

# 3D Keystone North Extension Marine Seismic Survey North West Shelf, Western Australia

## Environment Plan: Public Summary

This document is a summary of the Environment Plan (EP) in support of WesternGeco's three dimensional (3D) Marine Seismic Survey in open acreage, previously licensed as Exploration Permit Area WA-346-P off northwestern Western Australia (WA). The public summary is submitted to the Western Australian Department for Mines and Petroleum (WA DMP), as required by Regulations 11(7) and 11(8) of the Offshore Petroleum and Greenhouse Gas Storage (Management of Environment) Regulations 2009 and the Commonwealth *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGGS Act).

### Introduction

WesternGeco is to conduct a 3D marine seismic survey in Commonwealth marine waters of the North West Shelf (NWS), within open acreage, previously licensed as Exploration Permit Area WA-346-P. The survey will be conducted in water depths ranging from 1,000 to 1,300 m (chart datum).

### Coordinates of the Activity

Seismic data will be acquired over a survey area totalling approximately 815 km<sup>2</sup>, which coordinates are provided in Table 1. Additional areas to the east and west boundary of the survey area will be used for vessel turns and soft start procedures, which will extend the operational area to approximately 970 km<sup>2</sup>.

**Table 1: Coordinates of the Survey Area**

Location point	Latitude (GDA94)	Longitude (GDA94)
A	19° 9' 55.8324" S	113° 14' 17.6568" E
B	19° 9' 55.3392" S	113° 45' 4.8276" E
C	19° 19' 55.304" S	113° 45' 4.752" E
D	19° 19' 55.354" S	113° 20' 4.8372" E
E	19° 14' 56.356" S	113° 23' 11.3172" E

### Description of the Activity

The seismic survey will map sub-surface geology via the acquisition of 3D seismic data to ascertain potential sub-surface oil and gas deposits of the survey area.

The survey will be undertaken by WesternGeco and will involve a specialised seismic survey vessel, the *M/V Geco Eagle*, towing seismic equipment in a predetermined pattern within the survey area. The survey operations will be conducted 24 hours per day. The selected seismic survey vessel will be accompanied by a support/scout vessel for logistical, safety and equipment management support.

The seismic energy source will be provided by a dual airgun array, of a total capacity of 3,147 cubic inches. The airgun arrays will be towed astern of the seismic survey vessel, with a seismic discharge occurring at intervals of approximately 8 seconds. Seismic reflections from

subsurface layers will be detected by hydrophones inside streamers of approximately 6,000 m in length towed at a depth of approximately 9 m.

The survey is scheduled to commence in February 2010 or alternatively in June 2010, depending on the availability of the vessel. The survey is expected to take approximately 25 days to complete. All data acquisition will be completed by July 2010.

## **Description of the Receiving Environment**

### ***Physical Environment***

The survey area is located on the continental shelf, approximately 275 km north-west of the North West Cape, in waters ranging between approximately 1,000 and 1,300 m deep. There are no significant or shallow seabed features apparent in the bathymetric information for the area.

Data and information from the region is limited. However, it is expected that the substrate across the survey area is typical of that found on the NWS, i.e. comprising loose, silty carbonate sands in the flat or gently sloping areas, with exposed hard substrate where seabed bathymetry is more locally variable or steeper.

The region is characterised by two seasons: a wet 'summer' between September and April, and dry 'winter' between May and August. The climate in winter is dominated by intense anti-cyclonic belts generating strong winds, predominantly from the east to south-east, and infrequent rain. Summer winds are more variable, with south-westerly winds being the most common. Transitional conditions, with variable and/or reduced winds, may occur over short periods between seasons, generally in September and April–May.

Tropical cyclones typically occur in the region three to four times per year, bringing strong winds, heavy rain and high seas. These cyclones are unpredictable in occurrence, intensity and behaviour, but are most common between December and March.

Water circulation in the region is dominated by the generally southward flowing Leeuwin Current. The Leeuwin Current is strongest in winter, flowing steadily to the south-west at speeds of up to 0.3 m/s. Tides are strongly semi-diurnal, generating tidal currents along an east-north-east/west-south-west axis, with speeds generally ranging from 0.1 to 5 m/s.

Water temperatures range between approximately 24.5°C in August and 29°C, and sometimes higher, from January to April.

### ***Biological Environment***

The seafloor is likely to comprise mainly soft sediments with sparse communities of the larger benthic species (sea urchins, sea stars and crustaceans). Infaunal communities are likely to comprise smaller burrowing invertebrates, including polychaetes, crustaceans, and molluscs. Any areas of exposed hard substrate are likely to support more diverse assemblages, including deepwater epibenthic filter feeding organisms such as hydroids, bryozoans, soft corals and sponges.

The water depths generally preclude photosynthetic benthic habitats that might form significant fauna habitats such as coral reefs, seagrasses or algal communities. There are no significant upwelling areas and no other biologically significant features such as trenches within the survey area.

The deep offshore environment of the survey area is typical of the NWS and is not expected to represent habitat of particular significance for any macrofauna.

Some marine migratory species with broad distributions such as cetaceans, fish, sharks, marine turtles and seabirds may traverse the survey area, at least on occasion. The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected

Matters Database lists nine migratory and five threatened species that could occur in the area. These include:

- three species of marine turtle
- humpback, blue, Bryde's, killer, sperm and Antarctic minke whales

The Threatened and Migratory species listed above are considered to be wide spread throughout the region. The survey area does not contain recognised critical habitat for any Threatened or Migratory cetaceans, marine turtles, or fish. Whilst it is possible that individual blue whales or humpback whales may occur in the vicinity of the survey area, no significant impacts are anticipated as there are no physical features that would restrict avoidance behaviours, and any small deviation from normal routes is unlikely to affect cetacean movements through the region.

## **Socio-Economic Environment**

The offshore region of the NWS supports petroleum exploration and production, shipping, and low levels of commercial fishing. No tourism, recreational or game fishing is known to occur within the survey area.

### ***Petroleum***

There are no fixed hydrocarbon platforms or pipelines in the general survey area. The presence of exploration platforms or vessels, including other seismic vessels, will be managed by the Master of the survey vessel as a routine part of seismic exploration. The nearest land-based production facility is on Barrow Island, 230 km south-east of the survey area.

### ***Fisheries***

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

- Western Tuna and Billfish Fishery
- North-west Slope Trawl Fishery
- Southern Bluefin Tuna Fishery
- Western Deepwater Trawl Fishery
- Western Skipjack Fishery

In addition, State managed fisheries are permitted to operate in waters within and adjacent to the survey area and include:

- Deep Water Wet Line Fishery
- WA North Coast Shark Fishery
- West Coast Deep Sea Crab Fishery

Consultations with the Australian Fisheries Management Authority (AFMA), the Western Australian Department of Fisheries, the Western Australian Northern Trawl Owners Association and TunaWest undertaken in 2009 for another seismic survey conducted in the region, and those undertaken in 2010 for this survey, indicate fishing activity in the area is low due to water depths, remote location, distance offshore and often unpredictable weather.

The survey area is located within the North-west Slope Trawl Fishery, which is worth approximately \$5.2 million per annum to local fishers. Seven licences operate this fishery which targets scampi and deepwater prawns. It lies between the 200 m isobath and the edge of the Australian Fishing Zone, and is active throughout the year, but is mainly fished when the Northern Prawn Fishery is closed from the end of May to mid-August.

The remainder of the Commonwealth fisheries named above are of very low total value with very low effort being applied at any time across a wide area. The survey is not expected to impact upon them.

### **Marine Protected Areas**

There are no Marine Protected Areas (MPAs) listed under Commonwealth or State legislation within or adjacent to the survey area. The nearest MPA is the Montebello Islands Marine Park which is located more than 210 km from the survey area.

### **Shipping**

A major shipping route between the WA coast and Lombok Strait passes east of the survey area which is therefore traversed on a daily basis by a low number (typically 5-6 vessels per day) of merchant vessels. However the survey area does not form part of an approach to any regional ports and there are no channels or navigation hazards that restrict vessels transiting the survey area. Potential interactions with any vessels will require management. However this is routine aspect of marine seismic operations..

## **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 Standard AS/NZS 4360:2004 (Risk Management) and HB 203:2006 (Environmental Risk Management – Principles and Process), and based on WesternGeco's Hazard Analysis and Risk Control Standard. The results of the risk analysis have been used to determine risk likelihood and severity and to evaluate the environmental risks and effects (Table 2).

The risk analysis indicates that the risk of significant adverse environmental impact from the survey is low and likely effects are 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.

These sources of potential impacts to the marine environment are limited in duration, scale and intensity. The ecological consequences are expected to be insignificant from both local and regional perspectives. Furthermore, the Standard Management Procedures contained in the *EPBC Act Policy Statement 2.1 - Guidelines for Interactions between Offshore Seismic Exploration and Whales* (DEWHA, 2008), will be employed throughout the survey. If the survey is in June, as an additional measure a Marine Mammal Observer (MMO) will be employed onboard the seismic vessel to maximise the detection and identification of marine mammals.

## **Management Approach**

The environmental management approaches relevant to key aspects of the seismic acquisition program are summarised in Table 2. The WesternGeco marine seismic survey will be conducted in accordance with all legislative and regulatory requirements. WesternGeco's overall environmental objective for the program is to avoid or minimise environmental risks to as low as reasonably practicable (ALARP).

**Table 2: Summary of Potential Major Environmental Risks and Management Approach**

Hazard/ Incident	Potential Hazard Consequence	Risk and Management Approach
Acoustic discharge from airguns during seismic operations.	Physiological damage or disruption to behaviour patterns or breeding activities of sensitive marine fauna.	Low risk. Soft start would encourage animals to move away from the airgun array. Implementation of Standard Management Procedures set out within the EPBC Policy Statement 2.1 - <i>Guidelines for Interactions Between Offshore Seismic Exploration and Whales</i> . If the survey is conducted in June, an MMO will be onboard the survey vessel to maximise the detection and identification of marine mammals.
Collision or entanglement with marine mammals.	Injury or death.	Low risk. Soft start and option of continued low power during turns. Sensitive animals are likely to avoid operating seismic vessel.
Routine discharges of grey water, sewage and putrescibles waste from survey vessels.	Adverse effects on marine life due to reduction of water quality (e.g. nutrient enrichment).	Low risk. Low volumes/high dispersion-dilution factor. Grey water / treated sewage only. Offshore discharge (>12 nautical miles from land) only. Biodegradable detergents only. Deck scuppers will be plugged and no waste will be disposed when the vessel is within 25 km of a designated nature conservation site.
Displacement of other users, including commercial fisheries operations and shipping.	Potential disruption of commercial fishing/ shipping activity.	Low risk. Low levels of vessel and fishing activity and outside major navigation channels or fishing areas. Liaise with AMSA, AFMA fishermen and other commercial mariners to minimise conflict.

## Consultation

Consultations regarding the seismic survey have been undertaken with relevant stakeholders, including:

- Australian Fisheries Management Authority (AFMA).
- Western Australian Department of Fisheries.
- Austral Fisheries Pty Ltd.
- Northern Fishing Companies Association.
- Western Australian Fishing Industry Council (WAFIC).
- Recfishwest.
- Western Australian Northern Trawl Owners Association.
- Australian Southern Bluefin Tuna Industry Association.
- Commonwealth Fisheries Association (CFA).
- TunaWest.
- Raptis and Sons (commercial fishing company).
- Australian Maritime Safety Authority (AMSA).
- Department of Mines and Petroleum (DMP).
- Department of Defence (Royal Australian Navy and Royal Australian Air Force).

Preliminary results of the consultation indicate that fishing activity in the survey area is likely to be low due to the timing of the survey, and remote location and distance offshore of the survey area.

A shipping route passes east of the survey area between the WA coast and Lombok Strait therefore some traffic is expected to occur in the general area relating to and offshore oil and gas exploration, but is not anticipated to pose any hazard to the seismic survey.

WesternGeco will continue consultation with stakeholders to ensure minimal disruption to both survey and to fishing operations.

No petroleum producing activities operate within the survey area. In the event that planned seismic lines overlap with existing petroleum related exclusion zones, WesternGeco will operate according to its industry-compliant vessel operations procedures.

All sewage and domestic wastes will be treated in an environmentally responsible manner and all waste management operations will be conducted in accordance with MARPOL 73/78 prior to discharge, including maceration to less than 25 mm diameter. There will be no discharge of sewage or putrescible domestic wastes from vessels associated with the survey within 12 nautical miles of any emergent land or coastline.

## **Further Details**

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

Ryan Taylor-Walsh  
Multiclient Operations Manager  
Australia, New Zealand, PNG, Timor Leste, JPDA  
WesternGeco  
Level 5, 256 St Georges Terrace  
PERTH WA 6000  
Australia

Tel: +61 8 9420 4801  
Fax: +61 8 9420 4600  
Direct: +61 8 9420 4618  
Mob: +61 (0)413 020 853  
Email: walshe1@perth.westerngeco.slb.com