

2D and 3D Marine Seismic Survey Adele Island Region, Timor Sea Northern Western Australia

Environment Plan: Public Summary

This document is a summary of the Environment Plan (EP) in support of WesternGeco's two dimensional (2D) and three dimensional (3D) Marine Seismic Survey covering sections of several Permit Areas off northern Western Australia (WA), as required by Regulations 11(7) and 11(8) of the *Petroleum (Submerged Lands) (Management of Environment) Regulations 1999* (P[SL]MoE Regulations) and the *Commonwealth Offshore Petroleum Act 2006* (OP Act) and associated regulations. The EP was submitted to the Western Australian Department for Mines and Petroleum (WA DMP) regarding the proposed activities.

Introduction

WesternGeco is to conduct a 2D and 3D marine seismic survey in the Timor Sea in the region of Adele Island. The proposed seismic survey will take place in Commonwealth marine waters of the North West Shelf, within Permit Area WA-371-P, and a small overlap into adjacent Permit Areas WA-344-P and WA-274-P to allow for vessel turns. The survey will be conducted in water depths ranging from 50 to 380 m (chart datum), with most of the survey area being in deep water.

Coordinates of the Activity

The survey area is bounded by the coordinates listed in Table 1. Seismic data will be acquired over an area totalling approximately 1500 km², which includes a 14 km buffer zone required for vessel turning in which little or no data acquisition will occur.

Table 1: Coordinates of the Proposed Survey Area

Location point	Latitude (GDA94)	Longitude (GDA94)
A	13° 34' 54.968" S	123° 10' 4.494" E
B	13° 34' 56.356" S	123° 27' 14.772" E
C	13° 45' 9.328" S	123° 27' 19.256" E
D	13° 45' 10.740" S	123° 06' 44.529" E
E	13° 39' 56.438" S	123° 06' 44.407" E
F	13° 39' 56.456" S	123° 10' 4.577" E

Description of the Activity

The seismic survey will map sub-surface geology via the acquisition of 2D and 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 Western Spirit*, 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 single airgun array for the 2D survey, and a dual airgun array for the 3D survey, towed astern of the seismic survey vessel.

The airgun arrays will be towed at a depth between 6 m and 8 m, with a seismic discharge occurring at intervals of approximately 10 seconds. Seismic reflections from subsurface layers will be detected by hydrophones inside approximately 7000 m long streamers, towed behind the seismic survey vessel at approximately 6 m depth.

The survey intends to acquire seismic data from a total approximately 1500 square kilometres within the proposed survey area. WesternGeco has planned the survey schedule to minimise overlap with known commercial and environmental sensitivities described in the EP.

The survey is scheduled to commence in September 2009 at the earliest and is expected to take approximately 40 days to complete. All survey work will be completed by the end of December 2009.

Description of the Receiving Environment

Physical Environment

The proposed survey area is located approximately 200 nautical miles north of Derby, on the continental shelf in water ranging between approximately 50 and 380 m deep. The seabed rises generally from the deeper water in the north to shallower waters towards the Australian mainland. The nearest emergent land mass is Browse Island and the Adele Islands Group.

Data and information from the region is limited. However, it is expected that the substrate across the proposed survey area is typical of that found on the North West Shelf (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. The bathymetry also precludes significant upwellings across most of the area, and excludes other

biologically significant features such as trenches, except where there is an emergent feature or sudden change in depth.

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 proposed survey area, at least on occasion. The EPBC Protected Matters Database lists 15 migratory and eight threatened species that could occur in the area. The survey area does not contain recognised critical habitat for any threatened or migratory cetaceans, marine turtles, fish, sharks or seabirds.

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) lists 15 Migratory and eight Threatened species that could occur in the survey area. These include:

- five species of marine turtle
- whale shark
- one species of seabird
- humpback, blue, Bryde's, killer, sperm and Antarctic minke whales
- spotted bottlenose dolphins
- dugongs and saltwater crocodiles.

The Threatened and Migratory species listed above are considered to be wide spread throughout the region. The proposed survey area does not contain recognised critical habitat for any Threatened or Migratory cetaceans, marine turtles, fish, sharks or seabirds. Camden Sound is a known calving area for humpback whales between July and October. Whilst humpbacks are likely to be found at this location during the survey period, underwater sound modelling has shown that sounds from the seismic survey are unlikely to be audible in the calving grounds.

Socio-Economic Environment

The petroleum exploration and production industry is a significant stakeholder in the region, particularly within and adjacent to the Zone of Cooperation between Indonesia and Australia. Oil exploration activities in the Timor Sea region commenced in the late 1960s and a number of wells have been drilled throughout the region.

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.

WesternGeco has consulted with all relevant oil and gas companies whose operations have the potential to interact with the proposed survey.

The survey area overlaps with fishing zones for the both Commonwealth and State managed fisheries:

- North-west Slope Trawl Fishery (Commonwealth)
- Western Skipjack Fishery (Commonwealth)
- Southern Bluefin Tuna Fishery (Commonwealth) – migratory route only
- Western Tuna and Billfish Fishery (Commonwealth)
- Mackerel Managed Fishery (WA).

Consultations conducted in 2008 with Commonwealth and State fishing authorities and commercial operators regarding seismic survey in the area have indicated that fishery activity in the proposed survey area is likely to be low due to the remote location and distance offshore.

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 proposed survey is not expected to impact upon them.

The Mackerel Managed Fishery operates from 1 June to 30 November and so will operate during the proposed survey. However, the distance from shore indicates that interaction between the seismic survey and the fishery is unlikely.

No major shipping routes are located within the survey area. The nearest commercial shipping lane is approximately 212 km to the west of the survey area. 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. Little shipping traffic is expected to be encountered in and around the proposed survey area, apart from possible minor amounts of shipping associated with adjacent oil and gas exploration. Potential interactions with any vessels will require management. However this is routine aspect of marine seismic operations, and will happen as a matter of normal seismic operations.

Major Environmental Hazards and Controls

A risk analysis was undertaken for all aspects of the proposed 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 proposed 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. 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> . 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.
Temporary displacement of commercial fisheries operations.	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 proposed seismic survey within Permit Areas WA-371-P, WA-344-P and WA-274-P have been undertaken with relevant stakeholders, including:

- Commonwealth Fisheries Association.
- Recfishwest.
- WA Department of Fisheries.
- Australia Maritime Safety Authority.
- Northern Fishing Companies Association.
- Western Australia Northern Trawl Owners Association.
- Raptis and Sons.
- Australian Fisheries Management Authority.
- Western Australia Fishing Industry Council.

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

The Permit Areas does not overlap with major shipping routes, but 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 proposed seismic survey.

Consultation with Permit holders relating to the small sections of adjacent Permit Areas covered by the proposed survey has also been undertaken by WesternGeco. WesternGeco obtained authorisation to include these small overlaps within the proposed survey area.

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

Consultations have indicated that little shipping traffic passes through the survey area. The traffic volume is not considered a significant risk.

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 2D and 3D marine seismic survey, please contact:

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