Otway Basin 2D MC Marine Seismic Survey Environment Plan

1. Purpose of this report

NOPSEMA has accepted subject to limitations the Otway Basin 2D MC Marine Seismic Survey Environment Plan (the EP) submitted by Schlumberger Australia Pty Limited (the titleholder) for a seismic survey activity in the Otway Basin. This survey is estimated to take 100 days (including allowance for weather and other downtime) within the period November 2019 to June 2020.

The EP has been accepted subject to the following limitation;

> No discharge of seismic airguns in the pygmy blue whale biological important areas (BIAs) (including the Bonney Upwelling Key Ecological Feature) from 1 November 2019 to 30 April 2020; and implement measures that limit anthropogenic noise in BIAs for the duration of the activity so that any blue whale continues to utilise the area without injury, and is not displaced from a foraging area.

As required by the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (the Environment Regulations), the public was provided with an opportunity to comment on the EP. After this period, Schlumberger Australia Pty Ltd took into account public comments and prepared a Report on Public Comment which is published on NOPSEMA's website[2].

Following the public comment period, on the 5 September 2019 the titleholder submitted the EP to NOPSEMA for assessment. On the 11 November 2019, NOPSEMA completed its assessment of the EP and accepted the plan subject to limitations[3].

This report explains how NOPSEMA took into account comments received from the public during the public comment period in making its decision[4]. Comments have been grouped into 'key matters' that capture the key issues, concerns or new information provided during the public comment process. This report also contains other key matters that may be of interest to the public.

This report should be considered in the context of the accepted Otway Basin 2DMC Marine Seismic Survey Environment Plan (Revision 5.0), which is available on the NOPSEMA website and should be referred to for further information.

1.1. Information relevant to NOPSEMA's decision:

In making the decision to accept this EP, NOPSEMA took into account:

- the Environment Regulations;
- NOPSEMA Assessment Policy (PL0050), Environment Plan Assessment Policy (PL1347) and Environment Plan Decision Making Guidelines (GL1721);

[1] BIA boundaries to be informed by geographic information system layers displayed in the Australian government's Conservation Values Atlas [OBJECTID = 2645, OBJECTID 2492])

[2] Titleholder report on public comments – Otway Basin 2DMC Marine Seismic Survey, [dated: July 2019]

[3] Environment Regulations, Regulation 10(6) Acceptance subject to limitations, conditions, etc.

[4] Environment Regulations, Regulation 11(3) Publication of notice, etc.

- the Otway Basin 2D MC Marine Seismic Environment Plan;
- the information raised by relevant persons, government departments and agencies that is relevant to making a decision;
- the information raised through public comment that is relevant to making a decision;
    - there were two public comment submissions received during the public comment period with issues raised predominantly in relation to the key matters outlined in the below report;
- relevant plans of management and threatened species recovery plans developed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and relevant guidance published by the Department of the Environment and Energy;

2. Next steps

Responsibility for the ongoing environmental performance of the Otway Basin 2D MC Marine Seismic Survey activity remains, at all times, with Schlumberger Australia Pty Ltd.

NOPSEMA has legislated responsibilities to inspect and investigate offshore petroleum and greenhouse gas storage activities, and to enforce compliance with environmental law. These functions will be applied to this activity in accordance with NOPSEMA's policies.

3. Sensitive Information

Sensitive information received during the public comment period, such as the names and contact details of commenters and specific information identified by the commenter or relevant person as 'sensitive', is not published in this report. Sensitive information is contained in a sensitive information part of the EP which has been considered by NOPSEMA during its assessment process.

4. Further information

If you would like further information about the activity, please contact the titleholder's nominated liaison person specified in the EP and on NOPSEMA's webpage for the Otway Basin 2DMC Marine Seismic Survey.

If you would like to be notified of regulatory information on the activity, such as start and end dates and enforcement actions (if any), please subscribe to updates from https://info.nopsema.gov.au/ on NOPSEMA's website.

How NOPSEMA has taken into account key matters raised during the assessment and decision making process for the Otway Basin 2DMC Marine Seismic Survey

#	Matter	Titleholder response	NOPSEMA's assessment and decision
1	***There would be unacceptable impacts to blue whales due to the spatial and temporal overlap with significant blue whale feeding habitat (i.e. Bonney Upwelling Key Ecological Features and pygmy blue whale foraging BIAs)*** Claims were made that: • there is potential for detrimental impact on food source for blue whales (krill: *Nyctiphanes australis*) due to the geographical extent of the survey • whales may be displaced from foraging resulting in loss of condition and reduced breeding success • detection methods are not reliable as there is potential to displace whales beyond the visual range of Marine Fauna Observers (MFOs) and passive acoustic monitoring cannot adequately detect and locate low-frequency calls such as those of blue whales.	Schlumberger has responded to this matter by undertaking a comprehensive assessment of the presence and potential impacts to blue whales (EP, s7.2). This has been informed by underwater acoustic modelling that has accounted for physical and behavioural impacts (Appendix A), and contemporary scientific literature on blue whale distribution (e.g Gill *et al* 2011). In order to demonstrate that blue whales would not be displaced from a foraging biologically important area (BIA) and not incur injury in the BIA, Schlumberger included additional controls that exclude the survey from continuing in the Bonney Upwelling key ecological feature (an important habitat area within the foraging BIA), once the arrival of blue whales has been confirmed (informed by aerial surveys with 10 day intervals or via vessel observations). Schlumberger also committed to the use of two vessel based passive acoustic and visual observation platforms to implement a 10km observation zone within the blue whale foraging BIAs and a 10km buffer around the perimeter of the BIA. Schlumberger has set acceptable levels of impact and incorporated these into Environmental Performance Outcomes (EPOs) that require: • No mortality or physical injury to cetaceans throughout the Otway Basin 2DMC MSS Operational Area due to acoustic disturbance. • No disturbance to foraging pygmy blue whales within the pygmy blue whale foraging BIA due to acoustic disturbance. • No significant impact on zooplankton populations within the Bonney Upwelling Zone or any foraging marine fauna with the Bonney Upwelling from acoustic disturbance during the acquisition of tie lines.	NOPSEMA recognises the matter raised and agrees there is the potential for the activity, if not appropriately managed, to have an unacceptable impact on blue whales should they be feeding in the region during the course of the petroleum activity. In making a decision regarding this matter, NOPSEMA took into account the content of the EP; views expressed by the Blue Whale Study Inc.; relevant scientific literature; NOPSEMA's Decision Making Guidelines (GL1721); the Conservation Management Plan for the Blue Whale (DoE, 2015); EPBC Act Policy Statement 2.1 (DEWHA, 2008); and the EPBC Act Significant Impact Guidelines 1.1 – Matters of National Environmental Significance (DEWHA, 2013). Recognising that the proposed survey partially overlapped with BIAs for blue whales (high density foraging), NOPSEMA required the titleholder put in place effective whale detection and control measures to demonstrate that blue whales would not be injured or displaced from foraging in BIAs. In response, the titleholder included a 10km observation zone that applied to the foraging BIA and a 10km buffer; 10 day interval aerial surveys; the use of passive acoustic monitoring; and trained marine fauna observers / PAM operators to implement a shutdown of the seismic array should a blue whale be detected entering the shutdown zone of an active seismic source. In addition, the titleholder proposed to cease operations in the BIA during the month of February.

		Measures to be implement to achieve these acceptable levels include (though not limited to): • EPS 87: Operations will comply with the EPBC Act Policy Statement 2.1. Part A requirements at all times. • EPS 88: The following Precaution Zones will be implemented throughout the duration of the survey: Observation Zone – 3+ km (or 10 km observation zone when the acoustic source is active within the blue whale BIA and 10 km buffer); and shut-down Zone – 2 km (or 4 km inside the pygmy blue whale/southern right whale BIA). • EPS 90: When a whale is sighted, or detected via Passive Acoustic Monitoring (PAM) entering the Shutdown Zone, the acoustic source will immediately be shut-down. • EPS 103: During daylight hours, visual observations by trained MMOs will be maintained continuously, including during pre-start observation period and soft-start operations. PAM will run continuously, 24-hours per day for the duration of the MSS on the seismic vessel, but will only be implemented through adaptive management measures on the support vessel. • EPS 132: A 10 km behavioural disturbance buffer will be applied to the offshore extent of the pygmy blue whale BIA. This buffer zone will have the same control measures applied as the blue whale BIA. • EPS 134: A 4 km Extended Shut-down Zone will be implemented when operating within the BIAs and 10 km buffer. • EPS 140: Aerial surveys will be undertaken every 10 days during the Otway Basin 2DMC MSS to detect the arrival of any foraging blue whales within the Operational Area, as well as the location of any foraging blue whales outside the Operational Are, and the SBT fishing areas to identify any fishing activities • EPS 141: If foraging blue whales are observed inside the Operational Area during the aerial surveys, the lead MMO on the survey vessel will be notified of all relevant sighting data (i.e. location and number of foraging whales).	NOPSEMA is reasonably satisfied that with the control measures proposed, the seismic activities outside of the blue whale foraging season and outside of BIAs (foraging) reduce impacts to an acceptable level. However, given the scientific uncertainty in the effectiveness of the detection and control measures proposed, NOPSEMA is not reasonably satisfied that impacts to foraging blue whales within the BIAs can be managed consistent with the Blue Whale Conservation Management Plan 2015 (DoE, 2015), and to an acceptable level. Consequently, NOPSEMA has accepted the plan subject to the following limitation: No discharge of seismic airguns in the pygmy blue whale Biological Important Areas (BIA) (including the Bonney Upwelling Key Ecological Feature) from 1 November 2019 to 30 April 2020 and implement measures that limit anthropogenic noise in BIAs for the duration of the activity so that any blue whale continues to utilise the area without injury, and is not displaced from a foraging area. After taking into consideration all of the environmental management requirements in place (including the limitation imposed), NOPSEMA has concluded that the activity will not result in unacceptable impacts (no injury or displacement) to blue whales.

		• EPS 148: If the MMO or PAM operator onboard the support vessel observes a blue whale or southern right whale, the seismic vessel will be notified, and the acoustic source will be shut down immediately. • EPS 162: Tie line acquisition will only occur during daylight hours and in good visibility conditions that allow visual observations beyond the 3+ km Observation Zone or the 10 km observation zone when the acoustic source is active within the blue whale BIA and 10 km buffer. • EPS 163: A 4 km Extended Shut-down Zone will be implemented when acquiring the tie lines.	
2	***There would be an unacceptable impact to southern right whales in the calving biological important area (BIA) and during migration of adults and calves to and from coastal calving areas*** Claims were made that based on the timing and location of the survey, there is potential that southern right whales would be impacted at unacceptable levels during calving in biologically important areas.	Schlumberger has responded to the matter by implementing control measures for managing impacts to southern right whales to prevent stress response, energetic loss and reduction in fitness for mothers and calves utilising the calving BIA. Schlumberger adopted a conservative behavioural disturbance threshold and utilised underwater acoustic modelling to determine an appropriate exclusion area between an active seismic source and the BIA during southern right whale calving season. Schlumberger has set acceptable levels of impact and incorporated these into EPOs that require: • No injury to southern right whales or disturbance to southern right whales within the aggregating and calving BIA off Portland and Warrnambool, Victoria, due to acoustic disturbance. Measures to be implemented to achieve these acceptable levels include (though are not limited to): • EPS 154: No seismic operations will occur from 1 May 2019 to 31 October 2019 that will emit SPLs of 140 dB re 1 µPa or greater into the southern right whale calving and aggregation BIA.	NOPSEMA recognises that there is the potential for the activity, if not appropriately managed, to have impacts on southern right whales if the calving and breeding phases were disturbed, or if whales come within close proximity to the source and were subjected to injurious levels of sound. In making a decision regarding this matter, NOPSEMA took into account the content of the EP; NOPSEMA's Decision Making Guidelines (GL1721); Conservation Management Plan for the southern right whale (SEWPC, 2012); South-east Commonwealth Marine Reserves Network Management Plan 2012-23 (Director of National Parks, 2013), EPBC Act Policy Statement 2.1 (DEWHA, 2008); and EPBC Act Significant Impact Guidelines 1.1 – Matters of National Environmental Significance (DEWHA, 2013). Recognising the importance of the calving / breeding period potentially impacted by the proposed seismic survey, NOPSEMA required further evaluation in order to prevent stress response, energetic loss and reduction in fitness for mothers and calves utilising the calving BIA. Subsequently the titleholder adopted an 85 km exclusion buffer around the BIA informed by conservative

		• EPS 155: an 85 km exclusion buffer will be required around the calving/aggregation BIA during May-October. This 85 km will be additional to 10 km buffer for extra conservatism. • EPS 160: If a southern right whale mother and calf pair is observed in any part of the Operational Area, the acoustic source will immediately be shut-down. Pre-start observations and soft-start procedures will not commence until the whales have disappeared from observable distance for at least one hour, or until they are at least 10 km away.	behavioural disturbance thresholds for low frequency cetaceans. NOPSEMA is reasonably satisfied that, with the 85km exclusion buffer around the southern right whale calving BIA, in conjunction with shutdowns for mother-calf pairs that apply anywhere in the operational area, southern right whales will not be injured or disturbed to levels that cause unacceptable levels of impact during breeding and calving life stages After taking into consideration all the environmental management requirements in place, NOPSEMA concluded that the activity will not cause unacceptable impact (no injury or biologically significant behavioural disturbance) to southern right whales.
3	***There would be an unacceptable impact to Sperm whales in the biological important area (BIA)*** Claims were made that there has not been an accurate account of the distribution of sperm whales in the Operational Area by using the spatial extent of the sperm whale BIA to define the distribution of this species and as such, there is potential for unacceptable impacts on sperm whales	Schlumberger has responded to this matter by undertaking a comprehensive review of scientific literature relevant to sperm whales in the region (section 5.2.6.2). In addition, the EP to include additional information from Gill *et al*. (2015) to more accurately reflect the current knowledge of sperm whale distribution throughout the Operational Area. Schlumberger also adopted the use of PAM to detect sperm whales (and other relevant cetaceans) throughout the operational area. Schlumberger has set acceptable levels of impact and incorporated these into EPOs that require: • No mortality or physical injury to cetaceans throughout the Otway Basin 2DMC MSS Operational Area due to acoustic disturbance. • No significant impact on zooplankton populations within the Bonney Upwelling Zone or any foraging marine fauna with the Bonney Upwelling from acoustic disturbance during the acquisition of tie lines.	NOPSEMA recognises that, although the activity does not overlap with a sperm whale biologically important area, there is potential for sperm whales to be encountered during the activity, particularly in waters at the shelf break (roughly 1220m (Gill et al, 2015)). In making a decision regarding this matter, NOPSEMA took into account the content of the EP, views expressed by Blue Whale Study Inc., NOPSEMA's Decision Making Guidelines (GL1721); the South-east Commonwealth Marine Reserves Network Management Plan 2012-23 (Director of National Parks, 2013), EPBC Act Policy Statement 2.1 (DEWHA, 2008); and EPBC Act Significant Impact Guidelines 1.1 – Matters of National Environmental Significance (DEWHA, 2013). Recognising the potential impacts to sperm whales, NOPSEMA required the titleholder evaluate the application of PAM for detecting the presence of sperm whales in water depths between 200-1000m for both day and night. The titleholder responded to this request by

		Measures to be implemented to achieve these acceptable levels include (though re not limited to): • EPS 90: When a whale is sighted, or detected via PAM entering the Shutdown Zone, the acoustic source will immediately be shut-down. • EPS 101: If a whale is sighted within the Observation Zone during softstart procedures, an additional trained observer will be brought to the bridge to continuously monitor the animal. Two MMOs will be onboard the seismic vessel and one MMO onboard the support vessel at all times and will be supported by trained crew. Two PAM Operators will be onboard the seismic vessel and one PAM operator will be onboard the support vessel. • EPS 102: If a whale is sighted within or about to enter the Shut-down Zone, the acoustic source will shut-down completely. A soft-start procedure will resume only after the whale has been observed to move outside the Shut-down Zone, or when 30 minutes has lapsed since the whale was last sighted. • EPS 103: During daylight hours, visual observations by trained MMOs will be maintained continuously, including during pre-start observation period and soft-start operations. PAM will run continuously, 24-hours per day for the duration of the MSS on the seismic vessel, but will only be implemented through adaptive management measures on the support vessel. • EPS 104: Visual observations will continue during daylight hours, and PAM will continue under 24 hour operations, within the Operational Area even if the acoustic source is completely shut-down. A re-start will only occur following the pre-start observations and soft-start procedures.	adopting the use of PAM to detect sperm whales (and other relevant cetaceans) throughout the operational area. After taking into account the information on the distribution and abundance of sperm whales, the potential impacts relating to short term disturbance should foraging whales be encountered during survey lines, the spacing and length of survey lines and the environmental management requirements in place, NOPSEMA is reasonably satisfied that impacts to sperm whales will be of an acceptable level.
4	***The survey may have detrimental impacts to fisheries.*** Claims were made that:	Schlumberger has responded to this matter by claiming that the content of the EP has been supported by a wide range of published, peer-reviewed scientific literature. This view is supported by the extensive reference to published science demonstrating that there is	NOPSEMA recognises that there is a concern that seismic survey activities may induce mortality in zooplankton, and potentially in larval fish and crustacean, and that this could have consequence for recruitment to commercial fisheries.

• there has been selective use of published science • seismic could have a material impact on fish and crustaceans larvae in plankton leading to concerns about the cumulative impacts from multiple seismic surveys • sufficient control measures are not in place to mitigate the seismic impacts to zooplankton, larvae and commercial fish species including rock lobster	a broad use of scientific literature, including recently published literature. Schlumberger has evaluated that the potential for seismic impact to rock lobster on the seabed is extremely limited given there is very little overlap with rock lobster habitat (98% of the survey is in waters deeper than 200m). In respect to impacts from emitted sound to zooplankton, fish larvae and rock lobster larvae, the EP describes (section 7.2) that most of the studies detailed in the available scientific literature have shown no significant adverse effects. The EP also gives detailed consideration of the McCauley *et al.*, 2017, paper which describes a large scale field experiment and reported impacts to zooplankton beyond 1 km and mortality of krill larvae. Consideration also includes more recent publications (such as IAGC, 2017) addressing issues raised in the McCauley et al., 2017 paper. Schlumberger has adopted a conservative approach by evaluating the potential environmental consequence that would occur if zooplankton impacts occur at a distances predicted on the basis of threshold values described in the McCauley et al., 2017 paper. The evaluation takes into consideration the survey design (survey lines and spacing) and concludes that seismic-related mortality is likely to be within the range of natural mortality, population recovery is expected within days after seismic activity has ceased and no lasting ecosystem population impacts are expected. Schlumberger has discussed the potential cumulative impact from seismic noise of the Otway Basin Survey and other known possible surveys in the region, to commercial fish larvae and has provided a science based reasoned argument to support the conclusion that impacts will be acceptable. In response to fishery stakeholder concerns the survey operational area was reduced in size to limit overlap with the continental slope where fishing and fish spawning activity generally occurs. It is noted that the bulk of the survey (97%) is to occur in waters deeper than 200 m and that the survey lines for this 2D survey are spaced at 5km distance, thereby reducing any local impact.	In making a decision regarding this matter, NOPSEMA took into account the content of the EP, the relevant published science and other studies and NOPSEMA's Decision Making Guidelines (GL1721). While the body of scientific literature indicates that impacts are at a local scale (10s of meters), the McCauley 2017 paper reports impact at 10s of kilometres and consequently introduces scientific uncertainty about the scale of impact. In view of this NOPSEMA has taken into account the evaluation provided in the EP of the regional significance of the impacts to zooplankton (including fish, and crustacean larvae) based on the thresholds derived from the McCauley 2017 studies. This evaluation is reasonable and concludes that impacts to zooplankton at the regional scale will be to a minor proportion of the widely dispersed commercial fish and crustacean larvae, and will not be of a magnitude that will cause material impact on recruitment to commercial fisheries. In regard to impacts to zooplankton (including fish, and crustacean larvae), the EP has demonstrated that there is not a threat of serious or irreversible environmental damage even if impacts were to occur at the scale reported in the McCauley 2017 studies. Consequently the EP has provided sufficient information for NOPSEMA to be reasonably satisfied that impacts to zooplankton (including fish, and crustacean larvae) will be of an acceptable level.

5	***The survey may have detrimental impacts to Southern Bluefin Tuna fishing operations.*** Claims were made that: • Southern Bluefin Tuna fishing was carried out further east than is customary during the 2019 fishing season, including within the most western portion of the operational area. • Concerns were raised that the survey in the most western section could interfere with fishing, and pontoon operations.	Schlumberger undertook extensive consultation during the preparation of the EP with a range of fishing relevant persons including those representing the Southern Bluefin Tuna fishery. After the public comment period additional information was provided regarding Tuna fishing activity indicating that it had occurred, generally south of Cape Jaffa and within the western most portion of the survey operational area during the 2019 fishing season. The EP identifies that Tuna fishing has not typically occurred in this location, that the published science identifies the Great Australian Bight (GAB), as the location for the tuna fishing grounds (AFMA, 2018 and CSIRO, 2018). Schlumberger have responded to this matter by meeting with fishery representatives and providing written response to the issues raised. Arrangements and processes are detailed in the EP for how interactions with fishing operations will be managed. Specific proposals to modify the survey operations for defined locations relevant to tuna fishery operations, and for communication arrangements between the fishery and Schlumberger are under discussion as part of ongoing consultation.	NOPSEMA recognises that there is the potential for the activity, if not appropriately managed, to have impact on commercial fishing operations, including during the transport of captured tuna within pontoons. In making a decision regarding this matter, NOPSEMA took into account the content of the EP, the relevant published science, views expressed by representatives of the tuna fishery and NOPSEMA's Decision Making Guidelines (GL1721). NOPSEMA recognises that the historical records of the Southern Bluefin Tuna fishery indicate that fishing has not typically occurred in the proposed seismic survey operational area. However, although it may be unlikely, it is acknowledged that there is a possibility that fishing may occur within or adjacent to the operational area during the proposed seismic survey given the changing fishing locations observed in 2019. NOPSEMA is satisfied that Schlumberger has undertaken appropriate consultation during the course of preparing the EP, and has adequate arrangements for ongoing consultation with representatives of the tuna fishery. Sufficient processes and requirements are proposed that will ensure ongoing consultation and adaptive management to respond should tuna fishing again be undertaken within the operational area.

References:

AFMA, 2018. 'Southern Bluefin Tuna Fishery'. http://www.afma.gov.au/fisheries/southern-bluefin-tuna-fishery/

CSIRO, 2018. 'Playing Tag with tuna in the bight'. https://blogs.csiro.au/ecos/tuna-tagging/

DEWHA. (2008). EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales. Retrieved from http://www.environment.gov.au/system/files/resources/8d928995-0694-414e-a082-0ea1fff62fc8/files/seismic-whales.pdf.

DEWHA. (2013). Matters of National Environmental Significance - Significant Impact Guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999. Retrieved from http://www.environment.gov.au/system/files/resources/42f84df4-720b-4dcf-b262-48679a3aba58/files/nes-guidelines_1.pdf.

Director of National Parks. (2018). Australian Marine Parks - South-east Marine Parks Network Management Plan 2018. Retrieved from https://parksaustralia.gov.au/marine/parks/south-east/plans/

DoE. (2015). Conservation Management Plan for the Blue Whale – A recovery Plan under the Environment Protection and Biodiversity Conservation Act 1999. Retrieved from https://www.environment.gov.au/system/files/resources/9c058c02-afd1-4e5d-abff-11cac2ebc486/files/blue-whale-conservation-management-plan.pdf.

Gill, P.C., Pirzl, R., Morrice, M.G., Lawton, K., 2015. 'Cetacean diversity of the continental shelf and slope off southern Australia'. The Journal of Wildlife Management, 79(4): 672 – 681.

IAGC, 2017. 'Review of Recent Study Addressing Potential Effects of Seismic Surveys on Zooplankton'. Open letter from the International Association of Geophysical Contractors and API.

McCauley, RD, Day, RD, Swadling, KM, Fitzgibbon, QP, Watson, RA and. Semmens, J.M. (2017). Widely used marine seismic survey air gun operations negatively impact zooplankton, Nature Ecology and Evolution, Published 22 June 2017, Volume 1, Article No: 0195

NOPSEMA. (2018). Environment plan decision making guideline (GL1721). Retrieved from https://www.nopsema.gov.au/assets/Guidelines/A524696.pdf

SEWPC. (2012a). Conservation Management Plan for the Southern Right Whale - A recovery Plan under the Environment Protection and Biodiversity Conservation Act 1999. Retrieved from http://www.environment.gov.au/system/files/resources/4b8c7f35-e132-401c-85be-6a34c61471dc/files/e-australis-2011-2021.pdf.