



Cetacean Monitoring Program
Maxima 3D Marine Seismic Survey, Scott Reef

Woodside Energy Ltd.

Rev 0
August 2007

Cetacean Monitoring Program

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Woodside Energy Ltd.
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1 Introduction

1.1 Project Description

Woodside Energy Ltd. (Woodside) propose to undertake a three-dimensional (3D) marine seismic survey (Maxima 3D Marine Seismic Survey or Maxima 3D MSS) over an area of approximately 362 km² of Scott Reef, approximately 430 km north of Broome in Western Australia. Scott Reef is comprised of two significant atolls, (South Scott Reef and North Scott Reef) and is situated in the Browse Basin offshore northern Western Australia. **Figure 1-1** details the location of Scott Reef off the Western Australian coast.

The Maxima 3D MSS will occur in Commonwealth and State (Western Australia) jurisdictions comprising Petroleum Retention Lease Areas WA30R and TR/5 respectively. Approximately 50 percent of the proposed survey lies in Commonwealth waters with the remaining 50 percent within State waters. The survey is planned to commence in September 2007, and will last for approximately 50 days. The precise duration of the survey will be dependent on weather and sea state conditions encountered.

As part of the environmental management commitments of the survey, and as a ministerial condition for the Maxima 3D MSS Woodside has committed to the development and implementation of a Cetacean Monitoring Program (CMP). The objective of the CMP is to 'gather information about the patterns of use by cetacean species of the waters around Scott Reef.' The CMP, in accordance with the Ministerial Conditions for the Maxima 3D MSS, shall include methodologies for:

- 1) Determining the seasonal abundance and locations of listed and priority cetacean species around Scott Reef for a continuous twelve month period; and
- 2) Recording cetacean sightings in a manner compatible with the National Whale and Dolphin Sightings and Strandings Database which is housed at the Australian Antarctic Division, (Hobart).

Cetacean interaction requirements during the survey are outlined in the Maxima 3D MSS Environmental Plan 2007, and as such are not described in the CMP.

Figure 1-2 details the waters around Scott Reef; the minimum area to be included in the CMP. The waters around Scott Reef, for the purposes of the CMP are defined as the Torosa (WA-30-R & TR/5) and Brecknock (WA-29-R, WA-32-R, WA-31-R) gas fields.

1.2 Outline

The scope of this document is to provide a brief background and overview of the occurrence and previous sightings for cetacean species in the Scott Reef area, followed by a discussion on the current knowledge of cetacean seasonal distribution. The approach to the CMP will then be discussed and detailed.

The CMP consists of two phases:

Phase One

is comprised of three components intended to provide further detailed information in regards to patterns of temporal and spatial abundance of cetacean species at Scott Reef.

Phase Two

is comprised of an initial peer review of the information gathered during phase one to determine the need for phase two. Phase two, to be determined by the outcomes of the peer review, may include specific dedicated vessel based cetacean surveys at Scott Reef.

Figure 1-1 Location of Scott Reef and the adjacent gas fields

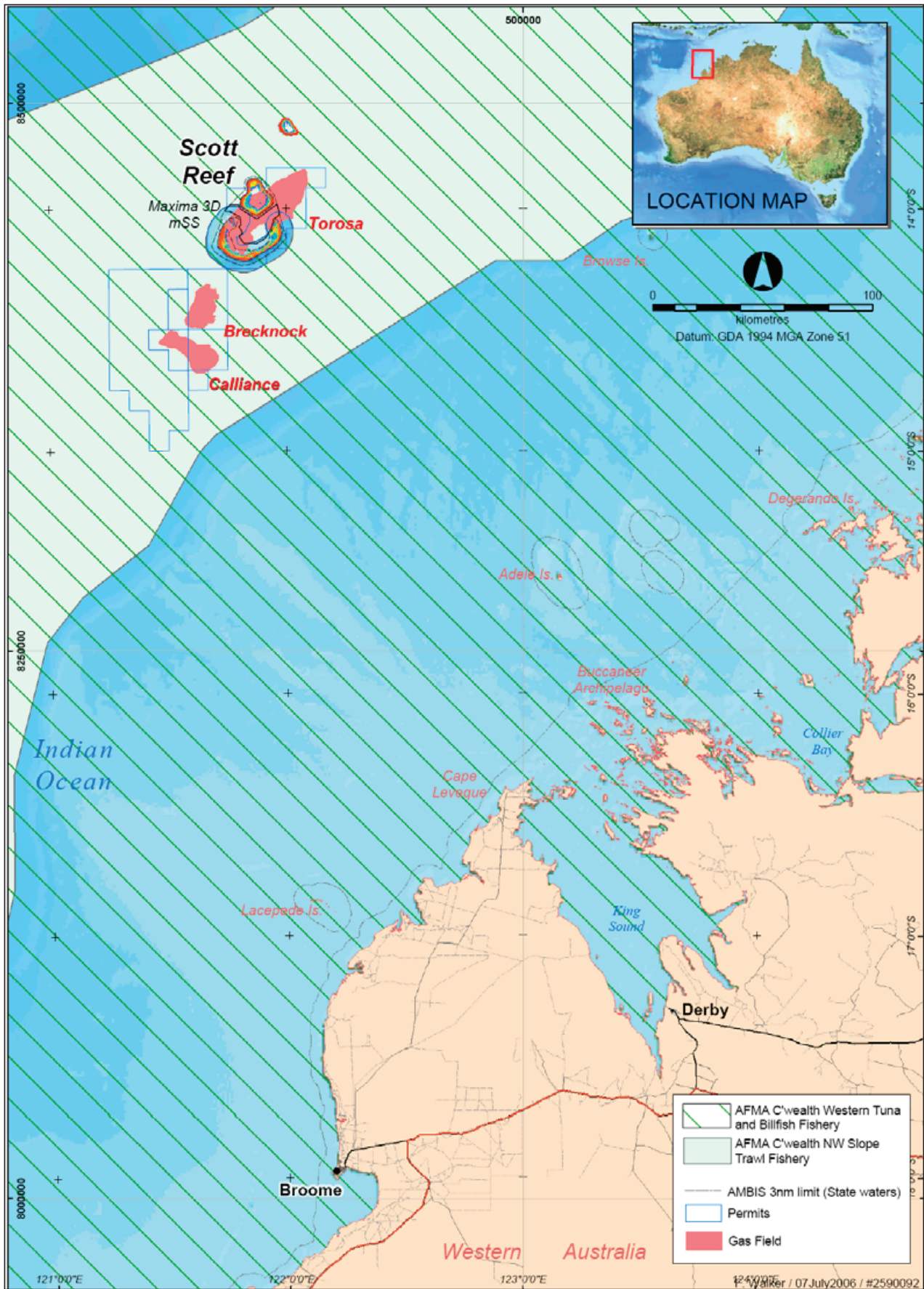
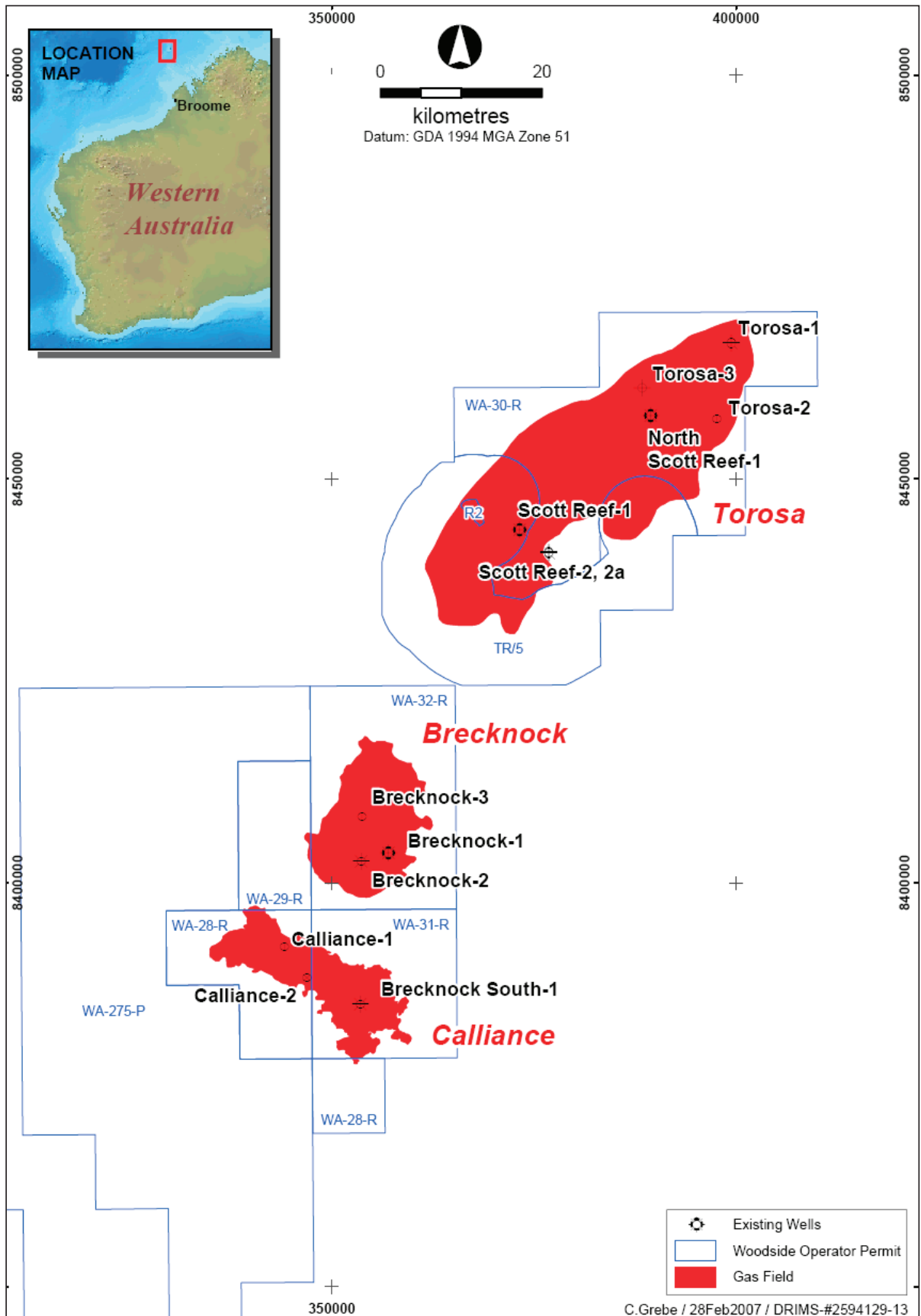


Figure 1-2 The waters around Scott Reef (Torosa, Brecknock and Calliance gas fields) – the focus area of the Cetacean Monitoring Program.



2 Background

The most common large whale species observed off the Kimberley coast in winter is the humpback whale (*Megaptera novaeangliae*). From June to mid November, the inshore waters (landward of the 100 metres isobath) between the Lacepede Islands and Camden Sound are used as a calving area for this species (Jenner *et al.*, 2001). These authors reported that peak numbers of the north-bound humpback whales approach the Kimberley coast near Quondong Point and the Lacepede Islands in mid to late July. The majority of humpbacks pass to the west of the Lacepede Islands and remain offshore until they reach Camden Sound. By mid August most migrants have ended their northern migration. When migrating south, in September, the whales parallel the coast on the 20 to 30 metre isobath, resting in areas like Pender Bay.

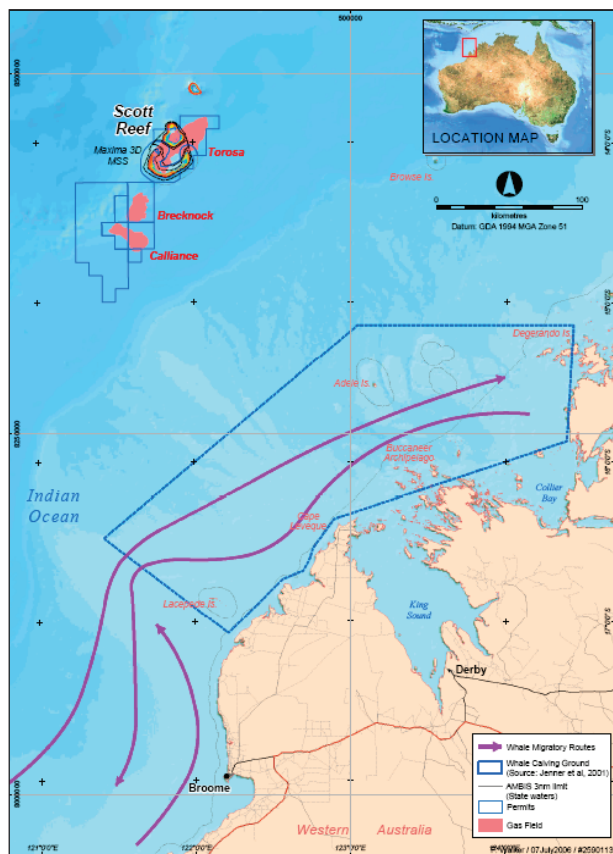
While the vast majority of both north and south-bound humpback whales appear to remain landward of the 100 metre isobath (about 300 kilometres from Scott Reef), no dedicated surveys have been undertaken to date to confirm this. Since the Jenner *et al.* (2001) spatial data is based on opportunistic coastwatch sightings, no knowledge is available regarding the extent of

the area searched, and therefore the areas without significant whale densities. To date random humpback whale sightings have been recorded near Scott Reef (for example, one adult and two calves were seen in the deep-water channel adjacent to the South Reef lagoon in October 2004; AIMS, 2004). These were the first humpback whales AIMS scientists had observed at Scott Reef in 37 expeditions since 1993. However, since the objective of their expeditions did not include whale surveys, there remains a knowledge gap as to the spatial and temporal distribution and abundance of cetaceans in the region.

According to the Centre for Whale Research (CWR) it is possible that protected species such as sperm (*Physeter macrocephalus*), blue (*Balaenoptera musculus sp.*) and beaked whales (Ziphiids and Mesoplodonts) may also occur in the Scott Reef area at certain times of the year (Curt Jenner, CWR, pers. comm.). Large numbers of spinner dolphins (*Stenella longirostris*) have been observed on a number of expeditions (AIMS, 2004). Birding WA field trips have identified Blainvilles beaked whales (*Mesoplodon densirostris*) during a trip to Scott Reef in November, 1999 and Mustoe (field trip report, October 2004) reports a sighting of 5 brick red unidentified cetaceans "with pale head markings and an indented blowhole but no raised jaw-line and no wholly pale melon (ruling out Longman's Beaked Whales)". Mustoe argues that they were also too large for tropical mesoplodonts such as Blainville's so through a process of elimination the animals were considered probable Cuvier's beaked whales (*Ziphius cavirostris*).

Whilst it is known that sperm and blue whales undertake extensive migrations, there is a lack of regional data that would help predict when they are most likely to be present in the Scott Reef area. However, it is generally accepted that blue whales, and blue whale subspecies, appear to breed during winter in warm open seas at relatively low latitudes (they do not gather in coastal areas) before migrating to colder water summer feeding areas in higher latitudes (Branch *et al.*, 2007). Thus, it is possible blue whales may move into or through the Scott Reef area between May and October. In the case of sperm whales, adult males move north from high latitudes in the Southern Ocean in late winter and spring to join breeding female groups that remain in temperate or tropical waters year round (Bannister *et al.*, 1996, Bryden *et al.*, 1998). The females and immature males are assumed to undertake a similar seasonal north/south migration, but of a lesser geographic extent than the males. Consistent with a winter to summer southern migration, Jenner and Jenner (2002) report pods of southbound sperm whales past North West Cape, Western Australia, during the months of September, October and November, making the winter months preceding these as a possible period of use in the Scott Reef area.

Figure 2-1 Migration Routes and Calving Areas for Humpback Whales



Whilst the extent of sperm whale calving and breeding grounds are undescribed at present, the possibility that one or more groups of sperm whales may be encountered in the Scott Reef area between April-September should not be discounted. Sperm whales world wide have been found near similar oceanic sea mounts such as the Galapagos Islands and the Canary Islands or near dramatic bathymetric profiles such as exist near Kaikoura, New Zealand. These same types of habitats have been shown to be feeding areas for species such as beaked whales, pilot whales and various oceanic dolphins.

2.1 Cetacean Species Occurring in the Scott Reef Area

Table 2-1 provides a list of threatened and migratory cetacean species and specially protected cetacean species potentially occurring in the vicinity of Scott Reef. **Table 2-2** provides a list of other cetacean species potentially occurring in the vicinity of Scott Reef. All species will be considered in the CMP.

Table 2-1 Listed Threatened and Migratory Species and Specially Protected Cetacean Species Potentially Occurring in the Vicinity of Scott Reef

Common Name	Scientific Name	Distribution and Habitat	Threatened Species Status (EPBC Act)	Listed Migratory Species (EPBC Act)	Specially Protected Fauna (WA Wildlife Conservation Act)
WHALES					
Blue whale	<i>Balaenoptera musculus spp.</i>	Open ocean, worldwide distribution. Considered endangered, and includes the pygmy subspecies <i>B. m. brevicauda</i> . They migrate seasonally	Endangered	Yes	Yes
Humpback whale	<i>Megaptera novaeangliae</i>	Very common in nearshore areas of the Pilbara and south Kimberley coasts from June-October. Calving occurs in Camden Sound, which also marks the northern end point for the winter migrants of the west coast stock	Vulnerable	Yes	Yes
Minke whale	<i>Balaenoptera acutorostrata</i>	The dwarf form may be more common in Australian tropical waters	Vulnerable	Yes	Yes
Bryde's whale	<i>Balaenoptera edeni</i>	Found in most warm water areas	Vulnerable	Yes	Yes
Killer whale	<i>Orcinus orca</i>	Worldwide distribution but uncommon in Australia's tropical waters	No	Yes	No
Sperm whale	<i>Physeter macrocephalus</i>	World-wide distribution. Often feeds in warmer equatorial waters in summer, so less likely to be present in the Scott Reef area after April.	No	Yes	No
DOLPHINS					
Fraser's dolphin	<i>Lagenodelphis hosei</i>	Found in low latitudes in all three major ocean basins. Distribution in south-west Indian Ocean may be localised. Most records from between 30°N and 30°S. Records outside low latitudes may represent vagrants	No	Yes	No
Spotted dolphin	<i>Stenella attenuate</i>	Wide occurrence in northern waters	No	Yes	No
Spinner dolphin	<i>Stenella longirostris</i>	Often in large groups. Tropical and warm waters	No	Yes	No
Bottlenose dolphin	<i>Tursops truncatus and T. aduncus</i>	Wide Distribution. Common	No	Yes	No

Table 2-2 Other Cetaceans Potentially Occurring in the Vicinity of Scott Reef

Common Name	Scientific Name	Distribution and Habitat	Threatened Species Status (EPBC Act)	Listed Migratory Species (EPBC Act)	Specially Protected Fauna (WA Wildlife Conservation Act)
WHALES					
False killer whale	<i>Feresa attenuata</i>	Common, including Australian tropical waters	No	No	No
Short-finned pilot whale	<i>Globicephala macrorhynchus</i>	Common in Australia's tropical waters, likely to be present all year round.	No	No	No
Melon headed whale	<i>Peponocephala electra</i>	Present in warm water areas	No	No	No
DOLPHINS					
Striped dolphin	<i>Stenella coeruleoalba</i>	Often in large groups. Tropical and warm waters	No	No	No
Risso's dolphin	<i>Grampus griseus</i>	Most tropical and temperate waters	No	No	No
Rough toothed dolphin	<i>Steno bredanensis</i>	Wide distribution in the tropics	No	No	No
Common dolphin	<i>Delphinus delphis</i>	Wide distribution. Common	No	No	No
Indo-pacific humpback dolphin	<i>Sousa chenensis</i>	Most commonly found in inshore tropical waters	No	No	No

3 The Cetacean Monitoring Program

3.1 Overview

The approach to cetacean monitoring in the Scott Reef area poses a number of significant issues. These primarily revolve around the location of the reef, its distance off the coast and the logistics required for undertaking dedicated aerial or vessel based cetacean surveys. However, an initial effort, based on the limited temporal and spatial profiles for key species identified in the preceding background, must be made in order to determine seasonal patterns of any cetaceans that may utilise the area. This has led to the development of a two phase approach to the monitoring program. Phase one is a broad and strategic approach to determining spatial and temporal patterns of any cetacean species that may be present in the area, so that a more comprehensive assessment of seasonal abundance and location of listed and priority cetacean species around Scott reef over a 12 month period can be determined in Phase two.

3.2 Phase One

Phase one consists of three components (summarised in **Table 3-1**) that will provide distinct data sets relating to cetacean occurrence. When combined and analysed, these data sets will provide an initial indication of likely seasonal distribution and abundance patterns of cetacean species at Scott Reef.

The outcomes and clarity provided by the results of Phase one will provide the necessary information to direct the need for and scale of Phase two. Phase two may include dedicated vessel based cetacean surveys directed by seasonal occurrence patterns determined through Phase one. Phase two may also include further satellite imagery analysis.

3.2.1 Component 1 – Noise Loggers

3.2.1.1 Objective

The objectives of this component are to: 1) strategically place noise loggers in the Scott Reef area to record, over a temporal scale, cetacean noise occurrence at Scott Reef (covering a minimum of a 12 month period), and 2) to identify patterns of seasonal presence and movement of cetaceans around Scott Reef. This information will compliment the information collected by other components and help build a picture of seasonal occurrence and abundance of listed cetacean species.

3.2.1.2 Recording of Data

Associate Professor Rob McCauley from the Centre for Marine Sciences and Technology (CMST), Curtin University, has been engaged by Woodside to deploy and retrieve noise loggers and analyse data recorded. A total of six loggers have been deployed in the vicinity of Scott Reef **Table 3-2** details the deployment and location details of these noise loggers. **Figure 3-1** details geographic location of these noise loggers. To date noise logger #1 has been retrieved. Please see **Appendix B** for a summary of the data from this noise logger.

Loggers set inside Scott Reef have an 80 Gigabyte recording capacity and take 500 second samples, at an interval of every 900 seconds. Loggers outside the Scott Reef lagoons will record 200 second samples at 900 second intervals. Noise recordings are taken until the hardware disk capacity is filled. This typically occurs within approximately seven to eight months.

Table 3-1 Phase One Components - Overview

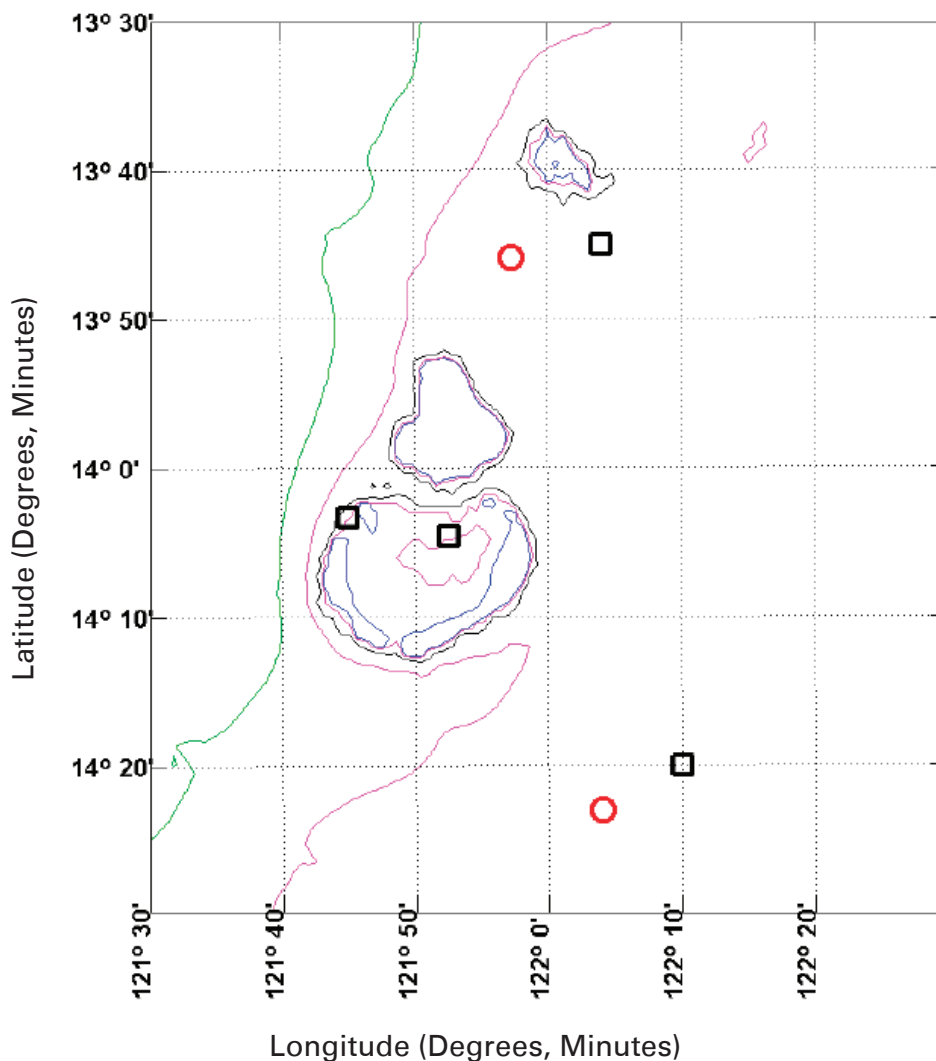
Component 1	Noise Loggers Noise loggers will be strategically placed around the Scott Reef area to record cetacean noise occurrence over time.
Component 2	Primary Productivity Sensing Sites in the Scott Reef area that may be favourable for stimulation of primary trophic production levels will be systematically searched for using remote sensing telemetry.
Component 3	Capacity building tools A training programme is to be established for crews of vessels contracted by Woodside to work in the Scott Reef area to improve opportunistic vessel based cetacean observations and recordings. Recordings will be made in a manner compatible with the National Whale and Dolphin Sightings and Strandings Database.
Additional information opportunity	Data sharing Woodside and Inpex are currently preparing a data sharing agreement to exchange cetacean data.

Table 3-2 Deployment and location details of Noise Loggers in the Vicinity of Scott Reef

Noise Logger #	Within Scott Reef	Mooring Logger	Latitude/ Longitude	Deployment Date	Expected Disk Fill Date
1	No	South-1	14°23.016' / 122°04.006'	5th September 2006	¹ 30th April 2007
2	No	North-1	13°45.873' / 121°57.222'	5th September 2006	² 30th April 2007
3	No	South-2	14°20.001' / 122°10.001'	14th June 2007	16th February 2008
4	No	North-2	13°45.003' / 122°04.000'	14th June 2007	16th February 2008
5	Yes	East	Easting 370931 Northing 8452861	14th June 2007	4th January 2008
6	Yes	West	Easting 362326 Northing 8447607	14th June 2007	4th January 2008

Figure 3-1 Location of all noise loggers within the Scott Reef area

Circles are noise loggers deployed in September 2006. Squares are noise loggers deployed in June 2007.



1 Retrieved on the 14th of June 2007

2 Due to be retrieved by December 2007

The timing of each noise event recorded is determined by clocks on each logger. These are synchronised to Global Positioning System (GPS) hardware prior to deployment. **Figure 3-2** provides an indication of preliminary results and the output of the noise logger recordings.

3.2.1.3 Analysis of noise logger data

Results from the noise loggers will be analysed by the CMST and results published in a stand alone technical report. The presence of cetaceans on a few occasions has already been identified from the preliminary results. (See **Appendix B**).

Analysis of the remaining loggers may determine the requirement for the deployment of additional loggers.

3.2.2 Component 2 – Primary Productivity Sensing

3.2.2.1 Objective

The objective of this component is to describe sites in the Scott Reef study area that may be favourable for stimulation of primary productivity, which has been trophically linked to whale abundance (Croll *et al.* 2005, Gill 2002). Historical telemetry records will be systematically searched across the study area to detect surface patterns. Analysis will determine historical monthly changes in water temperature, ocean currents, chlorophyll and other water quality parameters in surface waters in the area surrounding Scott Reef. Changes in surface water quality parameters can provide an indication of trophic changes within the broader marine ecosystem. An increase in productivity may result in a trophic trigger attracting cetaceans to Scott Reef on a seasonal / annual basis.

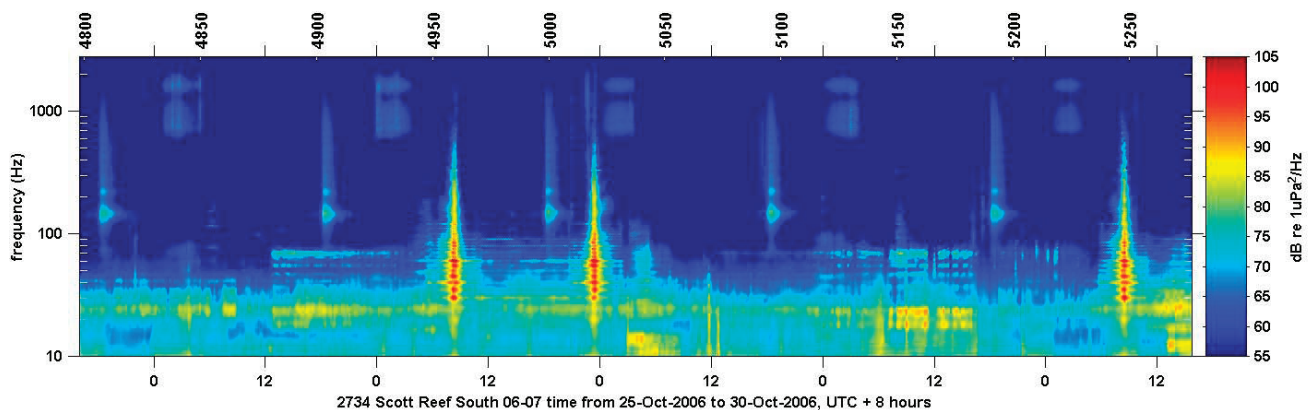
3.2.2.2 Remote Sensing Data

Woodside has an existing research framework with CSIRO to provide information captured by a number of satellites that CSIRO has direct access to and already provides interpretation and analysis services to clients within Australia. Satellites include NASA's Modis sensor on the Aqua Platform (EOS PM), a moderate Resolution Imaging Spectroradiometer, and European Space Agency's (ESA) Meris sensor on the Envisat Satellite, a programmable medium-spectral resolution, imaging spectrometer.

Modis Aqua (EOS PM) launched in 2002 is a NASA Earth Science satellite mission named for the large amount of information that the mission will be collecting in regards to the Earth's water cycle, including evaporation from the oceans, water vapor in the atmosphere, clouds, precipitation, soil moisture, sea ice, land ice, and snow cover on the land and ice. Additional variables also being measured by Aqua include radiative energy fluxes, aerosols, phytoplankton and dissolved organic matter in the oceans, and air, land, and water temperatures (NASA 2007).

Woodside will commission CSIRO to analyse historical data acquired from both Modis Aqua (EOS PM) and Terra on a monthly basis (based on averages of daily images that have removed redundant cloud cover imagery) and selected ESA Meris imagery. Modis Terra is available back to 1999, and 2002 for Modis Aqua and ESA Meris. Initial studies will focus on the time period 2004 to end of 2007. This will provide data over a continuous 48 month period (or four continuous periods of twelve months) with a potential follow up of an additional 12 month period if required.

Figure 3-2 An example of noise capture and preliminary results from a noise logger deployed 10nm south east of Scott reef in September 2006, showing three obvious peaks in sound frequency indicating passing vessels.



If upwellings and potential cetacean congregation sites are not readily identifiable from this Phase one activity despite sightings of cetaceans, Phase two vessel surveys for vertical profiling and acoustic mapping may be undertaken as well as analysis of other potential correlates such as the southern oscillation index.

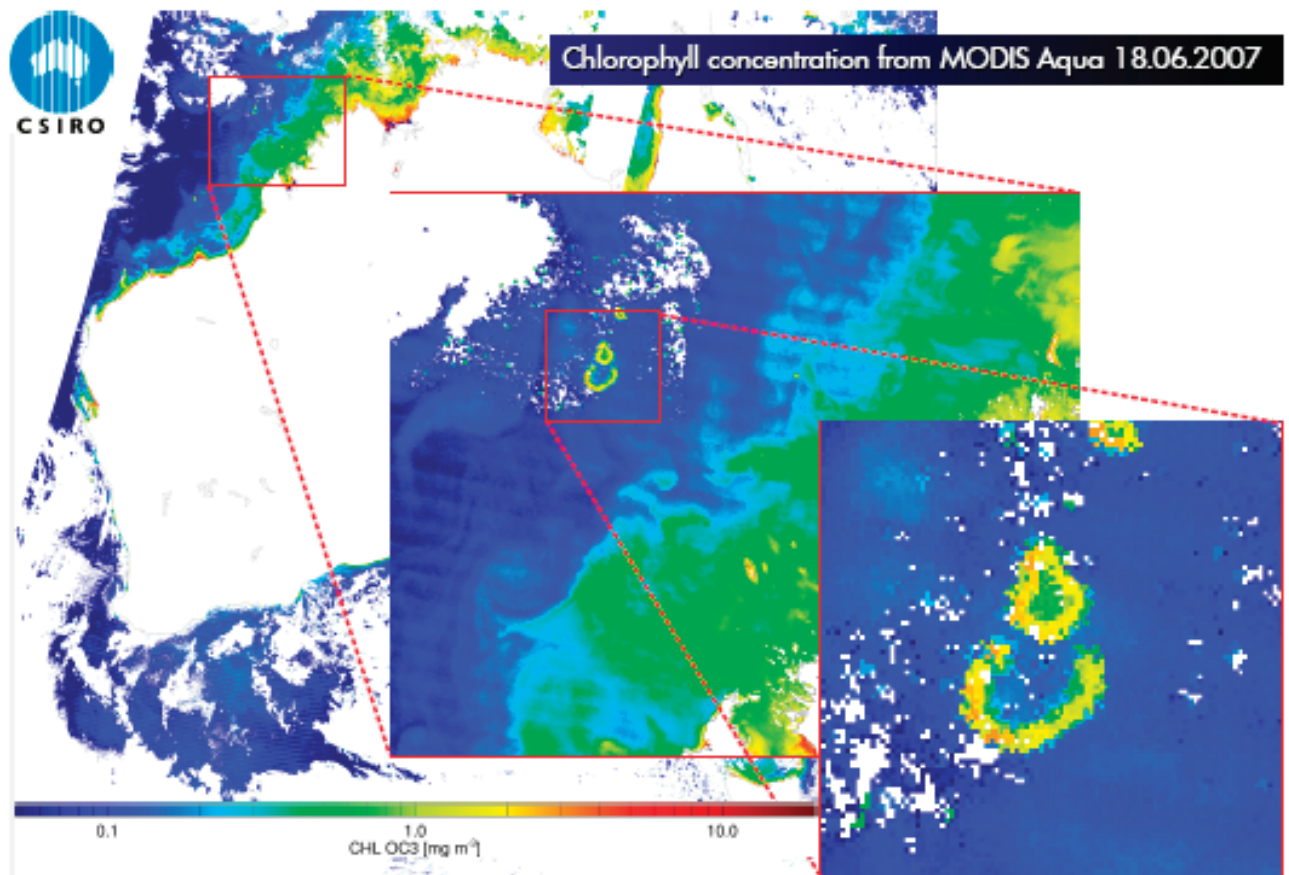
Figure 3-3 provides, as an example, an indication of chlorophyll concentrations interpreted from data retrieved from Modis Aqua in June 2007.

3.2.3 Component 3 – Improved Opportunistic Cetacean Observations and the Recording of Sightings Through the Development of Capacity Building Tools

3.2.3.1 Objective

The objective of this component is to improve the accuracy of whale sightings, identification and recordings by boat-based personnel within the Scott Reef area on an opportunistic basis (that is, not specific vessel based cetacean monitoring surveys). This component has been developed in recognition of the anticipated increase in vessels working in the Scott Reef area due to the Woodside Browse field development appraisal and feasibility studies.

Figure 3-3 CSIRO interpreted *Modis Aqua* data highlighting Chlorophyll concentrations at Scott Reef from 18.06.2007



3.2.3.2 Capacity building material

Chris Burton, director of Western Whale Research has been engaged by Woodside to develop capacity building material to improve cetacean identification and the recording of sightings. The material will consist of a waterproof A3 book containing various published cetacean identification posters and other relevant information. Further information in regards to the capacity building material is detailed in **Appendix C**. Training of boat-based Woodside personnel will also occur.

3.2.3.3 Recording of cetaceans sightings

In accordance with the Ministerial conditions, all cetacean sightings associated with the Maxima 3D survey and the CMP will be recorded in a manner compatible with the National Whale and Dolphin Sightings and Strandings Database (NWDSSD) housed at the Australian Antarctic Division. The NWDSSD has been in existence for a number of years and has a number of limiting aspects to its current design. These primarily relate to the lower level of detail required for sighting records. Dr Nick Gales and Catriona Johnson from the Commonwealth Department of the Environment and Water Resources (DEW) – Australian Antarctic Division (AAD) were contacted to discuss the limitations of the NWDSSD and progress of the new Cetacean Sightings and Strandings Database (CSSD). Catriona Johnson is currently based at the AAD to develop the CSSD, and had advised that the new CSSD will supersede the NWDSSD in the near future. DEW has provided the new reporting form for the CSSD (**Appendix A**).

The Capacity Building material will also include a “how to” guide, to provide further clarity on how to accurately record sightings and provide records. The guide will be based on the use of the new CSSD recording form provided by DEW. Records of sightings will be sent to the DEW – AAD for input into the new CSSD database. Records will also be sent to Woodside to feed into progress reporting of Phase one.

The capacity building material will be developed in a manner such that they can be easily reproduced for future use at Scott Reef and other Woodside and petroleum industry activities.

3.3 Reporting and Review of Phase One Components

Reporting against the progress of all three components of Phase one will be undertaken every six months. Reports will be made available to relevant government departments (WA Department of Environment and Conservation and the DEW – AAD). The first six-monthly report is due to be completed by the end of February 2008, the second, August 2008.

An independent review of Phase one and its three components will occur by the 31st of December 2008. Feeding into this review will be at least four full years (48 consecutive months) of either historical data interpretation and analysis or eighteen months of future data collection. Any clear pattern of seasonal occurrence and location of cetaceans at Scott Reef should be determined within this time-frame. The independent reviewer will be tasked with providing an independent perspective of whether:

- Dedicated, temporally strategic, vessel based surveys would be regarded as useful to further clarify the seasonal occurrence of listed and priority cetacean species around Scott Reef during all 12 months of the year;
- The three components of Phase one should continue to allow for the capture of another full year of data before providing a position on whether Phase two should commence or is required; and
- The approach used in Phase one has been sufficient to provide an overall picture of seasonal abundance and locations of listed and priority cetacean species around Scott Reef during all 12 months of the year.

The outcome of the independent review of Phase one of the Cetacean monitoring program will define the need for Phase two.

3.4 Conclusion

The two-Phase CMP approach as outlined in this document is the commencement of a longer term cetacean monitoring commitment at Scott Reef by Woodside as the Browse permit area moves towards further development.

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Appendix A - The New Cetacean Sighting and Strandings Database recording form provided by the Department of the Environment and Water Resources

Cetacean Sighting Report - Seismic										Report Number	
Observation Date			Local Time of First Sighting				Survey Name				
Vessel			Seismic Line and SP number								
Species			Confidence level of Identification				Certain / Probable / Possible				
Total Number			Number of Adults				Number of Calves				
Length of Largest			Length of Smallest				Observation Method			Eye / Binoculars	
Sighting Cue			Breach / Blow / Splash / Other								
Beaufort Sea State (circle or highlight as appropriate)			0-----1-----2-----3-----4-----5-----6-----7-----8-----9-----10								
Water Depth			Calm			Gentle Breeze			Strong Breeze		Strong Gale
Water Temp (oC)			Flat			White Caps Small Waves			Large Wave		High Waves Dense Foam
Weather			Sun / Rain / Fog / Overcast				Wind Direction				
Cloud Cover			/ 8				Visibility (km)				
ALL LOCATION DATA IS TO BE WGS84 DATUM											
Sightings	Observation Time	Vessel	Latitude	Vessel Longitude	Vessel Heading	Distance to Cetaceans	Bearing to Cetaceans	Cetacean Heading	Cetacean Movement	Gun Status Code	Mitigation Code
FIRST											
CLOSEST											
FINAL											
Movement	ST = swim to SW = swim away SP = swim parallel FL = fleeing MI = milling NO = no movement UN = unknown OT = other movement										
Gun Status	LPILT = low powerline turn LPISS % = low power/soft start (% guns in use) FP = full power NG = no guns NGILT = no gunline turn NGISD = no guns/shut down NGITech = no guns/tech issue										
Mitigation	MON = monitor situation PD = power down I to low MON/SD = monitor/shut down/excluded zone MON/PD = monitor/power down/excluded zone SD = shut down NA = no action DLS = delayed line start										
Draw shape and features of cetacean(s) Indicate size/shape of dorsal fin, head, blow, fluke and distinctive scars or colour patterns.						Show the path travelled by both vessel and cetacean(s) Include relative bearings and distances and any specific course changes by vessel and cetacean(s):					
						Bearing _____ 					
Behaviour of Cetacean(s) during observation period (include any change in general behavior)											
Swimming Flipper Slapping Dive Dive with Fluke Spy Hopping Milling Blow Breaching Bow Ride Feeding Other (describe)											
Description of vessel activity prior to and after sighting :											
RU = Ramp up LS = Line shooting BL = Between line shooting ST = Seismic testing SZ = Guns shut down as cetacean in Safety Zone SD = Guns shut down for repairs or between lines OT = Other											
Observer's Name			email								
Observer's Function			Dedicated Observer / Marine Crew / Seismic Crew				Phone				
Signature			CLIENT USE ONLY								

Appendix B - "Sea Noise Logger Deployment 2006-2007 Scott Reef – data summary" – Abstract

A sea noise logger (# 1) set 27 km SE of Scott Reef in 358 m of water operated over September 2006 to April 2007. A preliminary appraisal of the data set has been made. The noise logger detected: humpback whales; minke whales; pygmy blue whales; several regular daily fish choruses and unknown sources of great whales and fish. Comparatively low numbers of humpbacks singers were heard up until late September 2006, suggesting low humpback visitation around Scott Reef. Signals which are believed to be produced by the Antarctic sub species of the minke whale were detected in early October 2006. We believe the dwarf minke whale signals will be present in the data set. A comparatively low number of pygmy blue whale detections were made in late October 2006 into December 2006. Based on comparative data from a logger set 145 kilometres ENE over the same time frame at least one pygmy blue whale appeared to be meandering over a wide area, possibly searching for prey. The timing of pygmy blue signals agrees with sea noise data from off Exmouth, which suggests a southern pulse of animals down the west coast in October to December. Pygmy blue whale call detection rates were comparatively low, suggesting small numbers of animals passing through the area. Two regular daily fish choruses were heard. One chorus, believed produced by reef associated zoo-planktivorous fishes, peaked in the early morning and displayed short and seasonal temporal patterns. A second lower frequency chorus was remarkably stable in its behaviour, peaking after dusk and dying off around two hours post dusk with little seasonal variation.

McCauley, R (2007) "Sea Noise Logger Deployment 2006 – 2007 Scott Reef – data summary". Centre for Marine Science and Technology (CMST), Curtin University, GPO Box U 1987 Perth 6845, WA

Appendix C - Further detailed information on capacity building material

Reference materials for SKM-Woodside Capacity Building information kit.

Supplied by Chris Burton, Western Whale Research. September 2007.

The details of each item included in the information kit are as follows:

Poster:

Whales and Dolphins the World's Cetacea. A reference guide to whales and dolphins of the world. Pieter Arend Folkens and The Centre for Dolphin Studies, South Africa. 2001 Korck Publishing.

Foldout:

Whales and Dolphins the World's Cetacea. A reference guide to whales and dolphins of the world. Pieter Arend Folkens and The Centre for Dolphin Studies, South Africa. 2001 Korck Publishing.

Field guide book:

Guide to Marine Mammals of the World. 2002. Reeves, R.R., Stewart, B.S., Clapham, P.J. and Powell, J.A. National Audubon Society. Illustrated by Pieter Folkens. 528pp. Published by Alfred A Knopf, Inc.

Interactive CD-ROM Identification guide:

Search Australian Whales and Dolphins. 2004. Simon Mustoe and Graham Ross. Version 1. Production by Australian Petroleum Production Exploration Association and AES Applied Ecology Solutions Pty Ltd.