



**Tidepole MAz 3D Marine Seismic Survey
Environment Plan Summary**

Tidepole MAz 3D Marine Seismic Survey Campaign

Environment Plan Summary

This summary of the Tidepole MAz 3D Marine Seismic Survey (MSS) Environment Plan has been submitted in accordance with Regulation 11(7)(8) of the *Petroleum (Submerged Lands) (Management of Environment) Regulations 1999*. It may not be used for any other purpose without Woodside's prior approval.

1 Background

Woodside Energy Ltd (hereafter referred to as Woodside) proposes to undertake a multi-azimuth, three-dimensional (3D) marine seismic survey over an area of 109 square kilometres (km²) full fold in Commonwealth waters, located 120 kilometres offshore from Karratha, Western Australia. The proposed survey is referred to as the Tidepole MAz 3D MSS.

The Environmental Plan (EP) has been prepared in accordance with Commonwealth regulatory requirements, guidelines for the preparation of an EP and with Woodside's Corporate Environment Policy and Health, Safety and Environment (HSE) Management System (HSE-MS).

The scope of the EP covers all operational activities relating to the Tidepole MAz 3D MSS. The EP specifically describes:

- The activities of the Tidepole MAz 3D MSS and the environment in the vicinity of the survey area;
- The potential environmental effects, risks and measures designed to minimise and/or mitigate actual and potential risks of the seismic survey; and
- The management measures and strategies to be used in implementing the best practice requirements and commitment made in the Tidepole MAz 3D MSS Environment Plan.

2 Description of the Action

2.1 Location

Woodside proposes to undertake a 3D marine seismic survey over selected portions of the Tidepole and Goodwyn South fields to map the sub-surface geology and ascertain the potential of sub-surface oil and gas deposits for further investigation. The survey will be undertaken for approximately 26 days commencing between mid November and late December 2007. The DoIR will be notified prior to the commencement of the survey.

The proposed seismic survey is located in offshore Commonwealth marine waters approximately 120 kilometres north-west of Karratha, WA (see Figure 1). Water depths in the survey area range from approximately 100 to 130 metres. The closest area of emergent land to the survey is North-West Island approximately 65 kilometres to the south-west. The closest land based location to the sailed seismic lines for the survey will be approximately 120 kilometres from the WA mainland. The latitude and longitude references for the Tidepole MAz 3D MSS are provided below in Table 2-1.

Table 2-1 Tidepole MAz 3D MSS Coordinates (WA GDA94)

Latitude	Longitude
-19°44'20.82"	115°51'34.74"
-19°42'45.89"	115°54'58.20"
-19°48'51.93"	115°51'32.81"
-19°47'17.30"	115°54'56.37"

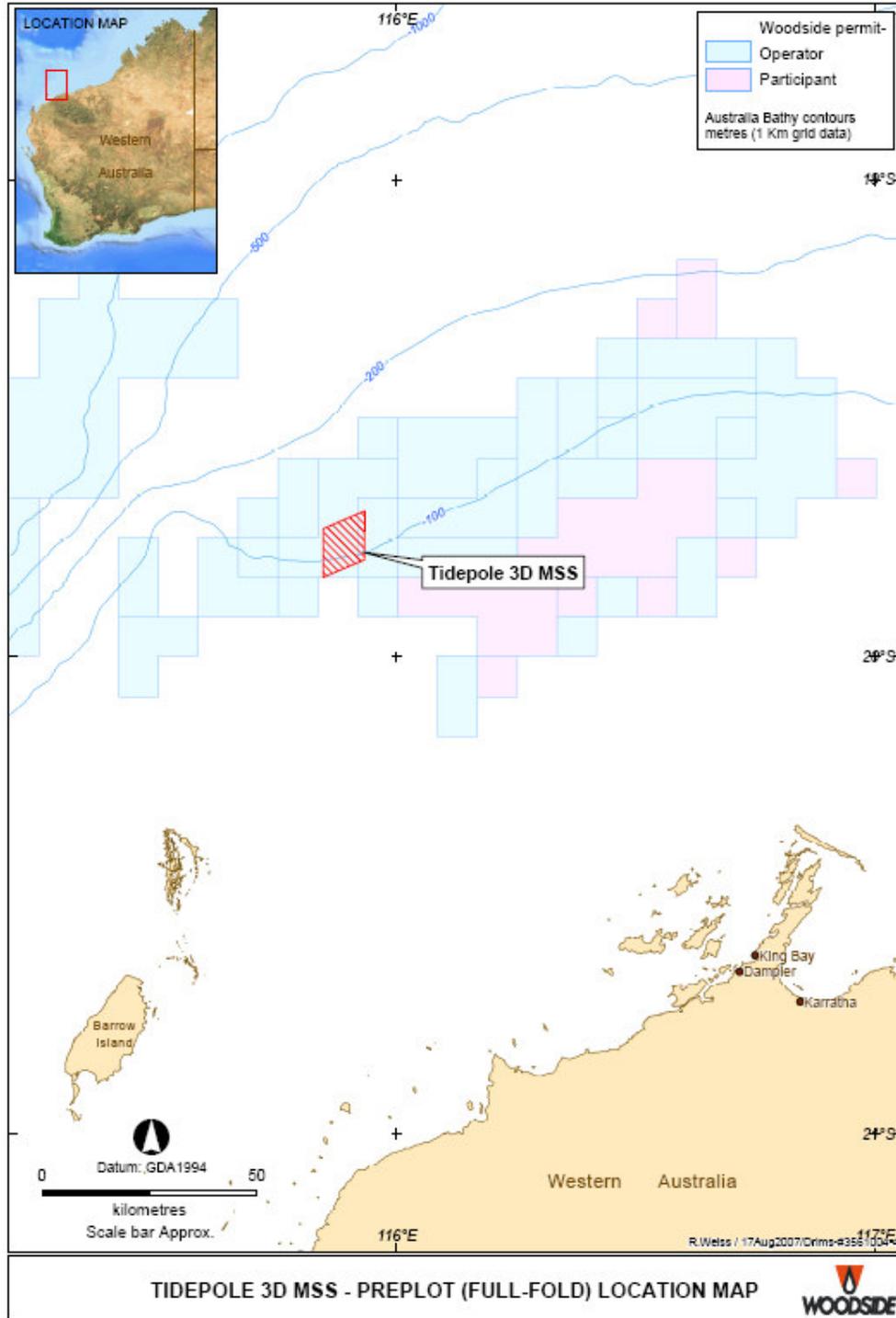


Figure 1: Location of the proposed Tidepole MAz 3D MSS in relation to the Western Australian Coastline

2.2 Proposed Operations

The survey will be conducted by a geophysical contractor, CGG Veritas Asia Pacific, using the “M/V *Veritas Voyager*” (68 metres in length). A support vessel will also aid the seismic operation, providing logistical, safety, and gear management support. The support vessel will be the OMS Voyager, a Twin Screw Offshore Supply Vessel. The OMS Voyager weighs 478 tonnes (gross tonnage) and measures 55 metres in length.

The vessel will tow four solid hydrophone streamers of up to 4.5 kilometres in length, at a depth of approximately seven metres. The streamers will be set approximately 120 metres apart, with tail buoys to identify the trailing end of each. The vessel will sail along a series of pre-determined, parallel transects, however there may be deviations from the planned lines in order to achieve full data coverage of the subsurface within the defined survey area. Such deviations may be required as a result of ocean surface currents that may push the streamers off-line from the planned transects. The areal extent of the survey shown in Figure 1 includes the area required for the survey vessel to turn from transect to transect.

Survey operations will be conducted in accordance with all relevant Commonwealth Acts and regulations, with procedures in place to govern the survey activities that involve potential environmental impacts, including cetacean interaction, refuelling operations, streamer handling and maintenance, and vessel encounters. Specific procedures will be implemented to avoid interference with cetaceans and other marine species during the seismic survey and will include those required by the *EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales (May 2007)*.

3 Receiving Environment

3.1 Physical Environment

The Tidepole MAz 3D MSS is located in offshore Commonwealth waters where water depths in the survey area range from approximately 100 to 130 metres. The seafloor of the area is smooth or slightly irregular seabed composed of hard calcarenite with a thin, intermittent cover of loose sand. The survey area lies in the tropical latitudes of the Indian Ocean where regional sea temperatures in summer range from 26 to 31 °C and in winter from 19 to 24 °C with winds during winter are predominately from the east and southeast, while westerlies prevail in summer.

The area in which the survey is to take place is situated in a subtropical region with tropical cyclone activity from November to April. The summer and winter seasons fall into the periods September to March and May to July, respectively. Weather is largely controlled by the seasonal oscillation of an anti-cyclonic belt. Winters are characterised by clear skies, fine weather and predominantly strong east to southeast winds and infrequent rain.

3.2 Ecological Environment

3.2.1 Cetaceans

A search of Department of the Environment and Water Resource's (DEW's) protected matters search tool revealed nine threatened and 15 migratory species which may occur within the proposed survey area.

Humpback whales (*Megaptera novaeangliae*) have a wide distribution, with recordings throughout Australian Antarctic waters and off all states including the Northern Territory (Bannister *et al.*, 1996). The whales migrate north and south along the eastern and western coasts of Australia from calving grounds in the tropical north to feeding grounds in the Southern Ocean. Analysis of the Department of the Environment and Water Resources whale distribution maps indicates that humpback whales migrate north through the Kimberley region during late July to early August, and south in late August to early September (DEH, 2006).

Blue whales (*Balenoptera bonaerensis*) are another cetacean species with a wide distribution. This species has been recorded throughout Australian Antarctic waters and off all states excluding the Northern Territory. Blue whales are known to feed in Antarctic waters with their diet having an almost

exclusive dependence on euphausiids, particularly krill (*Euphausia superba*) (UNEP, 2002). Their migration paths are widespread and do not clearly follow coastlines or particular oceanographic features. It is believed that calving grounds are in tropical waters, occurring in winter and peaking in May to June; however the exact breeding grounds of this species are unknown (Bannister *et al.*, 1996).

In addition to the humpback whale and blue whale, an additional six migratory marine mammal species were noted. Both Bryde's whale (*Balaenoptera edeni*) and the killer whale (*Orcinus orca*) are found in all Australian waters except the Northern Territory. The sperm whale (*Physeter macrocephalus*) is a cosmopolitan species occurring in deep water off the continental shelf (beyond 200 metres depth) with its main occurrences in WA being between Cape Leeuwin and Esperance (UNEP, 2002). The highest densities of the Antarctic Minke whale (*Balaenoptera bonaerensis*) are found in Antarctic waters during the summer feeding season. This species' winter breeding areas are thought to be relatively dispersed in open ocean areas throughout tropical and subtropical latitudes.

Although the spotted bottlenose dolphin (*Tursiops aduncus*) may travel through the proposed seismic survey area, these coastal, mainly tropical and subtropical species generally prefer shallow water depths (UNEP, 2002).

The distribution of the dugong (*Dugong dugon*) is widespread in WA waters, with scattered population pockets occurring from Shark Bay to the Kimberley coast (UNEP, 2002). It has also been sighted feeding on seagrass meadow flats at Ashmore Reef. This species is unlikely to occur in the vicinity of the proposed seismic survey area due to the distance offshore, water depths and the lack of any suitable substrate for seagrass beds, which are its primary food source. The species tends to be localised in its movements, remaining in close vicinity to seagrass beds (Marsh and Rathbun, 1990).

3.2.2 Turtles

Loggerhead turtles (*Caretta caretta*) are known to occur from Shark Bay to the southern North West Shelf. Nesting activity within WA waters occurs predominantly on beaches encompassing the Dirk Hartog Island (700 kilometres south-west) to Muiron Island (258 kilometres southwest) region (Limpus, 2004). These turtles have also been recorded basking on islands off the North West Cape and Dampier Archipelago.

The green turtle (*Chelonia mydas*) comprises seven separate breeding stocks throughout Australian waters, with WA containing the breeding populations of the North West Shelf and Ashmore Reef (approximately 1119 kilometres north of the site) (Limpus, 2004).

Although listed as occurring within the proposed seismic survey area, the leatherback turtle (*Dermochelys coriacea*) is considered unlikely to occur due to small population numbers and no confirmed breeding areas in WA (Limpus, 2004).

The WA population of hawksbill turtles (*Eretmochelys imbricata*) are predominantly concentrated on the Dampier Archipelago, being one of the largest hawksbill populations remaining in the world. Nesting mainly occurs between October and January on Rosemary Island, particularly on the north-western side of the island. It is believed that Rosemary Island may support up to 1,000 nesting females annually (Limpus, 2004). Nesting is also known to occur on the Montebello and Lowendal Islands, with sporadic to low density nesting occurring over a wider area.

Flatback turtles (*Natator depressus*) are endemic to Australia. In WA their breeding has been recorded from Exmouth, north to Cape Domett on the Kimberley Coast. Little information, however, is known regarding these populations (Limpus, 2004). Breeding in the Pilbara region occurs in summer, with several rookeries to the south-west on Barrow Island (105 kilometres), Montebello Island (72 kilometres), Thevenard Island (200 kilometres), Lowendal Islands (97 kilometres), the islands of the Dampier Archipelago and those off the Kimberley coast. This turtle species is known to feed throughout Australian continental shelf waters (Limpus, 2004).

3.2.3 Whale Sharks

Whale sharks (*Rhincodon typus*) are known to aggregate annually at Ningaloo Reef, approximately 1,000 kilometres southwest of the proposed seismic survey area. The main aggregation period is between March and July. It is thought that this aggregation occurs in response to local food availability.

3.2.4 Birds

It is possible that Southern Giant-Petrel (*Macronectes giganteus*) may fly over the proposed seismic survey area.

3.3 Socio-Economic Environment

Marine conservation areas within in the vicinity of the seismic survey area include the Ningaloo Reef Marine Park (271 kilometres southwest), Cape Range National Park (340 kilometres southwest), Barrow Island Nature Reserve (130 kilometres southwest), Great Sandy Islands Nature Reserve (126 kilometres south), Barrow Shoals Marine Management Area (95 kilometres south-west), Montebello Islands Marine Park (proposed) (68 kilometres southwest), Cape Preston Marine Management Area (115 kilometres south) and Dampier Archipelago Marine Park (proposed) (117 kilometres southeast). These areas will not be affected by the proposed actions.

Commercial fisheries within the study area are managed by the Commonwealth Australian Fisheries Management Authority. There are no commercial fisheries that potential operate in the area.

The proposed marine seismic survey area is located approximately 50 kilometres east of the nearest commercial shipping routes off the northwest Australian coastline.

3.4 Cultural Environment

A search of the Australian Heritage Database did not reveal any sites listed as National Heritage Places, within the proposed seismic survey area (Australian Heritage Council, 2007).

A search of the Department of Indigenous Affairs (DIA) Aboriginal Heritage Sites Register did not identify any indigenous heritage values within the proposed seismic survey area.

4 Major Environmental Hazards

The principal environmental risks and potential environmental effects of the proposed marine seismic survey have been determined on the basis of Woodside's previous seismic experience in the region and the generic environmental risks outlined in Swan *et al.* (1994). The principal environmental risks have been determined to be associated with noise generated by the seismic source arrays. Other environmental aspects of the marine seismic survey include:

- Operation of the vessels and towing of the airgun and streamer arrays through the survey area;
- Routine waste discharges from the survey and support vessels;
- Accidental fuel and oil spills from the survey and support vessels;
- Accidental loss of streamers, streamer fluid and associated equipment; and
- Ballast water discharge and hull bio-fouling.

In summary, the potential environmental effects associated with the above environmental aspects are:

- Acoustic disturbance to marine fauna;
- Disturbance to marine habitats;
- Marine pollution;
- Introduction of non-indigenous species;
- Interactions with fisheries; and
- Interactions with shipping.

An environmental risk analysis was conducted using the Woodside Corporate Risk Matrix to rate the major environmental hazards. There were eight key environmental risks identified, with one minor risk

and seven low risks. The minor risk identified was the potential physiological effects and disruptions to behaviour of populations identified in the area of the survey as a result of source array noise.

Woodside's environmental performance objectives, relevant standards and criteria to measure its performance are outlined in the Tidepole MAz 3D MSS Environment Plan.

5 Summary of Management Approach

Woodside's environmental management strategies and procedures to be used for the Tidepole MAz 3D MSS include responsibilities, training, reporting frameworks, mitigation and response activities and monitoring and auditing procedures. Commitments associated with these (listed in Table 1), will be used to reduce environmental risk to As Low As Reasonably Practicable (ALARP).

A series of environmental management controls will be implemented by Woodside and its survey contractors to ensure that no significant environmental effects are realised from the survey. Table 1

Table 1 details the environmental management commitments.

6 Stakeholder Consultation

Consultation has been carried out throughout the course of the preparation of the Tidepole MAz 3D MSS approvals. The following organisations, identified by Woodside as key stakeholders, have been contacted regarding the proposed seismic survey.

- Department of the Environment and Water Resources;
- Australian Fisheries Management Authority;
- Commercial fisheries potentially operating in the area; and
- Relevant Fishing Associations and Industry Councils.

A wider programme of engagement with stakeholders is in place to ensure adequate consultation. The following organisations have been identified by Woodside as key stakeholders who will be contacted regarding the seismic survey.

- Department of Industry and Resources;
- Australian Department of Foreign Affairs and Trade;
- International Maritime Organisation; and
- Australian Marine Safety Authority.

7 Contact Details

For further information about the Tidepole MAz 3D MSS please contact:

Emilio Papiccio
Principal Environmental Advisor
Woodside Energy
GPO Box D188, Perth, Western Australia, 6840
(08) 9348 5180
emilio.papiccio@woodside.com.au

Table 1: Key Management Objectives and Commitments for the Tidepole MAz 3D MSS

No	Objective	Commitments/Criteria
1)	To ensure all contractor personnel are aware of and comply with Project EP and applicable Woodside Policies and standards	<ul style="list-style-type: none"> • All Crew will undertake Woodside HS&E Inductions that will include environmental sensitivities, management procedures and commitments detailed in this EP.
2)	Minimise disruption to transient marine life (e.g. whales and turtles).	<ul style="list-style-type: none"> • Adherence to the requirements of the <i>EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales (May 2007)</i>. • Soft start procedure applied to all operations. • Whale, dolphin and porpoise sighting reports completed and returned to Woodside.
3)	Minimise disturbance to the seabed and benthic habitats.	<ul style="list-style-type: none"> • Anchoring of support vessels is minimised or avoided. • Recording and reporting of all items lost overboard. • Briefing of all project personnel on environmental sensitivities, management procedures and commitments detailed in the EP.
4)	Minimise occurrence and effects of hydrocarbon spills.	<ul style="list-style-type: none"> • No significant hydrocarbon spills. • All spills reported and cleaned up promptly and effectively. • Approved refuelling procedures are in place and followed for all vessels. • All valves and the flexible transfer hose checked for integrity prior to use. • At sea refuelling supervised by Vessel Master or nominated Officer. • Records kept of inspections and preventative maintenance. • Oil Spill Contingency Plans (OSCP) in place and followed. • Response actions to spills comply with the OSCP. • Personnel responsibilities are clearly understood and followed. • Briefing of all project personnel on environmental sensitivities, management procedures and commitments detailed in the EP.
5)	Minimise impact of chemical discharges on marine environment.	<ul style="list-style-type: none"> • Approved, low toxicity chemicals are used. • Minimise discharged volumes in accordance with ALARP principles. • Woodside and Contractor procedures followed for handling all chemicals. • Briefing of all project personnel on environmental sensitivities, management procedures and commitments detailed in the EP. • Set targets for and measure total losses for chemical use and discharges. • Design and operate equipment to prevent loss of containment.
6)	Minimise impact of routine waste discharge on marine environment.	<ul style="list-style-type: none"> • Relevant waste discharge requirements are followed. • Procedures for management and disposal of sewage in place. • Waste log maintained for sewage/ground food waste discharged overboard. • Briefing of all project personnel on environmental sensitivities, management procedures and commitments detailed in the EP.
7)	Minimise potential for introducing non-indigenous marine species	<ul style="list-style-type: none"> • All vessels contractually obliged to comply with AQIS requirements

No	Objective	Commitments/Criteria
8)	Minimise interference with commercial and traditional fishing.	<ul style="list-style-type: none"> • Functional navigational lighting in place and in use for all vessels. • No negative feedback received regarding effects of installation and construction on commercial and traditional fishing. • Adequate and timely consultation with local fishermen, fishing industry groups and management agencies, where required and in advance of actions that potentially affect these users. • Operations carried out in a manner that does not interfere with fishing to a greater extent than is necessary. • Briefing of all project personnel on environmental sensitivities, management procedures and commitments detailed in the Environment Plan.
9)	Minimise disruption to commercial fishing, shipping and recreational vessels	<ul style="list-style-type: none"> • Functional navigational lighting in place and in use. • No negative feedback received from shipping representatives or vessel masters. • Radio warnings provided to shipping. • Operations carried out in a manner that does not interfere with navigation to a greater extent than is necessary. • Radar/radio monitoring undertaken. • No collisions or incidents.

8 References

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