

ENVIRONMENT PLAN SUMMARY

This summary of the Bassett 3D Seismic Survey Environment Plan has been submitted in accordance to the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009*.

1 PROJECT DESCRIPTION

TOTAL E&P Australia proposed to undertake a 3D marine seismic survey over an area of approximately 713 km² over Permit Area WA-408-P, WA-343-P and AC/P37 with ingress into Exploration Permits AC/P36 and AC/P48 in Commonwealth waters off northern Western Australia (WA) (*Figure 1*).

Data will be acquired using arrays of airguns towed behind a specialised marine vessel, and generating acoustic pulses at regular intervals. The pulses reflected from the sub-surface geological layer boundaries, will be recorded by hydrophones which are similarly towed behind the vessel by ten streamer cables, 7km in length. The survey comment date is scheduled for the 30th September 2010 and it will take approximately 34 days to acquire the seismic data.

The survey will take place in deep water environments with water depths in the survey areas ranging from approximately 250 to 450 m.

2 COORDINATES OF THE SURVEY

The proposed 3D marine seismic survey will acquire sub-surface data within petroleum permit areas WA-408-P, WA-343-P, and AC/P 37 in the northern Browse Basin as shown by the boundary coordinates in *Table 1*. The shortest distance from the survey area to the mainland is 230 kilometres.

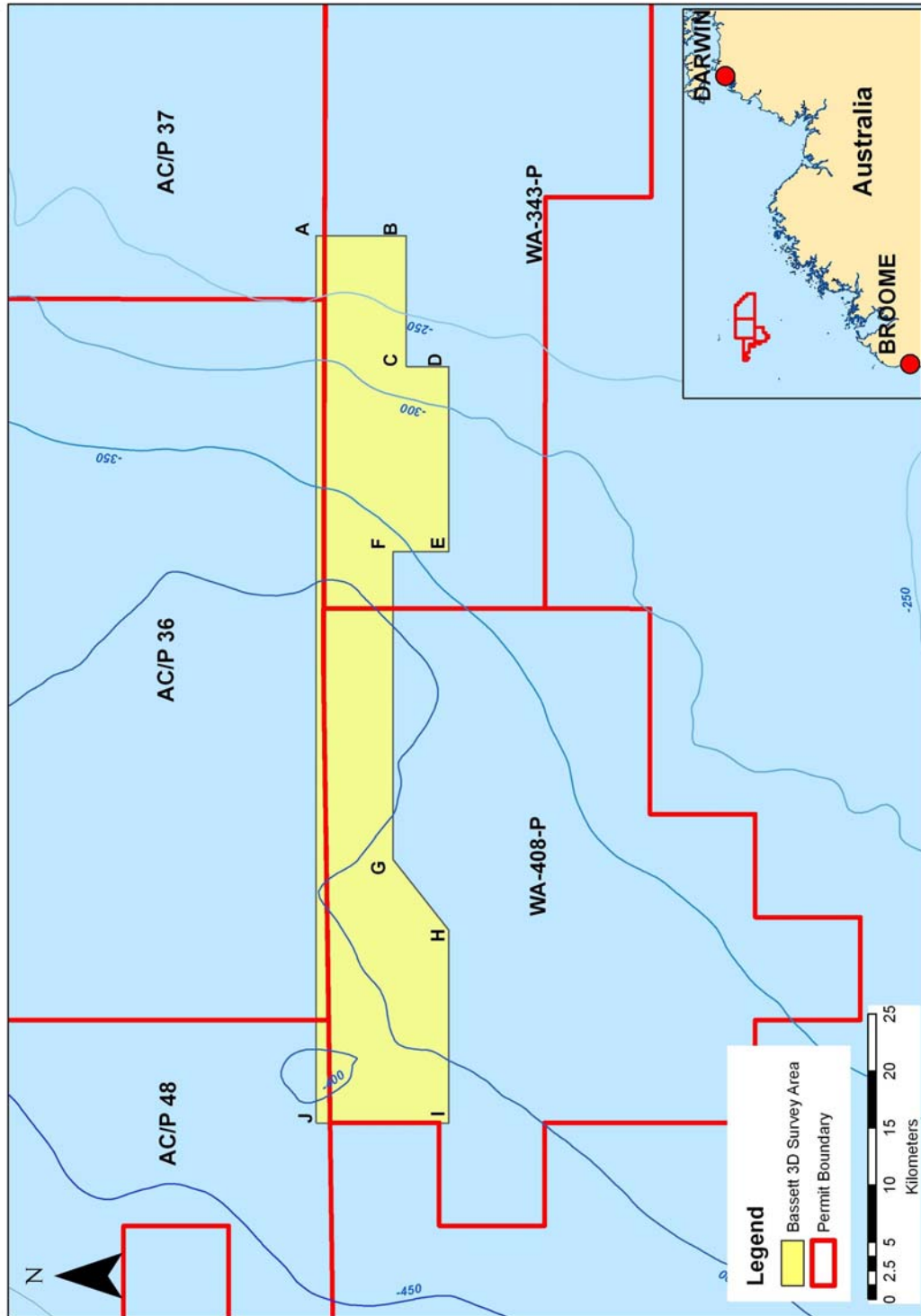
Table 1 Coordinates of Proposed 3D Bassett Seismic Survey

Point	Easting	Northing	Longitude	Latitude
A	568900	8527700	123° 38' 10"	13° 19' 02"
B	568900	8519835	123° 38' 11"	13° 23' 18"
C	557400	8519835	123° 31' 49"	13° 23' 19"
D	557400	8516100	123° 31' 49"	13° 25' 20"
E	541200	8516100	123° 22' 50"	13° 25' 21"
F	541200	8520960	123° 22' 50"	13° 22' 43"
G	514168	8520960	123° 07' 51"	13° 22' 44"
H	508000	8516100	123° 04' 26"	13° 25' 22"
I	491100	8516100	122° 55' 04"	13° 25' 22"
J	491100	8527700	122° 55' 04"	13° 19' 05"

*Datum: GDA94 - Projection: UTM Zone 51 for Easting and Northing



Figure 1 Location of the Bassett 3D Seismic Survey area and Permit areas





3 *EXISTING ENVIRONMENT*

The closest marine reserve is the Browse Island Marine Reserve (approximately 62 km south-east of the survey area). The nearest reefs are Seringapatam and Scott Reef, located between 100 km and 120 km to the south-west of the survey area.

Biological Environment

In shallower coastal waters of the continental shelf, and on reefs and shoals in less than 50 m water depth, epibenthic communities (living on the sea floor not within the sediments) are abundant and diverse. However sea floor communities in deeper waters are generally depauperate. In the general region of the survey area, at between 250 m and 450 m depth, there is little evidence of epibenthic communities. Species found in these areas include sponges, gorgonians, ascidians, echinoderms, crustaceans, bryozoans, and soft corals.

A search of the Department of Environment, Water, Heritage and the Arts (DEWHA) protected matters search tool revealed 20 Whales and Other Cetaceans species (two are listed as threatened and six are listed as migratory) which may occur in the area. The two listed threatened species are the Blue Whale (*Balaenoptera musculus*) classified as endangered and the Humpback Whale (*Megaptera novaeangliae*), classified as vulnerable.

Socio-Economic Environment

Commercial fisheries within the study area are managed by the Commonwealth Australian Fisheries Management Authority. Commercial fisheries permitted to operate in the area are:

- Southern Blue Fin Tuna Fishery;
- Western Skipjack Fishery;
- Western Tuna and Billfish Fishery; and
- North West Slope Trawl Fishery.

WA State managed commercial fisheries that are permitted to operate within the Permit areas include:

- North Demersal Scale Fishery;
- North Coast Shark Fishery; and
- Mackerel (Interim) Managed Fishery.



None of the major commercial shipping routes through the Timor Sea passes through the permit area. The major routes include ore carriers servicing terminals at Port Hedland and Karratha (Western Australia), Gove (Northern Territory) and Weipa (Cape York Peninsula) and coal carriers and container vessels departing Queensland ports for destinations in the Middle East, Europe and South Africa (LeProvost Dames & Moore 1997).

Notification to the fishing and shipping industries will be given at the commencement of the survey and all navigation legislation and regulations will be adhered to. The survey is not expected to have significant impact on these industries given the surveys' short duration and distance from shore.

4 MAJOR ENVIRONMENTAL HAZARDS

The activities associated with the seismic survey that are likely to cause potential environmental impacts include:

- operation of the seismic vessel and towing of the seismic source and streamer array through the survey area;
- emission of seismic pulses;
- routine waste discharges from the survey vessel;
- accidental fuel and oil spills from the survey vessel or associated vessels; and
- accidental loss of streamer and other equipment.

5 SUMMARY OF MANAGEMENT APPROACH

The following *Table 2* identifies the potential impacts and commitments to manage these impacts.

Table 2: Commitments to be undertaken for the Bassett Seismic Survey



Potential Impact	Commitments/Criteria
Collision of vessel with marine fauna causing death or injury to fauna	<ul style="list-style-type: none"> - EPBC Policy Statement 2.1, to be followed at all times. - A Marine Mammal Observer will be on duty at all times during the survey. - The survey is currently scheduled to occur outside the humpback whale peak migration period in the survey area (July through early September).
Collision of vessel causing pollution of sea water from a spill of fuel, oil or other hazardous material	<ul style="list-style-type: none"> - Development and implementation of procedures to deal with emergency incidents. - Vessel has a Shipboard Oil Pollution Emergency Plan (SOPEP), which outlines the actions to be taken in the event of a spill. - Spill response equipment (e.g. absorbent booms) will be stocked and maintained on the vessel in a Spill Response Kit. - Crew to be trained in clean-up equipment use and routine spill clean-up exercises.
Gas and particulate emissions from vessel engine causing a reduction in local air quality	<ul style="list-style-type: none"> - Routine maintenance and correct operation of vessel propulsion, exhaust systems, generator systems and incinerator systems.
Contribution to regional and global atmospheric pollution phenomena e.g. greenhouse effect	<ul style="list-style-type: none"> - No ozone depleting substances to be used. GHG emissions likely to be below 5000 tonnes of CO₂ equivalent for the whole survey.
Pollution of sea water with streamer fluid from streamer damage or spillage during refilling of 'streamers'	<ul style="list-style-type: none"> - Solid streamers, The filling gel used in GeoStreamers is named BUF 27. MSDS available from PGS or Total
Pollution of water with lubricants and rust inhibitors leaking from 'streamers'	<ul style="list-style-type: none"> - Application of lubricants and rust preventatives will be minimised to only that which is required to ensure streamer functionality.
Entanglement of turtles in streamers	<ul style="list-style-type: none"> - Turtle deflectors will be installed on the streamer tail buoy.
Damage to coral reef or sea floor flora and fauna from contact with streamers	<ul style="list-style-type: none"> - No coral reefs known to occur in the survey area. Inflatable devices on streamer sections.
Accidental loss of streamers and equipment resulting in reduced aesthetics and harm to marine fauna	<ul style="list-style-type: none"> - Should 'streamers' become broken or disconnected from the vessel they will be recovered where possible.
Disturbance to migration, feeding or breeding patterns of marine fauna from noise emitted by airgun (behavioural/lifecycle changes)	<ul style="list-style-type: none"> - Adherence to all requirements within the EPBC Policy Statement 2.1 - <i>'Management Guidelines for Seismic Vessels Operating in Australian Waters so as to Avoid or Minimise Interference with Whales and Certain other Large Cetaceans'</i>. - Adherence to all International Association of Geophysical Contractors (IAGC) and International Association of Oil & Gas Producers (OGP) guidelines. - Seismic activities to be shutdown if marine mammal observed within 500m radius of the survey vessel (not to commence till mammal is outside 2km radius).



ENVIRONMENT PLAN SUMMARY

Potential Impact	Commitments/Criteria
	<ul style="list-style-type: none"> - Airgun ramp up (soft start) over a 30 minute period will be conducted at beginning of line and at each line change if one exceeds 30 minutes. - Duration of survey operation to be minimised to the extent practicable. - The survey will be undertaken outside the time of the peak migration of whales (July through early September). - Specification of seismic source arrangement to maximise the proportion of energy directed downward.
Injury to marine fauna from pressure emitted by airgun (e.g. pathological damage to hearing systems or other organs in cetaceans)	<ul style="list-style-type: none"> - A system to record that ramp-up procedures are followed every time the airguns are to be fired will be implemented. - The seismic energy source used will not exceed that required to meet the objectives of the survey.
Injury or death of marine fauna due to strangulation or suffocation on plastic wastes	<ul style="list-style-type: none"> - All solid waste materials will be retained on the vessel and disposed of only at appropriate waste disposal facilities at the mainland port. Food scraps to be disposed of at sea only after maceration - Waste reception facilities to be clearly labelled and facilities to be closed or covered to prevent loss.
Changes to fauna feeding habits from scavenging food scraps from the vessel	<ul style="list-style-type: none"> - Management of all wastes in accordance with MARPOL and legal requirements. No wastes to be disposed of overboard. Properly licensed onshore contractors to be used to dispose of all solid and scheduled wastes in accordance with the legislation. - Vessel crew to be inducted and trained and information to be effectively disseminated to personnel.
Depletion of natural resources and increased contribution of waste to landfill	<ul style="list-style-type: none"> - Recyclable wastes (e.g. aluminium cans) will be segregated on the vessel and returned to the mainland port to a suitable recycling facility.
Pollution of sea water with biochemical oxygen demand (BOD), nitrogen and phosphorus from sewage waste	<ul style="list-style-type: none"> - Onboard sewage treatment is approved by the International Maritime Organisation (IMO) to be compliant with Annex IV of MARPOL (as implemented in Commonwealth waters by the <i>Commonwealth Protection of the Sea (Prevention of Pollution from Ships) Act 1983</i>).
Potential localised reduction in water quality	<ul style="list-style-type: none"> - Waste treated in accordance with MARPOL 73/78 (as implemented in Commonwealth waters by the <i>Commonwealth Protection of the Sea (Prevention of Pollution from Ships) Act 1983</i>) prior to discharge. - The use of biodegradable detergents only.
Loss of equipment overboard (particularly during rough seas) resulting in decreased aesthetics of the area and potential for leaks of	<ul style="list-style-type: none"> - All equipment will be properly secured during transit between the mainland and the survey location such that it cannot be dislodged and propelled overboard.



Potential Impact	Commitments/Criteria
hydrocarbons into sea water	- Any equipment lost overboard will be immediately retrieved by the vessel where possible or reported to the relevant authorities.
Pollution of sea water with hydrocarbons spilt during maintenance of engine and other equipment	- Only normal routine maintenance activities, as per vessel procedures, will be performed at sea. All other major vessel maintenance will be completed at a mainland port facility prior to or post survey. Oily wastes will be collected and disposed of to a registered controlled waste facility in compliance with port procedures for waste disposal. - Vessel to be equipped with appropriate containment and clean-up equipment e.g.; cable deck, storage and under streamer reel areas constructed to contain spills. - Oily waste handling systems and equipment (no oily wastes to be discharged at sea). - Compliance with MARPOL Annex I requirements (Oil Record Book, International Oil Pollution Prevention (IOPP) Certificate, slop oil tank etc) and Australian legislation.
Damage to marine organisms resulting from sea water intakes	- Installation of filters to reduce the drawing-up of marine organisms with intakes of cooling and service water.
Pollution of sea with fuel resulting from spill or overflow of fuel	- At-sea refuelling is not expected to be necessary during the survey . The <i>Ramform Explorer</i> does have refuelling at sea procedures, but these should not be required.
Use of anchor to secure vessel causing damage to reef, coral, and sea bed flora and fauna	- Except in an emergency it is not expected that the survey vessel will need to anchor at any time during the survey.
Introduction of foreign organisms	- Ballast water will not be discharged or exchanged during the survey.



6 *STAKEHOLDER CONSULTATION*

The following have been identified by TOTAL as key stakeholders for the seismic survey:

- DMP;
- DEWHA;
- Australian Fisheries Management Authority (AFMA);
- Adjoining permit holders; and
- Fishing industry representatives.

TOTAL will communicate with these stakeholders as appropriate during the lead up to, and during the survey.

7 *CONTACT DETAILS*

For further information about the Bassett 3D Seismic Survey please contact:

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