# AGRIPPINA 3D MARINE SEISMIC SURVEY
# PERMIT AREAS WA-439-P AND WA-366-P
# NORTH WEST SHELF, WESTERN AUSTRALIA

# ENVIRONMENT PLAN: PUBLIC SUMMARY

This document is a summary of the Environment Plan (EP) in support of the Chevron Australia Pty Ltd (Chevron) three dimensional (3D) marine seismic survey in Permit Areas WA-439-P and WA-366-P, on the North West Shelf, Western Australia. The Public Summary is submitted to the Department of Mines and Petroleum (DMP), as required by Regulations 11(7) and 11(8) of the Petroleum (Submerged Lands) (Management of Environment) Regulations 1999 as amended 2005 (P(SL) (MoE) Amended Regulations).

## Introduction

Chevron Australia Pty Ltd (Chevron) plans to undertake a three dimensional (3D) marine seismic survey within Permits Areas WA-439-P and WA-366-P in Commonwealth waters. The Permit Areas are located on the North West Shelf (NWS) in waters ranging in depth from 1300 m to 1600 m, approximately 230 km north west off the mainland of Western Australia at the closest point.

The seismic survey is scheduled to start in January 2010 and take approximately 30 days to complete. The survey will be conducted using a specialist seismic survey vessel towing a suitable array of airguns and hydrophone streamers.

The survey was referred to the Department of Environment, Water, Heritage and the Arts (DEWHA) in December 2009. It was assessed to be not a 'Controlled Action' if conducted under a Particular Manner, which involves the implementation of the Standard Management Measures listed in the EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales (DEWHA, 2008).

## Coordinates of the Activity

The survey area is bounded by the coordinates listed in Table 1.

**Table 1: Coordinates of Survey Area (GDA 94)**

| Location point | Latitude (south) | | | Longitude (east) | | |
|---|---|---|---|---|---|---|
| | degrees | minutes | seconds | degrees | minutes | seconds |
| 1 | 20 | 19 | 22.75 | 111 | 35 | 09.03 |
| 2 | 20 | 20 | 07.24 | 112 | 05 | 00.26 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 3 | 20 | 20 | 23.20 | 112 | 16 | 00.09 |
| 4 | 20 | 36 | 46.90 | 112 | 14 | 41.50 |
| 5 | 20 | 36 | 16.24 | 111 | 52 | 43.84 |
| 6 | 20 | 32 | 20.79 | 111 | 40 | 49.89 |
| 7 | 20 | 32 | 20.79 | 111 | 40 | 49.89 |
| 8 | 20 | 19 | 22.75 | 111 | 35 | 09.03 |

## Description of the Receiving Environment

### Physical Environment

The region is generally characterised by two seasons; summer (September–April) and winter (May–August). The climate in winter is dominated by intense anti-cyclonic belts (high pressure systems) which generate strong winds (predominantly from the east and south-east) and infrequent rain. Summer conditions are more variable, with varying wind directions (although south-westerly winds are the most common).

The area typically experiences a persistent winter swell of around 2 m, generated by low pressure systems in the southern latitudes. During winter, strong easterly winds can also generate 2 m seas. Both swell and seas tend to be smaller during summer.

Tropical cyclones occur in the region, typically three to four times per year. These are unpredictable in occurrence, intensity and behaviour, but are most common between December and March. Tropical cyclones can generate extreme seas and swell.

Water circulation in the area is influenced by the southward flowing oceanic Leeuwin Current. The Leeuwin Current is strongest in winter, flowing steadily to the south-west at up to 0.3 m/s (Holloway & Nye, 1985).

The survey area is located on the continental slope in water depths ranging from 1,300 to 1,600 m. There are no significant or shallow seabed features known to occur in the area. The nearest emergent land mass is 230 km from the survey area.

The substrate in the survey area is expected to comprise loose, silty carbonate sands and soft muds with occasional exposed hard substrate. Although previous surveys of shallower waters on the NWS suggest some spatial variation in grain size and origin of surface sediments, (Woodside, 1988), coastal inputs are reduced in the far offshore areas involved for most of this survey. The seafloor is likely to be broadly homogenous over extensive areas of similar water depth and is likely to comprise predominantly unconsolidated soft sediments.

## Biological Environment

Benthic Assemblages

There is limited information concerning the benthic communities of the survey area, due primarily to the remoteness and water depths of the areas. However, the biological productivity of the benthic environment is expected to be limited due to low light availability at depth, low nutrient availability and limited extent of exposed hard substrates.

The seafloor is likely to comprise predominantly unconsolidated soft sediments inhabited by sparse communities of relatively large benthic species (crustaceans, molluscs and sponges). Infaunal communities are likely to be comprised of smaller burrowing invertebrates (Woodside, 2005; Woodside, 2006). Any areas of exposed hard substrate that occur may support more diverse assemblages, including deep water filter feeding organisms, such as hydroids and sponges.

Macrofauna

The deep offshore environment of the survey area is typical of wide expanses of the continental slope 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 areas, at least on occasion. The EPBC Act Protected Matters Database (DEWHA, 2009) identified six species listed as Threatened and an additional four listed as Migratory species that could occur in the survey area, comprising:

- One bird species (southern giant petrel)
- Six cetacean species including blue and humpback whales (listed as Endangered and Vulnerable, respectively)
- Three turtle species (green, leatherback and flatback)

The survey area does not contain recognised critical habitat for any Threatened or Migratory fish, sharks, marine turtles, cetaceans or seabirds.

Further details regarding the main fauna groups that might occur in the area are provided in the following sections.

*Seabirds*

The southern giant-petrel (*Macronectes giganteus*) is listed as Endangered under the EPBC Act. The southern giant-petrel breeds in sub-Antarctic waters during the summer, while in winter most disperse north from 50°S to the Tropic of Capricorn and sometimes beyond (Environment Australia, 2001). The Tropic of Capricorn is located some 300 km south of the survey area and the southern giant-petrel is not expected to be present in significant numbers during any time of the year.

*Cetaceans*

Several species of whale identified in EPBC Act Protected Matters database (DEWHA, 2009) are known to frequent the waters of the NWS, including the blue whale (*Balaenoptera musculus*), and the Humpback whale (*Megaptera novaeangliae)*. Both species annually migrate between Antarctic/subantarctic waters and temperate/tropical waters during the Australian winter.

The humpback whale is the most common whale species in the region. The humpback's northbound migration passes Barrow Island and the Montebello Islands (320 km south-east of the survey area) from June to mid August and the southbound migration occurs between mid September until the end of November, although the exact timing of migration may vary by up to three weeks (Jenner et al. 2001). The northbound migration tends to be on or within the 200 m bathymetric contour, with southbound whales more dispersed (Jenner et al. 2001) and a significant component, including most cow-calf pairs, remaining closer to the coast.

The survey is scheduled outside of the humpback migration period. Additionally, the survey will be in depths greater than 1000 m and is outside (seaward) of the main migration routes, and therefore highly unlikely to occur in the vicinity of the main recognised migration path for humpback whales. The survey is also distant from known whale aggregation areas. The nearest known humpback resting area is the Exmouth Gulf, approximately 230 km to the south-east from the survey area.

Blue whale migration patterns in the southern hemisphere occur approximately between latitudes 20 °S and 60–70 °S (Bannister et al. 1996; DEH 2005), however the migratory habits of blue whales are poorly understood. The only known feeding area in Western Australia is at the Perth Canyon, where pygmy blue whales (*Balaenoptera musculus brevicauda*) feed between November and July (McCauley et al. 2004). Acoustic logger records from the Western Australian coast indicate that pygmy blue whales migrate north along the Western Australian coast to Indonesia in June/July and south in November/December (Branch et al. 2007). Blue whale migratory paths are generally associated with waters deeper than the continental shelf and are not prominent along the wide continental shelf of northern Australia (Branch et al. 2007).

In addition to this, blue whales tend to be more widely dispersed and rarely present in large numbers outside recognised aggregation areas (Reeves et al. 2002). The survey area does not include any recognised blue whale migratory routes or known feeding, breeding or resting area, hence significant numbers of blue whales are not expected to be present during survey operations.

Four whales listed as Migratory under the EPBC Act may occur in the survey area on occasion. These include the Antarctic minke whale (*Balaenoptera bonaerensis*), Bryde's whale (*Balaenoptera edeni*), killer whale (*Orcinus orca*) and the sperm whale (*Physeter macrocephalus*). Given the widespread distributions (Reeves et al. 2002)

of these species and the absence of particular bathymetric features in the survey area, it is unlikely that the survey area represent important habitat for any of these species.

*Marine turtles*
The three species of marine turtle that may occur in the survey area are all listed as Vulnerable under the EPBC Act.

Marine turtles, particularly green turtles, undertake extensive migrations and low numbers of individuals may transit the survey area. Migration and nesting activity generally occurs between September and April. The survey area does not contain any emergent land or shallow reef and the nearest areas of known turtle breeding or feeding importance are approximately 210 km south-east from the survey area.

Significant numbers of any turtle species are not expected at within the survey area during operations.

*Fish*
A number of sharks and pelagic finfish, including mackerels, tunas and billfishes, whilst not listed under the EPBC Act, occur in the waters of the NWS and would be expected to occur in the survey area. The deep offshore environment of the survey areas is typical of the continental slope of north western Australia and is not expected to represent habitat of particular significance to sharks and finfish.

**Socio-Economic Environment**

Petroleum Activities

The NWS supports extensive petroleum exploration and production activities, however, only limited activity occurs as far offshore as the survey area. The petroleum industry has developed major production operations on Thevenard, Airlie, Barrow and Varanus Islands. The nearest land based production facility is situated on Barrow Island, approximately 320 km south-east of the survey area.

Fisheries

The survey area overlaps several authorised commercial fishing zones, however consultations with AFMA, the Western Australian Department of Fisheries, the Western Australian Northern Trawl Owners Association and TunaWest indicate fishing activity in the area is low due to water depths, distance offshore and often unpredictable weather.

The following Commonwealth managed fisheries are authorised to operate in waters within and adjacent to the survey area:

- Western Tuna and Billfish Fishery

- North West Slope Trawl Fishery
- Southern Bluefin Tuna Fishery
- Western Deepwater Trawl Fishery
- Skipjack Tuna Fishery.

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

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

Shipping

Blue water cargo and other commercial vessels traverse the waters of the survey area. The vessel traffic is predominantly associated with movements between Indonesia and central-to-southern Western Australian waters. There are no bathymetric features or other navigational hazards in the area that will restrict ships avoiding the seismic vessel. The support vessel will provide back-up radar coverage and radio communication. These measures will reduce the likelihood of a shipping incident occurring. Both the seismic and support vessels will operate in accordance with prevailing maritime standards.

A Notice to Mariners will be issued by AMSA to advise vessels of the location of the survey area.

Marine Protected Areas

There are no Marine Protected Areas (MPAs) within the survey area. The nearest MPA is the Muiron Islands Marine Management Area, approximately 246 km south of the survey area.

## Description of the Action

Chevron proposes to conduct a 3D seismic survey to image the seabed subsurface geology. The purpose of the survey is to evaluate potential sub-surface oil and gas deposits. The proposed survey will use a specialised seismic vessel towing data acquisition equipment along a predetermined grid to acquire seismic data. The survey area is 1,867 $km^2$. Vessel turns, line run ins and run outs are adjacent and external to this area, but within the extent of Permit Areas WA-439-P and WA-366-P.

The survey will be conducted by Schlumberger (A) Pty Ltd on behalf of Chevron using the M/V Geco Eagle, a purpose built seismic survey vessel 94.8 m overall length and with a 37 m beam. A support vessel, the OMS Discovery, may be used for logistic, safety and equipment management support. The survey will operate 24

hours a day and vessel to vessel refuelling may occur during the proposed survey. The vessel(s) will not anchor at sea unless required in an emergency. All vessels associated with the survey will operate out of the Port of Dampier or Broome.

The seismic energy source will be provided by a dual airgun array of 3,147 cubic inches with an operating pressure of 2,000 psi. The airgun array will be towed astern of the vessel with airguns alternately discharged at approximately 8 second intervals, resulting in a seismic pulse interval of approximately 18.75 m. Each airgun array will generate a source peak-to-peak pressure of approximately 108 bar m (~261 dB re 1µPa at 1m). Seismic reflections will be detected by hydrophones in eight streamers of 6,000 m length towed at a depth of approximately 9 m.

The timing of the Agrippina survey is dependent on completion of the previous survey, with the start date planned for January 2010. The survey duration will be approximately 30 days.

## Summary of Environmental Risk Assessment

Environmental risk assessment has been undertaken for all aspects of proposed operations, in accordance with the Chevron HES Risk Matrix and the procedures outlined in the Australian Standard AS/NZS 4360:2004 Risk Management and HB 203:2006 Environmental Risk Management.

In accordance with HB 203:2006, the qualitative analysis was used to examine the environmental consequence of each event arising and its likelihood. The Chevron HES Risk Matrix was then used to determine the level of environmental risk for each aspect of operations. The risk assessment was based on the likelihood of the defined consequences occurring, assuming that standard management measures were applied, as discussed in HB203:2006 Environmental Risk Management. The relative levels of risk indicated via the risk analysis could then be prioritised for more detailed attention at the project planning stage by Chevron and during operations by the vessel crews.

The results of the risk analysis are summarised in Table 3. The risk analysis indicates that the risk of significant adverse environmental impact from the proposed surveys is low and likely effects are limited to the temporary and localised increase in ambient underwater noise levels as a result of acoustic discharges that could cause physiological damage to sensitive listed marine fauna if present within the vicinity of the proposed survey area.

Given the management procedures to be applied, including soft starts, the ecological consequences are expected to be insignificant from both local and regional perspectives.

## Management Approach

Environmental management used to minimise impacts is listed in Table 2.

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

| Environmental Aspect | Potential Environmental Effect | Proposed Management Measures |
|---|---|---|
| Acoustic impulse from airguns | Potential physiological effects or disruption to behaviour patterns of marine fauna | Compliance with EPBC Act Policy Statement 2.1 (Part A - Standard Management Measures) (DEWHA 2008) for minimising disturbance to cetaceans, including:<br>▪ Visual observations undertaken by trained crew<br>▪ 30 minute visual observations during pre-start procedures and during survey<br>▪ Use of soft-start procedures<br>▪ Delay start up procedures/power down any operating acoustic source if whales are within 2 km of the airgun array and shutdown if they approach the airguns within 500 m. |
| Grey water/ sewage disposal | Potential localised reduction in water quality - nutrient enrichment | ▪ Treat in accordance with the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) prior to discharge.<br>▪ Offshore discharge >12 nautical miles from land only.<br>▪ MARPOL 73/78 approved onboard sewage treatment plant.<br>▪ Biodegradable detergents only. |
| Discharge of oily water from bilges | Potential localised chronic/acute toxic effects | ▪ All bilge water passes through an oil/water separator prior to discharge.<br>▪ All bilge discharges treated to <15 ppm hydrocarbons; MARPOL 73/78 standard for oily water discharge.<br>▪ Discharge quality automatically monitored with alarm. |
| Putrescible galley wastes disposal | Potential localised reduction in water quality - nutrient enrichment | ▪ Low volumes and rapid dispersal/dilution.<br>▪ Incineration or maceration to <25 mm prior to discharge.<br>▪ Discharge only when >12 nautical miles from shore.<br>▪ Discharges in accordance with MARPOL 73/78. |
| Solid wastes disposal | Potential environmental degradation from incorrect disposal | ▪ Incineration or appropriate onshore disposal of solid wastes in accordance with MARPOL 73/78 and Environmental Protection (Controlled Waste) Regulations 2004 |
| Waste oil disposal | Potential localised chronic/acute toxic effects | ▪ All waste oils collected and returned to shore for recycling/disposal.<br>▪ Disposal in accordance with MARPOL 73/78 and Environmental Protection (Controlled Waste) Regulations 2004 |

| | | |
|---|---|---|
| Atmospheric emissions | Potential addition of greenhouse gases to atmosphere | ▪ Engines maintained to operate at optimum efficiency to minimise emissions.<br>▪ Compliance with MARPOL 73/78 regulations for the Prevention of Air Pollution from Ships. |
| Artificial lighting | Potential attractant/ disturbance to marine life | ▪ Lighting shall be kept to the minimum required for navigation and safety requirements. |
| Anchoring activity | Potential localised disturbance to benthos | ▪ No anchoring of vessels except in an emergency. |
| Vessel collision resulting in a fuel spill | Potential localised chronic/acute toxic effects on marine organisms from oil spill | ▪ Vessel equipped with appropriate navigational aids.<br>▪ A 24 hour visual, radio and radar watch will be maintained for other vessels by fully qualified and experienced mariners.<br>▪ Vessel presence shall be communicated via a Notice to Mariners.<br>▪ Implementation of the vessel-specific Shipboard Oil Pollution Emergency Plan (SOPEP) and oil spill response resources in the event of collision and fuel loss. |
| Hydrocarbon spill during refuelling operations | Potential acute toxic effect on marine organisms | ▪ Approved vessel-specific SOPEP and oil spill response resources maintained onboard.<br>▪ Bunkering Offshore Checklist<br>▪ No refuelling within 12 nautical miles of emergent land or the Australian coastline.<br>▪ Refuelling during daylight hours and under favourable sea conditions only.<br>▪ Use of reinforced hoses with dry-break and fail-safe fittings.<br>▪ Deck scuppers plugged prior to the refuelling operation and only unplugged upon completion.<br>▪ Continual visual monitoring of hoses, couplings, fuel flow gauges on both vessels, and the sea surface during refuelling.<br>▪ Continual radio contact between the supply vessel and the seismic vessel.<br>▪ |
| Loss/damage of streamer leading to hydrocarbon spill | Potential acute toxic effect on marine organisms | ▪ Relatively small volumes of very light hydrocarbons (kerosene) (no greater than 160 L per 100 m section).<br>▪ Rapid dispersion and evaporation in the prevailing air and sea temperatures of the survey area.<br>▪ Strict operating procedures, including onboard storage and spill containment procedures (including the capping of scuppers during streamer maintenance activities).<br>▪ Streamer handling procedures, |
| Interaction with other vessels | Potential disruption to commercial fishing/vessel operations | ▪ Vessel presence shall be communicated via a Notice to Mariners. |
| Introduction of marine pests into marine environment | Potential negative effects on native organisms from competition, predation or disease | ▪ M/V Geco Eagle was last inspected by AQIS on 14 October 2009 and has been operating within WA waters since.<br>▪ Compliance with AQIS and Australian Ballast Water Management Requirements, 2001.<br>▪ No exchange of ballast water <12 nautical miles from land. |

## Consultations

Relevant stakeholders were contacted via email in November 2009. These stakeholders were provided with a map of the proposed survey area, details of the survey including timeframe and location, and were invited to provide comment on any issues they could foresee with the survey.

The following stakeholders were contacted:

- Commonwealth Department of Environment, Water, Heritage and the Arts (DEWHA)
- Western Australian Department for Mines and Petroleum (DMP)
- Australian Fisheries Management Authority (AFMA)
- Department of Fisheries, Western Australia
- Western Australian Fishing Industry Council (WAFIC)
- Recfishwest
- Commonwealth Fisheries Association (CFA)
- Australian Southern Bluefin Tuna Industry Association
- Western Australian Northern Trawl Owners Association
- TunaWest
- Raptis and Sons (commercial fishing company)
- Australian Maritime Safety Authority (AMSA)
- Department of Defence (Royal Australian Navy)
- Department of Defence (Royal Australian Air Force)

The consultations have revealed that:

- Commercial and recreational fishing activity in the area is absent or at very low levels.
- Historical AFMA logbook data for 2007 and 2008 indicate that no vessels reported operating in the proposed area of the survey.
- The Royal Australian Air Force has no planned training activities that will be impacted by the seismic program.

**Table 3: Consultations Summary**

| Stakeholder | Date | Stakeholder Response Date | Comment |
|---|---|---|---|
| AFMA | 5 Nov 2009 | 5 Nov 2009 | Historical AFMA logbook data for 2007 and 2008 indicate that no vessels reported operating in the proposed area of the survey. On this basis AFMA does not object to the proposal conduct a seismic survey. |
| FWA | 5 Nov 2009 | No response | |
| WAFIC | 5 Nov 2009 | No response | |
| Recfishwest | 5 Nov 2009 | No response | |
| Commonwealth Fisheries Association | 5 Nov 2009 | No response | |

| Stakeholder | Date | Stakeholder Response Date | Comment |
|---|---|---|---|
| Western Australian Northern Trawl Owners Association (WANTOA) | 5 Nov 2009 | No response | |
| Australian Southern Bluefin Tuna Industry Association | 5 Nov 2009 | 5 Nov 2009 and 12 Nov 2009 | Dec/Jan is the peak period in middle of 6-7 mth spawning season. Query whether the proposal is going to be referred under EPBC Act? (Confirmed) |
| TunaWest | 5 Nov 2009 | No response | |
| A Raptis and Sons | 5 Nov 2009 | No response | |
| AMSA | 5 Nov 2009 | | No major shipping routes in the vicinity of the survey area. Traffic should be minimal. |
| Department of Defence (Royal Australian Navy) | 5 Nov 2009 | 5 Nov 2009 | Request to provide vessel details and confirm dates three weeks prior to survey commencing. |
| Department of Defence (Royal Australian Air Force) | 5 Nov 2009 | 5 Nov 2009 | Air Force have no planned training activities that will be impacted by the activity |

The following organisations have been identified by Chevron as key stakeholders who will be contacted prior to the commencement of the surveys:

- AFMA
- FWA
- AMSA
- Australian Southern Bluefin Tuna Industry Association
- Department of Defence (Royal Australian Navy)

## Contact Details

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