

Vampire 2D Non Exclusive Seismic Survey Environment Plan: Public Summary

This document is a summary of the Environment Plan (EP) in support of the Vampire 2D Non Exclusive Seismic Survey submitted to the Western Australian 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.

Introduction

Seabird Exploration FZ-LLC is proposing to conduct a Two Dimensional (2D) marine seismic acquisition survey known as the Vampire 2D Non Exclusive Seismic Survey located within Commonwealth waters offshore of the Kimberley coastline in north-west Western Australia (WA).

Coordinates of the Proposed Activity

The proposed Vampire 2D Seismic survey area is located in Commonwealth and International waters, west of the Kimberley coastline between Broome and the Mitchell Plateau in the north-west Western Australian coast, in water depths ranging from 10 to 4000 m Chart Datum (CD) and will cover an area of approximately 238,900 square kilometres (km²). The broad footprint for the survey is provided in **Table 1**.

Table 1 Vampire 2D Seismic Survey Bounding Coordinates

location point	Latitude			Longitude		
	degrees	minutes	seconds	degrees	minutes	seconds
1	16°	5'	0"	119°	10'	0"
2	15°	0'	0"	119°	10'	0"
3	14°	20'	0"	119°	40'	0"
4	13°	35'	0"	120°	25'	0"
5	12°	30'	0"	121°	50'	0"
6	11°	40'	0"	122°	55'	0"
7	11°	15'	0"	123°	20'	0"
8	10°	50'	0"	124°	35'	0"
9	10°	50'	0"	124°	50'	0"
10	11°	40'	0"	125°	40'	0"
11	11°	45'	0"	125°	40'	0"
12	13°	0'	0"	125°	10'	0"
13	13°	55'	0"	124°	45'	0"
14	14°	55'	0"	124°	0'	0"
15	15°	25'	0"	123°	25'	0"
16	15°	55'	0"	122°	30'	0"
17	16°	20'	0"	121°	15'	0"
18	16°	20'	0"	120°	15'	0"
19	16°	15'	0"	119°	20'	0"
20	16°	5'	0"	119°	10'	0"

Description of the Activity

The specialist seismic acquisition vessel Aquila Explorer will be engaged for the Vampire 2D Survey. Seabird Exploration FZ-LLC will be required to ensure that the survey vessel meets all AQIS requirements.

The single source deployed on the Vampire 2D will be an airgun array of 4,230 cubic inch (cu in) volume using compressed air at a pressure of 2000 pounds per square inch (psi). There will be a single passive streamer 7,950 metres (m) long detecting 636 channels of acoustic reflection data. The data will be transmitted down the streamer and recorded onboard ship on magnetic tape. The array will be towed at a depth of 6 m below surface and fired at 25 m pop intervals about every 8 seconds whilst recording a seismic line or traverse. Seismic data will be acquired for approximately 50% of the time the vessel is at sea, the remaining time being for line changes, weather standby and crew changes.

The survey lines will be acquired as a sparse, roughly orthogonal grid orientated North west –South east by South west –North east. The average line length is about 225 kilometres (km), and the grid density varies from the most sparse at about 40 km x 40 km to a still very broad 15 km x 15 km. The reflection seismic data recorded on magnetic tape will be processed later onshore.

Aquila Explorer will travel at a speed of approximately 4-5 knots (kn) through the water when surveying, and therefore the vessel and its passive trailing gear will transit over any one spot in about 40 minutes. The total personnel on-board the seismic vessel will be about 32 persons. Aquila Explorer will operate with 35 day tours of duty, between port calls, out of Broome. The vessel will take fuel, supplies, and crew changes on port calls. Offshore re-supply, re-fuelling and crew changes are not planned.

Description of the Receiving Environment

Physical Environment

The proposed survey area is located in Commonwealth and International waters, west of the Kimberley coastline between Broome and the Mitchell Plateau in the north-west WA coast, in water depths ranging from 10 to 4000 metres (m) CD and will cover an area of approximately 238,900 km².

The bounding coordinates are within the Northwest Marine Region (NWMR) which extends from Kalbarri (south of Shark Bay) north to the WA/Northern Territory (NT) border. This region is characterised by relatively shallow offshore waters, the majority less than 500 m deep. The marine environment is essentially tropical, characterised by nutrient poor saline water. Consequently, the NWMR is considered to have a lower level of primary productivity compared to other regions in Australia.

The North-west Shelf Province, the Timor Province and the North-west Shelf Transition all fall within the boundaries of the survey area. The region is bounded inshore by the outer limit of the WA State water boundary and the offshore edge of the Australian Exclusive Economic Zone (EEZ) generally 200 nautical miles (nm) from the low water mark.

A tropical monsoon climate with two distinct seasons occurs across the region. During the summer, winds from the Indian Ocean and southern Asian waters prevail, resulting in monsoonal troughs and cyclones. During the dry season, a predominantly south easterly airflow from the continent's interior brings warm, dry air.

The proposed survey area contains within its boundaries, however excludes, Scott Reef, Ashmore Reef and Browse Islands and surrounding waters. The area does not otherwise overlap any area having conservation status.

There are no major ports in or near the survey areas. The bulk iron ore export ports of Dampier (which also exports LNG) and Port Hedland are located approximately 520 km and 500 km south-east of the survey area respectively. A north-south shipping lane passes through the west of the proposed survey area, as evidenced by shipping locations reported to Australian Marine Safety Authority (AMSA). The Port of Broome will be used for port-calls.

Petroleum related seismic survey activity and exploratory drilling has been occurring in the operational area and surrounding waters for several years. Continued petroleum exploration involves mobile offshore drilling units (MODUs) and related supply vessels which frequent the areas within and surrounding the operational area as specific drilling programmes require. Three floating, production, storage and offloading facilities (FPSOs) currently operate in the proposed survey area.

Biological Environment

The proposed Vampire 2D Seismic Survey occurs in offshore waters, which contain sensitive marine organisms, that require management during the seismic acquisition, as detailed in this EP.

Marine Turtles

Worldwide, seven species of marine turtles are recognised, with six of those occurring in Australian waters. One species, the Flatback, is endemic to Australia. Up to six species may occur in waters of the Vampire 2D Survey area. All six species are listed in Schedule 1 (fauna that is rare or likely to become extinct) under the *Wildlife Conservation Act 1950* and are classified as being of National Environmental Significance (NES) under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act). Green, Hawksbill, Flatback and Leatherback Turtles are listed as Vulnerable, and Loggerhead and Olive Ridley Turtles are listed as Endangered under the EPBC Act. All turtle species are listed as Migratory under the EPBC Act. Marine turtles are also listed under the Convention for the Conservation of Migratory Species of Wild Animals and Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The International Union for the Conservation of Nature (IUCN) has assigned Critically Endangered status to Hawksbill and Leatherback Turtles, Endangered status to Green and Loggerhead Turtles and Vulnerable status to Olive Ridley Turtles. Flatback turtles are listed as Data Deficient. Loggerhead, Green and Flatback Turtles found at Roebuck Bay are also listed under the Ramsar Wetland Criterion.

Of the six species in Australian waters, the Green and Flatback Turtles appear to be the most populous and are known to nest in significant numbers in certain parts of the Kimberley region (Prince 1994). The Lacepede Islands, Ashmore Reef, Cartier Island and Scott Reef are recognised as significant nesting and interesting habitats for Green Turtles (Department of the Environment, Water, Heritage and the Arts (DEWHA) 2008). Ashmore Reef and Cartier Island are also known to support significant feeding populations (approximately 11,000 per annum) of Green, Hawksbill and Loggerhead Turtles (DEWHA 2008). It is unlikely that marine turtles nest within the survey area, however they are likely to use the benthic habitat as foraging grounds. Marine turtles are unlikely to be affected by the seismic activity given the majority of the survey depth range is outside of their typical foraging depths. Furthermore, waters surrounding Ashmore Reef, Cartier Island, Seringapatam Reef, Scott Reef Nature Reserve, Browse Island Nature Reserve and Adele Island Nature Reserve will be excluded from the survey area by a minimum 20 m exclusion buffer.

Sea snakes

Sea snakes are air-breathing reptiles, and most have shallow benthic feeding patterns. Observations would indicate that most sea snakes are found in depths rarely exceeding 30 m (Cogger 1975). Some species are known to dive deeper than this, but it can be concluded that non-pelagic species seldom, if ever, dive deeper than 100 m (Heatwole and Seymour 1975). Sea snakes have been recorded along the Kimberley coastline in large numbers. In the wider region, the offshore reefs are an important area for sea snakes. Few areas have such a diversity or abundance of sea snake species (Guinea and Whiting 2005). For example, large populations have been recorded from Ashmore Reef. Estimates in 1994 to 1998 placed the sea snake population at approximately 40,000 or 228 per km² (Guinea and Whiting 2005). Ashmore Reef is considered to be internationally significant for its abundance and diversity of sea snakes, while Scott and Seringapatam Reefs are also important areas for sea snakes. All species of sea snakes are listed under EPBC Act. The 20 m exclusion buffer surrounding Ashmore Reef, Cartier Island, Seringapatam Reef, Scott Reef Nature Reserve, Browse Island Nature Reserve and Adele Island Nature Reserve will mitigate impacts to seasnakes occurring within the project area.

Crocodiles

The Saltwater Crocodile (*Crocodylus porosus*) is a listed migratory and marine species under the EPBC Act, and has a tropical distribution that extends to the north coast of Australia inhabiting areas such as coastal waters, estuaries and freshwater lakes, inland swamps and marshes (DEWHA 2008). The Saltwater Crocodile is unlikely to be found throughout the Vampire 2D Survey area.

Marine Mammals

The relevant legislation includes the State *Wildlife Conservation Act 1950* and the Commonwealth EPBC Act. Australia is also a signatory to two relevant International agreements, the Conservation of Migratory Species Agreement and the CITES. Australia's obligations under these agreements are enacted by the EPBC Act. The EPBC Act provides a legislative framework to protect endangered, vulnerable, listed and migratory marine species. The species protected by EPBC Act are described in further detail below.

The EPBC Act and its environmental reporting tool identified 24 cetaceans and the Dugong as potentially occurring in the Vampire 2D Survey area. Of these species, the Blue Whale (*Balaenoptera musculus*) is listed as Endangered under the EPBC Act, and the Humpback Whale (*Megaptera novaeangliae*) is listed as Vulnerable.

Avifauna

Only one threatened bird species is listed as potentially occurring in the survey area, the Australian Lesser Noddy. Although the Australian Lesser Noddy may forage in the region, the nearest area of importance is the Houtman Abrolhos Islands, on which about 68,000 pairs are known to breed (DEWHA 2008). The seabirds may forage in the survey area, however are unlikely to be affected by the seismic activities given the nature of the activity and due to the seabirds mobility.

Fishes

In general, the fishes offshore of north-western Australia are typical of the Indo-Pacific region. Seas encompassing northern Australia and the tropics that lie immediately northward are inhabited by the richest fish fauna on earth (Allen 1997). Official counts are lacking, but an estimated 4,000 species occur in the region, or about 30% of the world's total marine fishes (Allen, 1997). The dominant groups across this region usually include such families as gobies, wrasses, damselfishes, groupers, moray eels, cardinalfishes, and surgeonfishes (Allen 1997) and due to the mobility of these species no key impacts to the fish populations are expected.

Other EPBC Listed Species

The family *Syngnathidae* which includes pipefish, seahorses and seadragons are mostly found in seagrass, coral reefs and mangrove habitats in tropical, subtropical and warm temperate habitats (NSWDPI 2007). A search of the EPBC database identified some 20 species as potentially being found in the survey area. However, there is no suitable habitat in the deeper waters where the seismic survey will take place.

Major Environmental Hazards and Controls

All aspects of the survey have been subjected to risk assessment, in order to evaluate the potential environmental risks and effects and characterise risk likelihood and severity of impacts of the proposed activity on the environment. Seven individual risks have been identified as listed below:

- R1. Vessel impact on other users e.g. trailing gear collision, damage to fishing gear etc.
- R2. Vessel collision or grounding leading to large diesel and/or lube oil spill
- R3. Quarantine failure
- R4. Chemical storage failure leading to spill or discharge
- R5. Waste stream disposal / handling
- R6. Acoustic disturbance to marine fauna due to seismic acquisition
- R7. Material handling error - minor oil or chemical spill

None of the seven risks have been deemed to be Major (defined as per Risk Matrix as likely to require major mitigation (including offsets) and assessment required of factors and aspects). A summary is provided in **Table 2**.

Management Approach

The environmental management approach relevant to the key risks listed above are summarised in **Table 2**.

Table 2 Risk Assessment and Proposed Management Measures

Source of Risk	Description of Potential Impacts on the Environment	Proposed Management Measures	Risk Level
R1. Physical presence of vessel-interference with other user's activities	Potential social impact on other users e.g. trailing gear collision, damage to fishing gear etc.	Advise fishing industry of expected timing, and location. Recover any lost streamer sections if practicable and report incident to DMP.	Low
R2. Physical presence of vessel-collision or grounding leading to large oil spill	Potential oiling of sea birds, fish tainting, shoreline pollution, disruption of fishing activities. Potential damage to benthic habitat. Potential disturbance of migration and breeding patterns of marine mammals, reptiles and fish.	Ship Collision Avoidance/Grounding Procedures in Place SOPEP in place Crew awareness and exercises in OS/E response Reporting of spills >80L Incident investigation & monitoring requirements Survey vessel lighting at night will be kept to the minimum required for navigation and safety purposes. Low vessel operating speed (approximately 4.5 knots) to minimise likelihood of fauna vessel interactions. Shallow reef areas (<10 m) to be avoided.	Low
R3. Quarantine failure - ballast water and hull bio-fouling	Potential to introduce exotic marine pests and/or diseases	Check AQIS requirements have been met including anti-fouling certification for previous importation of vessel into Australia Check and maintain ballast water records on vessel Ensure new equipment has cleared AQIS	Low
R4. Chemical storage failure	Toxic effects on marine life including fish, plankton, benthos, marine mammals and marine reptiles.	Secure containment areas for oils and chemicals; Focus on chemical storage as part of Searcher Seismic marine audit Use of safe liquid management procedures e.g. shore to ship fuel transfer ; 1.1.1 Use of appropriate materials, e.g. absorbents, for cleanup 1.1.2 Use of drip trays whilst decanting 1.1.3 Cleanup of spills as soon as practicable	Very Low

Source of Risk	Description of Potential Impacts on the Environment	Proposed Management Measures	Risk Level
R5. Waste Streams – poor disposal of waste (including sewage and food scraps discharge)	Increased nutrient availability increased BOD, potential toxic effects on marine life.	<p>Compliance with MARPOL and all laws and regulations. Wastes will be segregated, labelled and stored in secure areas prior to removal to the shore for appropriate disposal. Personnel will be trained to ensure compliance with the waste management requirements.</p> <p>1.1.4 Treated effluent and food scraps to be disposed in accordance with MARPOL.</p> <p>1.1.5 Dry waste will be managed to prevent contamination of the sea, e.g. skips covered.</p> <p>1.1.6 Wastes disposed to approved sites onshore</p> <p>1.1.7 Minimise quantities of waste generated</p> <p>1.1.8 Bilge water discharged via oily-water separator</p> <p>1.1.9 Oily water separator (OWS) will be inspected on Searcher Seismic audit</p>	Very Low
R6. Seismic acquisition – acoustic disturbance	Acoustic disturbance to marine fauna.	<p>Management measures will consider impacts to: fish, marine mammals and marine reptiles. Employ dedicated MMO and comply with EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales. The survey is outside main Humpback Whale migration season (commence no earlier than November 2010), and known breeding/calving areas (buffer 'no go' zones). Consultation with fishing industry Distance of permit from sensitive habitat.</p>	Medium
R7. Operational handling failure of hazardous materials	Toxic effects on marine life including fish, plankton, benthos, marine mammals and turtles if inadvertently released to sea.	<p>Areas for storage and use of chemicals and dangerous liquids to be contained. MSDSs available. Appropriate materials to be used in the event of a spill e.g. absorbents. Training of personnel in safe handling procedures. Chemical storage and handling to be a focus area of the Searcher Seismic marine audit</p>	Very Low
Boat to boat transfer of fuel to Vessel is not planned	n/a	n/a	n/a

Consultation

The following organisations have been consulted:

- Australian Fisheries Management Authority
- Australian Hydrographic Office
- Border Patrol
- Defence
- Department of Fisheries
- Northern Fishing Companies Association
- RAAF
- Raptis and Sons
- Western Australian Seafoods
- Western Australian Fishing Industry Council
- Recfishwest
- Commonwealth Fisheries Association
- Australian Southern Bluefin Tuna Industry Association
- Western Australian Northern Trawl Owners Association

To date there have not been any issues raised by fishery bodies. If there are any changes to the times and areas already provided to these groups, they will be further advised.

Contact Details

The proponent is Searcher Seismic, an Australia based company which designs, manages and markets non-exclusive seismic projects. These projects range from new 2D and Three-Dimensional (3D) survey acquisition, through to large scale 2D and 3D reprocessing projects. For further information, please contact:

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