mammals may traverse the survey area, at least on occasion. The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Database lists 23 Migratory and 18 Threatened species that could occur in the area.

These include:

- Twelve bird species
- Nine mammal species
- Three turtle species
- Two shark species.

These Threatened and Migratory species are considered to be widespread throughout the region. The survey area does not contain recognised critical habitat for any Threatened or Migratory cetaceans, marine turtles, fish, sharks or birds.

#### Fish

A number of sharks, demersal and pelagic finfish occur in the waters of the GAB and would be expected to occur in the survey area. The EPBC listed shortfin mako shark and porbeagle shark may be encountered during the survey due to their habitat preference and distribution.

Both the orange roughy and southern blue fin tuna are listed under the EPBC Act as conservation dependent. The orange roughy occurs in water depths < 750 m therefore large numbers are not anticipated in the survey area. The southern blue fin tuna occurs in the southern waters off the southern coast of Australia congregating near the surface in coastal waters; therefore it is anticipated to be present in the survey area.

#### Seabirds

Several species of albatross and petrel may transit the survey area however there are no breeding or nesting colonies for these species within or adjacent to the survey area.

#### Mammals

Three cetacean species which are listed as endangered or vulnerable under the EPBC Act may occur in the survey area: the humpback whale, southern right whale and blue whale (true blue and pygmy blue whale sub-species).

The survey is scheduled to occur outside of the period when humpback whales are likely to be found in the region, and the survey area is distant from the main migration routes for this species.

Due to the distribution of the true blue whale, it is unlikely that this sub-species will be encountered during the survey period. However, as the survey overlaps with the feeding period for pygmy blue whales (between November and May, peaking in December), it is expected that some individuals of this sub-species may be encountered during the survey. Important foraging habitat for pygmy blue whales are located at the eastern Great Australian Bight upwelling and Kangaroo Island canyons, extending to the west along the continental shelf break, as recently documented in the Draft South West Marine Bioregional Plan (DSEWPaC 2011).

Recent studies have shown foraging activity for this species is mainly concentrated around the 200 m isobath or further inshore, potentially extending into areas where water depths reach approximately 1,000 m (Gill et al. 2011). Due to the location of the survey area (southward of the 200 m isobath), only low numbers of pygmy blue whales may be expected to be seen during the survey.

The southern right whale may be found throughout the GAB region, including in the survey area. They aggregate in the GAB region over winter to breed. The calving season occurs between May and November and the closest calving area is located in the shallow protected waters of the Head of Bight, approximately 200 km from the survey area.

Six additional Migratory species listed under the EPBC Act that may occur in the area include the Antarctic minke whale, Bryde's whale, pygmy right whale, killer whale, the sperm whale and the dusky dolphin. Potential feeding areas occur within the region for the sperm whale, pygmy right whale and dusky dolphins, therefore they may be encountered during the survey. The remaining three species are only anticipated in very low numbers.

The Australian sea-lion is not protected under the EPBC Act; however it is known to breed on at least 73 islands and several mainland sites within southern Australia. The survey area is 240 km from the nearest sea-lion colony and therefore only very low numbers of Australian sea-lions are expected to occur in the survey area.

#### Turtles

The loggerhead, green and leatherback turtle may occur within the survey area, however due to the habitat preference of these species only very low numbers would be expected.

### **Socio-Economic Environment**

#### Petroleum

The petroleum exploration and production industry is a significant stakeholder in the region. Four wells are located within 100 km of the survey area, namely the Apollo 1, Gnarlyknots 1 and 1A and Potoroo 1.

#### Fisheries

The survey area overlaps with fishing zones for the following Commonwealth-managed fisheries:

- Western Skipjack Tuna Fishery
- Small Pelagic Fishery
- Southern and Eastern Scalefish and Shark Fishery
- Southern Bluefin Tuna Fishery
- Southern Squid Jig
- Western Tuna and Billfish Fishery.

The survey area overlaps with fishing zones for the following State-managed fisheries:

- Abalone Fishery
- Blue Crab Fishery
- Giant Crab Fishery
- Marine Scalefish Fishery
- West Coast Prawn Fishery
- Rock Lobster Fishery
- Sardine (Pilchard) Fishery
- Charter Boat Fishery.

Although the survey area overlaps with the above fishing zones, fishing effort is predominantly located in coastal waters. Ongoing consultation with State and Commonwealth fisheries organisations, including the fishers and their associations, will be conducted. This consultation will provide the communications and agreed actions to ensure that interactions between ongoing fisheries activities and seismic activities are minimised.



Due to weather constraints, both BP and the seismic contractor have determined that November to April are the key months during which 3D seismic operations can be undertaken in the survey area. This timing coincides with two stock assessment surveys in the area, which are scheduled to be undertaken between January and April 2011. An aerial survey of southern bluefin tuna stocks will be conducted by CSIRO from January to March, and a vessel based survey of trawl fishery stocks will be conducted twice between January and April. Consultations with the relevant stakeholders (including CSIRO, ASBTIA and GABIA) have indicated that only one southern bluefin tuna stock assessment survey aerial transect overlaps with the survey area (northern extremity).

The Centre for Marine Science and Technology's noise modelling results have predicted that noise levels will decay rapidly inshore of the survey area and will not be at a level sufficiently above ambient noise levels to cause an impact on fish. Therefore it is considered unlikely that the survey operations will have any impacts on the bluefin tuna stock assessment survey.

#### Shipping

Shipping activity in the GAB is low with the majority of vessels travelling south of the Bight between the south-western corner of Australia and Melbourne. AMSA has confirmed that some shipping traffic between South Australian ports and Western Australia passes through the survey area. However, the traffic volume was assessed by AMSA to be light.

#### Marine Protected Areas

The survey area overlaps with part of the GABMP. The GABMP (Commonwealth waters) area contains the Marine Mammal Protection Zone (MMPZ) and the BPZ. The BPZ is a narrow 20 nautical mile (37 km) strip which extends from the MMPZ approximately 200 nautical miles (370 km) offshore. The BPZ has been designed as a transect representative of the seabed on the continental shelf and slope of the GAB.

At its closest point, the survey area is approximately 200 km from the MMPZ. The survey area overlaps a portion of the BPZ however the survey area is not considered to support any regionally significant or sensitive habitats. Therefore the survey is unlikely to have an impact on benthic communities of the GAB region.

#### Recreation and tourism

The majority of the marine-based tourism around the GAB region is undertaken from the shoreline or within shallow coastal reefs areas although some offshore fishing does occur. The survey area is potentially used by recreational and chartered fishing vessels, however given the distance of the survey area from shore and the main regional ports such as Port Lincoln, few recreational or charter fishing vessels are expected in the survey area.

### **MAJOR ENVIRONMENTAL HAZARDS AND CONTROLS**

A risk analysis was undertaken for all aspects of the seismic survey, in accordance with the procedures outlined in the Australian and New Zealand Standards (AS/NZS ISO 31000:2009) (Risk Management) and HB 203:2006 (Environmental Risk Management), and based on the BP HSE Risk Matrix. The results of the risk analysis have been used to determine likelihood and severity of risks associated with the survey, evaluate the resultant environmental risks and effects and identify management measures to reduce these potential risks and effects to As Low As Reasonably Practicable (ALARP).

The risk analysis indicates that the risk of significant adverse environmental impacts from the survey is low and limited to:

- temporary and localised increase in ambient underwater noise levels as a result of acoustic discharges
- temporary and localised changes in water quality from routine discharges of grey water, sewage and putrescible wastes during the survey
- managed interaction with fisheries surveys
- temporary displacement of commercial fisheries operations.

These sources of impact to the marine environment at the survey area are limited in duration and intensity. The ecological, social and economical consequences are therefore expected to be insignificant at both local and regional perspectives.

### MANAGEMENT APPROACH

The environmental management approaches relevant to key aspects of the seismic survey and the residual risk after management implementation are summarised in Table 2. The seismic survey will be conducted in accordance with all legislative and regulatory requirements. BP's overall environmental objective for the program is to avoid or minimise environmental risks to ALARP.

**Table 2: Summary of Likely Environmental Risks & Management Approach**

Hazard/ Incident	Potential Hazard Consequence	Risk and Management Approach
Acoustic pollution from vessel movements and from seismic source during seismic operations.	Physiological damage to sensitive listed marine fauna from seismic noise generated by survey operations.	<b>Low risk</b> <ul style="list-style-type: none"> <li>▪ Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) EPBC Act Policy Statement 2.1 Standard Management Procedures (DEWHA 2008) implemented throughout survey.</li> <li>▪ Additional use of two Marine Mammal Observers (MMOs) on seismic vessel for the duration of the survey.</li> <li>▪ Power down vessel to lower power during vessel turns.</li> </ul>
	Disruption to behaviour patterns of sensitive listed marine fauna.	<b>Low risk</b> Standard Management Procedures to be applied (as above)
Grey water/ sewage/ putrescibles waste disposal	Adverse effects on marine life due to reduction of water/habitat quality (e.g., nutrient enrichment).	<b>Low risk</b> <ul style="list-style-type: none"> <li>▪ Discharges in accordance with MARPOL 73/78 and OPGGS (E) Regulations.</li> <li>▪ Offshore discharge &gt;12 nautical miles (12 km) from any land, including islands.</li> <li>▪ Offshore discharge more than 25 km from the GAB Marine Park boundary. There will be no discharge in the GAB Marine Park.</li> <li>▪ Biodegradable detergents only.</li> </ul>
Vessel presence, leading to displacement of other users of marine environment	Potential temporary disruption of commercial fishing/ shipping activity.	<b>Low risk</b> Offshore communications plan, including liaison with SBT Stock Assessment Survey Coordinator to limit interaction between seismic survey and SBT stock assessment survey.



## CONSULTATIONS

The following stakeholders have been consulted:

### Government organisations:

- Australian Fisheries Management Authority (AFMA)
- Australian Maritime Safety Authority (AMSA)
- Commonwealth Scientific and Industrial Research Organisation (CSIRO)
- Department of Agriculture, Fisheries and Forestry (DAFF)/ Australian Bureau of Agricultural and Resource Economics
- Department of Environment and Natural Resources (DENR)
- Department of Primary Industries and Resources South Australia (PIRSA)
- Department of Resources, Energy and Tourism (DRET)
- Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC)
- Geoscience Australia
- Government of South Australia
- Parliament of South Australia
- National Offshore Petroleum Safety Authority (NOPSA)
- South Australian Museum.

### Fishing interests:

- Australian Seafood Industry Council (ASIC)
- Australian Southern Bluefin Tuna Industry Association (ASBTIA)
- South Australian Research and Development Institute (SARDI)
- Commonwealth Fisheries Association (CFA)
- Great Australian Bight Fishing Industry Association Inc (GABIA)
- South East Trawl Fishing Industry Association (SETFIA)
- South East Fisherman's Association (SEFA)
- Seafood Council SA
- Wildcatch Fisheries SA
- Lucky S Fishing Pty Ltd
- Seafish Tasmania Pty Ltd
- Ship Agencies Australia Pty Ltd
- Veronica Sea Fish Pty Ltd
- Austral Fisheries Pty Ltd
- Raptis Fishing Licences Pty Ltd
- Sanford Australia Pty Ltd
- Sarriba Pty Ltd
- Valente Holdings Pty Ltd
- Australian Fishing Enterprises Pty Ltd
- Di Fishing Eden Pty Limited
- Emily Krstina (Australia) Pty Ltd
- Markane Seafoods Pty Ltd
- P W Herman & W Herman
- S & Z Lukin Pty Ltd
- Tony's Tuna International Pty Ltd
- Tuna Farmers Pty Ltd.

Conservation interests:

- Conservation Council of South Australia
- Whale & Dolphin Conservation Society
- Deakin Whale Ecology Group
- Wilderness Society of SA
- Australian Conservation Foundation
- Australian Marine Conservation Society
- Greenpeace Australia
- WWF-Australia
- Sustainable Shark Fishing.

Local authority and community representatives:

- City of Port Lincoln
- Eyre Regional Development Board
- Flinders Ports, Pt Lincoln
- District Council of Lower Eyre Peninsula
- District Council of Ceduna
- Port Lincoln Aboriginal Community
- Yalata Aboriginal Community, Ceduna.

The main issues raised by key stakeholders include:

- Survey timing.
- Exclusion of fishers from the area.
- Impacts to cetaceans.
- Impacts to fish migration.
- Impacts to the GABMP's BPZ.

These issues have been addressed in the approved Environment Plan.

#### **FURTHER DETAILS**

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#### **REFERENCES**

DSEWPaC. 2011. Marine bioregional plan for the South-west Marine Region prepared under the Environment Protection and Biodiversity Conservation Act 1999. Draft for Consultation.

Gill, P.C., Morrice, M.G., Page, B., Pirzl, R., Levings, A.H., and Coyne, M. (2011). Blue whale habitat selection and within-season distribution in a regional upwelling system off southern Australia. *Marine Ecology Progress Series*. Vol. 421: 243-263.



