

# Summary Environment Plan

Gardline Marine Sciences

Exmouth West 2D Marine Seismic Survey

May 2008

## Introduction

Gardline Marine Sciences Pty Ltd (Gardline) are to acquire up to approximately 5,500 line km of two dimensional (2D) marine seismic data within a proposed 2008 acreage release area west of petroleum permit areas WA-364P and WA-366P offshore Western Australia. The project is called the Exmouth West 2D Marine Seismic Survey (hereafter referred to as 'the survey'). The survey will be conducted with a specialised vessel Ocean Endeavour. Data acquisition will take approximately 45 days during the period June to August 2008.

## Coordinates of Survey

	Latitude			Longitude		
	degrees	minutes	seconds	degrees	minutes	seconds
Exmouth West 2D Marine Seismic Survey (GDA94)	20	46	21	113	1	47
	21	9	36	113	1	47
	21	9	36	110	38	11
	19	16	52	110	38	11
	19	16	52	112	12	35
	19	37	27	112	12	35
	19	37	27	113	20	8
	20	0	43	113	20	8
	20	0	43	112	23	46
	20	46	21	112	23	46
	20	46	21	113	1	47

## Receiving Environment

The Exmouth West survey area is located in a Commonwealth marine area on Australia's western continental shelf. The water depth in the survey area ranges from 970 m to 3,100m. The survey area is on the western corner of the Exmouth Plateau. Beyond the western edge of Exmouth Plateau is the Gascoyne Abyssal Plain. The sea bed is generally devoid of any small scale features such as reef build-ups and narrow canyons. The survey area is subject to the seasonal Leeuwin Current which stems from the Indonesian through flow, a system of ocean currents which drain the Pacific Ocean through the Indonesian archipelago into the Indian Ocean.

Based on a search of the Department of the Environment, Water, Heritage and the Arts (DEWHA) EPBC Act Online Protected Matters Database (DEWHA, 2008), fauna of national significance that **may be encountered** within the survey area are listed in Table 1.

Marine birds are not listed in Table 1 as they are mostly migratory, and may overfly the survey area but are highly unlikely to be impacted by the survey. There are also no seabird breeding grounds within the survey area. The nearest breeding sites are located to the south on the offshore Muiron Islands (approximately 185 km from the survey).

Of the birds that may overfly the survey area, there are two species of petrel, one of which is a migratory species whose status is threatened (one species is endangered and one species is vulnerable). There is also one species of noddy (this species is vulnerable) that may overfly the survey area.

Category	Species	Common Name	Status
Cetaceans	<i>Balaenoptera musculus</i>	Blue Whale	T, E, M, C
	<i>Eubalaena australis</i>	Southern right Whale	T, E, M, C
	<i>Megaptera novaeangliae</i>	Humpback Whale	T, V, M, C
	<i>Balaenoptera borealis</i>	Sei Whale	T, V, M, C
	<i>Balaenoptera physalus</i>	Fin Whale	T, V, M, C
	<i>Balaenoptera bonaerensis</i>	Antarctic Minke Whale, Dark-shoulder Minke Whale	M, C
	<i>Balaenoptera edeni</i>	Bryde's Whale	M, C
	<i>Orcinus orca</i>	Killer Whale	M, C
	<i>Physeter macrocephalus</i>	Sperm Whale	M, C
Other Cetaceans	<i>Balaenoptera acutorostrata</i>	Minke Whale	C
	<i>Feresa attenuata</i>	Pygmy Killer Whale	C
	<i>Globicephala macrorhynchus</i>	Short-finned Pilot Whale	C
	<i>Indopacetus pacificus</i>	Longman's Beaked Whale	C
	<i>Peponocephala electra</i>	Melon-headed Whale	C
	<i>Mesoplodon ginkgodens</i>	Ginkgo-toothed Beaked Whale	C
	<i>Kogia breviceps</i>	Pygmy Sperm Whale	C
	<i>Kogia simus</i>	Dwarf Sperm Whale	C
	<i>Mesoplodon densirostris</i>	Blainville's Beaked Whale, Dense-beaked Whale	C

Other Cetaceans (cont'd)	<i>Ziphius cavirostris</i>	Cuvier's Beaked Whale, Goose-beaked Whale	C
	<i>Pseudorca crassidens</i>	False Killer Whale	C
	<i>Delphinus delphis</i>	Common Dolphin	C
	<i>Stenella coeruleoalba</i>	Striped Dolphin	C
	<i>Stenella attenuata</i>	Spotted Dolphin	C
	<i>Lagenodelphis hosei</i>	Fraser's Dolphin	C
	<i>Steno bredanensis</i>	Rough-toothed Dolphin	C
	<i>Stenella longirostris</i>	Long-snouted Spinner Dolphin	C
	<i>Grampus griseus</i>	Risso's Dolphin	C
	<i>Tursiops truncatus s. str.</i>	Bottlenose Dolphin	C
Reptiles	<i>Chelonia mydas</i>	Green Turtle	V, L
	<i>Dermochelys coriacea</i>	Leathery Turtle, Leatherback Turtle	V, L
	<i>Natator depressus</i>	Flatback Turtle	V, L
Other Reptiles	<i>Aipysurus laevis</i>	Olive Seasnake	L
	<i>Disteira kingii</i>	Spectacled Seasnake	L
	<i>Disteira major</i>	Olive-headed Seasnake	L
	<i>Ephalophis greyi</i>	North-western Mangrove Seasnake	L
	<i>Hydrophis elegans</i>	Elegant Seasnake	L
	<i>Pelamis platurus</i>	Yellow-bellied Seasnake	L

Key: T-threatened; M-migratory; E-endangered; V-vulnerable; L-listed; C-Cetacean.

The peak migratory periods for humpback whales in the North West Shelf region are June to August for the northward leg and September to October for the southern leg (see Environment Australia, 2001), thus possibly coinciding with the beginning of the survey. The whales tend to migrate in water depths of 20m to 500m with the majority of whales within the 50 m to 200 m isobaths based on DEWHA whale sighting reports over recent years. This survey area is located in water depths between 970 m to 3,100 m, well outside whale sighting reports.

Turtles are oceanic with the exception at nesting time when they come ashore. The nesting season (depending on species) occur generally from September to March (Pendoley, 2005), therefore outside the timing of the survey. There is also no suitable habitat for turtle nesting within approximately 185 km (Muiron Islands) of the survey area.

As the migratory and threatened species are widely oceanic species, the survey is not likely to affect the movement of any of these species through the area. There are no known features that would make the area particularly attractive to these species as the conditions are widely represented on the tropical continental shelf of Australia and elsewhere in the tropics.

The nine listed species of turtle and seasnake in Table 1 are widely distributed and given the water depth and lack of suitable habitat, it is highly unlikely that these species will be impacted by the survey. The seismic survey is not likely to have any lasting effects upon any local populations of these species, and does not involve any process which threatens the species or significant populations of the species.

## Description of the Survey

Gardline Marine Sciences Pty Ltd are to acquire up to approximately 5,500 line km of 2D marine seismic data within a proposed 2008 acreage release area west of petroleum permit areas WA-364P and WA-366P. The proposed 2008 acreage release area is located well offshore of the Pilbara Coast in the Indian Ocean of northern Western Australia.

Marine seismic surveys are undertaken to map the subsurface geology of an area and enable identification of potential petroleum reservoir rocks, such as sandstones. The survey will be conducted with a specialised vessel using an acoustic source to produce acoustic pulses and hydrophone detectors to record the reflected energy impulses. Data acquisition will take approximately 45 days during the period June to August 2008, with the precise commencement and completion dates being dependent on vessel availability and weather conditions. Seismic data will be acquired for approximately 50% of the time the vessel is at sea, the remaining time will be for line changes, weather standby and crew changes.

The acoustic source will comprise one tuned airgun array, operating alternately at approximately 11-second intervals. The source generates a pressure wave pulse that travels as a seismic signal down through the geological layers where it is reflected back and recorded by hydrophones. The acoustic source will have an operating pressure of about 2000 psi and a volume of approximately 1 x 1940 cubic inches.

The survey vessel (Ocean Endeavour) will tow 1 hydrophone cable streamer, approximately 6000 m long detecting 480 channels of acoustic reflection data along pre-determined survey transects. The direction of the survey lines will facilitate data interpretation, taking into account sub surface geological features such as fault lines. The hydrophone cable streamers will travel approximately 6 to 8 m below the sea surface and be controlled by mechanical devices called 'birds' to maintain the travel depth, and prevent the equipment from making contact with the seabed. The survey lines will be acquired as a sparse grid. The average line length is about 100 km and the reflected seismic data will be recorded onboard the vessel on magnetic tape, which will be processed later onshore.

The vessel will be required to turn outside of the proposed survey areas at the completion of each transect pass, due to the required turning circle of the vessel with cables in tow and the need to obtain full seismic coverage of the survey areas. Due to the short duration of the survey, vessel refuelling is not expected to be required; however, should this change refuelling will only be performed in port.

## Environmental Hazards and Controls

Potential environmental issues associated with seismic acquisition offshore are summarized in the table below.

Potential Hazard	Mitigation/Management Measures
The physical presence of the vessel	The vessel has the potential to present a hazard to other shipping that could result in a collision but with good seamanship and operating practices this risk can be minimized. The fishing industry can also be affected through either collisions or damage to fishing gear. However, with close liaison and planning any impacts on fishing activities in the area can be minimized.
Ballast water	Ballast water has the potential to introduce exotic marine pests. As the seismic contractors are all familiar with ballast water management procedures, including mobilising into Australia from overseas, this is not considered to be an issue. In any event the proposed vessel has been working for several months in Western Australia prior to the proposed action.
Oil spills	<p>The risk of oil spillage is very small and is mostly attributable to small spills of diesel during loading operations in port. If such a spill occurs they are typically small by volume i.e. generally less than one cubic metre. Offshore fuel transfer operations are not planned.</p> <p>The seismic streamer contains low toxicity, light liquid hydrocarbons as a buoyancy fluid, the brand names are Clearco Food Grade Cable Lubricant and Isopar M Fluid (which are very similar fluids and interchangeable). If the streamer is damaged (eg from shark attack) only small releases of hydrocarbons would result as the streamers are sectioned every 100 m to 200 m. The impact will be very minor due to the small initial oil volumes released; dispersal and weathering; distance from the nearest shore; and the general water depths of 970 m to 3,100 m.</p>
Various Waste Streams	<p>The treatment and/or discharge of various waste streams and emissions will be as follows:</p> <ol style="list-style-type: none"> <li><b>Sewage and grey water</b> will be released to the ocean in accordance with MARPOL regulations. This will have only a localised impact on water quality affecting planktonic communities. It is readily biodegradable.</li> <li><b>Solid wastes, rubbish, and litter</b> will be brought ashore for disposal in authorised landfill sites.</li> <li><b>Hazardous waste</b>, if any, will be properly manifested, labelled, and stored in containers in banded areas which are separated from ordinary wastes, and will be brought ashore for disposal in accordance with local regulations.</li> <li><b>Oil and grease</b> from machine areas will be returned to shore for recycling or disposal.</li> <li><b>Deck drainage</b> will be contained on board with no drainage to the sea.</li> <li><b>Combustion products</b> from normal vessel operations only. Given the temporary nature of the operation and scale of the workforce and equipment, none of these waste streams is considered environmentally significant.</li> </ol>
Acoustic disturbance to marine fauna	<p>Acoustic disturbances arising from seismic acquisition have been shown to have a number of potential environmental impacts.</p> <p><b>Cetaceans</b></p> <p>At ranges of approximately 1.5-3 km most whales would show avoidance to the vessel (McCauley, 1994).</p>

	<p><b>Fishes</b></p> <p>Captive fishes showed a generic fish 'alarm' response of swimming faster, swimming to the bottom, tightening school structure, or all three, at an estimated 2 to 5 km from a seismic source (McCauley et al, 2000).</p> <p><b>Turtles</b></p> <p>Turtles show avoidance at 1.5 to 2.6 km ((McCauley et al, 2000).</p>
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## Management Approach

The primary goals of the implementation strategy are to direct, review and manage the operations so that environmental effects and risks are continually reduced to as low as reasonably practical, performance objectives and standards are met for the duration of the activity, and no reportable incidents occur.

The key responsibilities for Environmental Management are as follows

- The Gardline Managing Director is responsible and accountable to the Gardline Board for ensuring that appropriate resources are allocated to meet Gardline Health, Safety, Security and Environmental Protection Policy requirements; and establishing and regularly reviewing the policy.
- The Operations Geophysicist and Offshore QC Supervisor are responsible and accountable for implementing the Health, Safety, Security and Environmental Protection Policy within the operational area, through application of the Environment Plan.
- All Project personnel including Gardline personnel and third party contractors are responsible and accountable to adhering to the Environmental Policy and this Environmental Plan in all tasks that they undertake.
- The Ocean Endeavour Project Manager and Party Chief are responsible for implementing the Environmental Plan.
- The Ocean Endeavour Party Chief, the QC Supervisor and Marine Mammal Observer are responsible for implementing the Cetacean Guidelines. Responsibilities and accountabilities for each position within the Company are documented to avoid confusion over responsibilities and accountabilities.

## Consultation

The following organizations have been consulted prior to mobilisation of the vessel. To date there have not been any issues raised by the various fishery bodies listed below. If there are any changes to the times and areas already provided to these groups they will be further advised.

Organisation	Contact Details	Comments
WAFIC (Commercial Fishing)	Valerie Sheahan	No concerns
DOIR	Enzo Fable	EP submitted for approval
Department Environment, Water, Heritage and the Arts	Jennifer Pickering	EPBC Referral submitted 31 March. It is anticipated that the DEWHA decision will be 'not a controlled action'
WA Northern Trawl Owners Association	Norm Peovitis and David Carter	No comments
Australian Fisheries Management Authority	Bronwen Jones	Information provided on what organizations to advise on the activities
Commonwealth Fisheries Association	Mr Peter Franklin	No comments
TunaWest	Mr Bert Boschetti (Chair) No comments	No Comments
Northern Fishing Companies Association	Steven Valentine (Darwin Manager)	No Comments
A Raptis and Sons	Mike O'Brien	No comments

- Consultation has been undertaken and will continue through a range of media including:
- Meetings with regulators
- Meetings and correspondence with key stakeholders
- Provision of information brochures
- Invitation for public comment via EPBC referral DEH website
- Vessel communication with maritime traffic

## Contact Details

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