Great Australian Bight Exploration Project

Great Australian Bight Exploration Drilling Program

ENVIRONMENT PLAN SUMMARY

(EPPs 37, 38, 39, 40)

Rev 0
1 October 2015

Revision	Comment	Date
Rev 0	Draft issued for public information	1 October 2015

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1 Introduction

BP Developments Australia Pty Ltd (BP), in its capacity as operator of the proposed Great Australian Bight (GAB) Exploration Drilling Program, proposes to drill four exploration wells in Commonwealth marine waters in the GAB.

Exact well locations are yet to be determined for all wells, however they will be drilled within the Ceduna 3D seismic survey area, which was acquired between November 2011 and May 2012 and covered 12,100 km^2 across Exploration Permit for Petroleum (EPP) 37, EPP 38, EPP 39 and EPP 40 (herein referred to as the 'drilling area'). The EP addresses drilling anywhere within this drilling area.

The GAB exploration drilling program is scheduled to commence in the summer of 2016-2017, with each well taking between 45 and 170 days to drill.

The purpose of the drilling program is to determine whether the target formations have commercially recoverable volumes of hydrocarbons.

The Environment Plan (EP) for the GAB Exploration Drilling Program was submitted to the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) on 1 October 2015. This document is a summary of the EP that has been submitted. Note that the EP is yet to be accepted by NOPSEMA, and therefore this summary will remain in draft form until acceptance is obtained.

1.1 Proponent

BP and Statoil are the registered titleholders of EPPs 37, 38, 39 and 40, with BP being the Operator. BP is wholly owned by BP Australia Group Pty Ltd and is ultimately owned by BP p.l.c (a company registered in England and Wales).

BP is an international oil and gas companies, operating in over 75 countries. In Australia, BP is a foundation investor and one of six equal joint venture partners in the North West Shelf Venture (NWSV) and also has interests in the Browse basin.

Statoil is an international energy company headquartered in Norway, with operations in 37 countries. In Australia, other than its interests in the GAB, Statoil has acquired the WA-506-P exploration permit off the Western Australian (WA) coast.

The four exploration permits in the Ceduna Sub-Basin of the GAB cover an area of 24,000 km^2. The Ceduna three-dimensional (3D) seismic survey over the four permits took place from November 2011 to May 2012. This seismic data is being used to identify exact drilling locations.

The BP operating office is located in Perth at:

Level 8, 250 St Georges Terrace
Perth, Western Australia, 6000.

1.2 Legislative Framework

The permit areas and the proposed activity are located in Commonwealth waters off the SA coast. Petroleum activities undertaken in this area are regulated entirely by Commonwealth legislation and primarily under the *Offshore Petroleum and Greenhouse Gas Storage* (OPGGS) *Act* 2006 and associated regulations. The OPGGS (Environment) Regulations 2009 specify the requirements to manage the environmental impacts of petroleum activities. Key to these Regulations is the submission of an EP to the regulatory authority (NOPSEMA) for acceptance prior to commencing the proposed activities. In addition to the EP, several other plans will be submitted to NOPSEMA prior to drilling, including an Oil Pollution Emergency Plan (OPEP), an Operational and Scientific Monitoring Plan (OSMP), a MODU Safety Case and Safety Case Revision and a Well Operations Management Plan (WOMP).

Prior to early 2014, approval of the drilling program under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) may also have been required. However, a strategic assessment of the environmental management authorisation process for offshore petroleum and greenhouse gas storage activities was undertaken under the EPBC Act, which essentially delegated authority to NOPSEMA to assess offshore petroleum activities that may have impacts on matters of 'National Environmental Significance' through the EP assessment process. This change came into effect on 27 February 2014. BP had previously referred the GAB exploration Drilling Program under the EPBC Act in May 2013. However, this strategic assessment resulted in the Department of the Environment closing out the project under section 146B of the EPBC Act.

Also, under section 359B of the EPBC Act, approval to undertake activities within Commonwealth Marine Reserves (CMRs) is required from the Director of National Parks. However, the drilling of the GAB exploration wells is part of the scheduled works specified in the exploration work programs. On this basis, the drilling of the wells is exempt under Section 359 of the EPBC Act and does not require approval from the Director of National Parks. However, BP is in regular contact with representatives from the Department of the Environment (DoE) and has consulted these representatives regarding the proposed drilling program.

2 Activity Description

2.1 Location

Exact well locations are yet to be determined for all wells, however they will be drilled within the Ceduna 3D seismic survey area, which was acquired between November 2011 and May 2012 and covered 12,100 km^2 across Exploration Permit for Petroleum (EPP) 37, EPP 38, EPP 39 and EPP 40 (herein referred to as the 'drilling area'). The EP addresses drilling anywhere within this drilling area. The coordinates of the drilling area are outlined in Table 1 and shown in Figure 1.

Table 1 Boundary coordinates of the drilling area

Point	Latitude	Longitude
1	35° 03' 42.2892" S	130° 54' 59.4432" E
2	35° 06' 14.4108" S	130° 55' 09.0048" E
3	35° 12' 51.7752" S	130° 46' 07.3056" E
4	34° 20' 21.7860" S	129° 40' 55.2144" E
5	34° 15' 01.6992" S	129° 48' 04.7303" E
6	34° 15' 06.3792" S	130° 19' 59.7576" E
7	33° 45' 10.0404" S	130° 20' 12.8544" E
8	33° 45' 10.0944" S	130° 26' 25.6596" E
9	34° 08' 03.6960" S	130° 54' 48.5712" E
10	34° 27' 33.1272" S	130° 54' 48.8268" E
11	34° 59' 09.3264" S	131° 34' 48.7308" E
12	35° 09' 19.7100" S	131° 34' 48.4176" E
13	35° 17' 22.2072" S	131° 25' 48.4644" E
14	34° 58' 38.0028" S	131° 01' 53.7924" E

GDA 94, MGA Zone 53

The drilling area has water depths ranging between 1,000 and 2,500 m Lowest Astronomical Tide (LAT), though the permit areas range in depth from 500 m at the shallowest point to 4,500 m at its deepest. At the closest point, the drilling area is located approximately 395 km west of Port Lincoln and 340 km southwest of Ceduna in South Australia (SA) (Figure 1).

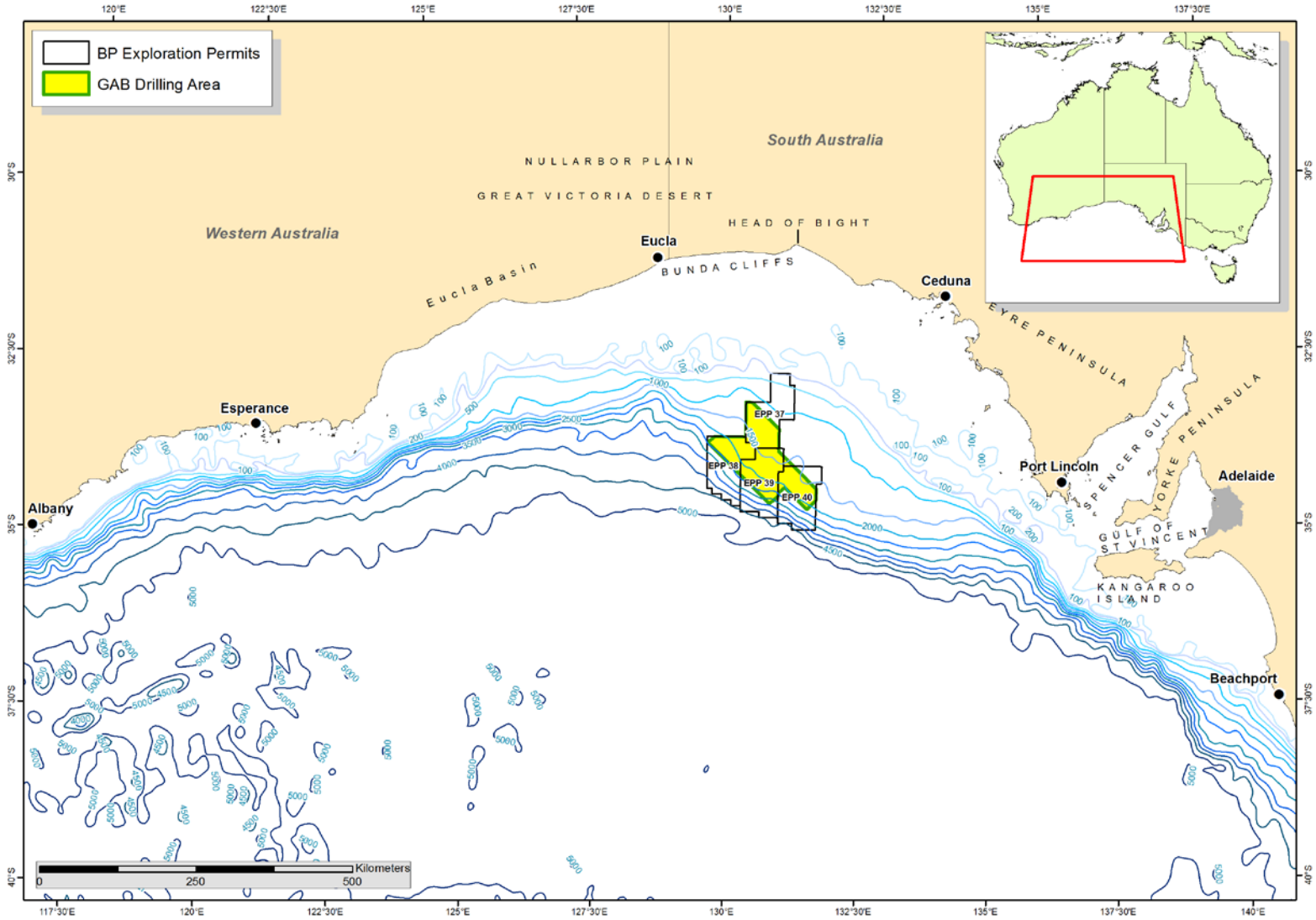


Figure 1 – BP permits and drilling area location

2.2 Operational Details

2.2.1 Mobile Offshore Drilling Unit

The wells will be drilled using a semi-submersible Mobile Offshore Drilling Unit (MODU), named the Ocean Great White. The Ocean Great White will use dynamic positioning to stay on location, rather than anchoring, and has been designed to operate in water depths from 150 to 3,000 m. It has been designed to maximise the stability of the MODU in harsh weather environments.

Diamond Offshore Drilling Inc (Diamond) will own and operate the Ocean Great White.

2.2.2 Support Vessels

A fleet of vessels will be used to support the drilling program. The vessels will provide the MODU with food, fuel and drilling supplies, and will collect waste from the MODU for onshore disposal in licenced facilities. The vessels will also monitor the 500 m petroleum safety zone around the MODU, and will assist in an emergency response situations should they arise.

Support vessels will be based out of Port Adelaide.

2.2.3 Aviation Operations

Ceduna will be developed as the main base for helicopter operations in support of the GAB drilling program. In some cases, depending on specific parameters related to payload restrictions and MODU location, the outbound helicopter may stop to refuel at a proposed heliport to be developed at the current Approved Landing Area at Coorabie Station.

2.3 Drilling Program

2.3.1 Timing and Schedule

The drilling program is scheduled to commence in the summer of 2016-2017. It is anticipated that each well will take between 45 and 170 days to drill, with a break between wells two and three to assess the outcomes of the first two wells.

2.3.2 Well Design and Drilling Methodology

The well design and drilling methodology is detailed in the Well Operations Management Plan (WOMP), which is required to be accepted by NOPSEMA prior to commencement of drilling.

At the completion of drilling operations, a series of cement and mechanical plugs will be set within the wellbore, and the well will be plugged and abandoned in accordance with the WOMP.

Drilling fluids

Drilling fluids (or muds) will be used during the drilling program to provide a range of functions, including:

- Control of formation pressures (i.e., providing a hydrostatic head by managing mud density maintains well stability and prevent a blowout);
- Transport of drill cuttings out of the hole to the MODU;
- Maintenance of drill bit and assembly (i.e., lubrication, cooling and support); and
- Sealing of permeable formations to prevent formation invasion

A notional drilling fluid design has been developed, which details the chemical additives that may be used in the various muds. Riserless hole sections will be drilled with seawater and sweeps. A combination of water based muds and synthetic based muds (SBM) will then be used. SBM is manufactured from a synthetic base oil, with the preferred based oil for this project being an olefin system (LAO 141618 blend). It has excellent aerobic degradability in seawater and is classified by the Offshore Chemical Notification Scheme (OCNS) as a non-CHARM Group 'D'-'E' product (effectively 'low toxicity'). OCNS is used to manage chemical use in the UK and Netherlands, and is often used in Australia given the absence of Australian standards specifically relating to drilling chemicals.

The majority of SBM will be removed from cuttings prior to discharge, as described below.

Drilling cuttings and fluid discharge

All cuttings generated by riserless drilling (ie in the first sections of the well bore) will be returned directly to the seabed where they will be deposited in the vicinity of the wellhead. Once the riser is in place, cuttings and muds will be returned to the MODU.

On the MODU, the mud returns carrying the drilled cuttings will initially pass through a shale shaker where the majority of mud will be separated from the cuttings, before cuttings are discharged overboard. When SBM is used, cuttings from the shale shaker will be passed through a cuttings dryer, which will further remove SBM from cuttings. Tests will be conducted to determine the Retention on Cutting (ROC) for SBM to ensure that no more than 6.9% by weight on wet cuttings is discharged overboard.

Drilling fluid will be re-circulated via the riser for reuse in the wellbore. Bulk WBM will be discharged overboard, and bulk SBM will be returned to the shore base for treatment or disposal to a licensed facility.

Well evaluation

Wireline evaluation will be undertaken to determine rock and fluid properties of the targets. A suite of standard wireline logs will be run, including gamma ray, neutron-density, resistivity, sonic, acquisition of pressures and samples, vertical seismic profiling (VSP) and side wall coring.

VSP operations involve deploying an acoustic sound source (typically between three and six air guns, with a volume of between 150 – 250 cubic inches each) from the MODU or support vessel, while a number of receivers (geophones) are positioned at different levels within the drilled hole to measure the travel time. Another option for undertaking seismic profiling is the use of Seismic While Drilling (SWD), where the receivers are incorporated

into the Bottom Hole Assembly (BHA). The sources used for SWD are the same as those in VSP. VSP operations are typically of short duration, normally taking no more than a day to complete.

Whilst VSPs are quieter and shorter in duration than exploration seismic surveys, measures outlined in the EPBC Act Policy Statement 2.1 'Interaction between offshore seismic exploration and whales' (DEWHA, 2008) will be implemented during VSP.

2.4 Well Control

Well control is maintained during drilling by monitoring the formation pressure and controlling the density (or weight) of the drilling fluids. When a rise in formation pressure is observed, the density of the drilling fluid is increased to maintain an overbalance of pressure against the formation and to keep the wellbore stable. The drilling fluid density is considered the primary well control barrier. In the event that the primary well control system fails, the next line of defense is a blow out preventer (BOP) system, which is a secondary well control measure. A BOP is a mechanical device designed to seal off a well at the wellhead when required. The system is made up of a number of different types of closing mechanisms consisting of rams (opposing pistons that move horizontally across the top of the well, creating a seal around the drill string), shear rams to sever drill pipe, or blind rams to close the well when no pipe is present. Annular preventers (which deploy an elastomer donut-like device) can also be used to close off the well around various sizes of pipe in the event of an unexpected or sudden increase in pressure.

A blowout is an uncontrolled flow of formation fluids from a well that has suffered a failure of barrier systems such as the pressure control equipment, or when the well pressure has exceeded the working pressure of the pressure control equipment. Well control is the process implemented to prevent a blowout from occurring.

2.4.1 Loss of Well Control Prevention

A BOP rated to 103 MPa (15,000 psi) working pressure will be installed and pressure tested for the wells. This BOP consists of a series of hydraulically-operated valves and sealing mechanisms that are open to allow the mud to circulate during drilling, but can be quickly closed if excessive pressure (a 'kick') enters the well. If a kick occurs and secondary controls are required, an annular preventer (of which there are two for double redundancy) is closed to prevent any further influx from the reservoir into the well if there is pipe in the hole (otherwise blind rams are closed if there is no pipe in the hole). The next line of defence, provided there is pipe in the hole, is the pipe rams (of which there are three for redundancy). The last line of defence is the shear rams, which, if necessary, cut right through the drill pipe and seal the well completely. There will also be a sixth ram that is capable of cutting planned casing sizes, which is called a casing shear ram.

The BOP stack will be pressure tested on the MODU deck prior to installation on the well, and again on installation on the well to test the wellhead connection with the BOP. Additionally, the BOP will be regularly function tested and pressure tested while connected to the wellhead. The BOP will only be removed once suitable barriers are in place and are tested. This will be at completion of plug and abandonment activities or for any unplanned BOP maintenance or weather suspension reasons. Casing will be pressure tested above the abandonment plugs to confirm plug integrity.

2.4.2 Loss of Well Control Response Equipment

Since the Montara well blowout in the Timor Sea in August 2009 and the Deepwater Horizon (Macondo) well blowout in the Gulf of Mexico (herein referred to as the DWH incident) in April 2010, the global upstream petroleum industry has developed, and continues to advance innovative technologies to respond to a well blowout (especially those in deep water).

BP has access to response equipment from the following groups:

1. Oil Spill Response Limited (OSRL) – Capping and containment equipment, debris removal and dispersant equipment.
2. AMOSC – Australian ROV tooling, debris removal and dispersant equipment package.
3. BP containment response equipment and tools

The response equipment from these groups is outlined below. Further detail on response arrangements are outlined in the OPEP and Emergency Response Plan (ERP).

OSRL Response Services

OSRL is an industry-owned organisation responsible for oil spill response and cleanup, from which BP subscribes to industry-developed capping and containment systems. OSRL provides capping and containment equipment, debris removal, and dispersant equipment on 24-hour standby for rapid worldwide deployment.

The Subsea Well Intervention Services (SWIS) is OSRL'S dedicated subsea division, providing OSRL members with the opportunity to access a full subsea intervention capability (dispersant, capping and containment) as well as the Tier 3 response OSRL membership provides (the tiered oil spill response system is described in the OPEP). BP is a signatory to the SWIS and worked as part of the Subsea Well Response Project to create the SWIS.

The integrated SWIS includes four capping stacks to shut-in an uncontrolled subsea well and two hardware kits to clear debris and apply dispersant at a wellhead, creating safer surface working conditions and enhancing bio-degradation. The SWIS equipment is suitable for the majority of known subsea wells. It can be deployed in water depths up to 3,050 m and control flow pressures up to 15 kpsi.

The four capping stack systems are strategically located around the world (Norway, Brazil, South Africa and Singapore) and are maintained ready for immediate mobilisation anywhere in the world and for onward transportation by sea and/or air in the event of an incident. For a response in Australia, the primary 10 kpsi capping stack system located at the Singapore facility and primary 15 kpsi capping stack system located at the Norway facility would be mobilised.

AMOSC Subsea First Response Toolkit

BP has access to the Subsea First Response Toolkit (SFRT) via AMOSC, which is stored at Fremantle, WA, and is maintained by Oceaneering. The SFRT is similar to the equipment and tooling available via OSRL. This equipment and tooling is what is required initially to respond to a subsea blowout to clear debris, survey the site and conduct preparations required in order to run the capping stack.

Thirteen companies have financed the Australian SFRT, including BP, a Foundation Member to the SFRT Membership. The SFRT equipment includes:

- Subsea dispersant injection system;
- Torque tools and hot-stab tools that allow BOP override with any work class ROV;
- Subsea hydraulics allow for tool use and faster BOP closure;
- 3D Sonar to give a 'picture' of the site;
- Sonar buoys to mark specific hazards or safe zones; and
- Subsea tools such as shears and saws to clear the site (e.g., to remove choke and kill lines, drill pipe and the drilling riser).

The tasks for the SFRT include specialty ROV tasks:

- To intervene on the existing BOP and function it hydraulically;
- Conduct area surveys, maps, and video recordings;
- Set sonar arrays for equipment guidance during deployment;
- Clear debris and equipment from the wellhead area to allow intervention tooling to be deployed (i.e., the deployment of a capping stack).

BP Containment Response Equipment and Tools

BP's containment response equipment and tools complement the equipment available through BP's membership with OSRL and the SFRT via AMOSC.

A set of subsea response equipment and support tooling was assembled by BP following the DWH response. The equipment and tools can be airfreighted to any of BP's operating regions, and logistics plans are in place to mobilise them from the centralised storage facility in Houston, Texas to Australia for the GAB drilling program.

BP also established a Containment Response Team to develop methods and procedures for component storage, service, testing and maintenance. The Houston location was selected for its easy access to Houston's Intercontinental Airport to enable rapid mobilisation to BP's global operating regions. The equipment and tools are maintained and is in a state of readiness, requiring minimal preparation prior to mobilising, and will be delivered by air transport.

BP has also established agreements/contracts for the provision of emergency support, services with a global vendor base and routinely conducts periodic drill/exercises to test and improve the response process.

BP will also maintain an inventory of oil spill response equipment at the Adelaide supply base (details of which are outlined in the OPEP).

APPEA Mutual Assistance Agreement

In August 2011, 12 APPEA Member Companies, including BP, signed the Memorandum of Understanding (MoU): Mutual Assistance (known as the Mutual Assistance Agreement, MAA) to facilitate the transfer of a MODU between operators in the event of a drilling emergency that requires a relief well to be drilled to 'kill' the well.

2.4.3 Well Capping

BP's internal standard is that the BP Containment Response Team will mobilise and deploy cap and containment equipment and tools as soon as possible, and within 35 days. BP is currently finalising a Capping and Containment Response Plan which will include details regarding equipment locations, logistical requirements and operational procedures needed to cap a well within 35 days.

BP has conducted logistics studies, which examine the schedule for mobilisation and installation of the capping stack from OSRL in Singapore and Norway. Broadly however, BP would initially deploy the AMOSC-managed SFRT to begin preparatory work such as debris removal in anticipation of the arrival of the equipment from OSRL and BP in Houston. Detailed logistical studies have demonstrated that the transportation of the capping stack is not on the critical path for capping the well, as it is anticipated that it will be delivered in situ whilst preparatory work is being completed.

2.4.4 Relief Well

Each well to be drilled will have an individual Relief Well Plan, which may be implemented or optimized to meet the specific requirements in the event of a blowout to 'kill' the well, ie permanently stop the flow from the well. It should be noted that the drilling of a relief well would be conducted in parallel to implementation of the well capping and containment activities. The Relief Well Plans link to the ERP and deal with various well control response scenarios and the equipment required to manage those scenarios, including:

- Location of long-lead consumables required to drill a relief well, the mobilization activities, inter-dependencies and timelines via air or sea;
- Location of additional pumping equipment to perform the well kill; and
- Location of MODUs capable of drilling a relief well.

It is unlikely there will be any other MODUs in the GAB at the time of the project. The duration of mobilisation and drilling a relief well has been based on a worst-case (P90) time forecast and includes a 50% non-productive time assumption, resulting in an estimate of 149 days to kill the well. The use of P90 is considered highly conservative.

In the event of a well blowout, the OPEP will be implemented. The response strategy, and regulatory reporting mechanisms that will be enacted in the event of a well blowout, are discussed in detail in the OPEP.

2.5 BP Learnings from the Macondo well blowout

On the 20th of April 2010, a well control event allowed hydrocarbons to escape from the Macondo well in the GoM onto the Transocean *Deepwater Horizon* MODU, resulting in explosions and fire on the MODU and the loss of 11 lives. BP Exploration and Production Inc. was the lease operator of the well. Hydrocarbons flowed from the reservoir through the wellbore and the BOP for 87 days, causing a spill of national significance. In January 2015, the United State District Court for the Eastern District of Louisiana found that 3.19 million barrels of oil were discharged into the GoM.

BP acknowledges that some stakeholders may view BP's proposal to drill in the GAB in the context of the 2010 DWH incident. BP's priority is to take such actions as to prevent such oil spills from taking place, and to ensure that BP lessons learnt from the DWH incident are incorporated into the planning and operations of the GAB drilling program, and all of BPs drilling programs conducted globally.

BP's 2010 internal investigation involved a team of over 50 internal and external specialists from a variety of fields, including safety, operations, subsea, drilling, well control, cementing, well flow dynamic modelling, BOP systems and process hazard analysis. Eight key findings relating to the causal chain of events were made by BP, with associated recommendations to enable the prevention of a similar accident. The investigation report, known as the Bly Report (BP, 2010), made 26 recommendations aimed at further reducing risk across BP's global drilling activities. A total of 25 recommendations are complete at August 2015. BP expects the final recommendation to be completed by the end of 2015, as scheduled. This recommendation involves verifying the implementation of revised well control and monitoring standards to BP-owned and BP-contracted offshore MODUs. It takes time to fully implement as it requires training a large proportion of BP's Global Wells Organisation (GWO) operating personnel on the revised standards

Table 2 outlines the eight BP key findings related to the cause of the Macondo well blowout, as outlined in the Bly Report (BP, 2010), and how these areas are addressed by the GAB drilling program in order to prevent a reoccurrence of the DWH incident.

Table 2 - BP Key findings from the Macondo well blowout and application to the GAB drilling program

Finding	Summary description	Investigation conclusion	Application to this project
Critical factor: Well integrity was not established, or failed			
1. The annulus cement barrier did not isolate the hydrocarbons.	The day before the accident, cement has been pumped down the production casing and up into the wellbore annulus to prevent hydrocarbons from entering the wellbore from the reservoir. The annulus cement that was placed across the main hydrocarbon zone was light, nitrified foam cement slurry. This annulus cement probably experienced nitrogen breakout and migration, allowing hydrocarbons to enter the wellbore annulus.	There were weaknesses in the cement design and testing, quality assurance and risk assessment.	BP's Cementing Practice and Guidelines were updated and clarified, which establish the minimum requirements for specification, design, and qualification of well barrier elements installed to achieve zonal isolation during well construction, temporary abandonment and permanent abandonment. Zonal isolation objectives are intended to prevent unintended movement of fluids between Distinct Permeable Zones (DPZ), flow to surface or seabed, development of sustained casing pressure (SCP) during well operations due to communications of a DPZ with the surface or seabed, and contamination of potable water aquifers.
2. The shoe track barriers did not isolate the hydrocarbons.	Having entered the wellbore annulus, hydrocarbons passed down the wellbore and entered the 9 ⅞" x 7" production casing through the shoe track, installed in the bottom of the casing. Flow entered into the casing rather than the casing annulus. For this to happen, both barriers in the shoe track must have failed to prevent hydrocarbon entry into the production casing. The first barrier was the cement in the shoe track, and the second was the float collar, a device at the top of the shoe track designed to prevent fluid ingress into the casing.	Hydrocarbon ingress was through the shoe track, rather than through a failure in the production casing itself or up the wellbore annulus and through the casing hanger seal assembly. Potential failure modes were identified that could explain how the shore track cement and the float collar allowed hydrocarbon ingress into the production casing.	BP's Well Barrier Practice establishes the minimum requirements for the selection, design, installation, maintenance, monitoring and management of well barriers and well barrier elements throughout the full life cycle of the well. This practice was developed in response to the DWH incident. Well barriers are specifically required to isolate energy sources within the earth from each other, the surface environment, and people. This practice applies to all wells regardless of where they are in their life cycle, including those under construction, actively in service, temporarily abandoned or permanently abandoned.

Finding	Summary description	Investigation conclusion	Application to this project
Critical factor: Hydrocarbons entered the well undetected and well control was lost			
3. The negative-pressure test was accepted although well integrity had not been established.	Prior to temporarily abandoning the well, a negative pressure test was conducted to verify the integrity of the mechanical barriers (the shoe track, production casing and casing hanger seal assembly). The test involved replacing heavy drilling mud with lighter seawater to place the well in a controlled underbalanced condition. In retrospect, pressure readings and volume bled at the time of the negative pressure test were indications of flow-path communication with the reservoir, signifying that the integrity of these barriers had not been achieved.	The Transocean MODU crew and BP well site leaders reached the incorrect view that the test was successful and that well integrity had been established.	BP's Well Barrier Practice addresses the pressure testing requirements for wells. Additionally, BP established a global wells institute so that BP wells professionals have access to a single, systematic training program. Courses cover more than 32 technical streams, from basic cementing to subsea well intervention. The curriculum is underpinned by BP's values and the practices laid out in the Operating Management System (OMS). BP has also signed a contract with Maersk Training who has a state of the art immersion simulator in Denmark and is currently building a second facility in Houston, Texas. The Maersk facilities allow other teams (operations, marine, etc.) to conduct simultaneous training with well control personnel, in order to enhance coordinate operations across the rig. The training is opened up to the rig teams that include individuals from BP, drilling contractors and service companies who support the wells activities. The focus of this scenario and simulator-based program is to help develop the rig teams so they function as one team. The institute's training facility in Houston has received preliminary accreditation by the international Association of Drilling Contractors (IADC) Well Control Accreditation Program and the International Well Control Forum (IWCF) to teach drilling well control courses and certify personnel.

Finding	Summary description	Investigation conclusion	Application to this project
4. Influx was not recognised until hydrocarbons were in the riser.	With the negative pressure test having been accepted, the well was returned to an overbalanced condition, preventing further influx into the wellbore. Later, as part of normal operations to temporarily abandon the well, heavy drilling mud was again replaced with seawater, under-balancing the well. Over time, this allowed hydrocarbons to flow up through the production casing and passed the BOP. Indications of influx with an increase in drill pipe pressure are discernible in real-time data from approximately 40 minutes before the rig crew took action to control the well. The rig crew's first apparent well control actions occurred after hydrocarbons were rapidly flowing to the surface.	The rig crew did not recognize the influx and did not act to control the well until hydrocarbons had passed through the BOP and into the riser.	See item 2.
5. Well control response actions failed to regain control of the well.	The first well control actions were to close the BOP and diverter, routing the fluids exiting the riser to the DWH mud gas separator (MGS) rather than to the overboard diverter line.	If fluids had been diverted overboard, rather than to the MGS, there may have been more time to respond, and the consequences of the accident may have been reduced.	BP's Well Control Practice provides requirements and possibilities for well control risk mitigation, response, and remediation on all BP operated activity throughout the lifecycle of a well. BP has also participated in the development and chaired several committees at API to improve Standards (16 series) that advance capabilities across the industry. These standards are incorporated into BP's requirements. BP personnel also receive internationally recognised well control certifications prior to working offshore and offshore crews also participate in group simulation training to enhance their collective team capabilities.

Finding	Summary description	Investigation conclusion	Application to this project
Critical factor: Hydrocarbons ignited on Deepwater Horizon			
6. Diversion to the mud gas separator results in gas venting onto the rig.	Once diverted to the MGS, hydrocarbons were vented directly onto the rig through the 12' goosenecked vent exiting the MGS, and other flowlines also directed gas onto the rig. The increased the potential for the gas to reach an ignition source.	The design of the MGS system allowed diversion of the riser contents to the MGS vessel although the well was in a high flow condition. This overwhelmed the MGS system.	BP's Process Safety in Well Design, Construction, Intervention and Operations Practice outlines the methods and tools to achieve design safety through management of hazards. Managing hazards involves eliminating or minimizing major accident hazards at source and preventing those that remain from becoming major accidents. This may include equipment and design modification before the MODU begins a drilling program. All MODUs are also inspected by BP's Rig Engineering intake team and they provide assurance that the MODU is fit for purpose. In addition, the design requirements for mud gas separators have been changed in order to divert gas overboard and not near equipment or personnel.
7. The fire and gas system did not prevent hydrocarbon ignition.	Hydrocarbons migrated beyond areas on DWH that were electrically classified to areas where the potential for ignition was higher.	The heating, venting and air conditioning system probably transferred a gas-rich mixture into the engine rooms, causing at least one engine to overspeed, creating a potential source of ignition.	
Critical factor: The blowout preventer did not seal the well			
8. The BOP emergency mode did not seal the well.	Three methods for operating the BOP in the emergency mode were unsuccessful in sealing the well. • The explosions and fire very likely disabled the emergency disconnect sequence, the primary emergency method available to the rig personnel, which was designed to seal the wellbore and disconnect the marine riser from the well. • The condition of critical components in the yellow and blue control pods on the BOP very likely prevented activation of	There were indications of potential weaknesses in the testing regime and maintenance management system for the BOP.	BP requires that all subsea BOPs have 2 shear rams and the Subsea BOP Practice provides technical and management requirements aimed at improving BOP system performance. The intent of this practice is the reduction of Major Accident Risks potential associated with well control through improved reliability of subsea BOP systems. Requirements in this practice are based on the recommendations from: • The DWH Investigation Report (September, 2010). • Industry practices.

Finding	Summary description	Investigation conclusion	Application to this project
	another emergency method of well control, the automatic mode function, which was designed to seal the well without rig personnel intervention upon loss of hydraulic pressure, electric power and communications from the rig to the BOP control pods. An examination of the BOP control pods following the accident revealed that there was a fault in a critical solenoid valve in the yellow control pod and that the blue control pod AMF batteries had insufficient charge; these faults likely existed at the time of the accident. • Remotely operated vehicle intervention to initiate the autoshear function, another emergency method of operating the BOP, likely resulted in closing the BOP's blind shear ram (BSR) 33 hours after the explosions, but the BSR failed to seal the well.		• Requirements of the Exploration and Production (E&P) Operating Management System. This practice is aligned with API STD 53 (Blowout Prevention Equipment Systems for Drilling Wells) and provides requirements including shearing capability, emergency control systems, emergency disconnect sequence, reliability processes, testing verification, operations procedures, maintenance verification and performance monitoring. It applies to subsea BOP systems owned by BP or installed on a MODU under contract to BP and to drilling, completion, intervention, testing and P&A well activities. BP also formed a dedicated BOP Reliability Team, comprised of over 20 individuals and includes some of the industry's leading experts in BOPs and associated systems. The team is located in Houston, Texas and has a global remit. The team supports all offshore BP drilling activities and can be called upon to assist with BOP related issues as needed. The team is also instrumental at advancing industry capabilities through the American Petroleum Institute (API) (Subcommittee 16A Drill Through Equipment and co-chair of STD 53 revision) and the International Association of Oil and Gas Producers (IOGP) Well Expert Committee and the BOP Reliability and Technology Taskforce. The team has also initiated a BOP Performance Joint Industry Project (JIP) in coordination with IOGP and the International Association of Drilling Contractors in order to enhance BOP reliability globally.

3 Stakeholder Consultation

The philosophy that BP has adopted to stakeholder consultation in respect of its exploration activities in the GAB has been to ensure that the right people have the right information, at the right time. This is in order for stakeholders to be able to effectively engage with BP about the project, so that BP is assured that it has understood the risks, considered the means of ensuring they are reduced to ALARP, and are satisfied that they are acceptable.

In practice, this has meant communicating in a manner that is simultaneously targeted (focussing on community, industry, academic and local government stakeholders that BP could anticipate) as well as broad (using internet tools to make information available to any member of the public anywhere in the world who might choose to identify themselves as an affected person).

Throughout some eight months of correspondence and meetings, BP has undertaken several iterative phases of consultation and is confident that sufficient information has been provided in a sufficient time to both affected persons and the broad community. During this consultation, BP observed three broad categories of input from stakeholders:

1. Requests for clarification. The Commonwealth waters adjacent to SA are lightly explored and broad sections of the community are not familiar with petroleum exploration operations. Many of the matters raised during consultation have been requests for information that have simply required BP to provide an explanation of the nature of its activities.
2. Requests for amendment. Only a very few affected persons have made suggestions or requests for changes in intended operational practice. Indeed, relative to recent experience of marine seismic surveys in the GAB, stakeholders have expressed little objection to the planned impacts of drilling operations, although of course the demand for satisfaction about unplanned events (i.e., oil spill prevention and response) has been significant.
3. Objections to oil and gas exploration in the GAB *per se*. Some environmental non-government organisations (NGOs) have expressed opposition to BP's proposed exploration on the grounds of broad concerns about fossil fuel extraction, establishment of 'sanctuaries' in the marine environment, and climate change. These are issues in which BP (globally and locally) engages regularly through public debate, as well as through parliamentary and government consultation processes. BP respects that some of the views in opposition to oil and gas exploration are sincerely held and legitimately expressed in these forums. However they sit uneasily in the scope of an EP, which is predicated upon the community having concluded these debates in favour of conducting petroleum exploration, and consequently have had to be considered not material to this stakeholder engagement process. This is not intended to imply a lack of respect for these views or a diminution in BP's willingness to engage with them through more appropriate mechanisms

3.1 Stakeholder Identification

Stakeholders were identified from a ground-up evaluation of the economic, social and environmental interests in the GAB that was initially developed for BP's 2011 marine seismic survey. This existing stakeholder database has been further refined according to BP's ongoing consultation.

Internet publication of relevant project information has further enabled the self-nomination of other interested parties. Some community groups, such as The Wilderness Society, have been effective in drawing widespread attention to the project in local media and through the internet. This provides BP with a high degree of confidence that affected parties are unlikely to have been unaware of the project or the means of engaging with BP.

A full list of stakeholders that have been consulted as part of this EP is provided in Table 3.

Table 3 - GAB exploration drilling stakeholders

Academic	
South Australian Research and Development Institute (SARDI) - Wild Fisheries	
Business Organisations	
Regional Development Australia – Whyalla and Eyre	South Australian Chamber of Mines and Energy
Environmental Non-Government Organisations	
Australian Conservation Foundation (ACF)	Whale & Dolphin Conservation Society (WDCS)
Conservation Council (SA)	The Wilderness Society (SA)
International Fund for Animal Welfare (IFAW)	World Wildlife Fund-Australia (WWF)
Wild Migration Kangaroo Island	
Oil Spill Response Organisations	
Australian Marine Oil Spill Centre (AMOSC)	Oil Spill Response Limited (OSRL)
Community Organisations	
Clean Bight Alliance - Ceduna	Friends of Scale Bay
Commonwealth Government	
Australian Fisheries Management Authority (AFMA)	AMSA
NOPSEMA	DoE
Commonwealth Members of Parliament	
Rowan Ramsey MP – Federal Member for Grey	
Fishing and Aquaculture	
Abalone Fisheries	GAB Trawler Industry Association
Southern Shark Industry Alliance	South Australian Marine Scalefish Fishery
Charter Boat Fisheries	Northern Zone Rock Lobster Fishery Association

Commonwealth Fisheries Association	Sardines Fishery
Marine Fishers Association	Sarin Group
Great Australian Bight Fishing Industry	Seafood Council SA
Spencer Gulf and West Coast Prawn Fishers Association	Australian Southern Bluefin Tuna Industry Association (ASBTIA)
South Australian Oyster Growers Association	Wildcatch Fisheries of South Australia
Western Australian Fishing Industry Council	
Self-Identified Interested or affected stakeholders	
Fowlers Bay Eco Tours	
Indigenous Community	
Far West Native Title Group	Yalata Community Inc.
Alinytjara Wilurara Natural Resource Management Board	
Local Government	
City of Port Lincoln	District Council of Streaky Bay
District Council of Ceduna	Eyre Peninsula Local Government Association
District Council of Elliston	Kangaroo Island Council
District Council of Lower Eyre Peninsula	Eyre Peninsula Mineral and Energy Resources Community Development Taskforce
South Australian State Government	
Department of Planning, Transport and Infrastructure (DPTI)	Department of Environment, Water and Natural Resources (DEWNR)
Hon Ian Hunter- Minister for Sustainability, Environment and Conservation Minister for Water and the River Murray	Department of Primary Industries and Regions South Australia (PIRSA) – Fisheries and Aquaculture
Department of State Development (DSD)	Hon Geoff Brock - Minister for Regional Development and Local Government
South Australian Police (SAPOL)	Environment Protection Authority (EPA)
Natural Resource Management (NRM) - Eyre Peninsula	DEWNR GAB Marine Park (Manager)
South Australian State Parliament	
Peter Treloar MP – State Member for Flinders	
Western Australian Government Agencies	
Department of Transport (DoT)	Department of Parks and Wildlife (DPAW)
Department of Mines and Petroleum (DMP)	

3.2 Stakeholder Engagement

Since being awarded the exploration permits in January 2011, BP has implemented a stakeholder engagement strategy for the exploration program. Specific consultation regarding the exploration drilling EP has been undertaken since late 2014, however the drilling program itself has been discussed with stakeholders since 2012. This timeframe for consultation has allowed adequate time for an iterative feedback loop before submitting the EP.

The project stakeholder engagement process is summarised below.

1. Identification of stakeholders as discussed above
2. Introductory correspondence was sent to all identified stakeholders in December 2014 offering to meet with BP and provide further information.
3. Meetings were secured with stakeholders, and introductory face-to-face briefings were held to discuss proposed drilling operations. Questions, issues and concerns raised during these meetings and through correspondence were recorded. BP addressed these issues directly with stakeholders, and information was also provided on BP's website www.bpgabproject.com.au. This website was established in 2013 and is updated regularly.
4. Allow time for stakeholders to raise issues and ask questions regarding proposed drilling operations based on BP's responses and online information.
5. Further face-to-face consultation was then conducted based on initial questions, issues and concerns and follow up questions received post introductory briefings. This second round of consultation largely focused on oil spill prevention and oil spill response given these were the key issues raised by stakeholders.
6. Answers to further issues raised were provided by written correspondence and online at www.bpgabproject.com.au.
7. The draft summary EP was published on BP's website upon submission of the EP to NOPSEMA, and stakeholders were notified of its availability.

In addition to the above meetings that focused specifically on the EP, BP has been in discussions with AMOSC, OSRL, SA DPTI and WA DoT regarding oil spill response preparedness.

3.3 Key Themes Raised During Consultation

The key themes have been raised during consultation are outlined in Table 4. These key themes have been responded to during face-to-face consultation workshops by BP Subject Matter Experts, summarised in correspondence and referenced on the project website

Table 4 - Key themes raised during stakeholder consultation

Public access to oil spill modelling and oil spill response documents
A number of stakeholders have requested a full copy of the oil spill modelling report, as they believe that they need to see this report to be assured that BP has adequately planned for oil spill response. BP is unable to publish the full oil spill modelling report due to the commercial sensitivities of model inputs, which are of commercially competitive significance (including hydrocarbon phase, volume and reservoir quality assumptions). However, BP agrees that the conclusions of the modelling and the response plans derived from it are important matters of public consideration and has provided information regarding how the modelling was conducted, such as the thresholds used and scenarios modelled. BP has also discussed key modelling results with stakeholders, such as probability of shoreline contact, and how these results are used to inform oil spill planning. BP has also provided a summary of tactical response plans on our consultation website. The details of how the GAB drilling program has incorporated BP lessons learned from the Deepwater Horizon incident have also been discussed during consultation meetings, with specific information regarding prevention of loss of well control and technical solutions to a loss of well control event, such as capping and containment and relief well planning, provided. A summary of oil spill response planning is outlined in Section 6 below. Summaries of the tactical response plans developed for the drilling program are also available on our website at www.bpgabproject.com.au.
Prevention of, and response to, a well blowout
A number of stakeholders raised concerns regarding BP's capacity to prevent oil spills, with a focus on spills resulting from a loss of well control, particularly in light of the Deepwater Horizon incident. Specific questions focused on the use of capping stacks and BPs capacity to drill a relief well. Given this feedback from the initial consultation, BP focused follow up face-to-face meetings on oil spill prevention and response. Specific information was provided regarding loss of well control prevention and response measures, as well as details of oil spill planning and response. These follow up meetings were conducted by BPs specialists in these areas (the GAB Engineering Team Leader and GAB Crisis and Continuity and Emergency Response Manager). Specific information was provided by the GAB Engineering Team Leader in face-to-face meetings regarding capping and containment as well as the drilling of relief wells. Information regarding the various capping stacks available for use, and how these capping stacks would be used during a loss of well control event were discussed. Details regarding the relief well planning process were also provided, including information regarding timeframes associated with drilling a relief well, and how BP would access required resources. This information has been summarised and included on the project website. The details of how the GAB drilling program has incorporated BP lessons learned from the Deepwater Horizon accident have also been discussed during consultation meetings, with specific information provided regarding prevention of loss of well control and technical solutions to a loss of well control event, such as capping and containment and relief well planning.

Use of dispersants

A number of questions were raised regarding BP's plans to use dispersant in the event of an oil spill, particularly regarding the type of dispersant that would be used, and how they work. Reference was made to toxic impacts associated with dispersant use in response to the Deepwater Horizon incident.

BP provided information regarding the types of dispersant that may be used and the requirements of the Australian Oil Spill Control Agents (OSCA) register (i.e., requirements for toxicity and efficacy testing of dispersants before they are approved for use in Australia).

BP also outlined the decision-making process that would be undertaken prior to deciding to apply dispersants (i.e., that a net environmental benefit analysis would be conducted as part of oil spill response).

BP has also provided a summary of tactical response plans on our consultation website www.bpgabproject.com.au, which includes a summary tactical response plan for dispersant use.

Impact of underwater sound on marine life

A number of questions were raised regarding generation of underwater sound and the potential impacts of this sound on marine life.

BP discussed the results of underwater sound modelling that was conducted for the project. This modelling predicts that the level of sound generated during drilling is highly unlikely to cause physical or behavioural impacts to sensitive marine species.

The underwater sound modelling report has been made available to stakeholders via the project website.

Water depths

Most stakeholders asked about the water depth of the GAB wells, and specifically if they were deeper than 'normal' wells.

Only the first drilling location has been identified to date - Stromlo, which is located in just over 2, 200 m water depth. The subsequent well locations have yet to be determined, so specific details of water depths cannot be provided at this time. However, BP advised that the water depths in the drilling area range from approximately 1,000 m to 2,500 m. Furthermore, BP advised that both these water depths, along with likely well depths, are similar to wells drilled by BP elsewhere in the world, such as the Gulf of Mexico, Angola and Brazil.

Economic opportunities from the program

A number of stakeholders were interested in discussing the economic opportunities that may arise as a result of the drilling program.

BP discussed potential opportunities that will arise in locations such as Ceduna. It was noted however, that at this early stage of exploration, opportunities employment opportunities are limited.

Details were also provided regarding the Industry Capability Network (ICN) portal that BP has opened to engage with the local supply chain, which encourages potential suppliers to register interest in order to be informed of future local supply chain opportunities.

Public access to the Environment Plan

A number of stakeholders have requested a full copy of the EP prior to it being submitted to NOPSEMA. They believe that being asked to provide input without seeing the full EP is not possible.

BP deliberately began the eight-month consultation process leading up to the submission of this EP at a time when it had identified key issues, but had not settled upon the answers to them. Most stakeholders welcomed the fact that BP was prepared to develop its EP through an iterative process with them, rather than presenting them with a final document. However, other stakeholders who expressed more generalised opposition to fossil fuel exploration in the GAB chose to present this inclusive process as a failure to provide answers.

Nevertheless, in order to maximise disclosure, BP has provided an outline of what key environmental impacts will be assessed in the document, and the mitigation and control measures that will be implemented to manage these potential impacts. BP has also asked for stakeholders to identify specific areas that they would like additional information on. As a result, BP focused follow up face-to-face meetings on oil spill prevention and response.

While the full EP contains some information (such as the confidential data of members of the public who engaged with BP, or certain elements of proprietary analysis) and is therefore not capable of publication, BP decided to publish a draft of its Summary EP (this document) at the same time the full EP is submitted to NOPSEMA. This allows all stakeholders to review the coverage of issues raised prior to the EP being accepted by NOPSEMA.

BP has ensured answers to specific questions raised during EP consultation are shared by including FAQs on the 'consultation' part of the project website. BP has also responded to specific correspondence that provided more detail on a number of areas throughout the consultation process.

Opposition to drilling
Some stakeholders indicated broad scale opposition to BP's plans to drill in the GAB per se rather than specific aspects of the EP, for example due to opposition to fossil fuel extraction or exploration in the GAB. Whilst BP recognises that these are legitimate views for debate in society, and engages with them in a number of forums such as government policy White Paper processes, it proved difficult to find areas of constructive discussion and mutual agreement from these discussions that relate to the EP itself.

BP believes that sufficient information has been provided to stakeholders regarding the key themes raised during stakeholder consultation. BP will continue to consult with stakeholders during well planning and operations, and will provide relevant information as it becomes available.

3.4 Ongoing Consultation

Stakeholder consultation will be ongoing in the lead up to and during the project. Key milestones that will trigger further consultation include:

- The availability of the draft EP Summary (this document) on BPs project website.
- EP acceptance and the availability of the EP Summary on BP's project and NOPSEMA websites.
- The mobilisation of the MODU to Australian waters;
- The arrival of the MODU in the drilling area and spudding of the first well;
- At regular intervals (quarterly) throughout the drilling program; and
- Upon completion of the drilling campaign.

Where there are specific issues raised by stakeholders that have not been closed out at the time of EP acceptance, consultation will be ongoing in the lead up to the start of the project.

BP wrote to all stakeholders notifying them of additional information available at the project website, committing to ongoing engagement throughout the project and closing out the EP consultation for the purposes of preparing a Draft EP Summary for public access at the time BP submits the EP to NOPSEMA.

4 Description of the Existing Environment

Where possible, the Area that May Be Affected (AMBA) by a worst-case oil spill is used in this chapter to define the boundary within which the marine environment is described (excepting onshore socio-economic descriptions that lie outside the AMBA). The AMBA is defined as 'the predicted extent of exposure of sea-surface (5 µm), dissolved and entrained hydrocarbons (58 ppb) and shorelines with a minimum load ashore of 100 ml/m2 hydrocarbons as a result of a 35-day subsea blowout commencing in the summer season', and is shown in Figure 2.

4.1 Research

Since being awarded the GAB exploration permits in 2011, BP has been instrumental in the development of the $20 million, four-year GAB Research Program, which is a collaboration between BP, CSIRO, the South Australian Research and Development Institute (SARDI), the University of Adelaide and Flinders University.

The GAB Research Program will reveal new insights into how the GAB ecosystem operates. Multi-disciplinary research teams comprising more than 100 of Australia's top scientists and technical staff are focused on seven major research themes, these being:

1. Oceanography
2. Open water (pelagic) ecosystem and environmental drivers
3. Sea floor (benthic) biodiversity
4. Ecology of iconic species, such as whales and sea lions and apex predators, such as southern bluefin tuna and sharks
5. Petroleum geology and geochemistry
6. Socio-economic analysis
7. Integration of projects and ecosystem modelling

Information flowing from these studies has been incorporated into the EP wherever possible, though many of the projects are still in their early stages.

4.2 Physical Environment

4.2.1 Climate

The GAB has a 'Mediterranean' summer, with mild wet winters and hot dry summers. Average monthly temperatures along the coast range from 28°C in January to 17°C in July. The majority of annual rainfall in the region occurs during the autumn and winter months (April to August), with an annual average of 272 mm at Eucla and 296 mm at Ceduna.

The area has an average wind speed of 14.72 knots and maximum wind speed of 44 knots. While winds are variable throughout the year, they tend more from the south to east quadrant during January to March.

The sea surface temperatures of the GAB vary from about 15°C in September to just below 20°C in February/March.

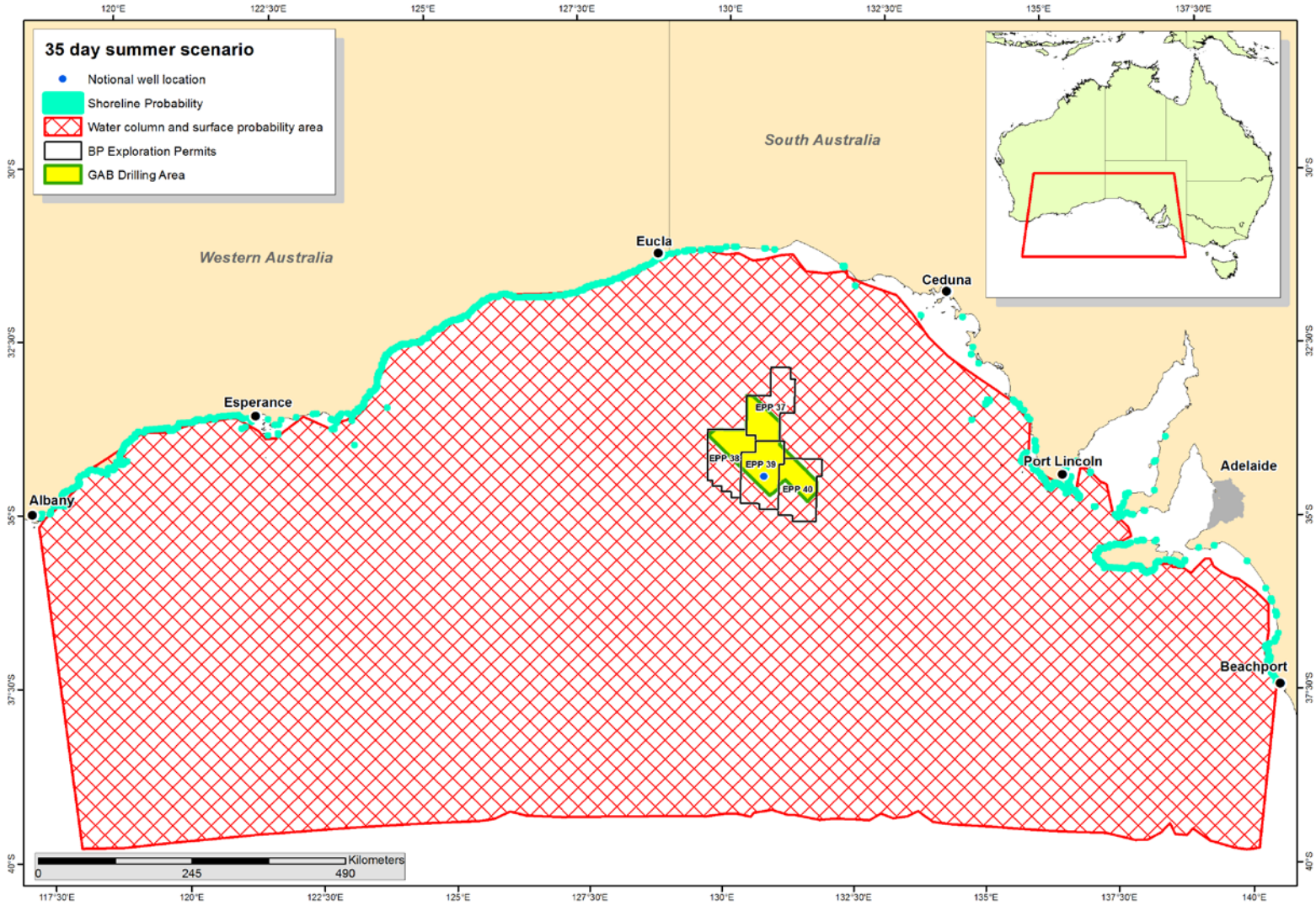


Figure 2 - The project AMBA

4.2.2 Oceanography

The drilling area has water depths ranging between 1,000 and 2,500 m.

Four distinct currents occur within the GAB:

1. Leeuwin – comprises waters of low salinity and high temperatures, originating from the tropical Indian Ocean and passing in an easterly direction along the continental shelf during winter with speeds up to 1 ms^{-1} (Rogers *et al.*, 2012). During summer, the penetration of the Leeuwin Current into the GAB is weak to non-existent (Rogers *et al.*, 2012).
2. Central Bight – characterised by warm, highly saline waters derived from the southwest Indian Ocean and is present in the central and eastern portions of the GAB, especially during winter.
3. West Wind – present in the slope and shelf break parts of the GAB throughout the year and comprises cold water with low salinity.
4. Flinders – a surface current characterized by cool, low saline waters (Edyvane, 1998). It is considered a 'small sister' to the major western boundary currents of the world (Rogers *et al.*, 2012). In the absence of eddies, these data would indicate the Flinders Current to have an amplitude of 20 cms^{-1} at depths of 500-600 m and to form part of the Leeuwin Undercurrent that penetrates the GAB during winter (Rogers *et al.*, 2012).

A feature of the circulation in the GAB is the presence of mesoscale eddies during summer and winter. These eddies may penetrate to depth and effect local cross-shelf exchange including both upwelling and downwelling (Rogers et al., 2012).

Seasonal (summer) upwellings occur in the eastern GAB however there is no strong evidence that upwelling occurs in the mid-GAB (Rogers *et al.*, 2012). For the mid-GAB, recent research indicates year-round downwelling to 300 m (Rogers *et al.*, 2012).

Southern Australian waters experience a tidal cycle varying from normal semi-diurnal tidal variations at springs to almost no tidal movements at neaps. The swells are predominantly from the southwest, creating a high wave energy regime along the eastern coastline of the region.

Wave height is predicted to exceed 3 m for 30-60 days of the year and 6 m for 0-10 days of the year.

4.2.3 Ambient Ocean Sound

Ambient sound levels in the GAB were recorded by sound loggers that were deployed in the GAB as part of BP's efforts to investigate underwater sound characteristics of the area; one near the Head of Bight and two along the shelf break at water depths of approximately 200 m. Ambient sound was higher at the shelf break sites compared with the Head of Bight, and the two shelf break sites showed a steady increase in ambient noise over summer and into early Winter (McCauley *et al.*, 2012). McCauley et al (2012) found that ambient sound levels:

- At the Head of Bight – ranged from 73.5 to 131.9 dB re 1µPa (RMS), with an average of 97.1 dB re 1µPa (RMS); and
- At the shelf break - ranged from 74.5 to 144.9 dB re 1µPa (RMS), with an average of 111.7 dB re 1µPa (RMS).

4.2.4 Seabed

The drilling area occurs entirely within the continental slope of the GAB, within water depths varying from 1,000 m to 2,500 m. The continental slope is up to 250 km wide in the GAB and features mid-slope terraces and numerous deep submarine canyons (GA, 2005), most of which are located to the southeast of the BP permits. The continental shelf break is at the 200 m isobath (GA, 2005).

About 70% of the seabed in the GAB is composed of soft unconsolidated sediments. Due to large variations in bathymetry however, there are marked differences in sedimentary composition and benthic assemblage structure across the region (Rogers *et al.*, 2012).

There are few sensitive seabed features in the drilling area. There are two volcanic pinnacles in the northern half of EPP39, known as 'Anna's Pimple' and 'Murray's Mount'. These volcanic pinnacles measure approximately 800 m in diameter and are 200 m high (Currie and Sorokin, 2011) and are located in water depths of about 1,800 m. The pinnacles are expected to support diverse and unique benthic faunas (Currie and Sorokin, 2011).

4.3 Coastal Environment

Key coastal areas of outstanding natural value in the GAB include:

- Head of Bight (260 km north of the drilling area) - Shallow waters adjacent to the Head of Bight provide habitat for calving southern right whales (from May to October each year), sharks and seals. A visitor center at the Head of Bight allows visitors to view whales from a viewing platform.
- Nuyts Archipelago (263 km northeast of the drilling area) - contains a complex, interconnected network of highly varied habitats, such as islands, shallow bays and estuaries of varying type and orientation. These habitats provide important nursery and feeding grounds for commercially and recreationally important crustacean and fish species. The southern right whale, Australian sea-lion, New Zealand fur-seal, little penguins and other water birds use the waters of the islands as major food sources and breeding grounds.
- Kangaroo Island (460 km east-southeast of the drilling area) – supports significant Australian sea-lion and New Zealand fur-seal breeding colonies. Little penguin colonies are found at numerous sandy beaches around the island, resident coastal waders use the coastline, while white-bellied sea eagles nest on the western side of the island and forage in the nearby waters resident coastal waters. Over 60 shipwrecks lie in the waters around the island. The Kangaroo Island coastline is popular for surfing, scuba diving, fishing, snorkeling, swimming and sailing.
- Recherche Archipelago (515 km west of the drilling area) – this group of over 1,500 islets composed of granite, with rocky headlands and sandy beaches (Kendrick *et al.*, 2001). Seagrass meadows, flat platform and low profile reef, limestone and granite reef and bare sand are the key benthic habitats. The archipelago provides habitat to over 1% of the world's population of short-tailed shearwaters, white-faced petrels and pied oystercatchers, and over 1,000 pairs of little penguins. The island group is also the only breeding site for the western subspecies of the Cape Barren goose. Breeding colonies of Australian sea-lion and New Zealand fur-seal are found on some islands.

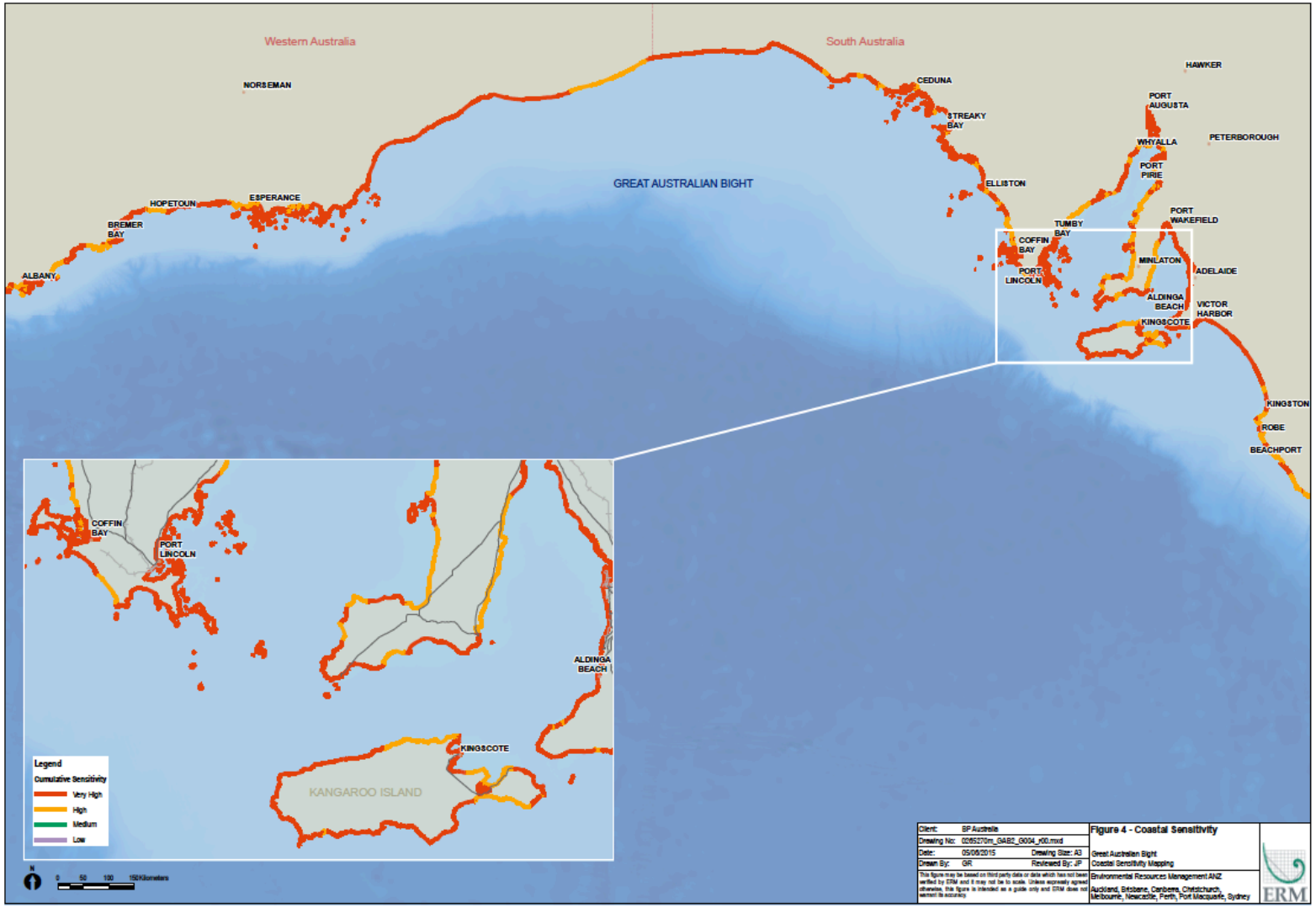
- Coorong coast (670 km southeast of the drilling area) – the Coorong National Park was declared primarily to protect the shallow saltwater lagoons behind the coastal sand dunes, which are wetlands of national and international importance. However, the sandy beaches and fore dunes of the coast provide important nesting sites for the hooded plover, roosting and breeding sites for other bird species, breeding and haul-out sites for Australian sea-lions and New Zealand fur-seals. The coastal waters of this park are popular for swimming, surfing, sight-seeing, diving and recreational fishing.

Coastal areas of high socio-economic value include:

- Eyre Peninsula oyster growing – the section of the Eyre Peninsula between Ceduna and Port Lincoln encompasses several oyster growing areas including Coffin Bay (358 km east of the drilling area); Streaky Bay (344 km northeast of the drilling area), Denial Bay (332 km northeast of the drilling area) and Smokey Bay (342 km northeast of the drilling area)
- Port Lincoln (396 km east of the drilling area) – the southern bluefin tuna (SBT) industry is centered on the town of Port Lincoln, where tuna is caught in the GAB and grown to maturity in pontoons moored off Port Lincoln.
- Venus Bay (345 km northeast of the drilling area) – this enclosed bay is popular for local recreational and tourism pursuits such as swimming, fishing, boating, jet-skiing, canoeing, and surfing, with dolphins and seals present year-round.

BP commissioned ERM Australia to undertake sensitivity mapping along the SA coastline and southern WA coastline, encapsulating the AMBA. Sensitivity mapping assists in the development of oil spill response plans, especially in the identification of sensitive receptors.

Sensitivity classifications were applied to shoreline habitats; biological and ecological resources; and socio-economic resources. Each of these separate sensitivity classifications were then combined to produce a cumulative sensitivity map (Figure 3) to understand the comparative overall vulnerability of the coastline.



ERM (2015).

Figure 3 – Cumulative sensitivities along the coastline of the AMBA

4.4 Biological Environment

4.4.1 Benthic Habitats and Assemblages

Recent sampling of infauna undertaken as part of the GAB Research Program (5 transects in water depths of 200 m, 500 m, 1,000 m, 1,500 m and 2,000 m in the eastern and central GAB) has found that total species richness is not correlated with depth, though species composition changes were partially explained by changes in depth (Williams, 2015). Information from the preliminary results obtained during this sampling program is provided below (Williams, 2015).

This survey was the first systematic collection and detailed identification of macroinfauna from the deep GAB, and has uncovered a diverse set of benthic invertebrates, with 128 distinct species across 72 families in eight major taxonomic groups. Roughly half of all confidently identifiable species were new to science and suggest a new and endemic fauna in the region. The overall structure of the macrofaunal assemblage was largely consistent with previous deep-water sampling from Australia (Poore et al., 2014), with composition and diversity dominated by large numbers of polychaetes and infaunal crustaceans, but generally low abundance. The most abundant amphipod and isopod families are known to be associated with the deep-sea and their compositions were generally consistent with surveys in other regions (Brandt et al., 2012, Knox et al., 2012). The composition of the polychaete fauna, with most abundant families including Cirratulidae, Spionidae, Glyceridae and Opheliidae, is typical of studies elsewhere at comparable depths (Alalikinya, 2013; Shields & Blanco-Perez, 2013).

The large number of new species uncovered was also unsurprising. There have been relatively few surveys of deep-water infauna in Australia, but the proportion of undescribed species (80%) in the deep GAB was consistent with taxa from similar depths along the Western Australian shelf (Poore et al., 2014).

The Department of Sustainability, Environment, Water, Population and Communities (DSEWPC 2012a) report that benthic invertebrate communities inhabiting the east shelf of the GAB, particularly the inner shelf (i.e., northeast of the drilling area), have been identified as one of the world's most diverse soft sediment ecosystems (798 species have been identified so far, including 360 species of sponges, 138 ascidians [sea squirts] and 93 bryozoans [lace corals]). The species that make up these communities decrease in abundance moving away from the coast. On the inner shelf of the more eastern parts of the GAB Shelf Transition bioregion, marine plant communities are more diverse, particularly in the lee of islands in the Nuyts Archipelago, where significant beds of seagrass are found.

Nudibranchs are well represented in SA with over 500 species recorded, though the abundance and distribution of mollusc species in the GAB remains largely unknown (McLeay et al., 2003). Bryozoans (colonial animals attached to solid substrates) are abundant in the GAB, with over 500 species reported in southern Australia (Rogers et al., 2012). Southern Australian waters are rich in echinoderms, with 17 species of sea star recorded from the deeper waters of the continental shelf, and 73 species of brittle stars and 49 species of sea urchins recorded in SA waters (Rogers et al., 2012).

South Australian waters are thought to support the richest assemblage of ascidians (sessile, filter-feeding sea squirts) in the world, with over 200 described species, most of these recorded from offshore islands in the GAB and the limestone reefs of the western Eyre Peninsula. Many ascidian species in the northern GAB are endemic (Rogers et al., 2012).

4.4.2 Marine Flora

The inner coastal regions of the GAB support a diverse range of seagrasses, macroalgae habitats and sponge-dominated communities, however, these are restricted by light penetration and therefore are generally limited to water depths less than 100 m. Due to the waters of the drilling area being deeper than this, it is not expected that marine flora is present in the area.

Seagrass distribution in the GAB is patchy and limited by exposure to swell, with most seagrass found in sheltered bays or in the lee of reefs and islands in the eastern GAB (McLeay et al., 2003).

4.4.3 Demersal Fauna

Knowledge of the demersal fish fauna of the GAB is based primarily on a multi-vessel survey undertaken in 1988, which found at least 166 species from 125 genera and 71 families.

4.4.4 Pelagic Fauna

Plankton

Seasonal upwelling of nutrient-rich water in the eastern GAB leads to increased phytoplankton biomass and primary productivity along the Bonney coast in summer/autumn (Kloser and van Ruth, pers comm., 2015). The central GAB is thought to have downwelling all year round (Kloser and van Ruth, pers comm., 2015) and relatively lower biomass and primary production. Preliminary analysis of plankton samples collected in April 2013 by the GAB Research Program suggests that there may be periodic pulses of deep nutrient-rich water being advected into the euphotic zone of the central GAB (Kloser and van Ruth, pers comm., 2015).

Fish

Two fish species, the great white shark and porbeagle (or mackerel) shark, are listed under the EPBC Act as potentially occurring in the drilling area, in addition to 34 syngnathid (pipefish and seadragon) species. An additional three listed species potentially occur in the ABMA.

A biologically important area (BIA) for the great white shark is located ~130 km from the drilling area. White sharks are widely but sparsely distributed throughout temperate and subtropical regions of the work, and are primarily found in the coastal areas near pinniped colonies. The Neptune Islands, Dangerous Reef, Fowlers Bay and the Pages (near Kangaroo Island) are areas of known great white shark encounters (Cavanaugh et al., 2003.

The GAB is also an important habitat for southern bluefin tuna (SBT), which is an important commercial species. Juvenile SBT migrate down the west coast of Australia from breeding areas near Indonesia, and during the summer months (December to April), they congregate near the surface in waters off the southern coast of Australia.

Mammals

There are 28 whale species, eight dolphin species and three pinniped species recorded under the EPBC Act as potentially occurring within the AMBA. Of the whales, 22 species are 'listed marine species' only, while there are five threatened species. Only one of the dolphins is migratory, the rest being 'listed marine species'.

The National Conservation Values Atlas recognises BIA's for a number of these mammal species within the AMBA. These species are discussed in more detail below.

A southern right whale (SRW) BIA is located ~220 km from the drilling area. The SRW is typically distributed between 20°S and 60°S in the southern hemisphere and is present off the Australian coast between May and November (primarily southwest WA and far west SA). The closest aggregation area to the drilling area is the Head of Bight, 260 km to the north. This is a significant aggregation area, where up to half the population gathers between May and November to calve (DEH, 2006; DSEWPC, 2012c). Twilight Bay, Fowlers Bay and Encounter Bay are other known calving areas in the region (DSEWPC, 2012c).

Exact SRW migration paths away from the coast are unknown, however it is thought that in the spring months (September to November), SRW move offshore from the GAB to higher latitude feeding areas including the Antarctic ice edge (Rogers et al., 2012). The entire coastline from Kangaroo Island west to the Perth Canyon is thought to be an important migratory pathway for the SRW, however a defined near-shore coastal migration corridor is considered unlikely given the absence of any predictable directional movement of southern right whales (DSEWPC, 2012b). From photo identification data, it is thought that relatively direct approaches and departures to the coast are likely, and that there is a seasonal westward movement (DSEWPC, 2012a). Information obtained from sound loggers deployed in the GAB indicates that southern right whales move into the Head of Bight from the south, and possibly from the west (McCauley et al, 2012). Satellite tracking of three SRW undertaken by the Australian Marine Mammal Centre in September 2014 found that two whales initially observed at the Head of Bight travelled more or less directly south across the shelf without following the coastline (Mackay et al, 2015) . It is therefore possible that SRW will travel through the drilling area.

No southern right whales were observed in the drilling area during the November 2011 to May 2012 Ceduna 3D seismic survey.

There are two recognized subspecies of blue whale in Australian waters; the Antarctic blue whale (*B. musculus. intermedia*) and the pygmy blue whale (*B. musculus. brevicauda*) (DSEWPC, 2012b). Both subspecies are found in all Australian waters, with the Antarctic blue whale primarily found in waters south of 60°S and pygmy blues found in waters north of 55°S (DSEWPC, 2012b). Both species feed on krill, with the nearest feeding area about 95 km east of the project area, along the shelf break to the west and east of Kangaroo Island, extending northwest along the 200 m isobaths (Morrice et al., 2004; DSEWPC, 2012a). Antarctic blue whales feed mainly during summer-autumn, while pygmy blues feed during November to May in a regional upwelling system of temperate latitudes (Gill et al., 2011), this being the Eastern GAB Upwelling/Kangaroo Island canyons (DSEWPC, 2012a) located between 167 km and 470 km southeast of the drilling. Pygmy blue whale migration is thought to follow the continental shelf break, with a BIA (migration) for this species located ~ 8 km north of the drilling area. During the 2011-12 Ceduna 3D seismic survey, a total of 12 blue whales were observed; 10 within the drilling area and two during transit. Ten of these sightings occurred during November. Pygmy blue whales were also detected at the Head of Bight by sound loggers deployed from November 2011 to June 2012, with no detection of pygmy blue whales from late January to May 2012 at the Head of Bight (McCauley et al., 2012).

Sperm whales are found in waters from the Arctic to the tropics, and are rarely observed in waters less than 600 m, with females generally found in deeper waters of at least 1,000 m (DSEWPC, 2012a). Females and juveniles appear to move between the eastern Indian Ocean and Tasman Sea down to 55°S while mature males migrate seasonally between Antarctic waters and equatorial breeding grounds. DSWEPC (2012a) indicates that in the South-west Region, sperm whale foraging is concentrated along the shelf break of the GAB and waters south of Kangaroo Island. The BIA overlaps with the northern 15 km of the drilling area. During the 2011-12 Ceduna 3D seismic survey, a total of 25 sperm whales were observed during December, April and May. No sperm whale sound signals were detected by sound loggers deployed from November 2011 to June 2012 at three locations in the GAB (McCauley et al., 2012).

Australian sea-lions are endemic to Australia, found only in southern and southwest Australia. The species generally hauls out (rests) and breeds on rocks and sandy beaches on sheltered sides of islands, although some small colonies exist on the mainland. It breeds on at least 73 islands and at several mainland sites within southern Australia, including a number of locations in the GAB including Dorothy Island, Pearson Isles, Kangaroo Island, Head of Bight and Nuyts Archipelago (DSEWPC, 2012a). Female Australian sea-lions travel up to 130 km on foraging trips and dive to depths of 130 m, while males travel up to 300 km and dive to at least 200 m (Rogers et al., 2012). The drilling area is 57 km south of a (foraging) BIA for the Australian sea-lion. No Australian sea-lions were observed during the 2011-12 Ceduna 3D seismic survey.

Reptiles

Three species of marine turtle (loggerhead, green and leatherback) are listed under the EPBC Act as potentially occurring in the AMBA, though are unlikely to occur in high numbers. All three species are threatened and migratory.

Birds

Nineteen (19) bird species (skua, albatross and petrel) are listed under the EPBC Act as potentially occurring in the drilling area. The majority of these are migratory species that pass through the area on annual migrations to and from feeding and breeding areas. Numerous other bird species known to use marine or coastal habitat potentially occur within the AMBA.

The National Conservation Values Atlas indicates that BIAs for foraging exist within various parts of the AMBA for the following species:

- Antipodean albatross (*Diomedea exulans antipodensis*), black-browed albatross (*Thalassarche melanophris*), Campbell albatross (*T. melanophris impavida*), shy albatross (*T. cauta cauta*), and wandering albatross (*D. exulans*) – foragaing areas south of Kangaroo Island and all seas off the Victorian and Tasmanian coasts. May forage through the GAB.
- Black-faced cormorant (*Phalocrocorax fuscescens*) – foraging in near-shore areas of Spencer Gulf, Gulf of St Vincent, and mid-southern WA coast.
- Bridled tern (*Sterna anaethetus*) – foraging in high numbers along the southwest WA near-shore coast as far east as the Eastern Recherche archipelago.
- Fairy tern (*Sterna nereis*) - foraging in near-shore areas of Spencer Gulf, Gulf of St Vincent, and foraging in high numbers of the near-shore southwest WA coast as far east as the Eastern Recherche archipelago.

- Flesh-footed shearwater (*Pandion haliaetus*) - foraging in high numbers in near-shore areas of the southwest WA coast as far east as the Eastern Recherche archipelago, and in low numbers for a short distance east of the archipelago.
- Great-winged petrel (*Pterodroma macroptera*) – foraging for young in offshore waters of the southern WA coast.
- Indian yellow-nosed albatross (*Thalassarche carteri*) - foragaing areas south of Kangaroo Island and all seas off the Victorian and Tasmanian coasts, together with the southwest coast of WA.
- Little penguin (*Eudyptula minor*) – foraging and foraging for young in nearshore waters from the southwest coast of WA east to Kangaroo Island (except for cliff shorelines).
- Little shearwater (*Puffinus assimilis*) - foraging in high numbers off the southwest WA coast as far east as just east of the Eastern Recherche archipelago.
- Pacific gull (*Larus pacificus*) - foraging in high numbers in nearshore waters of the southwest WA coast as far east as just east of the Eastern Recherche archipelago, and foraging from this point east to Kangaroo Island.
- Short-tailed shearwater (*Puffinus tenuirostris*) - foraging in high numbers in offshore waters of most parts of the GAB.
- Soft-plumaged petrel (*Pterodroma mollis*) - foraging in offshore waters of the southwest WA coast.

4.5 Conservation Values and Sensitivities

This section describes the Commonwealth and state environmental and heritage values found through the AMBA.

4.5.1 Key Ecological Features

Key ecological features are elements of the Commonwealth marine environment that are considered to be of regional importance for either a region's biodiversity or its ecosystem function and integrity. Sixteen key ecological features have been identified in the South-west Marine Region, with eight of these KEFs identified as occurring within the GAB and the broader AMBA (DSEWPC, 2012a):

- Ancient coastline between 90 and 120 m depth – 62 km north of drilling area
- Kangaroo Island Canyon Pool, canyons and adjacent shelf break – 167-470 km southeast of drilling area
- Commonwealth Marine Environment surrounding the Recherche Archipelago – 495 km west of drilling area
- Albany Canyons Group and adjacent shelf break – 510 km west of drilling area
- Bonney Coast Upwelling – 685 km southeast of drilling area
- The Diamantina Fracture Zone – 900 km southwest of drilling area
- Small pelagic fish
- Benthic invertebrate communities of the eastern GAB

The location of these KEF's are shown in Figure 4. Note that the small pelagic fish and the benthic invertebrate KEF's have not been spatially defined, and are therefore not mapped.

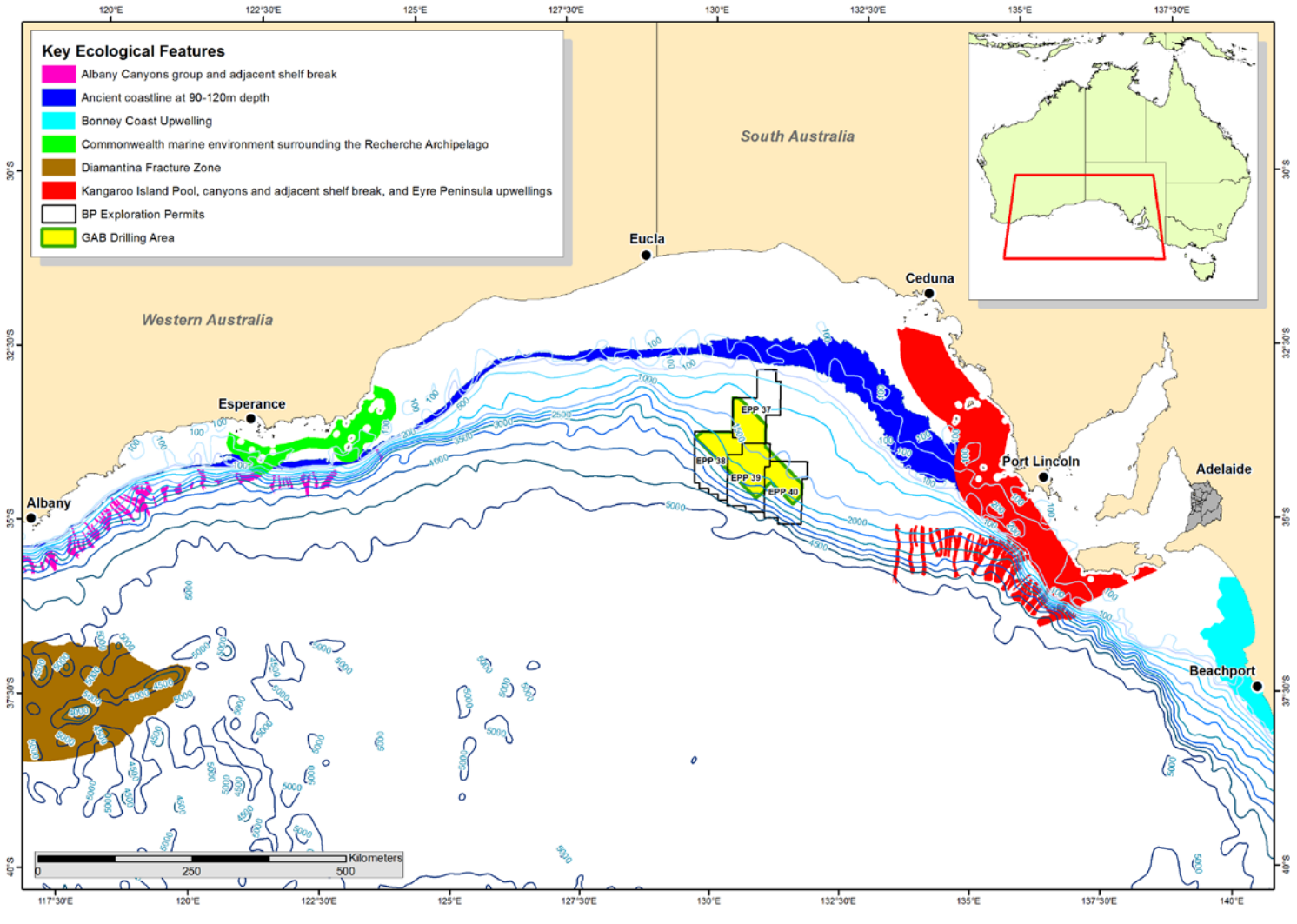


Figure 4 – Key Ecological Features present within the AMBA

4.5.2 Commonwealth Marine Reserves

In 2012, the Australian Government established 40 new Commonwealth Marine Reserves (CMR) around Australia. Ten CMRs occur within the AMBA (Figure 5), and these are discussed in more detail in the EP. It is important to note that the Commonwealth Government is currently undertaking a CMR Review following the setting aside of the CMR management plans that were scheduled to come into effect in July 2014.

Of particular note is the GAB CMR which intersects the proposed drilling area. The GAB CMR was originally declared in 1998 and initially included two main zones within a 19 700km^2 area: the Benthic Protection Zone and the Marine Mammal Protection Zone. These areas have been encompassed into the extended CMR, which covers 45,926 km^2.

In the absence of a finalised management plan for the GAB CMR, the 'major conservation values' identified for the GAB CMR (Director of National Parks, 2013) have been used. These are the:

- Important foraging areas for the threatened Australian sea lion and great white shark;
- Important foraging areas for the migratory sperm whale and short-tailed shearwater;
- Provision of globally important seasonal calving habitat for the SRW;
- Examples of central and western ecosystems of the GAB Shelf Transition and the eastern-most ecosystems of the Southern Province;
- Presence of three KEFs, these being the:
    - Ancient coastline 90-120 m (high productivity zone).
    - Benthic invertebrate communities of the eastern GAB (high species diversity).
    - Areas important for pelagic fish.

These 'values' incorporate the original conservation values of the GAB marine park, ie the Benthic Protection Zone (benthic fauna and habitats) and Marine Mammal Protection Zone (SRW calving).

4.5.3 Other Sensitive Sites

There are no World Heritage listed Sites, Commonwealth Heritage Places or National Heritage Places located within the AMBA.

The Coorong and Lakes Alexandrina and Albert Wetland Ramsar wetlands are located 661 km east-southeast of the drilling area. This boundary of this wetland network encapsulates the coastal dune network to the high water mark, thus intersecting the AMBA.

4.5.4 State Marine Reserves

Nineteen State Marine Parks have been established in coastal SA waters under the *Marine Parks Act* 2007 (SA) (Figure 6). All of these marine reserves are located along the coastline, more than 230 km from the drilling area, with many of these being located within the AMBA. There are no WA marine parks located within the AMBA.

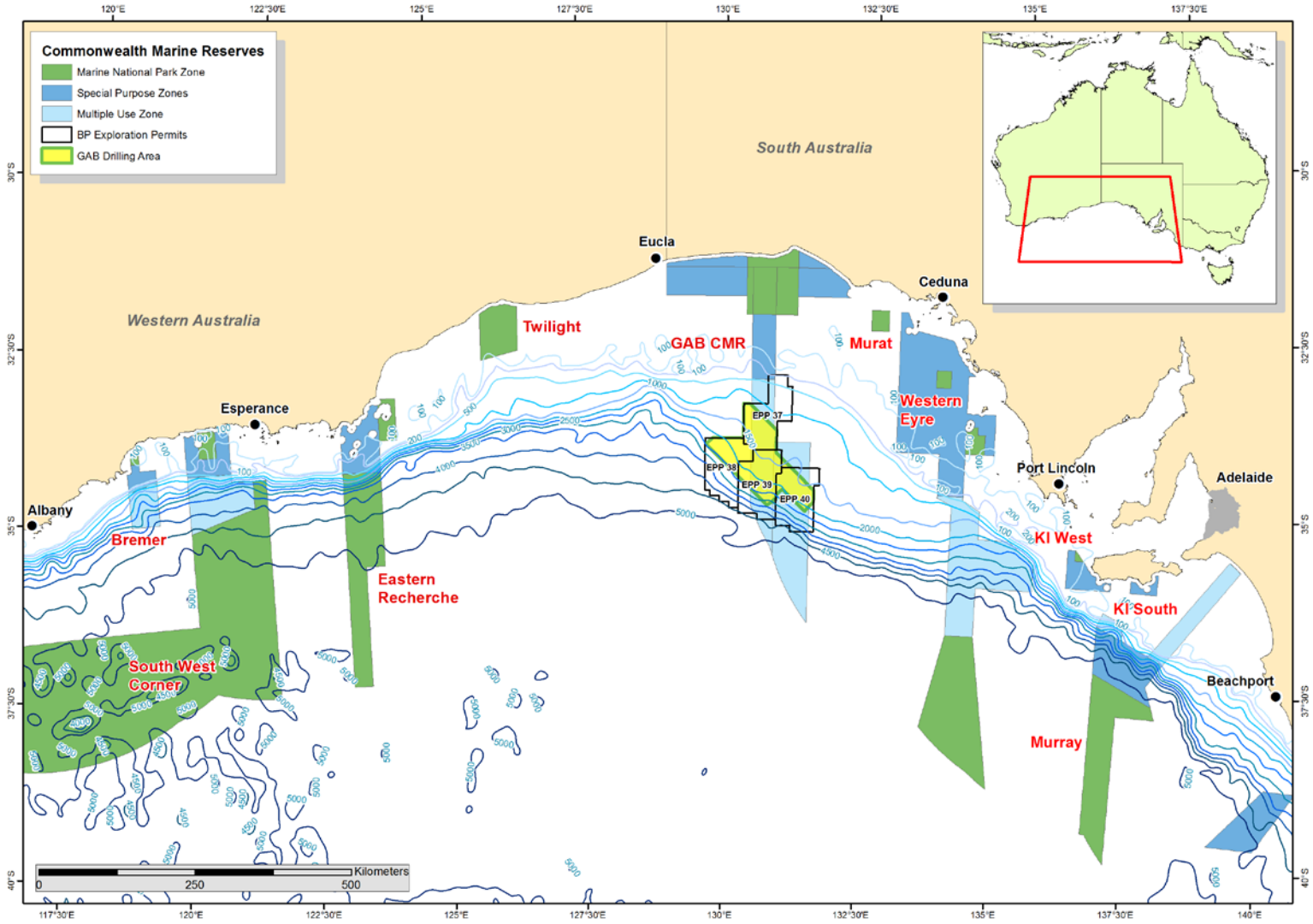


Figure 5 - Commonwealth Marine Reserves

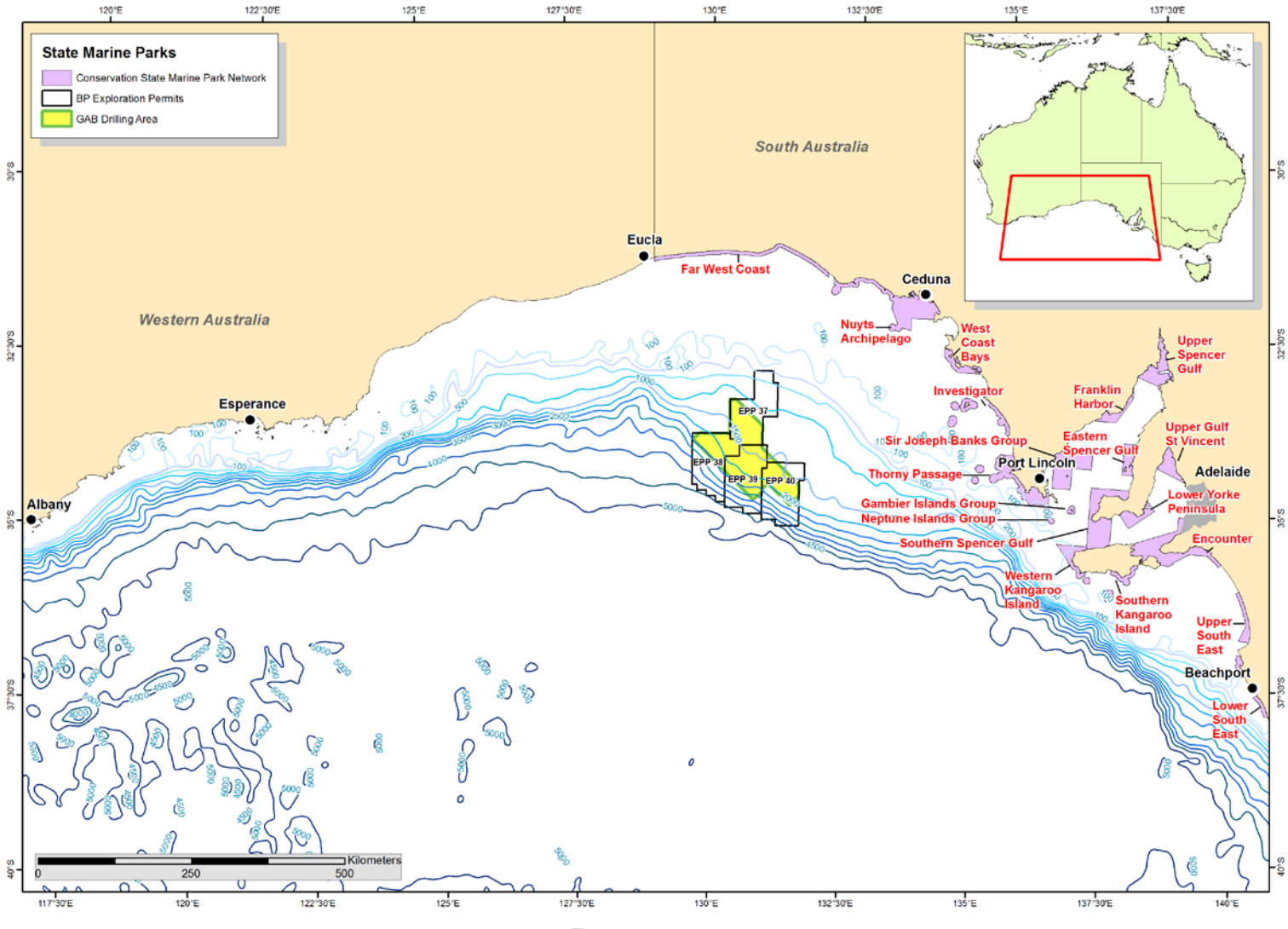


Figure 6 - South Australian State Marine Parks

4.6 Cultural Environment

No areas of Aboriginal or non-Aboriginal archaeological heritage are identified in the GAB.

There are no shipwrecks recorded for offshore areas of the GAB. However, there are 181 'historic' shipwrecks along the SA coast. There are 19 ships' graveyards located in SA waters, with the majority of these located within the two gulfs, except for one at Goat Island near Ceduna and two on the southeast tip of Kangaroo Island. Within the AMBA of the WA coast, there are 33 shipwreck recorded.

Native Title claimant applications cover much of the SA and southern WA coastlines (including some state waters), and are therefore intersected by the AMBA. None of the claimant applications that extend into state waters have been determined yet. No Native Title claims extend into Commonwealth waters (NNTT, 2015).

4.7 Socio-economic Environment

4.7.1 Coastal Settlements

At its nearest point, the drilling area is located 240 km south of the Australian mainland. This part of the mainland is dominated by the Nullarbor Plain, with very few populated settlements.

Ceduna and Port Lincoln are the largest towns in the region. Ceduna's economy is centered on crop and sheep farming, tourism and port activities. Aquaculture (oyster farming) in Denial Bay and Smoky Bay are also important industries for the area (District Council of Ceduna, 2012). Port Lincoln is known as the 'seafood capital' of Australia, well regarded for its tuna fishing. Like Ceduna, its economy is based on crop, sheep and beef farming, as well as tuna, prawn, abalone and scale fishing

4.7.2 Commercial Fishing

The drilling area is overlapped by the jurisdiction of several Commonwealth and State-managed fisheries, as outlined below.

However, very little fishing activity is undertaken in and around the drilling area. BP will continue to consult with fishing groups to ensure a continued awareness of fishing activities in the vicinity of drilling operations is maintained.

Commonwealth-managed Fisheries

Commonwealth fisheries are managed by AFMA, with Commonwealth fisheries operating from 3 nm of baseline out to 200 nm (the extent of the Australian Fishing Zone, AFZ). The drilling area lies within an area encompassed by several Commonwealth managed fisheries, with a number of other fisheries within the AMBA. These fisheries are summarised in Table 5.

State-managed Fisheries

State managed fisheries in SA are managed by PIRSA. In WA, state managed fisheries are managed by the WA Department of Fisheries. These state managed fisheries are restricted to coastal areas and do not intersect the drilling area, however are intersected by the AMBA. Details of these fisheries are summarised in Table 6.

Table 5 - Commonwealth-managed fisheries in the AMBA

Fishery	Geographic extent	Target species	Fishing season	Fishing method	Fishery jurisdiction intersects drilling area?	Fishing in drilling area?
Skipjack Tuna (Western)	All waters within the AFZ between the SA/Vic border around WA waters and across to the northern tip of Qld.	Indian Ocean skipjack tuna, western and central Pacific skipjack tuna.	Year-round.	Purse seine (98%), pole-and-line (2%).	Yes.	Unlikely. Focused on areas around the 200 m isobath. Fishing in recent years has been sporadic, with no fishing since 2010-11.
Southern Bluefin Tuna	All waters in the Australian Fishing Zone (out to 200 nm from the 3nm limit). 95% of quota taken from the GAB and towed alive to grow out cages off Port Lincoln.	Southern bluefin tuna.	Year-round. Fishing for grow out ranching occurs from December to March.	Purse seine (using about 5 vessels).	Yes.	Unlikely based on Woodhams *et al* (2013) and Georgeson *et al* (2014).
Western Tuna and Billfish	Extends from Cape York (Qld) to the Vic/SA border, out to 200 nm.	Yellowfin tuna, bigeye tuna, albacore tuna, broadbill swordfish and striped marlin	Year-round.	Pelagic longline, some minor line (handline, rod and reel, troll and polling) and purse seine.	Yes.	Unlikely based on consultation undertaken and Woodhams *et al* (2013).
Small Pelagic (Western sub-area)	Extends from the Qld/NSW border, typically outside 3 nm, around southern Australia to a line at latitude 31° south (near Lancelin, north of Perth).	Jack mackerel, blue mackerel, redbait and Australian sardine.	Year-round.	Mostly purse seine, very little mid-water trawl.	Yes.	Unlikely based on consultation undertaken and Woodhams *et al* (2013).

Fishery		Geographic extent	Target species	Fishing season	Fishing method	Fishery jurisdiction intersects drilling area?	Fishing in drilling area?
SESS	GAB Trawl Sector	Extends from Cape Leeuwin, WA, to Cape Jervis near Kangaroo Island, SA (excluding state fishery shelf waters). Three distinct depth ranges – shelf (up to 250 m), slope (300-750 m) and deepwater (750 m+).	Deepwater flathead, bight redfish, ocean jacket, blue grenadier, and western gemfish	Year-round.	Mid-water, demersal otter, and pair trawling.	Yes.	Unlikely based on consultation undertaken and Woodhams *et al* (2013), with only 7.5% of fishery effort in the deepwater range (2012-13).
	Gillnet, Hook & Trap (GHT) Sectors	Extends from the WA/SA border to Cape Jervis near Kangaroo Island, SA, out to 200 nm.	Gummy shark, pink ling, blue-eye trevella	Not reported.	Demersal longline, dropline, bottom set gillnet, fish trap.	Yes.	Unlikely based on consultation undertaken.
	Scalefish Hook Sector (managed under GHT sectors)	Extends from north of Brisbane (at 24°30'S) to the SA/WA border, encompassing Tasmania.	Blue grenadier, blue-eye trevalla, flathead among others.	Year-round.	Mid-water, demersal otter, and pair trawling, Danish seine, hook.	Yes.	Unlikely based on consultation undertaken.
Southern Squid Jig		Cwth waters adjacent to NSW, Vic, SA, Tas and Qld up to Sandy Cape (adjacent to Fraser Island). The major fishing grounds are off the southeast corner of Australia in continental shelf waters.	Gould's squid	Year-round, but mostly from January to June.	Jigging, otter trawl.	Yes.	Unlikely based on consultation undertaken and Woodhams *et al* (2013), showing areas of greatest fishing intensity in waters <200 m deep.

AFMA (2014; 2013a;b), Woodhams et al (2013).

Table 6 - State-managed wild catch fisheries and aquaculture in the AMBA

Fishery	Geographic extent	Target species	Fishing season	Fishing method	Fishery jurisdiction intersects drilling area?	Fishing in drilling area?
Abalone	Covers all state waters, divided into southern, central and western zones. Abalone inhabit near-shore reefs (5 to 40 m water depth), most abundantly on the leeward side of reefs, and are found in waters with temperatures ranging between 9 and 14°C.	Blacklip and greenlip abalone.	Not documented. Likely to be year-round.	Abalone divers operate from small boats using hookah gear (a long hose delivering air to the diver from a deck-mounted compressor). Divers harvest abalone by hand with a metal blade known as an 'abalone iron' and sometimes use self-propelled cages that provide protection from sharks and enable divers to fish (by driving) large areas with minimal effort.	No.	No.
Oyster	Confined to discreet intertidal areas of the Yorke Peninsula (Stansbury and Port Vincent), Kangaroo Island (Nepean Bay & Eastern Cove), Franklin Harbour, Streaky Bay, Coffin Bay, Smoky Bay and Ceduna.	Pacific oyster and Angasi oyster.	Year-round. Maturity at about 2 years of age. Line building generally performed during summer.	Oysters begin life in a hatchery environment before being grown out in trays, baskets and rafts. The infrastructure used is found in the intertidal zone where oysters are exposed at low tide. A series of posts either support lines, from which baskets are suspended, or racking for trays.	No.	No.
Mussels	Grown in Boston Bay, Eyre Peninsula and processed in Port Lincoln.	Mediterranean mussel	Year-round.	Mussel spawn is collected from wild populations and then grown in horizontal systems of ropes suspended in the water by buoys, pipes or floats. They feed on natural populations of algae in the sea and take 12-18 months to reach maturity.	No.	No.

Fishery	Geographic extent	Target species	Fishing season	Fishing method	Fishery jurisdiction intersects drilling area?	Fishing in drilling area?
				The infrastructure used is found in the intertidal zone where oysters are exposed at low tide. A series of posts either support lines, from which baskets are suspended, or racking for trays.		
Blue crab	Restricted to the St Vincent Gulf and Spencer Gulf (excluding aquatic reserves). Blue crabs occur in algal and seagrass habitats on sandy and muddy substrata, from the intertidal zone to 50 m water depth.	Blue crab	20 February to 20 December (Spencer Gulf) – closed for 2 months. 16 January to 31 October (St Vincent Gulf) – closed for 2.5 months.	Crab pots (maximum diameter of 2 m and minimum mesh size of 75 mm) and bait nets.	No.	No.
Prawn – St Vincent Gulf	St Vincent Gulf, all waters >10 m depth. Adult prawns are benthic species that prefer sand or mud sediments, inhabiting waters greater than 10 m and harvested in waters up to 45 m depth.	Western king prawn	November to June (inclusive), with exclusion period in January and February. Daylight fishing and fishing in areas less than 10 m banned.	Night-time trawling (sunrise to sunset) using the demersal otter trawl technique with a minimum mesh size of 4.5 cm.	No.	No.

Fishery	Geographic extent	Target species	Fishing season	Fishing method	Fishery jurisdiction intersects drilling area?	Fishing in drilling area?
Prawn – Spencer Gulf and west coast	Restricted to the Spencer Gulf and western coastal area of Eyre Peninsula, all waters >10 m depth. Adult prawns are benthic species that prefer sand or mud sediments, inhabiting waters greater than 10 m and harvested in waters up to 60 m depth.	As above.	As above.	As above.	No.	No.
Sardine (pilchard)	All SA waters out to the edge of the 200 nm AFZ.	Australian sardine	Year-round. Majority of catch used as fodder for the Southern Bluefish Tuna aquaculture sector.	Purse-seine nets (up to 1,000 m in length) with a mesh size of 14-22 mm. Schools are first located by sonar.	Yes.	Yes.
Rock lobster	All SA waters out to the edge of the 200 nm AFZ, divided into northern (mouth of Murray River to WA border) and southern zones (mouth of Murray River to Victorian border). Found and fished in waters up to 200 m deep on the continental shelf.	Southern rock lobster	1 November to 31 May – closed for 5 months.	Rock lobster pots, with a maximum diameter of 1 m, one entrance at the top, a 50 mm minimum mesh size and 2 escape gaps per pot. One to 10 days of fishing per trip.	Yes (northern zone).	No.

Fishery	Geographic extent	Target species	Fishing season	Fishing method	Fishery jurisdiction intersects drilling area?	Fishing in drilling area?
Marine scalefish	All SA waters and out to the edge of the 200 nm AFZ. The deepest waters fished are generally 150 m.	More than 60 species, but the majority of fishing effort (60% by weight) is on four species; King George whiting, southern garfish, snapper and southern calamari	Year-round. Nine other fisheries have some level of access to this fishery.	A total of 21 different gear types can be registered, with the dominant types being hook and line, haul nets, mesh nets and jigs.	Yes.	No.
Charter boat	Charter boats generally do not venture as far out as the drilling area due to the distance from the safety of ports	A commercial platform to undertake recreational fishing. Primary target species are snapper and King George whiting, with secondary target species including yellowtail kingfish, WA salmon and samsonfish among others.	Year-round.	Mostly inshore scalefishing, offshore scalefishing and game fishing.	No.	No.
Miscellaneous	Shallow to deep waters.	Multi-species fishery that do not fall within existing management arrangements, including sea urchin, scallop and oyster among others.	Year-round.	Various.	Unknown.	Unknown.

Fishery	Geographic extent	Target species	Fishing season	Fishing method	Fishery jurisdiction intersects drilling area?	Fishing in drilling area?
South Coast crustacean	From the SA border to Augusta. All WA waters and out to the edge of the 200 nm AFZ.	Comprises four pot-based fisheries, taking southern rock lobster, western rock lobster, giant crab, crystal crab and champagne crab.	Year-round.	Rock lobster and crab pots.	No.	No.
Greenlip/ brownlip abalone	All WA shallow coastal waters (divided into 3 management zones for the south coast). No commercial fishing is permitted in Zone 2 (between Point Culver and Shoal Cape).	Greenlip and brownlip abalone	1 October to 15 May in the southern zone.	Diving from small vessels (generally <9 m in length) using hookah to harvest by hand with an 'abalone iron' to prise the shellfish off rocks. Minimum length is 140 mm shell length.	No.	No.
Southcoast nearshore & estuarine finfish (South Coast Salmon Managed Fishery & South Coast Estuarine Managed Fishery)	All WA coastal waters and estuaries in the south coast bioregion between Cape Beaufort and 129° east longitude.	WA salmon and Australian herring are the key species, with small quantities of southern sea garfish and sea mullet with 38 species landed in 2012.	Seasonal, area and size closures occur.	Beach-based and estuarine fishing, using trap nets (herring), beach seine (suing row boats or small jet-powered boats), haul nets and gill nets.	No.	No.

Fishery	Geographic extent	Target species	Fishing season	Fishing method	Fishery jurisdiction intersects drilling area?	Fishing in drilling area?
South Coast Purse Seine	All waters between Cape Leeuwin and the WA/SA border out to 200 nm. Divided into five zones, with Zones 2, 3 and 4 (on the southern coast) intersecting the AMBA.	Australian sardine and smaller quantities of yellowtail scad Australian anchovy and scaly mackerel.	Year-round.	Purse seine nets	No.	No.
Temperate Demersal Gillnet and Demersal Longline	From 33°S latitude to the WA/SA border, comprising three management zones, out to 200 nm (Zone 2 takes in most of the southern coastline).	Gummy shark, dusky shark, whisky shark and sandbar shark. Primarily gummy and dusky sharks on the south coast.	Not documented. Likely to be year-round.	Demersal gillnets ad power-hauled reels. Three or less vessels fished in Zones 3 and 4 in 2011-12.	No.	No.
South Coast Demersal Scalefish	Oceanic waters from near Black Point at 115° 30′ E to the WA/SA border at 129° E.	Pink snapper, Bight redfish, blue morwong and hapuku.	Not documented. Likely to be year-round.	Droplines and handlines.	No.	No.
Aquaculture	Offshore farm near Augusta, two sites. Onshore farm near Bremer Bay.	Greenlip abalone .	Year-round.	Purpose-built concrete structures on the seabed.	No.	No.

Source: PIRSA; Fletcher & Santoro

4.7.3 Recreational Fishing

The majority of recreational fishing in the GAB is based around the coast and shallow waters of Kangaroo Island and the Eyre Peninsula. Beach and vessel fishing is popular, as is recreational diving for abalone. There is no recreational fishing known to occur in the drilling area given its remote distance offshore.

4.7.4 Tourism

The drilling area is too far offshore to intersect with tourism activities, however a number of activities occur within the AMBA.

Marine mammal watching tours are popular tourist attractions in the region, particularly to view southern right whales and Australian sea-lion colonies at the Head of Bight, where these animals can be viewed from the shoreline. Boat tours also operate around the Nuyts Archipelago.

Cage diving with sharks, and diving with SBT is also popular along the Eyre Peninsula.

4.7.5 Petroleum Exploration and Production

Nine EPPs exist within the GAB, seven in the central GAB and two in the eastern GAB (Figure 7). Four of these (EPPs 37, 38, 39 and 40) in the central GAB were awarded to BP in January 2011. BP and Statoil are joint Titleholders, with BP being the Operator. BP undertook a 3D seismic survey in these permits from November 2011 to May 2012 and undertook a geotechnical and geophysical survey from late March to late May 2013. Two additional exploration permits in the GAB have been released by the Commonwealth Government, however these have not been awarded to date.

4.7.6 Shipping

Shipping activity in the GAB is low, with the majority of vessels travelling south of the Bight in a straight line between southwest WA and Melbourne. Vessels travelling into the Port of Adelaide from the west will traverse the GAB, but generally to the south of the permit areas. There is some light shipping traffic between SA port and Cape Leeuwin, which may pass through the permit areas.

4.7.7 Defence Activities

The Commonwealth Department of Defence training areas do not extend into any offshore waters of the GAB. The closest training areas are in Investigator Strait (a body of water lying between the Yorke Peninsula and Kangaroo Island) used for military flying and firing, and waters off Port Lincoln used for firing and naval operations.

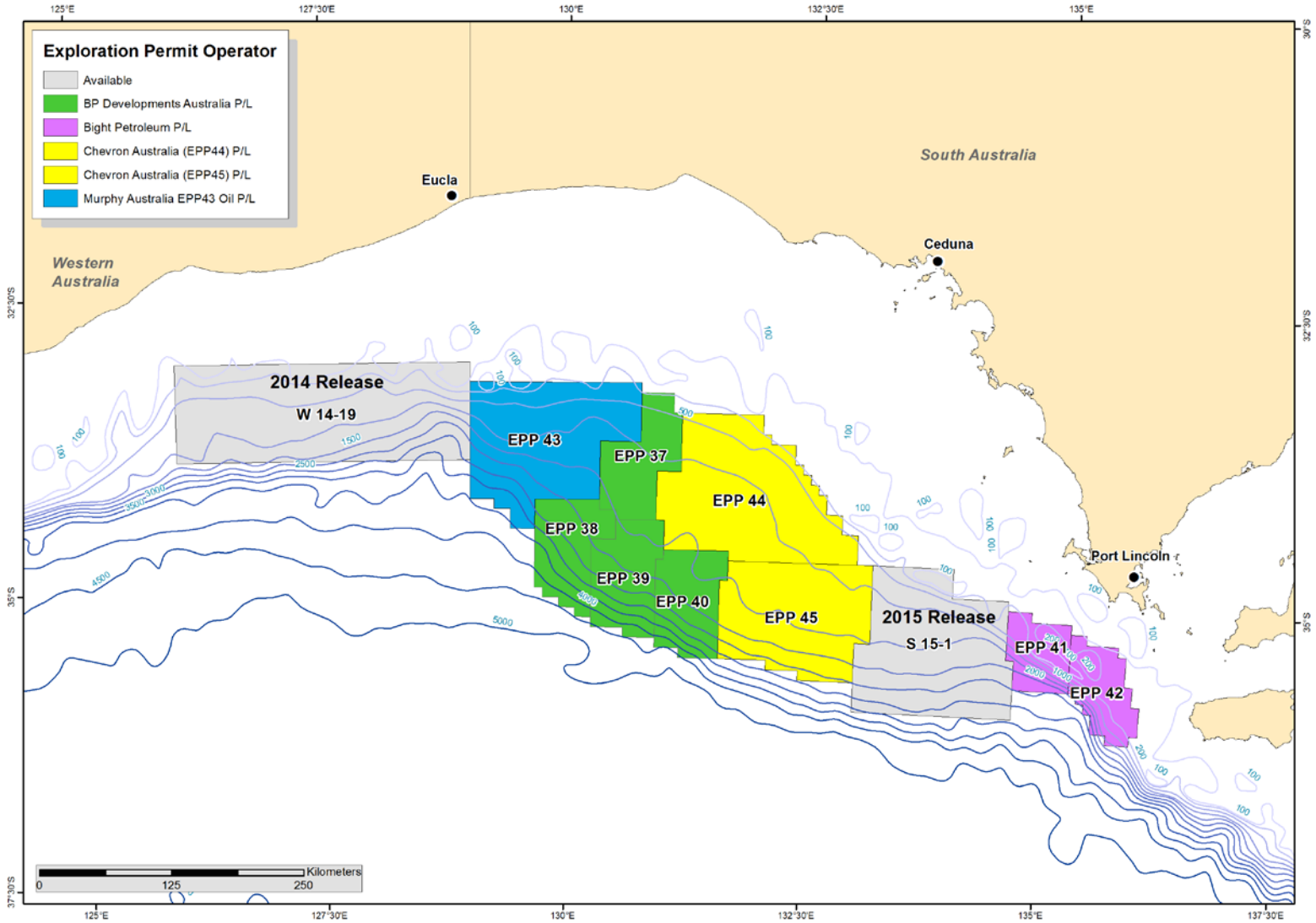


Figure 7 - EPPs in the GAB

5 Environmental Risk Assessment

BP identifies and assesses potential environmental impacts through an ENVIID (environmental [and social] impact identification) process. ENVIID is a systematic and flexible method used to identify the potential impacts of a project or operations throughout its lifecycle, from conception to abandonment. ENVIID identifies planned impacts and unplanned risks and is used to:

- Systematically identify environmental and social aspects and potential impacts;
- Assess the significance of the potential impacts;
- Identify areas of design or operations that could be changed, modified or optimised to reduce environmental and social impacts;
- Identify control, mitigation and management measures that are currently in place to reduce environmental and social impacts and risks;
- Propose recommendations and actions to eliminate, prevent, control or mitigate environmental and social impacts and risks;
- Propose further studies, as necessary, to eliminate or reduce impacts through changes in design, construction or operations; and
- Support the objective of "no damage to the environment".

The potential environmental impacts identified during the ENVIID were carried forward into the detailed risk assessment process in the EP, which is based on the following:

- The probability/frequency criteria provided in Table 7 to assign a rating (1 to 4) to the likelihood of occurrence of the potential event, divided into planned and unplanned events.
- The impact criteria given in Table 8 to assign a Level (A to H) to the potential consequence(s) of the potential event.
- Table 9 to assign a significance (i.e., risk) rating for each event, taking into account probability and consequence.

The purpose of risk assessment is to assist in making decisions, based on the outcomes of analysis, about the sorts of control measures required to reduce an impact or risk to 'As Low As Reasonably Practicable' (ALARP) and to acceptable levels. Planned and unplanned events are subject to this step in the same manner. To demonstrate the ALARP Principle, the 'Hierarchy of Controls' philosophy was applied to each event. With regard to determining 'acceptability' of risks, BP applied NOPSEMA's Guidance Note for EP Content Requirements (N04750-GN1344, Rev 0, February 2014).

The environmental risk assessment also outlines the controls, performance outcomes, performance standards and measurement criteria required to address the impacts and risks identified.

A list of the environmental risks identified for the GAB Exploration Drilling Program, and their assessed risk rankings, is provided in Table 10.

Table 7 - Environmental risk framework: Likelihood of Occurrence

Rating	UNPLANNED EVENTS		PLANNED EVENTS		
	Frequency term	Unplanned, emergency or abnormal events likelihood or probability	Duration term	Planned frequency/duration of normal events	Examples
1	Unlikely, infrequent	Unheard of incident in industry. Unlikely, although potential exists.	Very short duration.	Series of events of duration less than 12 hr/yr. Single event with duration of less than an hour. Social – up to 2 weeks.	• Pigging. • Temporary re-routing of roads.
2	Low probability, frequent	Incident has occurred in industry. Similar event has occurred somewhere in the BP Group.	Short duration.	Series of events of duration up to 3 days/yr. Single event with duration of up to a day. Social – up to 6 months.	• Flaring. • Noise, odour, vibration and traffic during major construction. • Moderate security activities.
3	Moderate probability, frequent	Incident has or is likely to occur in BP. Strong possibility of occurrence, likely to occur within the lifetime of 10 similar facilities. Expected to occur once or twice in facility lifetime.	Medium duration.	Series of events of duration up to 3 months/yr. A single event with duration of up to one year. Social – up to 2 years.	• Blowdown for planned maintenance. • Presence of large contractor workforce in/near community. • Intensive security activities. • Chronic leak from subsurface or unsighted infrastructure.
4	High probability	Incident has happened or is likely to occur several times in facility lifetime. Common occurrence, almost certain to happen at least annually at the facility.	Long duration.	Continuous duration. Social – greater than 2 years.	• Power supply, combustion, permanent physical resettlement leading to civil unrest. • Severe economic displacement.

Table 8 - Environmental Risk Framework: Potential Consequence Severity

Severity	Environmental consequences
A/B	• Widespread damage to the environment with catastrophic impact. • Long term, widespread damage to fisheries. • Widespread and long-term damage to the regional ecosystem. • Major contribution to waste volumes. • Major contribution to a known global air pollution problem. • Major contribution to a known regional air pollution problem. • Major degradation of groundwater aquifers currently used for drinking water, prejudicial to human health.
C/D	• Extensive damage to the environment with severe impact. • Extensive damage to industrial fishing area, resulting in medium term suspension of fishing activity or restricting potential for further usage. • Extensive damage to ecosystems. • Extensive contribution to a known global or regional air pollution Significant contribution to waste volumes. • Environmental ecosystems quality approaching environmental quality limits. • Major degradation of groundwater aquifers currently used for irrigation or stock watering. • Major degradation of groundwater aquifers potentially usable for drinking water.
E/F	• Moderate degradation of the environment, reversible over the long-term. • Localised damage to fisheries causing short-term disruption to fishing activities. • Localised damage to ecosystems. • Slight local degradation of resources, but not jeopardizing further usage. • Small contribution to global air problem, minor contribution to Business Unit total. • Small contribution to waste volumes. • Small contribution to regional air or water pollution problem. • Elevation in ambient pollutant levels greater than 50% of environmental quality guidelines or standards.
G/H	• Undetectable or limited local degradation of the environment, rapidly returning to original state by natural action. • Unlikely to affect resources to noticeable degree. • No significant contribution to global or regional air pollution problem. • No significant contribution to waste volumes.

Table 9 - Environmental Risk Framework: Significance matrix

		Probability/frequency/duration			
		1	2	3	4
Impact severity	A/B	MS	S	S	HS
	C/D	MS	MS	S	S
	E/F	NS	MS	MS	S
	G/H	NS	NS	NS	MS

Significance	Significance level	Action
NS	No significance	Requires no further action.
MS	Minor significance	Requires impact management.
S	Significant	Requires additional control measures.
HS	Highly significant	Requires immediate action.

Table 10 GAB Exploration Drilling environmental risk assessment summary

Hazard	Potential Impacts	Key avoidance, mitigation & management measures	Risk Ranking
Planned events			
Seabed disturbance	• Temporary and localised loss of benthic habitat. • Localised mortality of benthic fauna. • Temporary and localised increase in turbidity.	• Drilling will not take place within a 3 km radius of known and mapped seabed volcanic mounts (Anna's Pimple and Murray's Mount).	Minor significance
Underwater sound	• Temporary and localised disturbance to noise sensitive marine fauna, such as cetaceans.	• MODU and support vessel engines and thrusters will be maintained as per planned maintenance system (PMS) to ensure they are operating efficiently. • Vertical seismic profiling (VSP) operations will be conducted in accordance with EPBC Act Policy 2.1 Part A. • VSP crew aboard the MODU will be inducted into the EPBC Act Policy 2.1 requirements.	Minor significance
Light emissions	Temporary and localised attraction of light-sensitive species (e.g., seabirds, squid, zooplankton), in turn affecting predator-prey dynamics.	• Ensure the MODU and vessels are lit in accordance with maritime safety standards.	No significance
Atmospheric emissions	• Temporary and localised reduction in air quality. • Contribution to global Greenhouse Gas effect.	• No waste incineration will take place on board the MODU. • Only low-sulphur marine diesel oil will be used to power the MODU and vessel engines and other combustion equipment. • Combustion equipment on the MODU and vessels will be maintained in accordance with the PMS to ensure they are operations to design specifications. • Fuel use will be measured, recorded and reported. • The MODU Heating, Venting and Air Conditioning system will be maintained in accordance with the PMS to ensure operation to design specifications.	Minor significance

Hazard	Potential Impacts	Key avoidance, mitigation & management measures	Risk Ranking
Discharge of drilling cuttings and fluids	• Temporary and localised increase in water column turbidity. • Temporary and localised smothering of benthic habitat and organisms. • Temporary and localised reduction in water quality from toxic mud components.	• Drilling will not take place within a 3 km radius of known and mapped seabed volcanic mounts (Anna's Pimple and Murray's Mount). • The MODU's bunkering procedure will be implemented during the loading and back loading of mud and associated products. • Only low toxicity, readily biodegradable and non-bio accumulating drilling base fluids and mud chemical additives will be used. • Synthetic based mud (SBM) operations will be managed to ensure discharges contain less than 6.9% (wet weight) mud on cuttings. • No bulk SBM will be disposed overboard. • Fluids discharged overboard from mud tank cleaning will contain <15 ppm oil in water. • Remote Operated Vehicle (ROV) footage of the seafloor will be conducted post-drilling to determine whether a cuttings pile has formed.	Minor significance
Discharge of cement	• Temporary and localised increase in water column turbidity. • Localised smothering of benthic habitat and fauna.	• The MODU's bunkering procedure will be implemented during the loading (and possible back loading) of dry cement. • Cementing will be undertaken in accordance with the Cement Program. • Chemical additives used will meet technical requirements and will be of low toxicity (according to OCNS ranking). • During top hole cementing operations, operations will be coordinated with the ROV Technicians to prevent excess discharges at the seabed.	No significance

Hazard	Potential Impacts	Key avoidance, mitigation & management measures	Risk Ranking
Discharge of cooling and brine water	• Temporary and localised increase in surface water temperature, causing thermal stress to marine biota. • Temporary and localised increase in surface water salinity.	• Engines and associated equipment that requires cooling by water will be maintained in accordance with the PMS so that they are operating within specified operating parameters. • The MODU Electrolytic Marine Growth Protection System will be maintained in accordance with the PMS so it is operating within specified operating parameters. • Chemicals used in the MODU cooling and brine water systems will be of low toxicity (according to OCNS ranking).	Minor Significance
Discharge of sewage and grey water	• Temporary and localised increase in nutrient and pollutant levels of surface water.	• A MARPOL-approved sewage treatment plant (STP) will be fitted to the MODU and support vessels • The STPs will be maintained in accordance with the PMS to ensure they are not discharging untreated sewage	Minor Significance
Discharge of putrescible waste	• Temporary and localised increase in nutrient levels of surface water. • Increase in scavenging behaviour of marine fauna and seabirds.	• A Garbage Management Plan will be in place and implemented on the MODU and support vessels. • A MARPOL Annex V-compliant macerator will be installed on the MODU and support vessels and used while within the Petroleum Safety Zone (PSZ). • The galley macerator will be maintained in accordance with the PMS to ensure it is fully functional. • All non-putrescible galley waste (i.e., packaging, cooking oils and grease) will be transported back to shore for recycling or disposal.	Minor significance

Hazard	Potential Impacts	Key avoidance, mitigation & management measures	Risk Ranking
Discharge of deck drainage and bilge water	• Temporary and localised reduction of surface water quality. • Acute toxicity to marine fauna.	• Overboard discharges of hydrocarbon or chemical spills will be prevented or controlled by a number of measures including bunding of hydrocarbon and chemical storage tanks and the use of scupper plugs on deck. • Bilge water will be treated through an oily water system to remove hydrocarbons prior to overboard discharge (discharge water will not contain > 15 ppm hydrocarbons, in line with MARPOL Annex I). • Chemicals will be stored in chemical storage lockers. • Deck cleaning detergents will be biodegradable with a 'Gold' CHARM rating (according to OCNS ranking). • Spills on deck will be rapidly cleaned up.	Minor significance
Discharge of and hydraulic fluids	• Temporary and localised reduction of water quality. • Acute toxicity to marine fauna.	• Low toxicity (according to OCNS ranking) hydraulic fluids and pipe dope will be used. • Chemicals will be stored in chemical storage lockers. • Spills on deck will be rapidly cleaned up.	Minor significance
Unplanned events			
Accidental disposal of hazardous and non-hazardous materials and waste	• Marine pollution. • Injury and entanglement of marine fauna and seabirds. • Smothering or pollution of benthic habitats.	• A Garbage Management Plan will be in place and implemented on the MODU and vessels. • A procedure for MODU loading and back loading will be in place and implemented to reduce the risk of dropped objects. • Objects dropped overboard from the MODU will be retrieved wherever possible.	Minor significance
Introduction of invasive marine species	• Loss of diversity and abundance of native species.	• The MODU and support vessels will have anti-fouling paint applied. • The MODU and support vessels will be cleared to enter Australian waters by the Australian Quarantine Inspection Service (AQIS).	No significance

Hazard	Potential Impacts	Key avoidance, mitigation & management measures	Risk Ranking
Interference with other marine users	• Collision between MODU and third-party vessels. • Damage to commercial fishing equipment. • Loss of commercial catches. • Disruption to commercial navigational activities.	• The MODU and support vessels will be readily identifiable to third-party vessels using anti-collision monitoring equipment. • The location of the MODU and support vessels will be communicated to other marine users. • A 500-m radius PSZ will be gazetted and enforced around the MODU for the duration of the project.	No significance
Collision with cetaceans	• Cetacean injury or death caused by vessel strike	• The support vessels will implement the Australian Guidelines for Whale and Dolphin Watching (2005) for sea-faring activities while in the PSZ.	Minor significance
Bulk chemical, drilling mud and other spills	• Temporary and localised reduction of water quality. • Acute toxicity to marine fauna	• A pre-acceptance inspection of the MODU will be conducted to verify all equipment is in good condition, including storage tanks, equipment, bunding and machinery spaces. • Low toxicity chemicals (as per OCNS ranking) will be used. • Aviation fuel will be stored within a bunded area. • The dump valve/s for the SBM tanks will remain closed and locked while using SBM. • Transfer hoses will be regularly inspected and replaced in accordance with the PMS schedule. • The MODU bunkering procedure will be implemented for all bulk hose transfers. • Planned maintenance will be undertaken on all MODU storage and transfer systems. • Repairs will be undertaken on all MODU storage and transfer systems that are found to be defective. • Spills on deck will be rapidly cleaned up. • SBM loss from the riser is prevented during planned riser disconnections.	No significance

Hazard	Potential Impacts	Key avoidance, mitigation & management measures	Risk Ranking
Diesel spill	• Temporary decrease in water quality. • Injury or death of exposed marine fauna. • Tainting of commercial fisheries species.	• The MODU bunkering procedure will be implemented. • Fuel hoses will be regularly inspected and replaced in accordance with the PMS schedule. • The MODU crew will undertake spill response training in accordance with the MODU Shipboard Oil Pollution Equipment Plan (SOPEP) requirements. • Diesel spills to deck will be promptly cleaned up to avoid drainage overboard. • A pre-spud Emergency Response desktop exercise will be conducted to test emergency responses. • A satellite tracking buoy will be immediately deployed in the event of a significant diesel spill in the PSZ. • A diesel spill within the PSZ will be promptly reported internally and managed to minimise the risk of further damage to the vessel. • A diesel spill within the PSZ will be promptly reported to external regulatory agencies. • In the event of a significant diesel spill, operational monitoring data will be collected to support spill response and to characterise any environmental impacts from the spill.	Minor significance
Well blowout	• Decrease in water quality. • Pollution of shoreline. • Injury or death of exposed fauna. • Tainting of commercial fisheries species.	• An independent survey ensures the BOP is compliant with API Standard 53 (Blowout Prevention Equipment Systems for Drilling Wells). • The wells will be safely drilled in accordance with designs and documents prepared specifically for the project (including the Well Operations Management Plan, Drilling Program, Safety Case and Safety Case revision, drilling fluid program, cement program and BOP testing procedure).	Significant

Hazard	Potential Impacts	Key avoidance, mitigation & management measures	Risk Ranking
		• The wells will be drilled by qualified and experienced drillers. • Regular well control drills will be undertaken in order to keep the drilling crew familiar with response procedures. • It will be ensured that key BP and Diamond office- and MODU-based management personnel are familiar with their roles in a well blowout response. • An ROV Intervention Plan will be place to remotely operate the BOP if required. • The wells will be plugged and abandoned in accordance with industry guidelines to prevent future hydrocarbon leaks from the wells. • A loss of well control will be promptly reported to external agencies. • The Well Control Response Guide will be implemented immediately in the event of a well blowout to attempt to stop the flow of the well. • Oil spill response strategies will be implemented in accordance with the Project OPEP. • Available subsea blowout controls (including the SFRT, capping stack and relief well) will be deployed for use if deemed suitable by the Incident Commander. • Operational and scientific monitoring data will be collected to support spill response and to characterise environmental impacts.	

Hazard	Potential Impacts	Key avoidance, mitigation & management measures	Risk Ranking
Oil spill response activities			
Surveillance and tracking	• Noise, air and light emissions from vessels and aircraft. • Liquid and solid discharges from vessels. • Unplanned events from vessels, such as the introduction of IMS, collision with other vessels and cetaceans, and diesel spill.	• For the duration of the project, BP will retain access to surveillance and tracking resources. • First strike kits will be available on location at all times. • Operational monitoring will be undertaken in accordance with the OSMP.	No significance
Surface dispersant application	• Noise, air and light emissions from vessels and aircraft. • Liquid and solid discharges from vessels. • Unplanned events from vessels, such as the introduction of IMS, collision with other vessels and cetaceans, and diesel spill. • Toxicity impacts to fauna and flora.	• For the duration of the project, BP will retain access to dispersant resources. • Only dispersants listed on the OSCA register will be used. • First strike kits will be available on location at all times. • Internal, regulatory and response agency notifications will be made in accordance with the OPEP. • Oil spill trajectory modelling (OSTM) and Net Environmental Benefit Analysis (NEBA) will be instigated in accordance with the OSMP. • Dispersant will be applied in accordance with the Dispersant Tactical Response Plan (TRP). • Operational monitoring will be conducted in accordance with the OSMP.	Minor significance
Subsea dispersant injection	• Noise, air and light emissions from vessels and aircraft. • Liquid and solid discharges from vessels. • Unplanned events from vessels, such as the introduction of IMS, collision with other vessels and cetaceans, and	• For the duration of the project, BP will retain access to dispersant resources. • Only dispersants listed on the OSCA register will be used. • Internal, regulatory and response agency notifications will be made in accordance with the OPEP. • OSTM and NEBA will be instigated in accordance with the OSMP.	Minor significance

Hazard	Potential Impacts	Key avoidance, mitigation & management measures	Risk Ranking
	diesel spill. • Toxicity impacts to fauna and flora	• Subsea dispersant injection (SSDI) will commence as soon as possible as per the Capping and Containment Response Plan. • Dispersant will be applied in accordance with the OPEP • Operational monitoring will be conducted in accordance with the OSMP.	
Subsea well capping (source control)	• Noise, air and light emissions from vessels and aircraft. • Liquid and solid discharges from vessels. • Unplanned events from vessels, such as the introduction of IMS, collision with other vessels and cetaceans, and diesel spill.	• For the duration of the project, BP will retain access to well capping resources. • Capping operations will be undertaken in accordance with the Capping and Containment Response Plan.	No significance
Relief well drilling (source control	• The potential environmental risks associated with drilling a relief well are as per those outlined for the drilling of the exploration wells, as outlined in 'planned events' and 'unplanned events' above.	• MODUs and well site services for drilling a relief well will be accessible under the APPEA Mutual Aid Agreement. • Well control specialists will be mobilised to Australia in the event of a loss of well control. • Drilling of a relief well will be undertaken in accordance with the Relief Well Plan.	Minor significance
Offshore containment and recovery	• Noise, air and light emissions from vessels and aircraft. • Liquid and solid discharges from vessels. • Unplanned events from vessels, such as the introduction of IMS, collision with other vessels and cetaceans, and diesel spill. • Water decanting and oil transfer activities.	• For the duration of the project, BP will retain access to containment and recovery resources. • Containment and recovery operations will be undertaken in accordance with the Offshore Containment and Response TRP.	No significance

Hazard	Potential Impacts	Key avoidance, mitigation & management measures	Risk Ranking
In-situ burning	• Noise, air and light emissions from vessels and aircraft. • Liquid and solid discharges from vessels. • Unplanned events from vessels, such as the introduction of IMS, collision with other vessels and cetaceans, and diesel spill. • Local reduction of air quality	• For the duration of the project, BP will retain access to in-situ burning resources • In-situ burning operations will be undertaken in accordance with the BP in-situ burning procedure. • Monitoring of the impacts of in-situ burning is undertaken in accordance with the in-situ burning Operations Plan and OSMP	Minor significance
Shoreline protection	• Noise, air and light emissions from vessels and aircraft. • Liquid and solid discharges from vessels. • Unplanned events from vessels, such as the introduction of IMS, collision with other vessels and cetaceans, and diesel spill. • Damage to nearshore habitats from inshore shallow draught vessel activities and boom anchoring. • Damage to shoreline environments from vehicle and foot access and associated land use (e.g., waste storage). • Deeper mixing of oil within beach sediments. • Secondary contamination of shoreline .	• For the duration of the project, BP will retain access to shoreline protection resources. • Shoreline protection operations will be undertaken in accordance with the Nearshore and Shoreline TRP.	Minor significance

Hazard	Potential Impacts	Key avoidance, mitigation & management measures	Risk Ranking
Shoreline cleanup	• Damage to or loss of intertidal or supratidal flora and fauna species and/or habitat. • Disturbance to shoreline fauna from noise, air and light emissions from response activities (such as pumps, vehicles and staging posts). • Secondary contamination of foreshore and backshore areas such as dunes. • Vertical infiltration of oil into shoreline sediments. • Disturbance to cultural heritage sites in backshore areas. • Increased demand for what may be limited resources in small, isolated coastal towns (such as accommodation, fuel, hire vehicles, PPE). • Temporary exclusion of residents and tourists from amenity beaches. • Disposal of oily and non-oily waste.	• For the duration of the project, BP will retain access to shoreline cleanup resources. • Shoreline cleanup operations will be undertaken in accordance with the Nearshore and Shoreline TRP. • Shoreline assessment and monitoring of the impacts of shoreline cleanup will be undertaken in accordance with the OSMP.	Minor significance
Oiled wildlife response	Offshore • Noise, air and light emissions from vessels and aircraft. • Liquid and solid discharges from vessels. • Unplanned events from vessels, such as the introduction of IMS, collision with other vessels and cetaceans, and diesel spill.	• For the duration of the project, BP will retain access to oiled wildlife response resources. • Oiled wildlife response operations are undertaken in accordance with the Oiled Wildlife Response Bridging Document. •	Minor significance

Hazard	Potential Impacts	Key avoidance, mitigation & management measures	Risk Ranking
	• Hazing of target animals may deter non-target animals from resting, feeding, breeding or other normal behaviours. • Euthanasia of affected animals that cannot be treated or have no chance of rehabilitation. Onshore • Disturbance to coastal habitat as a result of the establishment of oiled wildlife response facilities. • Hazing of target animals and the establishment of exclusion facilities (e.g., fences around sensitive habitat) may deter non-target animals from their normal resting, feeding, breeding or other behaviours. • Disposal of oily and non-oily waste.		
Waste removal and management	• Secondary contamination of the environment from inappropriate waste management and disposal.	• For the duration of the project, BP will retain access to waste management resources. • Waste management operations will be undertaken in accordance with the Waste Management TRP.	Minor significance

6 Summary of Response Arrangements in the Oil Pollution Emergency Plan

BP's OMS requires that BP entities prepare for and respond promptly to crisis and emergency events threatening harm to BP employees and contractors, company assets, neighbouring communities and business operations.

The project will operate under an Emergency Response Plan (ERP) and OPEP to ensure timely response and effective management of any emergency. Bridging documents will be prepared to link BP's and Diamond's safety management and well control systems. To ensure readiness, emergency exercises and drills will be conducted prior to commencement of drilling and regularly on-board the MODU. Any opportunities for improvement identified as a result of conducting the exercise will be used to update emergency response procedures, where necessary, to ensure a well-organised response to any emergencies during the project.

The Great Australian Bight drilling program OPEP details the BP incident management structures and arrangements for dealing with an oil spill event from this project. It defines the arrangements from immediate response to escalation for a worst credible case discharge event. This includes the full scalability of the resources required.

6.1 Support Arrangements

The BP response capability has been designed around BP owned resources, those that are accessible from within Australia, and those from the regional and global response networks.

These arrangements include the following;

- A comprehensive equipment stockpile owned by BP and held at the Adelaide supply base
- An agreement through full membership of AMOSC that provides access on a 24/7 basis to oil spill response equipment, dispersant and specialist personnel in Geelong and Fremantle; access to oil industry resources (Mutual Aid Stockpiles) and trained industry response core group personnel; Fixed Wing Aerial Dispersant Capability (FWDC); and the Global Response Network which provides mutual assistance during an oil spill event.
- AMOSC master service agreement with the Australian Maritime Safety Authority (AMSA) giving access to NatPlan response resources and the National Response Team (NRT)
- An agreement through full membership with Oil Spill Response Limited (OSRL) that provides an extensive range of oil pollution response equipment and specialist personnel from the OSRL bases of operation in Singapore, Southampton, Bahrain and Fort Lauderdale.
- Access to the Global Dispersant Stockpile via BP's membership of AMOSC and OSRL, making available very large volumes of approved dispersant.
- Support from the BP Mutual Response Team, which is a team of approximately 450 trained personnel from BP global operations.

The GAB OPEP provides a first strike plan that details the tasks to mobilise an initial response and the essential notifications that are required to be conducted.

It provides guidance for the IMT on all aspects of oil spill response and moves the response from the initial reactive phase into the development of a full Incident Action Plan (IAP) planning cycle.

It also defines the necessary integration and liaison required with the relevant state agencies.

6.2 Response Strategy

BP has assessed available response tactics for application to the GAB, and has established oil spill preparedness and response positions to demonstrate that impacts and risks associated with the loss of hydrocarbons would be managed to ALARP and acceptable levels.

The response tactics assessed and planned for are as follows;

- Source Control (deployment of capping stack and or relief well drilling
- Natural weathering
- Surveillance, tracking and monitoring
- Surface dispersant application (vessel and aerial)
- Offshore containment and recovery
- Shoreline protection
- Shoreline clean-up
- Shoreline clean-up assessment technique (SCAT)
- In-situ burning
- Waste Management
- Oiled wildlife response

These tactics have been summarised for stakeholder information, and are available on the GAB web-site www.bpgabproject.com.au.

Although there are predetermined scenarios and response tactics, in the unlikely event of an oil spill, the specific conditions at that time will determine the applicability of these pre-determined tactics. It is the chosen combination of these tactics that form the response strategy, which will vary depending on the nature of the material released and the physical conditions being experienced. The OPEP gives guidance on the limitations and applicability of each tactic.

BP has defined three release categories based on material type:

- Crude Oil
- Refined and processed hydrocarbon products such as fuels and lubricants
- Drilling mud

The mitigation strategy for a release of each of these types of material is summarised below. Primarily, the approach to any spill offshore will be to allow for natural dispersion to take place unless the slick will impact an environmental sensitivity or is of such a size that dispersion needs to be assisted by the use of vessels and or licensed chemical dispersants. For the larger releases, offshore containment and recovery will be utilised where it is safe to do so. All spills will be monitored by surveillance and supported by trajectory and fate modelling.

Should it be determined that a slick may reach the near-shore and shoreline environments, appropriate response strategies shall be adopted following thorough assessment and planning. The Shoreline Clean-up Assessment Technique (SCAT) process will be followed and supported by the pre-prepared shoreline tactical response plans.

6.3 Tiered Response Classification

The OPEP recognises the international and Australian incident response level classification. These levels of response in the OPEP are referred to as 'Tiers'.

The following summarises the pre-determined response strategy for each of the material types above, and the level (tier) of release.

6.3.1 Crude Oil

Spill Size	Strategy
Tier 1 Small (minor) 0 to 5 m^3	Conduct surveillance via vessel and helicopter (when available) to ensure that chosen actions are effective. Model fate and trajectory via the Subject Matter Expert (SME). Allow natural dispersion to take place if wave action present. Assist natural dispersion via PSV steaming through the slick if wave action not sufficient. Monitor effectiveness.
Tier 2 Medium 5 to 500 m^3	Conduct surveillance via vessel and helicopter (when available) to ensure that chosen actions are effective. Model fate and trajectory via SME. Conduct dispersant spraying operations via vessel(s) and monitor effectiveness. At a planning standard application of 1:20, 5 m^3 will disperse 100 m^3 of crude oil. For calm water conditions when dispersants will not be effective, the slick position will be monitored whilst the offshore and containment systems from the supply base are en-route.
Tier 3 Large > 500 m^3	In addition to that stated in 'Medium' above, offshore containment and recovery operations shall be mobilised. Aerial dispersant from Singapore will be mobilised. Although it is unlikely, modelling and surveillance will be used to identify any potential areas on the shoreline where oil may strand and require clean-up. BP resources will be utilised from the supply base and other coastal equipment storage locations.
Worst credible discharge (subsea release)	In addition to that stated in 'Medium and Large' above, full use of the available AMOSC and OSRL resources will be made. This will be for additional offshore containment and recovery systems, shoreline clean-up resources and for additional aerial dispersant application systems. Sub-sea dispersant injection will be utilised to enhance the natural dispersion already occurring and to assist in the reduction of VOCs at the surface.

6.3.2 Refined and Processed Hydrocarbon Products

Spill Size	Strategy
Tier 1 Small (minor) 0 to 5 m^3	Conduct surveillance via vessel and helicopter (when available) to ensure that chosen actions are effective. Model fate and trajectory via SME. Allow natural dispersion to take place if wave action present. Assist natural dispersion via PSV steaming through the slick if wave action not sufficient. Monitor effectiveness.
Tier 2 Medium 5 to 250 m^3	Conduct surveillance via vessel and helicopter (when available) to ensure that chosen actions are effective. Model fate and trajectory via SME. Chemical dispersant products are not suitable for these materials. For calm water conditions, the slick position will be monitored whilst suitable offshore and containment systems from the supply base are en-route.
Tier 3 Large (diesel fuel scenarios only) > 250 m^3	In addition to that stated in 'Medium' above, suitable offshore containment and recovery operations shall be mobilised. Although it is unlikely, modelling and surveillance will be used to identify any potential areas on the shoreline where diesel oil may strand and require clean-up. BP resources will be utilised from the supply base and other coastal equipment storage locations.

6.3.3 Drilling Mud

Spill Size	Strategy
Tier 1 Small (minor) 0 to 5 m^3	Conduct surveillance via vessel and helicopter (when available) to ensure that chosen actions are effective. The base oil will separate from the mud giving rise to a light sheen on the sea surface. Allow natural dispersion to take place if wave action present. Assist natural dispersion via PSV steaming through the slick if wave action not sufficient. Monitor effectiveness.
Medium 5 to 250 m^3	As above for small spill sizes. Due to the slow release of base oil from the mud, it is not anticipated that anything other than a monitoring response will be required.
Large (none predicted)	n/a

7 Implementation Strategy

The Implementation Strategy described in this section is a summary of the BP systems, practices and procedures that are in place to manage the potential environmental impacts described in the EP (summarised in Table 10 above) and to ensure objectives associated with these potential impacts are met.

7.1 The BP HSSE Management System

As outlined in the BP HSSE Policy (Figure 8), the HSSE goals of BP are 'no accidents, no harm to people, and no damage to the environment'.

BP manages the environmental impacts of all its activities through the BP OMS. The OMS sets out BP's principles for operating and provides a framework to help deliver the essentials, then excellence, in operating. The OMS provides a systematic and consistent approach for managing its operating activities, and delivering competitive performance while meeting BP's commitment to HSSE performance. The two objectives of the OMS are:

1. To further reduce HSSE risks in BP's operating activities, and
2. To continuously improve the quality of those operating activities.

The OMS is one of a set of consistent principles and processes that are applied across the BP group. Together these are designed to simplify the organisation, improve productivity, enable consistent execution and focus BP on performance.

7.2 Contractor Management System

BP has clearly defined practices which outline the processes and tools used in to procure and manage goods and services. These practices are intended to drive effective management of contractors in support of reduction of risk, improved operational performance, increased capital productivity, reduced cost, and improved access to resources and markets.

Through specific contract requirements, BP requires that contracted companies have in place a HSE management system that provides a systematic approach for controlling risk, complying with regulatory requirements and continually improving HSE performance.

The key contractor for this drilling program, Diamond, manages HSE performance by their Global Excellence Management System (GEMS), which is the equivalent of BP's OMS. GEMS is a fully-integrated Health, Safety, Environmental and Quality (HSEQ) system that contains the procedures to monitor, control and continuously improve performance in these areas. GEMS is certified by the IMO and by the International Management Code for the Safe Operations of Ships and Pollution Prevention (ISM Code). Diamond's Safety and Environmental Management System (SEMS) is part of the overall GEMS, and provides a system containing the company's policies, procedures and guidelines for conducting operations in a safe and efficient manner. These systems provide a consistent, worldwide management system for use on all Diamond facilities.

BP's Commitment to **health, safety, security** and **environmental** (HSSE) performance

Our HSSE goals are simply stated – no accidents, no harm to people and no damage to the environment.

We strive to be a safety leader in our industry, a world-class operator, a good corporate citizen and a great employer.

Nothing is more important to us than the health, safety and security of our workforce and the communities in which we operate, and behaving responsibly towards our shared environment. We must be vigilant, disciplined and always looking out for one another.

We are committed to:

– Complying with applicable laws and company policies and procedures.
– Systematically managing our operating activities and risks.
– Reporting our HSSE performance.
– Learning from internal and external HSSE events.

Everyone who works for BP has a part to play in meeting our HSSE commitment.

Bob Dudley,
Group Chief Executive
29 September 2014

Figure 8 - BP HSSE Policy

For vessel-based activities, BP will ensure that an Environmental Management System is in place for the selected contractors to ensure that their environmental impacts and risks are adequately identified and managed. The support vessel contractors must have systems in place to monitor and track compliance with the requirements of this EP. Pre-qualification criteria and pre-selection audits of potential vessel contractors will ensure these systems are in place prior to contract award.

7.3 Roles and Responsibilities

In accordance with BP's OMS, the environmental roles and responsibilities of key project personnel are summarised in the EP. Whilst compliance with HSE requirements is the responsibility of all personnel involved in the drilling program, the GWO New Ventures Wells Manager is responsible for ensuring all required plans, audits and reviews are undertaken in accordance with the EP.

7.4 Training and Competencies

BP's OMS defines the training and competency expectations for BP staff and contractors. BP employees are selected, trained, developed and evaluated to ensure that they attain and maintain the level of competency required for the position they hold. BP selects its contractors based on a detailed tendering process, whereby the qualifications and experience of tendering companies are used to select companies to fulfill specific duties than cannot be met by internal resources.

All BP and Diamond personnel involved with the project, including third-party contractors, will attend a project-specific pre-spud induction prior to joining the MODU. This will cover various aspects of the project, including environmental and EP awareness and compliance aspects, including:

- Environmental regulatory requirements;
- Environmental sensitivities and key risks;
- Key environmental management procedures, including:
    - Mud and cement management.
    - Waste management (segregation, containment and disposal).
    - Spill prevention, preparedness and response.
    - Housekeeping.
    - Incident reporting and recording.

Whilst on the MODU, all personnel will be involved in a number of different HSE meetings, including weekly HSE meetings, Toolbox meetings (job safety analysis) before initiation on tasks and daily 'pre-tour' HSE meetings.

Project specific emergency response training, including detailed oil spill response training, will be conducted for BP and Diamond personnel who have responsibility for responding to emergency incidents. Diamond has identified training needs for all positions on board, requiring all personnel undertaking activities that may create a significant impact on the environment to receive appropriate training. If the personnel do not have appropriate skills to undertake the identified responsibilities, training will be provided (including Common Safety Training Programme).

7.5 Incident Recording and Reporting

BP's OMS requires that BP records and reports environmental incidents. There are also obligations to report incidents to NOPSEMA and other government departments within a specified time period.

All breaches of this EP are considered non-compliances. Non-compliances may be identified during an audit, inspection, crew observation or as a consequence of an incident.

All non-compliances must be communicated immediately to the appropriate offshore personnel (i.e., the Wells Team Leader and/or OIM). This expectation will be reinforced at the induction and at weekly HSE meetings. All incidents of EP non-compliance will be investigated as per Element 4 (Procedures) of the OMS. Following an investigation, remedial actions are developed to prevent recurrence and tracked to completion. The outcomes of the investigations will be communicated to the crew during the weekly HSE meetings.

The BP Environment Manager or delegate will ensure internal notification, investigation and reporting of any environmental incidents is conducted in accordance with BP's internal reporting procedure, and that external reporting is conducted as required under relevant legislation or as agreed to during stakeholder consultation.

7.6 Environmental Monitoring & Record Keeping

The risk assessment conducted in the EP includes requirements regarding environmental monitoring. This monitoring will be conducted at the frequency outlined in the EP, and will contribute to the end-of-project EP performance report, which will be submitted to NOPSEMA within three months of completion of the drilling program.

7.7 Auditing and Review

GWO uses a system of checks and balances to verify the quality of their operations through a three-tiered assessment process consistent with BP's OMS. GWO conducts self-verification activities, which includes work conducted by third-party contractors. In addition, independent views on the quality of operation within BP are achieved through Assurance (conducted by Safety and Operational S&OR) and Audit (conducted by Group Audit).

To review performance of the project against this EP, BP will conduct a number of audits, including: a pre-moblisation audit of the MODU and support vessels; an EP compliance audit of the MODU at least once per well; and an EP compliance audit of each support vessel at least once during the drilling program. Environmental audits and inspections outside the scope of this EP, such as supply base operations, will also take place. The BP Environment Manager and BP HSE Advisor will coordinate and/or conduct the audits, as required. Audit findings will be recorded and communicated to key personnel through an audit exit meeting and formal audit report, and corrective actions will be recorded and tracked to closure through BP's 'Traction' system.

In addition to these audits, the BP Environment Manager and BP HSE Advisor will regularly review EP compliance as standard practice, using weekly checklists to ensure compliance. A summary of the environment audit results will be included with the EP end-of-project performance report submitted to NOPSEMA.

8 Contact Details

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