

21st January 2016

Feedback Sought: Proposed Three-Dimensional Marine Seismic Survey (Capreolus Phase II 3D MSS) in the Offshore Northern Carnarvon Basin and Roebuck Basin

Polarcus Seismic Limited (Polarcus) is seeking feedback on its proposed three-dimensional marine seismic survey (Capreolus Phase II 3D MSS), to be undertaken over the Northern Carnarvon and Roebuck Basins in Commonwealth waters off northern Western Australia (refer to the attached map). The Capreolus Phase II 3D MSS is anticipated to take up to two years to complete, most likely being undertaken in several phases over this period and beginning no earlier than the second quarter of 2016. Exact start and end dates will be communicated by Polarcus based on timing restrictions due to environmental sensitivities, availability of vessels and weather conditions, although it is currently proposed that the survey be completed no later than the second quarter of 2018.

Phase I of the Capreolus 3D MSS was completed between January and November 2015 following acceptance on 8 January 2015 by the Commonwealth Regulator for offshore petroleum activities, the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA), of the following Environment Plan (EP):

Capreolus 3D Multi-Client Marine Seismic Survey 2014-2015 Environment Plan Document No. 0267070-P, Revision 0, dated 1 November 2014, NOPSEMA reference A400021 ID2970
<http://www.nopsema.gov.au/environmental-management/ep-submissions-and-summaries/search/details/285>

Background to Polarcus' Request for Feedback

In accordance with the *Offshore Petroleum and Greenhouse Gas Storage Act 2006 (OPGGS Act)* and the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (OPGGS (E) Regulations)*, Polarcus is currently preparing an EP which provides the management measures to be implemented to address potential environmental impacts and risks associated with the survey. This EP is required to be assessed and accepted by NOPSEMA prior to commencing survey operations.

As part of the EP preparation process, Polarcus is seeking to engage with relevant stakeholders to identify any values or sensitivities associated with the existing natural and socio-economic environment relevant to the proposed operations. In planning for this engagement process and based on Polarcus' understanding of your organisation's remit, Polarcus has identified your organisation as having potential interest in the Capreolus Phase II 3D MSS. Polarcus has therefore enclosed further information regarding the Capreolus Phase II 3D MSS below so that you can confirm whether the survey is likely to interact with specific aspects of the existing natural and socio-economic environment relevant to your organisation's interests.

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Proposed Location and Extent

There are two indicative survey areas (as shown on the attached map) within which Polarcus currently anticipate 3D seismic acquisition will be undertaken. The northern survey area covers approximately 14,620 square kilometres (km²) and the southern survey area covers approximately 29,520 km², giving a total survey area of approximately 44,140 km². The wider operational area shown around the two survey areas on the attached map covers approximately 93,370 km² and incorporates the necessary space for vessel manoeuvring and ancillary activities (i.e. additional area for the purpose of line run-outs, source testing, soft starts and turns etc.). The operational area is therefore the conservative extent over which some level of operational activity may take place. At its closest, the operational area is approximately 110 km north of Dampier, 135 km north of Port Hedland and 410 km west of Broome.

Survey Characteristics

Seismic data acquisition will be undertaken by one to two Polarcus-owned and operated seismic vessels. The total proposed volume of the seismic source for each seismic vessel is 3,480 cubic inches and this will be towed a short distance behind each survey vessel at 5 to 10 m depth. Two seismic sources will be discharged alternately ('flip-flop' source configuration) at 12.5 m intervals (referred to as the shot point interval) along the survey line. This source size was selected as the minimum size to achieve the technical objectives.

Only one vessel will acquire seismic data in each survey area at any one time, although the two areas may be acquired either consecutively or concurrently (while always maintaining a minimum 40 km separation distance between operating seismic vessels). Each seismic vessel will tow the seismic equipment along predetermined survey lines within the survey areas at a speed of approximately 4.5 knots. A total of 12 solid hydrophone streamers each measuring between approximately 8 and 9 km in length will be towed at a depth of between 10 and 20 metres (m) below the surface. The hydrophone streamers will be spaced 100 m apart with tail buoys used to maintain position and clearly indicate the streamer ends.

A number of support vessels (estimated at three to four) will be engaged for the Capreolus Phase II 3D MSS. These include a chase vessel accompanying the seismic vessel to assist with managing potential interactions with other users of the area and at least one, and potentially two, supply vessels for resupply, refuelling and other support functions. Refuelling and resupply at sea is expected to occur approximately every 35 days during the survey. Crew changes are expected to occur every 35 days by helicopter.

Environmental and Socio-Economic Setting

As per the attached map, the operational area encompasses a wide range of water depths, being predominantly between 100 m and 5,000 m.

From the research conducted by Polarcus to date, the following key environmental values and sensitivities exist within or near the operational area:

- The operational area overlaps with approximately 20% of the pygmy blue whale's biologically important area (BIA) for migration that extends throughout the offshore waters of western and southern Australia (DOE 2016). Pygmy blue whales migrate near the operational area between

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April and August (northern migration) and between October and December (southern migration) (McCauley 2011);

- The operational area overlaps with approximately 5% of the whale shark foraging BIA that extends throughout the offshore waters of north-western Australia (DOE 2016);
- The operational area overlaps with approximately 1%, 0.5% and 0.5% of the flatback turtle interesting BIAs for the Montebello Islands, Dampier Archipelago and Legendre/Huay Islands, respectively (DOE 2016). The flatback turtle nesting season is between late-November and March, with a peak in January (Pendoley 2005). It is noted that the survey areas where seismic acquisition is anticipated to take place do not overlap with these turtle BIAs;
- The operational area overlaps with 75% of the Glomar Shoals, a key ecological feature (KEF) characterised by enhanced biological productivity supporting significant populations of a number of commercially important fish species (DOE 2016);
- The operational area is located north and outside of the Rankin Bank, which supports different habitats from the surrounding seabed that may host a relatively higher faunal diversity (DOE 2016). It is noted that the survey areas where seismic acquisition is anticipated to take place do not overlap with the Rankin Bank; and
- The operational area is located immediately north and outside of the humpback whale migration BIA that extends throughout the offshore waters of western and eastern Australia (DOE 2016). Peaks in humpback whale migration near the operational area occur in late July to early August (northern migration), late August to early September (southern migration for bulls) and in late September to early October (southern migration for cow-calf pairs) (Jenner et al 2001).

A range of other activities may occur within the operational area, including:

- commercial shipping;
- tourism;
- commercial fishing operations; and
- petroleum exploration and production operations.

There are three other potential seismic surveys that overlap the operational area and which may be completed during the scheduled acquisition period of the Capreolus Phase II 3D MSS. These include:

- the Canning-Northern Carnarvon Multi Client Marine Seismic Survey (TGS-NOPEC Geophysical Company Pty Ltd), for which an EP has already been accepted by NOPSEMA;
- the Titan Multi Client 3D Marine Seismic Survey (PGS Australia Pty Ltd), for which an EP has already been accepted by NOPSEMA; and
- the Davros Phase II MultiClient 3D Marine Seismic Survey (CGG Services (Australia) Pty Ltd), for which an EP has been submitted to NOPSEMA and is currently undergoing assessment.

Proposed Management Strategy

As required under the OPGGS (E) Regulations, Polarcus is required to undertake the Capreolus Phase II 3D MSS in a manner consistent with the principles of ecologically sustainable development and carried out such that environmental impacts and risks are reduced to as low reasonably practicable (ALARP) and acceptable levels. To this end, and to ensure that impacts to the sensitivities identified as described above are managed appropriately, Polarcus is proposing to implement the following key management measures

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during the Capreolus Phase II 3D MSS. This list is not exhaustive, and forms only part of the wider implementation strategy typically implemented by Polarcus in accordance with the requirements of their corporate environmental management system and Industry Best Practice for routine seismic operations.

Managing Interactions with Identified Environmental Sensitivities

- a) Undertaking seismic acquisition outside of the following:
 - i. the flatback turtle internesting BIAs during the nesting period (late-November and March);
 - ii. the Glomar Shoals KEF at all times during the survey;
 - iii. the Rankin Bank at all times during the survey; and
 - iv. southernmost portions of the southern survey area near the humpback whale migration BIA during peak migration periods (late July to early August, late August to early September and in late September to early October).
- b) Implementation of procedures detailed in 'EPBC Regulations 2000 – Part 8 Division 8.1 Interacting with cetaceans'. These procedures involve speed and separation distance restrictions on vessels and aircraft when approaching cetaceans (e.g. vessel to operate at less than six knots when within 300 m of a whale). Requirements applicable to whales will also be implemented for whale sharks;
- c) Operation of vessels at less than six knots when within 300 m of a sighted turtle;
- d) Implementation of measures detailed in Part A of 'EPBC Act Policy Statement 2.1 - Interaction between offshore seismic exploration and whales: Industry guidelines' to minimise disturbance to whales from underwater sound. This includes, but is not limited to, procedures for:
 - i. visual observations prior to start-up of the seismic source;
 - ii. gradual ramping up of the seismic source (soft starts);
 - iii. applying precaution, low power and shut down zones where the seismic source is powered down or shut down depending on the proximity of detected cetaceans to the vessel; and
 - iv. undertaking operations during night-time and low visibility conditions.
- e) Applying a 500 m shut-down zone as prescribed in EPBC Act Policy Statement 2.1 to whale sharks and marine turtles (rather than just to whales as prescribed in Policy Statement 2.1);
- f) Implementation of an adaptive management approach in response to multiple whale sightings;
- g) Implementation of an operational safety exclusion zone around shallow waters, which will inherently result in the avoidance of preferred habitats of several marine fauna (e.g. turtles, corals, fish); and
- h) Completion of seismic acquisition at a minimum distance of 10 km from any land (including emerging islands).

Managing Interactions with Other Users of the Operational Area

- i) Implementation of a 500 m exclusion zone from petroleum production platforms and other industry facilities and infrastructure.
- j) MARPOL 73/78 Annexes – requires Polarcus to adhere to regulations preventing the pollution of the marine environment. These include control measures to ensure the following discharges from the seismic vessel are minimised or prevented: oil, harmful substances carried by sea in

packaged form, sewage from ships, garbage from ships, air pollution from ships and controlling the pollution of noxious liquid substances in bulk. Example measures include:

- i. Survey vessels will hold a current International Sewage Pollution Prevention Certificate (ISPP Certificate).
 - ii. Putrescible wastes will be macerated to less than 25 mm in diameter prior to discharge.
 - iii. Discharge of macerated putrescible wastes will be conducted more than 3 nautical miles (Nm) from nearest land and when the seismic vessel is moving.
 - iv. Discharge of grey water and treated sewage will only occur when more than 3 Nm from nearest land and seismic vessel is moving.
 - v. The seismic vessel will hold a current International Oil Pollution Prevention (IOPP) Certificate and will be fitted with an oil-in-water separator.
- k) International Regulations for Preventing Collisions at Sea 1972 (COLREGS) and Chapter 5 of Safety of Life at Sea as implemented in Commonwealth Waters through the *Navigation Act 2012* and associated Australian Maritime Safety Authority (AMSA) Marine Orders Parts 21, 30, 59 - navigation, collision, support vessels. Example measures include:
- i. Appropriate lighting, navigation and communication to inform other users.
 - ii. Use of radar and implementation of 24/7 watch on board to keep other users of the area aware of the vessel's position.
 - iii. Advanced scouting will also be conducted by the chase vessel to ensure other users of the area are not in the path of the seismic vessel, and are provided with advance notice to move away.
 - iv. Streamers will be marked with tail buoys.
- l) *Protection of the Sea (Prevention of Pollution from Ships) Act 1983* – This Act and the relevant AMSA Marine Orders require Polarcus to protect the sea from pollution by oil and other harmful substances discharged from ships. The seismic vessel will have a Shipboard Oil Pollution Emergency Plan (SOPEP). In addition, an Oil Pollution Emergency Plan (OPEP) will be developed as part of the EP to respond to unplanned oil spills.
- m) *Protection of the Sea (Harmful Anti-fouling Systems) Act 2006* – This Act and the relevant AMSA Marine Orders requires Polarcus to protect the sea from the effects of harmful anti-fouling systems. The seismic vessel will have a valid hull anti-fouling certificate that meets the requirements of the Act. In accordance with Marine Orders – Part 98 (Marine pollution prevention – anti-fouling systems), vessels will have to demonstrate inspections are conducted to the satisfaction of AMSA.
- n) National Biofouling Management Guidance for the Petroleum Production and Exploration Industry – This document provides Polarcus with guidance for the management of biofouling hazards by the petroleum industry including vessels, equipment and infrastructure. A risk assessment and relevant clearance will be completed for the seismic vessel before entering Australian waters. The streamers on the seismic vessel will be inspected, maintained and cleaned during retrieval to reduce biofouling.
- o) Australian Ballast Water Management Requirements – These requirements prohibit Polarcus from discharging high-risk ballast water in Australian ports or waters. No exchange of ballast water will occur within 12 Nm of the Australian coastal baseline or in water depths of less than 200 m.

Managing Cumulative Effects from Concurrent Seismic Activities

Polarcus will endeavour to minimise the potential for interaction between seismic surveys to minimise both potential disruptions to operations and potential cumulative sound impacts to the environment. Polarcus will engage with other seismic companies relevant to this survey to develop a management approach for simultaneous operations where necessary. In previous surveys, Polarcus has agreed with other operators on a minimum separation distance of 40 km between seismic vessels. It is also noted that the nature of multi-client operations is that data is acquired and sold to multiple petroleum block titleholders. Like Polarcus, the seismic operators referenced previously will have sought commercial undertakings with petroleum block titleholders for the 3D data they acquire. For commercial reasons, it is very unlikely that a petroleum block titleholder would purchase data from more than one multi-client MSS operator and as such, it is likely that not all surveys and possibly only one will actually proceed.

Feedback Sought and Timeframes

Polarcus would welcome your organisation's input on the above information to ensure that all relevant environmental values and sensitivities have been appropriately identified and managed. As required under the OPGGS (Environment) Regulations, feedback received from your organisation (along with any further engagement undertaken) will be recorded for inclusion in the EP and may be included (in all or part) within the EP summary which is required to be made publically available via the NOPSEMA website. Polarcus is also committed to providing a prompt response to feedback received from your organisation. In accordance with regulatory requirements, this response will be accompanied by an assessment of the merits of this feedback, which will also be included in the EP.

To allow sufficient time for Polarcus to prepare a robust EP and for NOPSEMA to complete their assessment process, Polarcus seeks comments from your organisation by no later than 26th February 2016. You may provide input by either email or written submission, using the specific contact details provided below, set up so that any feedback received can be prioritised by Polarcus:

Email correspondence to be addressed to: **ERMAustraliaPolarcus@erm.com**

Written correspondence can also be addressed to:

Capreolus Phase II 3D MSS

PO Box 7338

Cloisters Square WA 6850

Australia

Finally, in the event the EP is accepted by NOPSEMA and Polarcus is successful in proceeding with Capreolus Phase II 3D MSS, Polarcus is committed to maintaining ongoing liaison (e.g. updates on timeframes for commencement and completion) should your organisation wish to be kept updated with progress beyond the timeframes required for EP preparation and assessment. If your organisation would like to be kept updated, please state this when providing feedback.

Polarcus looks forward to engaging with your organisation regarding the Capreolus Phase II 3D MSS. In the meantime, do not hesitate to contact us if you have any queries.

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References:

Department of the Environment (DOE), 2016, National Conservation Values Atlas, viewed 19 January 2016, <https://www.environment.gov.au/webgis-framework/apps/ncva/ncva.jsf>

Jenner, KCS, Jenner, M-NM and McCabe, KA. 2001. Geographical and Temporal Movements of Humpback Whales in Western Australian Waters. APPEA Journal 2001, pp. 749-765.

McCauley, RD. 2011. Woodside Kimberley Sea Noise Logger Program, Sept-2006 to June-2009: Whales, Fish and Man-made noise. Report produced for Woodside Energy Ltd, 86 pp.

Pendoley, KL. 2005. Sea Turtles and the Environmental Management of Industrial Activities in North West Western Australia, PhD thesis, Murdoch University.

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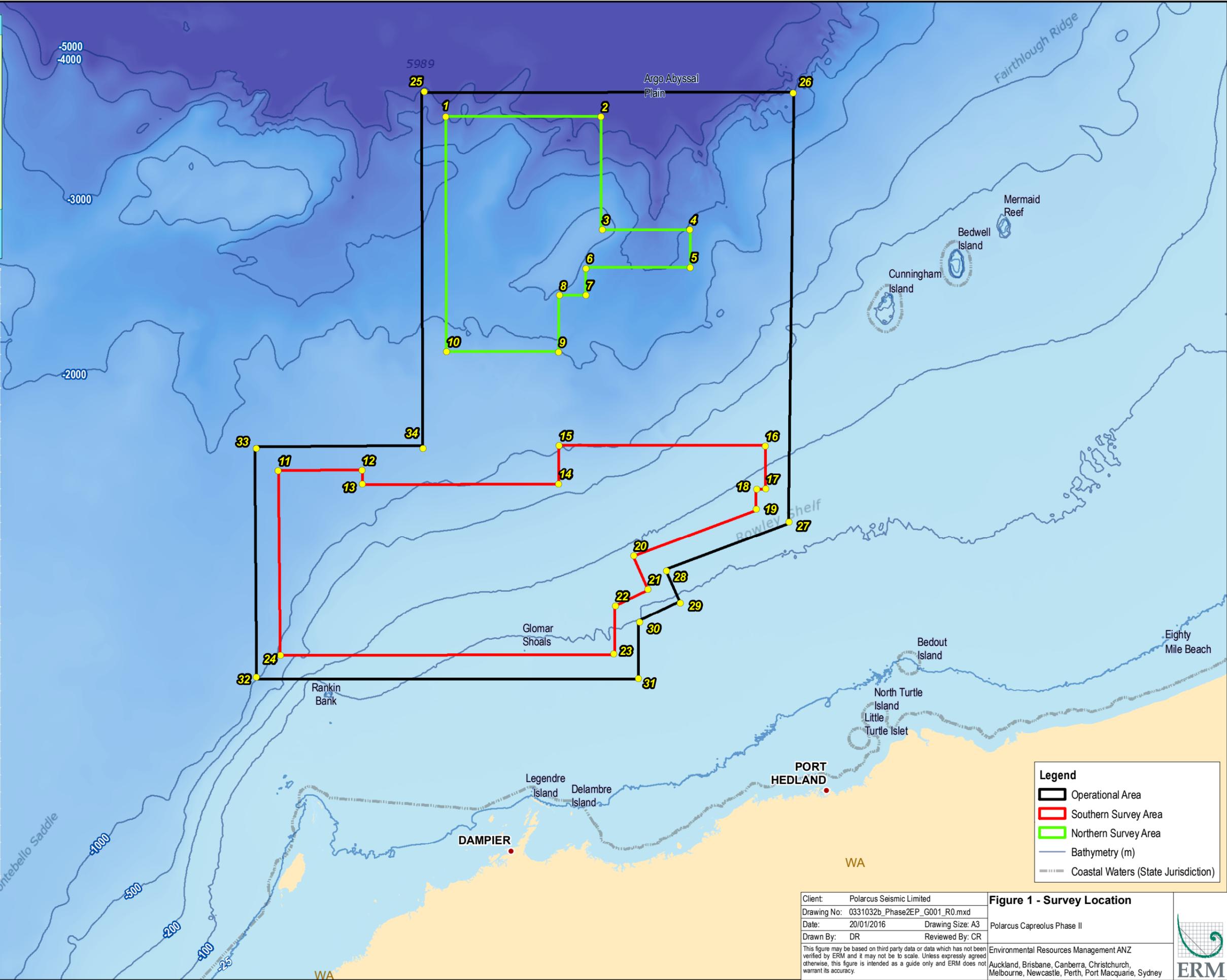
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16°00'S
17°00'S
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21°00'S



Survey Coordinates (GDA94z50)

ID	Easting	Northing
1	116.33841	-16.50170
2	117.24934	-16.50259
3	117.26014	-17.14192
4	117.77564	-17.14060
5	117.77903	-17.35607
6	117.16320	-17.36231
7	117.16334	-17.51316
8	117.00612	-17.51562
9	117.00114	-17.83646
10	116.33868	-17.83295
11	115.33256	-18.50189
12	115.83180	-18.50324
13	115.83379	-18.57985
14	117.00114	-18.58346
15	117.00365	-18.36798
16	118.22972	-18.36641
17	118.23395	-18.60814
18	118.17874	-18.61089
19	118.17702	-18.72580
20	117.44911	-18.99230
21	117.53528	-19.18119
22	117.34147	-19.27501
23	117.33194	-19.54793
24	115.33724	-19.54776
25	116.21241	-16.35818
26	118.37863	-16.36277
27	118.37317	-18.79696
28	117.64516	-19.07561
29	117.72621	-19.25845
30	117.48549	-19.36608
31	117.47839	-19.68658
32	115.19083	-19.67048
33	115.20481	-18.37381
34	116.19572	-18.38058



Legend

- Operational Area
- Southern Survey Area
- Northern Survey Area
- Bathymetry (m)
- Coastal Waters (State Jurisdiction)



Client: Polarcus Seismic Limited	Figure 1 - Survey Location
Drawing No: 0331032b_Phase2EP_G001_R0.mxd	
Date: 20/01/2016 Drawing Size: A3	
Drawn By: DR Reviewed By: CR	
<p>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</p>	
<p>Environmental Resources Management ANZ Auckland, Brisbane, Canberra, Christchurch, Melbourne, Newcastle, Perth, Port Macquarie, Sydney</p>	

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