

Poseidon 3D Marine Seismic Survey Environment Plan

Summary

1. Project Description

ConocoPhillips (Browse Basin) Pty Ltd (COP) proposes to undertake the Poseidon three-dimensional (3D) seismic survey in the Browse Basin, offshore northwestern Australia. The survey will be located approximately 440 km north of Broome, Western Australia, and will cover a maximum area of approximately 5,624 km² (Figure 1). The survey is scheduled to commence in the fourth quarter of 2009 (COP is targeting an October 1, 2009 start date) and will take approximately 120 to 180 days to complete. The purpose of the survey is to acquire 3D seismic data, which will assist in defining subsurface geological structures and identify areas that have hydrocarbon exploration potential.

The survey area is located in the Indian Ocean, in Commonwealth waters adjacent to northwest Western Australia, off the Kimberley coast, approximately 270 km offshore (at the nearest point to the mainland), as shown in Figure 1. The survey area does not include Seringapatam Reef (located in the southwestern quadrant of the survey area) and approximately 500 m of ocean surrounding the reef. The survey also does not include Scott Reef; the survey's closest point of approach to this reef will be 2 km. The survey is situated approximately 440 km north of the nearest populated centre, Broome. Browse Island is approximately 120 km east of the survey area. The specific coordinates defining the survey area are given in Table 1.

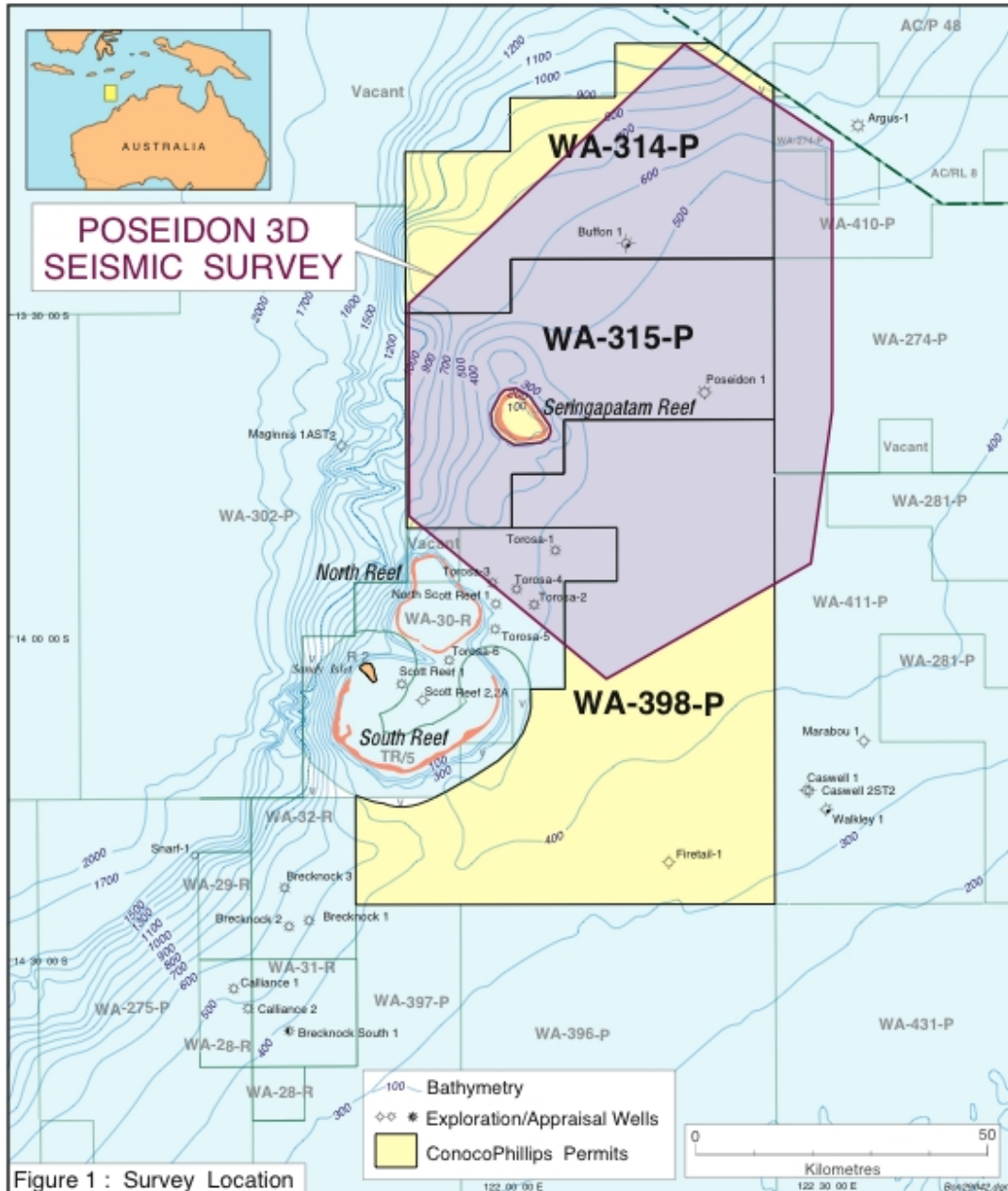
Table 1 Boundary coordinates of the Poseidon 3D Marine Seismic Survey area

Location Point	Latitude			Longitude		
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
Outer Boundary						
A	13	39	02.52	122	30	33.93
B	13	53	13.42	122	28	30.67
C	14	03	54.08	122	09	00.28
D	13	48	42.07	121	50	16.98
E	13	28	59.19	121	50	19.00
F	13	04	55.67	122	16	36.11
G	13	13	59.13	122	30	37.44
Seringapatam Area ¹						
H	13	36	51.59	122	00	30.20
I	13	37	35.82	122	01	46.79
J	13	40	20.80	122	03	41.25
K	13	40	53.04	122	03	47.50
L	13	41	29.36	122	03	33.55
M	13	41	54.50	122	02	52.69
N	13	42	07.06	122	00	20.29
O	13	41	25.89	121	59	07.83
P	13	40	19.85	121	58	13.92
Q	13	39	09.15	121	58	06.08
R	13	37	27.76	121	58	58.39
S	13	37	01.30	121	59	24.90

1. The coordinates for the Seringapatam Area represent a boundary around the Seringapatam Reef. The area inside this boundary is NOT part of the Poseidon 3D Marine Seismic Survey

The survey area bounded by the coordinates in Table 1 covers a total area of approximately 5,624 km². This is the maximum area for the survey and COP may choose to undertake a smaller survey, covering approximately 2,828 km² entirely within the larger survey area, depending on results from the Kontiki-1 exploration well, currently being drilled in permit WA-314-P. The EP covers the maximum survey area of 5,624 km².

Figure 1 Survey location



3.1 Physical Environment

The water depth in the survey area ranges from 200 m to approximately 1,000 m (see Figure 1). The seabed within the survey area is generally flat, with the atoll structure of Seringapatam Reef representing the area's most significant bathymetric feature. At Seringapatam Reef, the seabed rises dramatically from more than

200 m below sea level to emergent reef. Seringapatam Reef is separated from the shallow continental shelf edge and is considered to be a true 'shelf atoll'.

3.2 Biological Environment

Species that are rare or endangered are protected under the Commonwealth Environment Protection and Biodiversity Conservation (EPBC) Act 1999 and the Western Australian Wildlife Conservation Act 1950. The EPBC Act also provides protection for cetaceans. Six listed threatened species were identified from a search of the EPBC Act Protected Matters Database. These species may occur in the area but are likely to be transient through the area; it is highly unlikely that the area is a habitat critical to the survival of any listed threatened species.

The search of the EPBC Protected Matters database also returned 58 species covered by the marine provisions of the EPBC Act that may occur in the WA-314-P, WA-315-P and WA-398-P permit areas. These comprise:

- The Streaked Shearwater (migratory bird)
- 21 species of fish (pipefish, seahorses and pipehorses)
- One species of shark (Whale Shark)
- 12 species of seasnake
- Three species of turtle (the vulnerable, migratory species)
- 21 species of cetaceans (including the six whale species).

The bird, seasnake, turtle and cetacean species may transit through the area, however there are no known roosting or breeding habitats for these species within, or adjacent to, the proposed well locations. It is likely that the fish species identified by the search were listed due to the proximity of the permit areas to Scott and Seringapatam Reefs. However, the Seismic activities are highly unlikely to impinge upon either of these reef systems.

3.3 Cultural Environment

The program area is about 270km from the Australian mainland and about 440 km from the town of Broome, Western Australia. The boundary of the seismic program location is some 30 km distant from Sandy Islet (Figure 1). Whilst the program area is within the Indonesian Traditional Fishing Zone (Memorandum Of Understanding (MOU) 74 Box), the program will be conducted in water depths of 200-1000 m and is therefore unlikely to impact these fishing activities. The area is not known to be used by Australian Aboriginal people for hunting or fishing purposes. A search of the Department of Indigenous Affairs (DIA) Aboriginal Heritage Sites Register did not identify any heritage values within the permit areas.

3.4 Socio-Economic Environment

The survey area lies off the North Coast bioregion of Western Australia (Pilbara/Kimberley), which supports a valuable and diverse fishing industry. The survey overlaps four commercial, Commonwealth managed fisheries – The North West Slope Trawl Fishery, Southern Bluefin and Tuna Fishery, Western Tuna and Billfish Fishery and the Skip Jack Tuna Fishery (Western).

The State-managed Northern Demersal Scalefish Fishery (NDSF) also operates in the survey area. The NDSF comprises 20 vessels but rarely operates in water depths greater than 100 metres, and never in water depths greater than 200 metres. Shark fishing is licensed in this area, but activity is expected to be limited.

Indonesian and Timorese fishermen, using traditional methods, are legally permitted to harvest marine products in the MOU74 Box. Sea cucumbers (holothurians), *Trochus* and sharks are targeted by the fishers. Fishing effort is difficult to estimate, though in 1998, 89 Indonesian fishing vessels were recorded anchored at Scott Reef. Between August to October, up to 60 boats may be visiting the reef, though they often depart the region at the onset of the North-west Monsoon season.

The survey area is remote from the main commercial shipping routes off the Australian coastline. Military training activities are unexpected as the survey area is not within a Defence maritime exercise area.

4. Major Environmental Hazards and Controls

An environmental hazard analysis process was applied to the survey, based on the ConocoPhillips internal environmental risk assessment methodology and in accordance with the principles of Australian Standard AS/NZS 4360:2004. Environmental hazardous events have been identified from a review of the proposed seismic activities and the environmental setting for the activities.

Hazardous events have been assessed according to their potential environmental effects in the categories of atmospheric emissions, discharges to marine environment, physical presence, waste generation, and socio-economic effects.

High and significant residual risks are not deemed to be tolerable, and require further evaluation to determine practical risk management controls to treat and reduce the risk to as low as reasonably practicable (ALARP). Moderate residual risks are deemed to be tolerable, subject to on-going verification that risk management controls are effective. Low residual risks are deemed to be tolerable and do not warrant additional risk treatment. Nevertheless, they require regular review.

The hazard analysis process identified 6 moderate risks and 9 low risks. These are presented in Table 2, along with the associated management approach. There were no high or significant risks identified.

5. Management Approach

Environmental management of ConocoPhillips-operated activities is implemented through a hierarchy of policies and procedures that cascade from the corporate level through to the business units and their individual operations. These policies and procedures are framed and implemented within the Health, Safety and Environmental (HSE) Management System.

Environmental management strategies have been formulated to address the identified environmental hazards for the survey, categorised in the following groups: Exhaust Emissions, Spills, Waste, Seabed Impacts, Interactions with Wildlife and Socio-economic Impacts.

The environmental objectives defined in the Environmental Management Strategies are based on the identified environmental hazardous events, associated environmental effects and the assessed risks, corporate policies, performance commitments and applicable legal requirements.

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Table 2. Summary of Environmental Hazards, Potential Effects and Management Approach.

Environmental Hazardous Event	Potential Effect	Management Approach	Residual Risk	Management Strategy
Exhaust gas emissions from power generation on survey vessels	GHG and other air emissions (NO _x , SO _x , HCs and CO). Release of particulate matter.	Seismic contractor procedures for: <ul style="list-style-type: none"> • Equipment maintenance and repair. • Marine operations. Equipment maintenance to sustain efficient fuel burning.	Low	Management of Exhaust Emissions.
Spill of fuel during bunkering operations. Chemical storage failure.	Marine pollution if chemicals are lost to sea. Impact on marine species (including oiling and ingestion).	Seismic contractor procedures and policies for: <ul style="list-style-type: none"> • Offshore fuel transfer/bunkering. • Offshore emergency response plan. • HSE incident reporting. Secure containment areas for oils and chemicals. Dry break hoses used for bunkering operations. Onboard spill kits.	Moderate	Management of Spills.
Rupture of, or leakage from, survey vessel fuel tanks (e.g., from collision or grounding).	Marine pollution with hydrocarbons if fuel is lost to sea. Impact on marine species (including oiling and ingestion).	Seismic contractor procedures and policies for: <ul style="list-style-type: none"> • Shipboard Oil Pollution Emergency Plan (SOPEP). • Offshore emergency response plan. • HSE incident reporting. • Marine environmental protection procedure Watch (visual, radio and radar) maintained at all times when survey vessel is underway. Onboard spill kits. Maritime notification of seismic vessel and support vessels to AMSA (AusSAR)	Moderate	Management of Spills.

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<p>Discharge of engine oil from survey vessel.</p>	<p>Marine pollution with hydrocarbons if fuel is lost to sea. Impact on marine species (including oiling and ingestion).</p>	<p>Seismic contractor procedures and policies:</p> <ul style="list-style-type: none"> • Shipboard Oil Pollution Emergency Plan (SOPEP). • Offshore emergency response plan. • HSE incident reporting. • Marine environmental protection procedure. <p>Any machinery space bilge water to be discharged overboard is routed to the MARPOL-approved oily water separator before disposal. 15 ppm OIW discharge limit.</p>	<p align="center">Low</p>	<p>Management of Spills.</p>
<p>Loss of hydraulic fluid.</p>	<p>Marine pollution with hydraulic fluid if spill reaches sea.</p>	<p>Seismic contractor procedures and policies for:</p> <ul style="list-style-type: none"> • Shipboard Oil Pollution Emergency Plan (SOPEP). • Offshore emergency response plan. • HSE incident reporting. • Marine environmental protection procedure. • Marine operations general safety procedures. <p>Onboard spill kits.</p>	<p align="center">Low</p>	<p>Management of Spills.</p>

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<p>Release of hydrophone streamer fluid into marine environment (by snagging, shark bite, rupture, etc.).</p>	<p>Marine pollution from streamer fluid. Considered non-hazardous. Solid streamer used so minimal streamer fluid present.</p>	<p>Solid streamers used. Minimal amount of buoyancy fluid present around hydrophone only.</p> <p>Seismic contractor procedures and policies for:</p> <ul style="list-style-type: none"> • Shipboard Oil Pollution Emergency Plan (SOPEP). • Offshore emergency response plan. • Health safety and environment incident reporting. • Marine environmental protection procedure. • Work instruction for recovery of lost/damaged seismic streamers. <p>Onboard spill kits.</p> <p>When deploying or recovering towed streamers, any leaks found in the sections should be immediately resealed.</p> <p>All hoses and associated tools for filling towed streamer sections should be kept in good operational condition and regularly checked for leaks.</p>	<p>Low</p>	<p>Management of Spills.</p>
<p>Cyclonic events causing vessel grounding or collisions and subsequent loss of chemicals (fuel, hydraulic fluid, grease, etc).</p>	<p>Marine pollution with hydrocarbons if fuel is lost to sea.</p> <p>Impact on marine species (including oiling and ingestion).</p>	<p>Seismic contractor procedures and policies:</p> <ul style="list-style-type: none"> • Recovery of lost/damaged streamer. • Offshore emergency response plan. <p>During seismic survey operations, once a storm is reported, the path of the storm is plotted and monitored on the bridge. If the storm is likely to intercept the path of the survey, the vessel's emergency response plan will be adhered to, including recovery of towed equipment and avoidance.</p>	<p>Moderate</p>	<p>Management of Spills.</p>

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<p>Handling and disposal of hazardous and non-hazardous waste.</p>	<p>Incorrect identification and/or segregation of waste may lead to inappropriate waste handling and disposal practices. Consequences may include contamination of the atmosphere, soil and/or water resources, either on location or at the waste disposal facility.</p>	<p>Solid streamer used. Minimal amount of fluid present around hydrophone only.</p> <p>Seismic contractor procedures and policies for:</p> <ul style="list-style-type: none"> • Marine environmental protection procedure. • Waste management procedures. <p>Hazardous wastes will be segregated from other wastes for onshore recycling or disposal.</p> <p>Recyclable and non-hazardous wastes will be segregated from other wastes and returned to shore for reuse, recycling or disposal.</p> <p>Waste log kept up to date.</p>	<p>Low</p>	<p>Management of Waste.</p>
<p>Potential effects on marine organisms such as physical disturbance to benthic communities residing on shoals.</p> <p>Possible interference to commercial fishing and shipping.</p>	<p>Physical damage to benthic communities.</p> <p>Property damage to other vessels.</p>	<p>Seismic contractor procedures and policies for:</p> <ul style="list-style-type: none"> • Lifting and towing equipment procedures. <p>Strict adherence to streamer handling procedures.</p> <p>Vessel supplied with detailed bathymetric charts.</p> <p>All reasonable measures will be taken to retrieve any lost equipment.</p> <p>All relevant stakeholders informed of vessels movements during the survey.</p>	<p>Low</p>	<p>Management of Seabed Impacts and Management of Interactions with Wildlife.</p>

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<p>Collision of survey vessel with marine fauna, or their disturbance by marine noise from survey equipment.</p>	<p>Potential disturbance to local marine fauna. Potential injury or mortality of wildlife due to physical impact (e.g. boat strike with marine turtles or whales at water surface) Behavioural changes, including approaching or avoidance of towed airguns. No significant adverse effects on marine fauna have been recorded during surveys utilising these types of equipment to be deployed during the survey.</p>	<p>Management measures for organizations/vessels conducting seismic surveys in Australian Waters, pp7-12 of EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales. Seismic contractor procedures and policies:</p> <ul style="list-style-type: none"> • Wildlife interaction. • Instructions for minimising disturbance to marine mammals. <p>Watch maintained at all times when the survey vessel is under way. Survey being conducted outside known humpback whale peak migration, and distant from migration route. Survey area does not overlay significant feeding, breeding or resting areas for protected species. Protected species are able to move away from slow moving vessel. Steady course taken by vessel enables larger fauna (e.g. whales) to take logical, voluntary manoeuvres to avoid interaction. MMO will be onboard for the duration of the survey.</p>	<p>Moderate</p>	<p>Management of Seabed Impacts and Management of Interactions with Wildlife.</p>
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<p>Survey vessel lighting during night-time survey activities.</p>	<p>May result in a temporary local concentration of marine fauna that are attracted to the lights on the vessel.</p>	<p>Seismic contractor procedures and policies:</p> <ul style="list-style-type: none"> • Wildlife interaction. <p>Light is a safety and navigational requirement for night operations. Any marine fauna attracted to the light are expected to disperse during daylight hours. Survey is of relatively short duration and any impacts will be temporary and transient.</p> <p>The survey area is sufficiently far from known turtle rookeries (~20 km) and the risk of impact upon turtle nesting or hatchlings is considered to be negligible.</p>	<p>Low</p>	<p>Management of Interactions with Wildlife.</p>
<p>Environmental impact on the seabed from dropped objects.</p>	<p>Physical damage to seabed benthic communities.</p>	<p>Seismic contractor procedures and policies:</p> <ul style="list-style-type: none"> • Recovery of lost/damaged streamer. • Manual handling procedures. 	<p>Low</p>	<p>Management of Seabed Impacts</p>
<p>Cyclonic events causing the loss of survey equipment, vessel grounding or collisions.</p>	<p>Physical damage to seabed benthic communities.</p> <p>Potential injury or mortality of wildlife due to physical impact.</p> <p>Legacy 'ghost gear' impacts such as snaring of seabirds, marine turtles or cetaceans in lost rigging, etc.</p>	<p>Seismic contractor procedures and policies:</p> <ul style="list-style-type: none"> • Recovery of lost/damaged streamer. • Offshore emergency response plan. <p>During seismic survey operations, once a storm is reported, the path of the storm is plotted and monitored on the bridge. If the storm is likely to intercept the path of the survey, the vessel's emergency response plan will be adhered to, including recovery of towed equipment and avoidance.</p>	<p>Moderate</p>	<p>Management of Seabed Impacts</p>

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<p>Interference with commercial fishing vessels, commercial shipping, Navy and Customs vessels and other marine users.</p>	<p>Temporary navigation hazard and exclusion zone around the survey vessel and associated survey equipment (streamers).</p>	<p>Exclusion zone around the survey vessel and equipment required for safety reasons (500 m). Watch (visual, radio and radar) maintained at all times when survey vessel is underway. Navigation aids (lights, flags, radar, etc.) on survey vessel. Notification of survey vessel's location to AMSA – AusCoast warnings. Notifications to commercial fishers, AFMA, WAFIC, WA Department of Fisheries, and any other relevant stakeholder.</p>	<p>Low</p>	<p>Management of Social and Economic Impacts on Marine Users.</p>
<p>Transport of marine pest species into Australian waters.</p>	<p>Elimination of a commercially important native Australian marine species through competition with introduced pests.</p>	<p>Vessel to conform to Australian Quarantine Inspection Services (AQIS) guidelines relating to ballast water exchange, pest management and hull fouling.</p>	<p>Moderate</p>	<p>Management of Social and Economic Impacts on Marine Users.</p>

6. Stakeholder Consultation

Prior to the commencement of the seismic survey, various government agencies and stakeholders were contacted in an attempt to identify any concerns or conflicts that might arise from the program activities. The purpose of the stakeholder consultation is to effectively communicate planned activities with stakeholders or individuals who use and/or have a specific interest in the waters surrounding the proposed survey area.

Consultation activities were undertaken with the following stakeholders:

- A Raptis and Sons;
- Australian Institute of Marine Science;
- Australian Customs Service (Coastwatch);
- Australian Fisheries Management Authority (AFMA), Environmental Policy Section;
- Australian Hydrographic Office (HO) Surveying Ships and Units, Surveying Operations;
- Australian Maritime Safety Authority Rescue Coordination Centre;
- Australian Quarantine Inspection Service (AQIS);
- Broome Port Authority;
- Centre for Environment and Life Sciences;
- Centre for Whale Research (WA);
- Charles Darwin University;
- Commonwealth Fisheries Association;
- Department of Environment and Conservation (DEC);
- Dampier Port Authority;
- Department of Fisheries (WA);
- Department for Planning and Infrastructure (WA);
- Department for Resources, Energy and Tourism (Commonwealth);
- Kimberley Professional Fishermans Association;
- National Offshore Petroleum Safety Authority (NOPSA);
- Northern Fishing Companies Association;
- Port of Darwin;
- Western Australian Fishing Industry Council;
- Western Australian Northern Trawl Owners Association; and
- World Wide Fund for Nature (WWF).

COP will also advise AMSA and Customs Border Protection Command in advance of the seismic survey to allow appropriate communication to other stakeholders who may utilise the area.

7. Contact Details

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