

NORTH-WEST AUSTRALIA 4D MARINE SEISMIC SURVEY

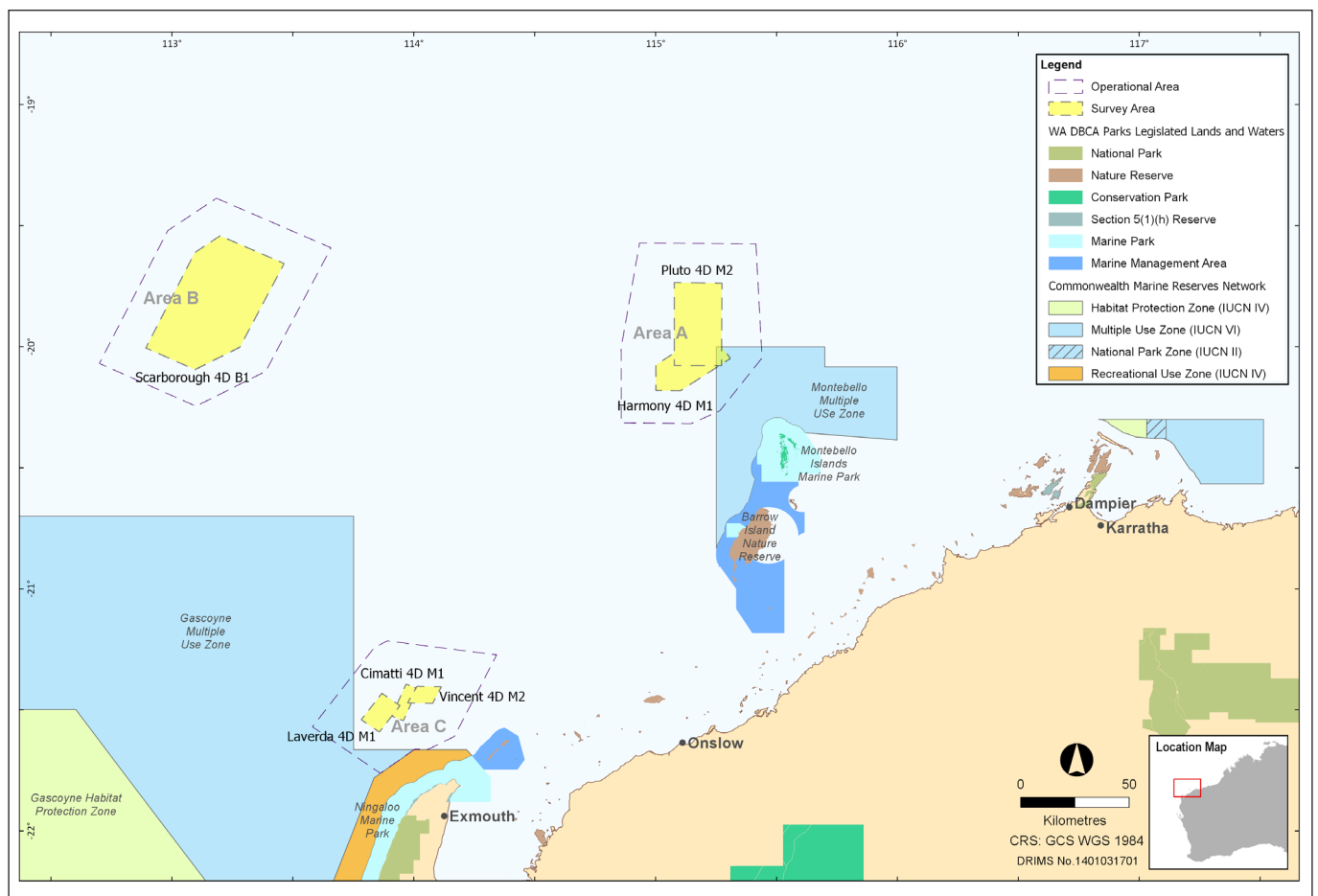
EXMOUTH PLATEAU SUB-BASIN / NORTHERN CARNARVON BASIN

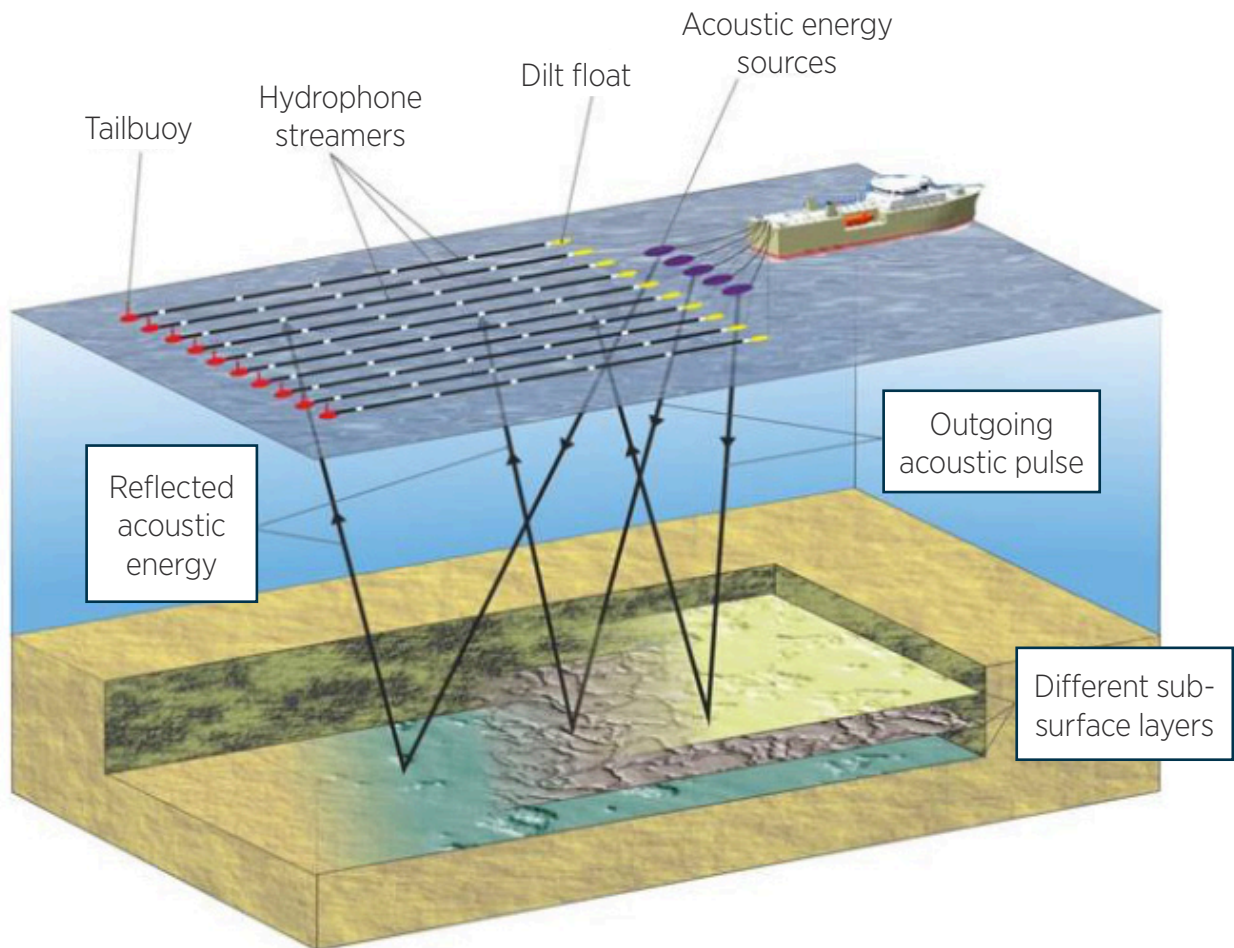
Woodside is planning to conduct a series of marine seismic surveys in three areas of Commonwealth waters in North-west Australia, starting in Q4 2019 pending approvals, vessel availability and weather constraints.

All of the proposed seismic surveys are over areas where Woodside has previously acquired seismic data and are termed 'time lapse' or 4D surveys. Data acquired from these surveys will be important to help inform current and future reservoir management decisions.

Data from surveys in Areas A and C are termed monitor surveys and will show how oil and gas reservoirs have changed as a result of hydrocarbon depletion resulting from production. This data will be acquired over the Pluto, Brunello, Vincent, Cimatti and Laverda oil and gas fields.

The survey in Area B over the Scarborough field, termed a baseline survey, will provide updated data to assist with planning for future production.





ABOUT MARINE SEISMIC SURVEYS

Marine seismic surveys use acoustic or noise pulses to image subsurface formations. This is done by transmitting sound waves that reflect off underground rock formations. The sound waves that reflect back are captured by recording sensors called hydrophones.

The information gathered by the hydrophones is collected, converted to a digital signal and relayed to data storage devices on the survey vessel. The data is typically transferred to shore via

tape or disc packs and data processors using powerful computers translate the information into digital images or maps of the subsurface. Geophysicists and geologists then analyse and interpret this data to determine the presence of hydrocarbons or monitor how hydrocarbon reservoirs change over time.

During a seismic survey, standard environmental procedures are followed, including a soft start of the noise pulses, gradually increasing the intensity of the

pulses while monitoring the area to be sure no whales are present.

For the period of seismic operations, marine fauna observers on board the vessel and during daylight hours continuously scan for marine life. If whales are detected within close vicinity, operations cease and are only restarted when the animals have moved away.

	Area A		Area B	Area C		
	Pluto 4D M2	Harmony 4D M1	Scarborough 4D B1	Laverda 4D M1	Cimatti 4D M1	Vincent 4D M2
Earliest commencement date	Q4 2019	Q1 2020	Q1-Q2 2020	Q1-Q2 2020	Q1-Q2 2020	Q1-Q2 2020
Estimated duration	28 days	20 to 23 days	45 days	12-13 days	11 days	23 days
Acquisition Area	780 km ²	469 km ²	2,059 km ²	144 km ²	87 km ²	82 km ²
Operational Area	3,710 km ²	2,419 km ²	5,597 km ²	1,758 km ²	1,564 km ²	1,655 km ²
Water depth in Operational area	41 – 1,382 m	39 – 1,195 m	961 – 1,242 m	205 – 1,198 m	183 – 1,028 m	153 – 983 m
Last acquired data	2015	2013	2004	2010	2010	2010
Distance from Acquisition Area to nearest port/marina	163 km north-west of Dampier	160 km north-west of Dampier	357 km north-west of Dampier	49 km north-west of Exmouth	47 km north-west of Exmouth	51 km north-west of Exmouth
Distance from Acquisition Area to nearest marine park	Overlaps north-west corner of Montebello Marine Park Multiple Use Zone	Overlaps north-west corner of Montebello Marine Park Multiple Use Zone	68 km north of Gascoyne Marine Park Multiple Use Zone	3 km east of Gascoyne Marine Park Multiple Use Zone	14 km north-west of Ningaloo Marine Park	21 km north of Ningaloo Marine Park

Proposed activity

The proposed surveys will be conducted by a purpose-built seismic vessel, using technical methods and procedures commonly used in Australian waters. No unique or unusual equipment or operations are proposed.

During the proposed activities, the seismic vessel will traverse a series of pre-determined sail lines within each survey Acquisition Area at a speed of approximately 7-9 km/hr. An additional buffer area, or Operational Area, is allowed for vessel manoeuvring. Bubble tests, soft starts and seismic line 'run in' and 'run out' data will be acquired in the Operational Areas.

As the vessel travels along the survey lines a series of noise pulses will be directed every 6-9 seconds down through the water column and the seabed.

The released sound will be attenuated and reflected at geological boundaries, with the reflected signals detected by sensitive microphones called 'hydrophones receivers', embedded within a number of cables, or streamers, towed behind the seismic vessel.

The reflected sound will then be processed to generate a three dimensional (3D) seismic image, providing information about the structure and composition of geological formations below the seabed.

The seismic vessel will follow as accurately as possible the previous source and receiver locations along pre-determined vessel sail lines, as acquired by previous surveys in order

to show how reservoir characteristics have changed over time. This change or difference in the seismic signal is known as time-lapse or '4D' seismic.

The seismic vessel will tow between 6 to 12 solid streamers at a depth of approximately 15-18 m with a spacing between streamers of 50-100 m and a maximum streamer length of approximately 8,000 m. Survey activities will take place during the day and night.

It is anticipated that three project vessels, comprising the seismic vessel and up to two support and chase vessels will be required for the surveys in Areas A and B. An additional source vessel may be required for surveys in Area C. During this time the main seismic vessel will be used to tow streamers.

Support and chase vessels will assist with re-supply, refuelling and other support functions, as well as be on stand-by to manage potential interactions with other marine users of the area.

Communications with Mariners

A 500 m 'safe navigation area' will be in place around the primary vessel and streamers during seismic operations.

The seismic vessels will be operating within the Operational Areas determined for these activities. Marine notices will be issued prior to the start of work to alert vessels that maybe operating in waters nearby and that access to these areas may be limited.

Woodside will provide updates on vessel movements and their details during the activities at an appropriate frequency to meet relevant stakeholder needs

Survey Coordinates

Area A							
	Latitude		Longitude				
Survey Operational Area	19°34'12.462"S		114°56'01.581"E				
	20°00'11.867"S		114°51'27.323"E				
	20°18'50.759"S		114°51'27.693"E				
	20°19'02.669"S		115°08'49.012"E				
	20°15'53.34"S		115°15'55.885"E				
	20°02'46.041"S		115°26'26.19"E				
	19°34'30.004"S		115°24'54.989"E				
Pluto 4D M2 survey			Harmony 4D M1 survey				
	Latitude		Longitude		Longitude		
Survey Acquisition Area	19°44'02.451"S		115°04'37.853"E		20°10'49.14"S		115°00'04.08"E
	20°04'37.104"S		115°04'37.946"E		20°10'53.22"S		115°06'11.94"E
	20°04'39.019"S		115°16'23.684"E		20°02'52.542"S		115°18'35.669"E
	19°44'11.842"S		115°16'28.804"E		19°58'18.234"S		115°15'08.425"E
					19°58'17.94"S		115°09'38.28"E
					20°04'29.34"S		115°00'03.6"E
Area B							
	Latitude		Longitude				
Survey Operational Area	19°23'08.078"S		113°10'55.817"E				
	19°35'25.579"S		113°39'22.485"E				
	20°06'02.861"S		113°23'11.159"E				
	20°14'43.528"S		113°05'50.122"E				
	20°04'07.021"S		112°41'50.389"E				
	19°31'10.437"S		112°58'49.251"E				
Scarborough 4D B1 survey							
	Latitude		Longitude				
Survey Acquisition Area	19°32'26.998"S		113°11'49.708"E				
	19°39'19.852"S		113°27'44.143"E				
	20°00'05.432"S		113°16'44.265"E				
	20°05'39.844"S		113°05'35.852"E				
	20°00'16.217"S		112°53'23.022"E				
	19°36'37.046"S		113°05'32.964"E				
Area C							
	Latitude		Longitude				
Survey Operational Area	21°12'56.728"S		113°53'22.29"E				
	21°14'36.163"S		113°50'07.552"E				
	21°34'15.565"S		113°34'45.669"E				
	21°45'48.511"S		113°51'38.324"E				
	21°39'48.312"S		114°00'06.655"E				
	21°39'49.318"S		114°03'34.487"E				
	21°36'39.407"S		114°10'00.881"E				
	21°16'24.45"S		114°20'31.463"E				
Laverda 4D M1 survey		Cimatti 4D M1 survey		Vincent 4D M2 survey			
	Latitude		Longitude		Latitude		Longitude
Survey Acquisition Area	21°29'00.941"S		113°56'29.805"E		21°31'33.609"S		113°54'25.865"E
	21°35'34.453"S		113°51'22.652"E		21°23'39.518"S		113°58'00.971"E
	21°32'30.412"S		113°46'53.538"E		21°24'50.059"S		114°00'56.251"E
	21°25'57.047"S		113°52'00.747"E		21°32'45.166"S		113°57'20.863"E
				21°24'12.065"S		114°00'45.066"E	
				21°28'19.742"S		113°58'24.633"E	
				21°28'26.392"S		114°04'38.121"E	
				21°24'18.387"S		114°06'47.17"E	

Implications for Stakeholders

In support of the proposed activities, Woodside will consult relevant stakeholders whose interests, functions, and activities may be affected by the proposed activities. We will also keep other stakeholders who have identified an interest informed about our planned activities.

Woodside has undertaken an assessment to identify potential risks to the marine environment and relevant stakeholders, considering timing, duration, location and potential impacts arising from the North-west Australia 4D Marine Seismic Survey.

A number of mitigation and management measures will be implemented and are summarised below. Further details will be provided in the Environment Plan.

Summary of key risks and/or impacts and management measures.

Potential Risk and/or Impact	Mitigation and/or Management Measure
Planned Activities	
Interests of relevant stakeholders with respect to:	<ul style="list-style-type: none"> + Consultation with petroleum titleholders, commercial fishers and their representative organisations, and government departments and agencies to inform decision making for the proposed activity and development of the Environment Plan.
+ Defence activities	
+ Petroleum activities	+ Advice to relevant stakeholders prior to the commencement of activities.
+ Commercial fishing activities	
+ Shipping activities	+ Ongoing consultation by way of updates on vessel movements during survey activities at a frequency to meet relevant stakeholder needs.
Marine fauna interactions	<ul style="list-style-type: none"> + Measures will be taken to protect marine fauna and ecosystems from vessel activities and to prevent vessel collisions and groundings. + Maintaining dedicated marine fauna observers throughout the survey. + All marine fauna sightings are recorded and reported to the Department of the Environment and Energy.
Marine discharges	+ All routine marine discharges will be managed according to legislative and regulatory requirements and Woodside's Environmental Performance Standards where applicable.
Underwater noise	<ul style="list-style-type: none"> + Implementation of <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act) Policy Statement 2.1. + Noise modelling to inform potential impacts and input to mitigation and management measures.
Vessel interaction	<ul style="list-style-type: none"> + Woodside will notify relevant fishery stakeholders and Government maritime safety agencies of specific start and end dates, specific vessel-on-location dates and any exclusion zones prior to commencement of the activity. + A 500 m radius safe navigation area will be in place around the seismic vessel and streamers during seismic operations. + The seismic vessel will display appropriate day shapes and lights to indicate the vessel is towing and is therefore restricted in its ability to manoeuvre. + The streamers will tow surface tail buoys fitted with radar reflectors. + A visual and radar watch will be maintained on the project vessel bridges at all times. + Support and chase vessels will be on standby to direct any shipping traffic or commercial fishing vessels away from the seismic vessel and its towed equipment.
Waste generation	<ul style="list-style-type: none"> + Waste generated on the vessels will be managed in accordance with legislative requirements and a Waste Management Plan. + Wastes will be managed and disposed of in a safe and environmentally responsible manner that prevents accidental loss to the environment. + Wastes transported onshore will be sent to appropriate recycling or disposal facilities by a licensed waste contractor.
Unplanned	
Hydrocarbon release	<ul style="list-style-type: none"> + Appropriate spill response plans, equipment and materials will be in place and maintained. + Appropriate refuelling procedures and equipment will be used to prevent spills to the marine environment.
Introduction of invasive marine species	<ul style="list-style-type: none"> + All vessels will be assessed and managed as appropriate to prevent the introduction of invasive marine species. + Compliance with Australian biosecurity requirements and guidance. + Contracted vessels comply with Australian ballast water requirements.

Providing feedback

Our intent is to minimise environmental and social impacts associated with the proposed activities, and we are seeking any interest or comments you may have to inform our decision making.

An Environment Plan for the proposed activity will be submitted to the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) for acceptance in accordance with the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009* (Cth).

If you would like to comment on the proposed activities outlined in this information sheet, or would like additional information, please contact Woodside before COB 3 May 2019.

Please note under new public transparency arrangements being implemented by NOPSEMA, the Environment Plan for this activity will be published in full following acceptance by the Authority. Please advise Woodside if you do not wish any part of your feedback to be published and we will ensure it is included in the sensitive information part of the Environment Plan. The information received will form part of the EP assessment however it will not be released publicly and will remain confidential to NOPSEMA throughout.

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Please note that stakeholder feedback will be communicated to NOPSEMA as required under legislation. Woodside will communicate any material changes to the proposed activity to affected stakeholders as they arise.