



# Environmental Protection Authority

annual report  
2014—15



## Acknowledgements

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Office of the Environmental Protection Authority.

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October 2015



# Letter to the Minister

**Hon Albert Jacob**

**Minister for Environment**

In accordance with s21 of the *Environmental Protection Act 1986* I submit for presentation to Parliament the Annual Report of the Environmental Protection Authority for the year ended 30 June 2015.



**Dr Paul Vogel**

CHAIRMAN, EPA

30 September 2015



# Message from the Chairman



On behalf of the Environmental Protection Authority (EPA), I am pleased to present to the Minister for Environment and to the Parliament this Annual Report on our activities and environmental matters generally.

Western Australia is a unique state with a remarkable environment. Our incredible variety of marine and terrestrial ecosystems sit side by side with vast mineral, oil and gas resources, bringing both prosperity and risk to the environment. Most of WA's population calls the Perth and Peel regions home – an area that can also claim to be part of one of the world's 34 biodiversity hotspots.

This report provides the EPA with an opportunity to take stock and comment on how the environment is faring in the face of competing challenges and pressures, explain emerging issues, and report our progress in taking a strategic approach to best protect the environment.

The EPA has again spent time this year looking at the importance of strategic planning and the need to consider cumulative impacts of developments. WA's environment is extraordinary but we need to plan now for a more sustainable future. While I believe the significant reform initiatives we have implemented over the past few years have streamlined the assessment process without compromising the integrity of our assessments, it is also vitally important we continue to evolve our comprehensive environmental policy framework – which is always based on science and evidence – to support the decisions and advice we provide.

Simply put, we all need to look at the overall, bigger picture. In the past year we have released two very significant pieces of strategic advice, namely the *Cumulative environmental impacts of development in the Pilbara region* and, most recently, the interim strategic advice *Perth and Peel @ 3.5 million: Environmental impacts, risk and remedies*, which provides advice to the State Government on how best to protect the environment as our city continues to grow to accommodate an additional 1.5 million people in the future.

This advice was one of the most important and wide reaching pieces of strategic advice released by the EPA in many years. It is intended to influence the development of final plans and strategies for the future development of Perth, which includes the conservation of natural values and the protection of air quality, water quality and amenity.

To this end, the EPA has spent much of the year evaluating outcomes. By taking a broader, strategic view of individual assessments, we are looking beyond individual projects and improving our understanding of the cumulative risks and impacts within a region. We want to know if the conditions we recommend are practical and – more importantly – do they help protect the environment in the long term? How do we ensure that we end up with a net environmental benefit when development activities end? The EPA again uses this annual report to explore the issue of rehabilitation and mine closure.

The EPA has continued to advocate for industry and government to work together to fill important knowledge gaps. There is a vast amount of information out there. Sharing this knowledge will benefit us all and, most importantly, benefit the environment.

Throughout all of this work, the EPA has continued to engage with our stakeholders. Whether it is through our Stakeholder Reference Group, pre-referral meetings with proponents, speaking with the media, through our online consultation hub or through my own open-door policy, listening to people and understanding their concerns is a significant part of our work.

On behalf of the EPA, I would also like to recognise the productive working relationship we have had with the Government and thank all of those we have worked with – in particular, the highly professional staff from the Office of the EPA.

On a personal note, as this is my last annual report as Chairman of the EPA, I would also like to take this opportunity to offer my thanks. To be Chairman has been a privilege and I am very proud of all that has been achieved for the environment.

Western Australia has many dedicated and talented people across the scientific, academic, environment, industry and government sectors and they have all contributed to positive environmental outcomes. I would particularly like to acknowledge my fellow board members, both past and present - Dr Andrea Hinwood,

Ms Joan Payne, Dr Chris Whitaker, Mr Denis Glennon, Dr Rod Lukateli, Mr Robert Harvey, Ms Elizabeth Carr, Mr Glen McLeod and Dr Tom Hatton. The board has maintained a collegiate approach to decision making while highlighting the need to examine the bigger picture, shine a spotlight on the potential cumulative impacts on our environment, and look at how we can make a real, practical difference over the long term.

I am confident that I leave the EPA in good hands and with the foundations needed to meet the challenges of managing the environmental impacts on our state into the future.



Dr Paul Vogel  
Chairman, EPA





*Marandoo mine with Hamersley Range in the background, September 2014.  
Photo: Office of the EPA*

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*Kingia in Stirling Range National Park*

*Phytophthora dieback is one of the biggest threats to biodiversity in Western Australia. In south-western Australia it poses a threat to 61 susceptible species of plants listed as threatened under the EPBC Act and nine threatened ecological communities.*

*Photo: © Andrew Halsall, iStock 9677217*





# About the EPA

## Legislative framework

The Environmental Protection Authority (EPA) was originally established in 1971 under the terms of the *Environmental Protection Act 1971* and was set up to provide environmental policies and advice. Under the original legislation, environmental impact assessment (EIA) was not considered – indicative of it being in an early, developmental stage.

Fifteen years later, the *Environmental Protection Act 1986* (EP Act) was enacted, clearly outlining the functions of the EPA (opposite) and stipulating that its objective is to:

- use its best endeavours –
- a) to protect the environment; and
- b) to prevent, control and abate pollution and environmental harm.

The EP Act defines the environment as ‘living things, their physical, biological and social surroundings, and interactions between all of these’.

The EPA has five members appointed by the Governor on the recommendation of the Minister for Environment.

The EP Act provides opportunity for the Minister to seek the EPA’s advice on any matter related to the environment, or to remit proposals to the EPA for assessment.

During 2014–15 the EPA provided advice to the Hon Albert Jacob MLA, Minister for Environment.

Section 8 of the EP Act outlines the independent role of the EPA, that neither the Authority nor the Chairman shall be subject to the direction of the Minister.

This statutory independence is integral to the ability of the EPA to provide open, unambiguous advice about the environment, consistent with the objectives of the EP Act, for the long-term protection of Western Australia’s environmental values.

Equally, it is an important tenet of our system that the Minister for Environment, in considering the EPA’s recommendations, can weigh that advice against the social and economic objectives of Government before making decisions.

The EPA acknowledges the good working relationship it enjoys with the current Minister.

### Annual report

The EP Act provides authorisation for the EPA to make an annual report to the Minister by the end of October next following that financial year on ‘a) the activities of the Authority during that financial year; and b) environmental matters generally’.

The Minister is required to provide the report to each House of Parliament within nine sitting days of that House after the receipt of the report by the Minister.

### Reports on development proposals

In 2014–15, the EPA provided the Minister for Environment with reports on 31 development proposals, fourteen of which were reports on changes to implementation conditions of

approved proposals requested under section 46. All but three of the proposals were considered environmentally acceptable by the EPA, subject to strict conditions.

Following a rigorous assessment at the level of Public Environmental Review (PER), the EPA recommended the Western Australian Shark Hazard Mitigation Drum Line Program 2014-2017 proposal should not be implemented due to scientific uncertainty over whether it could meet the EPA’s objectives for Marine Fauna.

Two iron ore proposals in the highly biodiverse Banded Iron Formations of the Midwest were set levels of assessment at API – Category B, meaning that the EPA recommended they could not be managed to meet the EPA’s environmental objectives. These have subsequently been remitted for assessment at the PER level.

The EPA also reviewed 259 planning schemes and scheme amendments and provided advice on 44 of them. None required formal assessment.

### Changes to proposals

Section 45c of the EP Act allows for changes to approved proposals as long as there are no significant new or additional impacts on the environment. The EPA makes decisions on these matters under delegation from the Minister for Environment.

In 2014–15, the EPA approved 32 changes to proposals. These are published on the EPA’s website.



## Functions of the Authority

The functions of the Authority are —

- (a) to conduct environmental impact assessments; and
- (aa) to facilitate the implementation of bilateral agreements; and
- b) to consider and initiate the means of protecting the environment and the means of preventing, controlling and abating pollution and environmental harm; and
- (c) to encourage and carry out studies, investigations and research into the problems of environmental protection and the prevention, control and abatement of pollution and environmental harm; and
- d) to obtain the advice of persons having special knowledge, experience or responsibility in regard to environmental protection and the prevention, control and abatement of pollution and environmental harm; and
- (da) to advise the Minister on the making or amendment of regulations when requested by the Minister to do so or on its own initiative; and
- (e) to advise the Minister on environmental matters generally and on any matter which he may refer to it for advice, including the environmental protection aspects of any proposal or scheme, and on the evaluation of information relating thereto; and
- (f) to prepare, and seek approval for, environmental protection policies; and
- (g) to promote environmental awareness within the community and to encourage understanding by the community of the environment; and
- (h) to receive representations on environmental matters from members of the public; and
- (i) to provide advice on environmental matters to members of the public; and
- (j) to publish reports on environmental matters generally; and
- (k) to publish for the benefit of planners, builders, engineers or other persons guidelines to assist them in undertaking their activities in such a manner as to minimise the effect on the environment of those activities or the results thereof; and
- (l) to keep under review the progress made in the attainment of the objects and purpose of this Act; and
- (m) to coordinate all such activities, whether governmental or otherwise, as are necessary to protect, restore or improve the environment in the State; and
- (n) to establish and develop criteria for the assessment of the extent of environmental change, pollution and environmental harm; and
- (o) to specify standards and criteria, and the methods of sampling and testing to be used for any purpose; and
- (p) to promote, encourage, coordinate or carry out planning and projects in environmental management; and
- (q) generally, to perform such other functions as are prescribed.

## An ongoing reform journey

Just over six years ago the EPA reviewed its practices and delivered a report to Government outlining – in 47 recommendations – how it could deliver better environmental protection and improve the efficiency and transparency of environmental impact assessment.

Today, that series of recommendations has snowballed into a much broader reform which now has its own momentum, consistent with the Government's expectations that the EPA, supported by a newly created Department, should focus on continuous improvement.

The EPA's reform program has not only broadened but matured, placing greater emphasis on strategic outcomes for the environment and in more systematically evaluating the EPA's own performance.

The reform program has won recognition and support from stakeholders and Government departments within Western Australia, as well as national bodies such as the Productivity Commission. The strength of the EPA's assessment practices, policy suite, public participation and the transparency of its advice to Government has also brought endorsement in the form of the Bilateral Assessment Agreement with the Commonwealth Government.

**Implementing the reform program is not a story of perfection. There has been trial and error, setbacks, successes and new opportunities. Importantly, it has been guided by the EPA ... and a Department with a clear commitment to improvement.**

Implementing the reform program is not a story of perfection. There has been trial and error, setbacks, successes and new opportunities. Importantly, it has been guided by the EPA – whose members change from time to time, bringing new insights – and a Department with a clear commitment to improvement.

The EPA is often asked – most recently by a New Zealand delegation – about the key elements of its reforms, and the experiences it had along the way. In summary, they are as follows.

### *Better support*

Establishing a separate Office of the Environmental Protection Authority (OEPA), as a standalone Department to primarily focus on the EPA's key strategies and work priorities, has been a critical ingredient of successful reform.

- The EPA recognised that, to sustain the reform program, there would need to be improvements to the service culture of the Department and this was supported by an entirely new OEPA Corporate Executive. In April 2012, the results of a client satisfaction survey of EIA clients showed strong support for a stand-alone Department assisting the EPA and marked improvement in its level of service and accessibility.

- The OEPA's levels of service to the EPA – as rated by the members – now form part of the Department's key performance indicators which are published every year.

### *Better planning*

- In 2010, the EPA developed a three-year Strategic Plan to set clear objectives for the OEPA. The plan has been instrumental in sharpening the Department's focus, allowing for prioritisation of work and – equally – disciplining the EPA to limit its goals to a manageable range. The second Strategic Plan is now in operation and is an established part of our planning cycle, with quarterly strategic dialogues held by the EPA to seek frank feedback from stakeholders, and reflect on our performance, priorities and practices.

### *Clear and certain processes*

- In 2010, the EPA collapsed its complex 'levels of assessment' from five to two to simplify its process. These two levels of assessment are Public Environmental Review (PER) for the most complex matters, and Assessment on Proponent Information (API) for more straightforward matters.
- New Administrative Procedures have been published (2010, 2012) to provide clear guidance to proponents and others about the EPA's processes and procedures.

### *Timely and risk-based decision making*

- In 2010, the EPA started holding itself to account by making a statement in the front of all assessment reports about whether it had



met agreed timelines for the assessment. This is now a standard feature of all reports.

- The EPA also published (2010, 2013) guidance on timelines for environmental impact assessment of proposals so proponents have a clear understanding of what to expect.
- In 2013, the EPA published its *Application of a significance framework in the environmental impact assessment process* (EAG 9). This was a seminal document that formally articulated risk-based decision making – that is, how the EPA will focus its assessments on the most important environmental issues, avoiding duplication with other regulators and unnecessary investigation and documentation by proponents on issues that are not significant.

### Conditions

- In 2010, the EPA introduced the practice of consulting proponents and key Government agencies on draft conditions. This was to ensure any matters of fact, technical issues and implementation issues were addressed without resort to the appeal process. Analysis of the trial period demonstrated the practice contributed to a 53 per cent reduction in appeals. Consultation on draft conditions is now standard practice.
- In 2013, the EPA published guidance on its approach to developing conditions to ensure they are consistent in form and language; readily assessed for compliance; enforceable; and improved from lessons learned over time. The approach favours outcome-based conditions, while recognising that this will not

always be possible in some circumstances.

- Some conditions make reference to Environmental Management Plans (EMPs) and these can vary in style, content and effectiveness. The EPA has published guidance (EAG 17, 2015) setting out its expectations for EMPs so they are lean and focused on the key issues. This is expected to further streamline post-approval decision making.

### Contemporary policy suite

Environmental impact assessment would not be effective without a clear and contemporary suite of science- and evidence-based policies and guidelines. Over many years the EPA has published many policies and guidelines that – by 2009 – had become dated, were overlapping, inconsistent or difficult to interpret. A major review of EPA policies was completed in 2014–15 which saw more than half of the policy suite replaced or withdrawn (see **Major policy and process improvements in 2014–15**, page 14). Since the establishment of the OEPA in 2009, more than 30 high-quality policies and guidelines have been produced to ensure there is clear, consistent and contemporary advice available to proponents on how to meet the EPA's objectives.

- The OEPA has worked with other Government departments to develop a State Offset guideline that allowed the EPA to withdraw its offset policy suite. All Departments now act consistently with the State policy and there are clear expectations and common approaches to offsets. For its part, the EPA has supported the Government's desire for greater

accountability and transparency around offsets by ensuring that any offset proposal is fully considered by the EPA, is the subject of enforceable conditions, and is documented in a public report to the Minister (and open to appeal).

### Strategic focus

- The EPA recognises that the best environmental outcomes are often achieved at the strategic level rather than through individual, case-by-case assessments. In recent years, the EPA has put greater effort into considering cumulative impacts and providing strategic advice and reports to the Minister for Environment. This has included:
  - advice on the environmental values of the Dawesville–Binningup region (2010);
  - the Shared Environmental Assessment Knowledge (SEAK) Taskforce (2012) which reported to Government on opportunities to better use and reuse information gleaned in environmental assessments;
  - the environmentally sensitive Fortescue Marsh in the Pilbara (2013);
  - environmental and health performance of waste-to-energy technologies (2013);
  - cumulative environmental impacts of development in the Pilbara region (2014); and
  - environmental impacts and risk associated with an expansion of the Perth and Peel population to 3.5 million (2015).



OEPA staff at Mt Weld, Laverton, the richest known deposit of rare earths in the world.  
Photo: Office of the EPA

### *Communication*

- At the request of the EPA, the OEPA boosted its communication support in 2011 to ensure EPA reports and recommendations were fully explained to the broader community and that there was more information available through the EPA website.

### *Stakeholder engagement*

- The EPA has adopted a more systematic approach to stakeholder engagement, inviting peak bodies and interest groups to provide candid feedback about their experiences of the EIA process and to discuss environmental concerns. This occurs at quarterly EPA strategic dialogues or at regular board meetings, and influences EPA reviews of its policies and practices. The EPA also undertakes regular site visits around the State to better understand mining, industrial and infrastructure operations, and planning issues, and how they might affect environmental values.
- In 2015, the EPA instituted a practice of seeking written feedback at the conclusion of every assessment so proponents can comment on timeliness, level of service, utility of policies and guidelines, and any other matters. This has yielded useful information for the EPA to consider in reviewing its practices.
- The EPA and OEPA have instituted regular engagement with key departments involved in the assessment and approvals process, supported by Memoranda of Understanding.



### *Increased transparency*

- In 2010, the EPA introduced the opportunity for the public to comment on the level of assessment that should be applied to a proposal. This provides early notice of referred development proposals and helps the EPA gauge the level of public interest and concern. The 7-day comment period is in addition to formal submission periods on PER documents.
- In many cases, the EPA decides not to assess proposals or schemes and may provide public advice in support of its decision. This is now routinely made public on the EPA website.
- All EPA reports and strategic advice to Government is routinely published on the EPA website, maintaining a high level of transparency.
- In 2012, the EPA introduced an online consultation hub so that members of the public can more readily and immediately make submissions to the EPA. This has improved efficiency for the OEPA, but also greatly enhances opportunities for public input.

### *Streamlining*

- In 2010, the EPA finalised a revised Bilateral Assessment Agreement with the Commonwealth so that assessments at the level of PER occur only once for both Commonwealth and State processes. On 1 January 2015, this agreement was extended to include the API level of assessment, offering proponents significantly greater opportunity to access the EPA as a 'one stop shop' for assessment. This Agreement is likely to be

extended further (to include approvals) in due course.

- In 2012, the EPA endorsed simplified administrative arrangements to consider planning schemes and scheme amendments, 100 per cent of which are referred to the EPA for consideration. Adopting a risk-based approach, the EPA has been able to fast-track most decisions, reducing the average turnaround time to 12 days. The EPA is also pursuing regulatory reform to prevent the referral of low environmental risk matters in future, saving further time and administrative effort.

### *Better science*

- The EPA has lent strong support to the establishment of the WA Marine Science Institution's Dredging Science Node to improve the capacity within both government and the private sector to predict and manage the impacts of dredging. The knowledge generated through this research program will be freely available and represent a 'compendium of contemporary best practice' for dredging impact prediction, monitoring, and management for Western Australia and beyond.
- The EPA is a foundation member of the new WA Biodiversity Science Institute which aims to generate high quality, relevant research about Western Australia's terrestrial biodiversity.
- Between 2009 and 2012, the EPA, in collaboration with government agencies, industry bodies and peak environmental groups, reported to the Minister for

Environment on the concept of Shared Environmental Assessment Knowledge (SEAK). The purpose of SEAK was to develop a model for delivering improved environmental data management and knowledge-building in relation to the environmental impact assessment process.

### *Evaluation*

- In 2014–15, the EPA has sought a greater focus on rigorous evaluation of its practices and on environmental outcomes associated with its decisions. This is a key part of learning and continuous improvement. The EPA has endorsed a series of evaluation projects to take place in the 2015–16 financial year, looking at the consistency of application of flora and vegetation guidelines, the implementation of environmental outcomes of its 'not assess' advice, the cumulative effect of development decisions on Weeli Wolli Creek in the Pilbara, and the effectiveness of mine closure plans.

## Major policy and process improvements in 2014–15

### Preparation of Management Plans under Part IV of the *Environmental Protection Act 1986*

Environmental Management Plans are an important tool for protecting the environment. They can be either submitted as part of the proponent's EIA documentation or required through the conditions of a Ministerial approval. They guide the implementation of proposals and demonstrate how a proposal will be managed such that actual impacts to the environment are consistent with those predicted and evaluated through the environmental impact assessment process, and to ensure the impacts of a project do not exceed those set out in the approval. In the last five years, proponents have submitted almost 500 management plans for review by the OEPA, which is responsible for monitoring compliance with Ministerial conditions related to approvals.

An *Environmental Assessment Guideline for Preparation of Management Plans under Part IV of the Environmental Protection Act 1986* (EAG 17) was released in August this year, adding to the existing suite of EPA policy material. This guidance was developed in response to stakeholder feedback and sets out the EPA's expectations regarding the form and content of management plans. It outlines proponents' legal obligations in relation to implementation conditions, and guides proponents on how to formulate management plans which clearly and

succinctly present the required information, focusing on the most significant environmental issues. This will assist the OEPA in reviewing the large number of management plans in a timely and efficient manner.

The EAG reinforces the need for monitoring environmental performance to achieve the EPA's objectives for each of its environmental factors. It shows how environmental performance, relative to either the outcomes or objectives in Ministerial implementation conditions, relates to the EPA's significance framework (EAG 9).

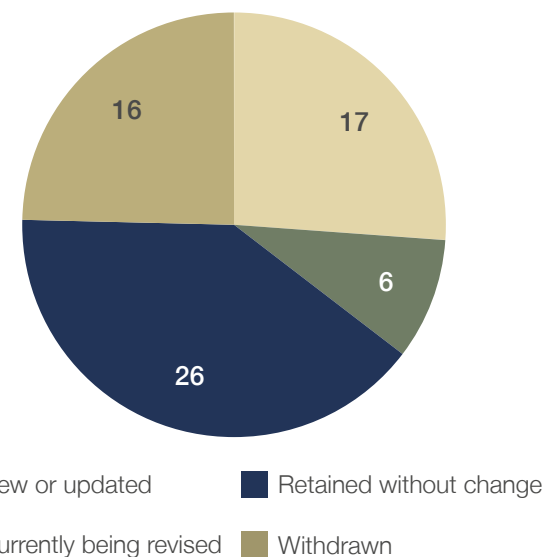
The EAG is complementary to and addresses the application of the three condition models in the EPA's guidance on recommending environmental conditions (EAG 11).

Training in application of EAG 17 is being provided, and the EPA looks forward to seeing the guidance applied in EIA documentation submitted by proponents. Stakeholders will be consulted on their experience with implementation during 2016 to inform future reviews.

### Policy review and improvements

Clear, consistent and contemporary policies and guidelines are essential to ensure the EPA's expectations for assessments are well understood.

For the past two years, the EPA has been engaged in a systematic program of updating its policies and producing new guidance to improve the environmental impact assessment (EIA) process.



**Figure 1: Changes to EPA policy suite since April 2013**

All EPA policies have been reviewed and a process put in place to achieve the following outcomes:

1. current and clear advice that meets proponents' needs;
2. consistent policy format; and
3. consistent with the EPA's factors, objectives and current assessment processes.

Older policies are being progressively revised as either Environmental Assessment Guidelines (EAG) or Environmental Protection Bulletins (EPB) to reflect the new format. Policies that have been withdrawn which contain relevant reference information have been archived on the EPA's website.



The EPA has published over 50 pieces of strategic advice to the Minister for Environment under Section 16(e) of the EP Act. In 2014 each piece of advice was reviewed, with 21 retained as current EPA advice and the remainder archived for historical reference.

The EPA continues to produce new policies to provide clear and consistent advice for proponents and the public on the EIA process, the application of EPA factors and objectives, and the EPA's position on important environmental matters.

In the past year, the EPA has published two new technical environmental assessment guidelines which articulate the EPA's expectations with regard to:

- management of marine environmental quality in Western Australia (*Protecting the Quality of Western Australia's Marine Environment* (EAG15)); and
- consideration of the impacts from noise emissions throughout the EIA process (*Consideration of environmental impacts from noise* (EAG13)).

The EPA requires sufficient information to determine if a proposal is likely to have a significant impact on the environment. During the year, guidance to outline the EPA's expectations at project referral was published (*Referral of a proposal under s38 of the Environmental Protection Act 1986* (EAG16)), and the EPA's referral form has been substantially updated to reflect the new guideline.

Additionally, the EPA has released guidance on *Preparation of an API – Category A Environmental Review Document* (EAG 14), and Environmental Protection Bulletin 22 – *Hydraulic fracturing for onshore natural gas from shale and tight rocks*.



## EPA decision-making

In each annual report, the EPA endeavours to explain specific aspects of its decision-making process.

### How does the EPA apply the precautionary principle?

The ‘precautionary principle’ is a much used, and abused, term in environmental impact assessment.

The EPA is often called upon by members of the public or interest groups to invoke the precautionary principle and recommend against a proposal.

However, it is a principle that cannot be applied capriciously or without careful consideration of the preconditions set out in the EP Act.

The precautionary principle is expressed in the EP Act in the following terms:

Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

In the application of the precautionary principle, decisions should be guided by —

- (a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and
- (b) an assessment of the risk-weighted consequences of various options.

The precautionary principle operates when a proposal presents a threat of serious or irreversible damage to the environment, and there

is a lack of full scientific certainty in respect of the extent of the threat. In short, the precautionary principle is “intended to promote actions that avoid serious or irreversible damage in advance of scientific certainty of such damage”.<sup>1</sup>

The precautionary principle is implemented in environmental impact assessment through the:

1. evaluation of the nature, degree and permanency of the threat to the environment;
2. evaluation of certainty and conclusiveness of the scientific evidence in relation to the threat and the threatened environment; and
3. making of well-informed decisions to avoid, minimise or mitigate the serious or irreversible threat.

### Threat of serious or irreversible damage

In determining whether a threat of serious or irreversible damage to the environment exists, the EPA considers a range of factors, which will be determined by the nature of the proposal. These factors may include:

- the geographical scale of the threat;
- the magnitude of possible impacts on the natural and human environment;
- the environmental values of the threatened environment;
- the timing and longevity of the impacts;
- the complexity and connectivity of the possible impacts;
- whether the impacts can be managed; and
- the reversibility of the possible impacts and, if reversible, the time frame for reversing the

impacts and the difficulty and expense of reversing the impacts.

While the threat of serious or irreversible damage need not be fully demonstrated by conclusive scientific evidence, it should be founded on available scientific evidence and not on mere conjecture.

### Scientific uncertainty

If the EPA considers that there is a threat of serious or irreversible environmental damage, then the EPA will consider whether there is a lack of full scientific certainty. This will involve consideration of the amount of evidence available, the nature of the uncertainty and the potential to reduce the uncertainty.

### Precautionary measures and recommendations

Where the EPA considers that the precautionary principle is applicable, the EPA will carry out a careful evaluation in relation to what action may be taken to avoid, where practicable, serious or irreversible damage to the environment. It will also assess the risk-weighted consequences of the various options.

The EPA’s evaluation and assessment will inform its recommendations. In some cases, the EPA may recommend that precautionary measures be taken. The precautionary measures that will be appropriate will depend on factors such as the degree of seriousness and irreversibility of the threat and the degree of uncertainty.

<sup>1</sup> Chief Justice Preston in *Bentley v BGC Properties Pty Limited* [2006] NSWLEC 34



The EPA may recommend that the proposal not be implemented, or that the implementation of the proposal be subject to conditions that address the threat. However, the application of the precautionary principle does not demand a particular result. The EPA's recommendations will depend upon its assessment of the proposal as a whole.

## Role of EPA strategic advice

The EPA's role in undertaking environmental impact assessment is well known, but a lesser known and equally important role it undertakes is to provide strategic advice to the Minister for Environment on environmental matters, under section 16(e) of the EP Act. The Minister for Environment can request the EPA to provide advice on specific matters, or the EPA can provide advice of its own volition.

Historically, the EPA has provided advice on important or emerging environmental issues, specific areas of conservation significance, particular types or sectors of industry, and on specific projects.

In developing its strategic advice, the EPA aims to provide advice that clearly describes the EPA's concerns and environmental objectives, and provides practical suggestions or recommendations which can be readily implemented. It has published over 50 pieces of advice since 1996, all of which are available on the EPA website.

The most recent advice published by the EPA is its interim strategic advice for the Perth and Peel regions (August 2015). The advice is discussed in detail on page 88 of this report.

Other recent strategic advice published by the EPA includes:

- *Cumulative environmental impacts of development in the Pilbara region* (August 2014);
- *Environmental and water assessments relating to mining and mining-related activities in the Fortescue Marsh management area* (July 2013);
- *Environmental and health performance of waste to energy technologies* (April 2013); and
- *Strategic Environmental Advice on the Dawesville to Binningup Area* (May 2010).

These reports have been influential in a variety of ways, and demonstrate the effectiveness of this important EPA function.

The EPA's strategic advice on the *Cumulative environmental impacts of development in the Pilbara Region* sets out recommendations to provide a pathway to sustainable development of the Pilbara. The advice recognises the important biodiversity values of the Pilbara and provides recommendations on how its biodiversity can be protected while supporting ongoing significant economic development.

The EPA's recommendations address the need for a whole-of-Government strategic plan for biodiversity conservation, strategic implementation of offsets through establishment of a regional conservation initiative, and the importance of rehabilitation and knowledge sharing.

The EPA's advice on *Environmental and water assessments relating to mining and mining-*

*related activities in the Fortescue Marsh management area* aims to provide clarity and consistency to the environmental assessment and approvals process through identification and prioritisation of water and environmental values in different zones.

Fortescue Marsh, approximately 100 kilometres north-west of Newman, is the largest ephemeral wetland in the Pilbara region and is recognised as nationally important. It is anticipated that a coordinated approach in the Fortescue Marsh management area will provide more effective and efficient management, a better collective understanding of the Marsh and knowledge gaps, and a better understanding of cumulative impacts on the Marsh.

The EPA's advice on the *Environmental and health performance of waste to energy technologies* was prepared jointly with the Waste Authority at the request of the Minister for Environment. This advice examines the potential environmental and health impacts and risks of waste to energy plants based on worldwide experience, and makes recommendations to support the development of a waste to energy industry in Western Australia based on world's best practice.

Since the advice was released in April 2013, the EPA has assessed and reported on five waste to energy proposals: the Port Hedland Boodarie Recovery Facility; the Resource Recovery Facility, Red Hill; the Kwinana Waste to Energy Project; the East Rockingham Waste to Energy Facility; and the Hazelmere Wood Waste to Energy Plant.

The advice has been very important in providing guidance to the proponents of these proposals

and assisting the EPA in its assessment and recommendations to the Minister for Environment. The advice has also been cited by peak groups and industry across Australia as providing an important benchmark for the health and environmental performance of waste to energy plants.

The *Strategic environmental advice on the Dawesville to Binningup area* identified areas of conservation significance and areas that may have potential for development and land use compatible with the environmental values. Significant values include the Yalgorup lakes (recognised under the Ramsar Convention as a wetland of international importance), geoheritage features of international significance, ecological communities, flora and fauna, and significant coastal and landscape values. Areas identified as highly constrained include the western side of the Yalgorup lakes system and the coast.

The City of Mandurah has recently used this strategic advice to guide an amendment to the town planning scheme and protect the environmentally significant areas of the Dawesville-Binningup area through the planning framework. The advice has also guided decisions of the Western Australian Planning Commission on subdivisions.

The EPA will continue to provide strategic advice as appropriate on environmental matters that need to be considered strategically or cumulatively to protect the environment.

## Case study

### When a referral isn't a referral

Many proposals are referred to the EPA every year, but only a small proportion are formally assessed. This is because the EPA is required to assess only those proposals that are likely to have a significant effect on the environment.

Sometimes the EPA may choose not to accept a referral because it is apparent that it is not significant. Under the EP Act only significant proposals can be referred to the EPA. Where the EPA chooses not to accept a referral it will write to the referrer explaining why it is not a significant proposal. In this case the EPA does not have to make a decision whether to assess the proposal.

A recent example of this was when a third party referred the State Government's *Guidelines for Sharks Posing a Serious Threat to Public Safety* (2014 Guidelines) to the EPA in January 2015.

The 2014 Guidelines is a policy which provides for the temporary deployment of capture gear in response to a shark attack, or multiple confirmed sightings or detections of a 'High Hazard Shark' where there is considered to be a High Risk, based on the criteria specified in the 2014 Guidelines.

The EPA closely considered the information provided in the referral and the 2014 Guidelines, in addition to seeking further information from the proponent to determine the likely environmental effects of this policy.

The State Government has had a policy of deploying capture gear in response to a shark attack and/or threat of attack since September 2012. Since that time capture gear has been deployed on 11 occasions and the EPA is advised that during that period two white sharks and one tiger shark were captured. The tiger shark was subsequently released.

Deployment of capture gear in accordance with the policy has been undertaken for a limited duration, and its implementation is responsive and temporary in nature.

Based on the existing level of impact over the implementation of the policy (i.e. 11 deployments taking two white sharks over a period of two years) the EPA considered that the policy, implemented in accordance with the 2014 Guidelines, is unlikely to have a significant effect on the environment.

The EPA wrote to the referrer explaining why the referred proposal is not a significant proposal.



... the EPA is required to assess only those proposals that are likely to have a significant effect on the environment.





## Western Australia's environmental challenge

Western Australia is home to a rich and diverse natural environment spread over a vast geographic area, from the tropical north to the temperate south and the arid inland. It has an ancient land surface made up of some of the oldest rocks in the world.

The ecosystems that have evolved in isolation often support rare and unusual species. There is the world's smallest known goanna – the Dampier Peninsula Goanna (*Varanus sparnus*) – recently found in the remote Kimberley and believed to have remained unchanged for over 6 million years. There is the critically endangered Swamp Starflower (*Calytrix breviseta* subsp. *breviseta*) – thought to be extinct until it was rediscovered in 1990. It still persists in the Perth Metropolitan Area despite our history of urban encroachment.

It is against this backdrop that the EPA assesses the environmental impacts of development proposals and planning schemes across the length and breadth of our State.

Recognising that the best environmental outcomes are often achieved at the strategic level rather than through case-by-case assessments, the EPA has put greater effort into considering cumulative impacts and providing strategic advice.

In this annual report, the EPA will provide comment and analysis against the broad themes of Land, Sea, Water, Air and People, which collectively cover the EPA's 15 environmental objectives considered when undertaking assessments and providing strategic advice.

Swamp Starflower  
(*Calytrix breviseta* subsp. *breviseta*)  
Photo: © Andrew Brown



*The Dampier Peninsula Goanna  
(Varanus sparnus)  
Photo: © Ryan Ellis*





*View from the Banded Iron Formations of the Helena-Aurora Range  
Photo: © Ruth Clark, Office of the EPA*





# Land





*Fringed Lily (Thysanotus manglesianus/patersonii) at Wongan Hills*  
Photo: Office of the EPA

## Land

**Western Australia is an enormous area of over 2.5 million square kilometres from the rugged Kimberley gorges in the tropical north, to the towering Karri forests in the cooler, wetter south-west and the spinifex and mulga of the arid interior. Western Australia covers one third of the Australian continent, and includes eight of Australia's fifteen biodiversity hotspots.**

Much of the land surface is ancient. The oldest area – the Yilgarn Craton – has not been submerged since it rose out of the sea almost three billion years ago. Some of the soils and rocks of the Yilgarn Craton are the oldest in the world due to minimal glaciation and a generally flat landscape, resulting in low rates of erosion.

In these old, climatically-stable places, ancient lineages of flora and fauna have continued to evolve, resulting in large numbers of species. Western Australia's climatic and topographic stability is a driving factor behind its biological diversity. The state is home to more than 11,000 species of plants, more than half of Australia's plant species, of which over 60 per cent are found nowhere else.

South-western Australia is Australia's only international 'biodiversity hotspot' and the centre of diversity for a number of Australia's most recognisable groups of plants. Around 30 per cent of the country's eucalypt species occur in this area, particularly in the Wheatbelt and Goldfields regions. The Wheatbelt is also the centre of *Acacia* diversity – for example, 185 species occur within 100 kilometres of the Wheatbelt town of Dalwallinu, which is more than in Africa and South America combined. South-western Australia also supports 10 times more species of *Banksia* than the rest of the country.

Western Australia's most iconic flora and fauna, such as the Red and Green Kangaroo Paw (*Anigozanthos manglesii*), the Christmas Tree (*Nuytsia floribunda*), Jarrah (*Eucalyptus marginata*) and the Honey Possum (*Tarsipes rostratus*), are all endemic. The ancestors of the Honey Possum date back some 40–50 million years, resulting in a marsupial that is highly specialised, with a unique diet of nectar and pollen from the area's species-rich heathlands. It is dependent upon a diverse array of plants to ensure it has continuous food sources throughout the year.

While the biodiversity of south-western Australia is well established, there is an increasing trend of new species being discovered in other regions, such as the Pilbara and the Kimberley. The Pilbara, for example, has been revealed as another area of high *Acacia* diversity, with more than 100 species recorded in the region. Many new species are being discovered as a result of increased survey for the purposes of environmental impact assessment.

Many of Western Australia's ancient species are highly specialised and occur in small, localised areas that have acted as refuges as Western Australia became a hotter, drier place more prone to fire. Many of these species, especially invertebrates and plants, occur over only a very limited distribution, sometimes being confined

## EPA objectives

**Flora and vegetation** – to maintain representation, diversity, viability and ecological function at the species, population and community level.

**Landforms** – to maintain the variety, integrity, ecological functions and environmental values of landforms.

**Subterranean fauna** – to maintain representation, diversity, viability and ecological function at the species, population and assemblage level.

**Terrestrial environmental quality** – to maintain the quality of land and soils so that the environment values, both ecological and social, are protected.

**Terrestrial fauna** – to maintain representation, diversity, viability and ecological function at the species, population and assemblage level.



to a single ridge, aquifer, or swamp, which makes them vulnerable to extinction.

There are many threats to Western Australia's unique biodiversity including impacts from feral animals, weeds, introduced diseases such as *Phytophthora* dieback, and land clearing. Western Australia has some of the most cleared landscapes in the world (the Wheatbelt and the Swan Coastal Plain) yet also retains some of the world's largest intact areas of Mediterranean type woodland (the Great Western Woodlands) and tropical savannah (the Kimberley).

The productive mining and agriculture industries that generate economic prosperity in Western Australia inevitably cause increased stress on the State's natural environments. Mining and cattle grazing particularly impact upon arid rangelands in the Midwest, Goldfields and Pilbara regions, which contain areas of high biodiversity. Increasing urbanisation puts pressure on our natural environment – with an expected population increase to 3.5 million people by 2050 in the Perth and Peel regions, even greater pressure will be placed on the fragile biodiversity on the Swan Coastal Plain.

It is the responsibility of the EPA to consider large and complex issues and the challenges they present in the context of social and economic growth, while ensuring the environment is protected for the benefit of current and future generations of Western Australians.



### Key issue Rehabilitation of disturbed landscapes

Rehabilitation is looming as one of the major environmental policy issues of coming years as older mines begin to close.

Most companies have rehabilitation commitments as a basic obligation of mine closure but the EPA remains concerned that boards of companies may be paying insufficient attention to the potentially substantial financial liability they are accruing if they do not invest in science, risk and options analysis and commit to long-term rehabilitation planning.

In its past two annual reports, the EPA has raised concerns regarding the limited amount of rehabilitation that has commenced and has encouraged sharing of research to assist in improving rehabilitation outcomes. In the EPA's 2012–13 Annual Report it was stated that rehabilitation conditions were applied to 76 per cent of the mining proposals in the Pilbara, which equals over 120,000 hectares of approved clearing that needs to be rehabilitated.

The EPA also noted in its 2013–14 Annual Report that it was pleased that rehabilitation had become a prominent topic of discussion between government, industry and the community. During 2014–15, conferences and workshops were held by various stakeholders, including AMEC's<sup>1</sup> Mine Closure and Rehabilitation Conference and an industry workshop run by the Department

<sup>1</sup> The Association of Mining and Exploration Companies (AMEC) is the peak industry representative body for mineral exploration and mining companies throughout Australia.

## EPA's objective for rehabilitation and closure

**To ensure that premises are decommissioned and rehabilitated in an ecologically sustainable manner.**

of Mines and Petroleum (DMP) to discuss rehabilitation success in the Pilbara.

Additionally, the industry-led Pilbara Restoration Initiative (managed by the Botanic Gardens and Parks Authority) has been created to develop and enhance the science, knowledge, and technical skills required to achieve cost-effective and scaleable environmental rehabilitation in the Pilbara.

Rehabilitation and mine closure is assessed by the EPA where a proposal is likely to have significant environmental impact that requires remediation post-mining, or where the proposal is not subject to the *Mining Act 1978*. In these cases, the post-mining land use will be agreed with the EPA and the proposal will be assessed based on whether rehabilitation and closure can be managed to meet the EPA's objectives.

The EPA and DMP *Joint Guidelines for Preparing Mine Closure Plans* were published in May 2015 to clarify the roles of the EPA and the DMP in managing rehabilitation and closure. The document provides detailed explanation on the EPA's and the DMP's process and objectives for mine closure.

Rehabilitation outcomes (based on agreed post-mining land use), objectives, completion criteria, closure implementation and monitoring plans should be developed throughout planning and construction stages of mining to guide operational outcomes, but should also be adaptable to respond to knowledge gained during operation. As knowledge is gained through research and practice, the rehabilitation outcomes are finalised and criteria become quantitative to measure completion.

The potential gap between EPA objectives and rehabilitation outcomes doesn't reduce corporate responsibility to undertake best efforts to return environmental values which are consistent with the agreed end-use of the land. However, in some cases, research and treatment trials may show that rehabilitation will not return agreed outcomes in reasonable timeframes and at reasonable cost. Alternative options must then be provided to address the significant residual impact from the permanent loss of environmental values.

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Environmental Protection Authority 2015, Environmental Protection Bulletin No. 19 – *EPA involvement in mine closure*. EPA, Perth, WA.

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It is important to remember that continual improvement in rehabilitation techniques will occur over time and proponents should actively include this in their mine closure planning.

Environmental Protection Authority and Department of Mines and Petroleum 2015



## Case studies in post-mining rehabilitation

Experience has shown the EPA that the challenges of rehabilitating disturbed landscapes can be successfully met with good, ecologically sustainable outcomes, when adequate attention is paid to forward planning and a genuine commitment to rehabilitation extends throughout the life of the mine.

Rehabilitation success is noticeably linked to the existence of clear objectives and agreed strategies, implemented with the support of management and with the benefit of a strong relationship between research and operations.

### Case study 1: Banksia woodland rehabilitation by Rocla Quarry Products

Rocla Quarry Products was established in Western Australia in the early 1980s and is a supplier of processed sand products. Rocla's 530 ha mine site at Gaskell Avenue, Lexia, is 23 km north of the Perth CBD, within the Gnamptarra-Moore River State Forest. The operations require clearing of native vegetation or pine plantation and removal of the sand resource.

Post-mining rehabilitation of this area faces a high level of community and regulatory scrutiny as it operates on publicly-held lands adjacent to urban areas. Rocla's stated objective of rehabilitation is to re-establish the original Banksia woodland that existed before clearing and mining. This objective can be particularly challenging where soils have been impacted by historical pine cultivation, resulting in altered soil pH and high weed load in the seedbank.

After unsuccessful rehabilitation works, Rocla approached the Botanic Gardens and Parks Authority (BGPA) to conduct a program to address their long-term objective of better understanding and implementation of Banksia woodland restoration. Research was carried out to address the various characteristics of ecological restoration and rehabilitation of Banksia woodland and provide insight into achieving the ultimate objective. Separate, related research projects undertaken included measurement of the response of seedling recruitment and plant survival rates with different soil cultivation techniques, and responses to ecological function change associated with the post-mining environment.

Research results in the Rocla rehabilitation area found topsoil to be a good source of seeds for rehabilitation of Banksia woodland communities and that topsoil handling and depth of spreading was important in achieving optimal seedling recruitment. Some results found that stockpiling topsoil for one year reduced seedling recruitment by 54 per cent in comparison to direct return recruitment. Advances in smoke treatment technology and treatment to break seed dormancy also provided improved species recruitment in Banksia woodland.

The results of the research have directed changes to the rehabilitation program and led to substantial improvement over the several years since implementation. Rocla has taken the initiative to address the lack of knowledge and become a leader in rehabilitation techniques within Banksia woodland with the positive results also being used by BGPA as an example of

best practice for urban woodland regeneration throughout the Perth region.

### Case study 2: Jarrah forest rehabilitation by Alcoa Alumina Australia

In 1957, exploration in the Darling Range of Western Australia mapped what appeared to be extensive reserves of bauxite ore. A joint venture between Australian and international operations created Alcoa of Australia (Alcoa), which is part of the primary aluminium production business. Both rehabilitated and operating mines are located in the Darling Range 80 – 140 km south of Perth. Bauxite reserves are usually located between one and six metres from the surface and therefore mining disturbance is often relatively small and short-term, lasting months rather than years.

The Jarrah Forest of the Darling Range is valued by the community for recreation, industry and settlement. Community concerns about impacts to water catchments, loss of timber production, forest access, and biodiversity required Alcoa to commit to best-practice standards of operation and closure – including rehabilitation of disturbed areas – to alleviate community concerns. Alcoa's mine rehabilitation objective was to re-instate the conservation value of the forest after mining. Clear and measurable objectives that were supported by management were the most important strategy driving improvement.

In this case study, history has shown that effort expended on planning, construction, initial performance, monitored performance and sustainability achieved an ecologically sustainable outcome. Research into the botanical



richness of the unmined Jarrah Forest, near Alcoa's operations, found approximately 300 plant species present. Research and monitoring found that vegetation in long-rehabilitated areas was often controlled by the species that first established on the site and it was therefore extremely important to ensure that the diversity of flora was established initially.

In 1990, the mean species richness was 65 per cent of the unmined areas and a target of 80 per cent species richness was set for 1996 rehabilitation. To work towards this target, a number of strategies were implemented, including better topsoil handling and improvements in seed treatment and application.

Research found that topsoil stockpiling over one season reduced seed content to 15 per cent while direct return of topsoil (not stockpiled) retained approximately 50 per cent of the seeds in the topsoil seedbank. Additionally, the timing of topsoil spread was important with 435m<sup>2</sup> of seeds capable of germination found in topsoil spread in summer compared to 261m<sup>2</sup> recorded in topsoil spread in spring.

Another stated target was:

The average number of indigenous plant species in 15 month old rehabilitation is 100 per cent of the number found in representative jarrah forest sites, with at least 20 per cent of these from recalcitrant species priority list.

Considerable effort was applied to restore recalcitrant plant species – those species that produced little or no viable seed, had seed that was difficult to collect or that did not break dormancy with known treatment. Methods were



*EPA members, OEPA officers and staff from Rocla inspecting rehabilitation at Rocla's Lexia rehabilitation site.  
Photo: Office of the EPA*

developed to suit particular species, such as seed treatments, seed germination, tissue culture, and plant division and were used to create greenstock for introduction to rehabilitation areas. Between 1997 and 2007, Alcoa successfully increased the number of recalcitrant species in rehabilitation from seven species planted in which only five plants per hectare were recorded to 24 species planted with 176 plants per hectare.

In 2000, Alcoa reached its target of 100 per cent mean species richness of unmined areas at two of their operating mines. These significant rehabilitation results, achieved by Alcoa in the Jarrah Forest, were linked with cooperation between research and operations as well as the support of management over many years.

### Common thread

Both case studies involved potential impacts to ecosystems that were highly valued by the community for a range of purposes including their biodiversity value, the ecosystem services they provided, recreational and forestry purposes. The companies developed their own clear objectives for rehabilitation which were driven by best-practice standards, supported by their management, and implemented throughout the life of mining.

Both companies had experienced unsuccessful rehabilitation efforts in the past and these fuelled learnings for the future. They also served to demonstrate that research effort and mining operations did not have to be undertaken separately and could achieve good outcomes in tandem.

The EPA considers the basic principles learned from these case studies suitable for application across different rehabilitation projects. Successful rehabilitation in Western Australia requires an understanding of the complex and ancient natural environment, support at the highest levels within organisations, and considerable effort in both time and resources.

**Successful rehabilitation in Western Australia requires an understanding of the complex and ancient natural environment, support at the highest levels within organisations, and considerable effort in both time and resources.**

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## Key issue

### Guidance on the Landforms factor

Landforms are an important component of the environment and one of 17 factors that are considered by the EPA through the environmental impact assessment (EIA) process. The EPA defines landforms as “a distinctive, recognisable physical feature of the earth’s surface having a characteristic shape produced by natural processes”. Common landforms in Western Australia include dunes, caves, mesas, wetlands and gullies.

Many proposals impact landforms. However, not every landform may be considered significant in the context of an assessment. When the EPA is considering a proposal, it considers a number of criteria to determine whether a landform is significant, including its integrity and ecological and scientific importance.

In 2014, the EPA initiated development of guidance to assist proponents on how the Landforms factor should be considered in EIA.

The Environmental Protection Bulletin *Guidance on the EPA Landforms factor* (EPB 23) was released in July 2015. It provides information to help proponents where landforms may be identified as a preliminary key factor, distinguishing between landforms and landscapes, and defining the natural landscape as being made up of a variety of landforms.

EPB 23 provides guidance on how the EPA will determine whether a landform is significant and should be considered through EIA. The EPA has

developed key criteria that should be used as the basis for determining the significance of a landform. Some considerations may include:

- whether the landform is considered a particularly good example of its type and how well it is represented in an area;
- whether it is rare;
- whether the landform is still whole and in good condition, or if it has been impacted by development, and to what extent;
- whether the landform has unusual or important geology or geomorphology; and
- whether it supports important ecological and physical processes.

If the EPA determines that the landform is significant, it will consider the likely impact of a proposal on the landform and determine whether the impacts are, or can be made, environmentally acceptable.

Physical alteration of a landform can also impact on its social and cultural landscape values. For example, the landform might be a camping area, provide the best view in the region, or contribute to the tourism value in the area. If the impacts to a landform are considered to have potentially significant effects on the environment that will impact on these social and cultural values, the EPA will consider the impacts through its Amenity or Heritage factors.

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### Pressure point Phytophthora dieback threat

Phytophthora Dieback is one of the biggest threats to biodiversity in Western Australia and has now spread throughout the south-west from Eneabba to Esperance. Dieback caused by *Phytophthora cinnamomi* was listed as a Key Threatening Process by the Australian Government under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). It is having a significant impact on the biodiversity of Tasmania, Victoria, South Australia and New South Wales, and causing disease in a diverse range of native flora. The devastating impacts of *P. cinnamomi* on south-western Australia's unique flora and fauna have been observed since 1921, although the cause of 'Jarrah Dieback', as it was originally known, was not identified until the 1960s. The severity of its impact has led to *P. cinnamomi* being called a 'biological bulldozer'.

The area considered at risk of the disease extends from Kalbarri to beyond Esperance on the southern coast (Figure 2) and contains many of the flora and fauna species that make south-western Australia an international biodiversity hotspot. It has been estimated that about half of the State's threatened flora species are susceptible to *P. cinnamomi*, and approximately 40 per cent of the flora of the south-west is susceptible. Its impact varies across the landscape, but it almost always results in the permanent loss of susceptible species from infested sites. At worst, mass collapse of ecosystems occurs, with significant disruption to

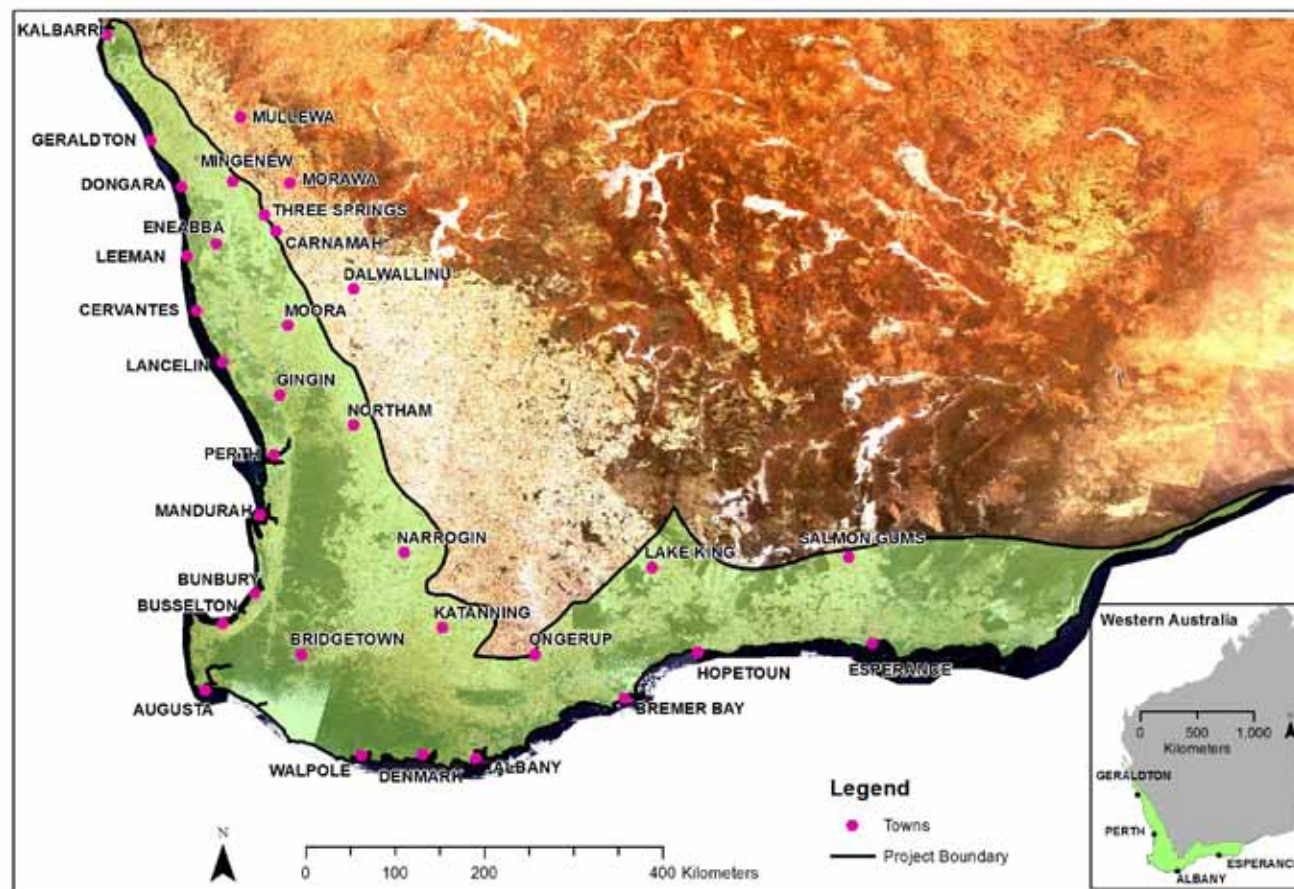


Figure 2: The area highlighted in green is considered to be at risk of Phytophthora Dieback. Map supplied by South Coast NRM.

important ecological processes (see the photos of Mondurup Peak overleaf). Change in the vegetation structure and composition can also significantly change habitat value for fauna.

Phytophthora Dieback is the primary extinction threat to the critically endangered threatened ecological community 'Montane Thicket of eastern Stirling Range', and threatened flora

species including the Feather-leaved Banksia (*Banksia brownii*), Fairall's Honeysuckle (*Lambertia fairallii*) and *Banksia montana*. In south-western Australia there are 61 species of plants listed as threatened under the EPBC Act that are susceptible to *P. cinnamomi*, and nine threatened ecological communities listed that may be impacted by it.

There are many species of fauna that rely on habitat that may be significantly altered by Phytophthora Dieback including the Woylie, Honey Possum, Dibbler, Yellow-footed Antechinus, Gilbert's Potoroo, Western Ground Parrot, Western Bristlebird and Western Whipbird.

While the disease can slowly spread independently through the soil, assisted movement of infested soil or infected root material by native animals, feral animals, and people (including their vehicles and machinery) are major contributors to disease spread. Humans have the potential to spread *P. cinnamomi* further and faster than any other species.

The only treatment (application of the chemical phosphite) provides a boost to a plant's immune system but does not eliminate the disease, and requires ongoing labour intensive treatments over time to be effective. There is currently no way of preventing spread through the soil via water flow. Prevention of infestation is the only effective means to manage the threat of Phytophthora Dieback in large areas.

In its 2007 *State of the Environment Report* the EPA highlighted the threat of Phytophthora Dieback to native flora and fauna species and flagged the need to manage the problem at a strategic level.

Efforts to manage the dieback continue through both treatment and prevention and the Department of Parks and Wildlife (DPaW) has a policy setting out how the Department is managing the threat. Many other organisations also have policies and undertake Phytophthora

Dieback management, including the Nursery Industry Association, Natural Resource Management regions, 'Friends' groups and local government.

Fitzgerald River National Park is an example of the challenge of managing dieback infestations. Phytophthora Dieback was first confirmed in the Fitzgerald River National Park in the early 1980s. There are now four known infestation centres that pose a threat to the remainder of the national park. These are known as the Bell Track infestation (first identified in 1976), Jacup Ranger Station infestation (1990), Sussetta River infestation (2007) and Pabelup Drive infestation (2009). The cost of managing these dieback infestations has been significant and will be ongoing.

Although significant attention and resources have been spent on managing this dieback, it is estimated that the area affected continues to increase by approximately 20,000 hectares each year. In 2006 it was estimated that over one million hectares of south-western Australia were affected by Phytophthora Dieback.

In January 2015 the EPA was briefed on Project Dieback, a strategic approach to the management of Phytophthora Dieback, funded by the WA State NRM Office and coordinated by South Coast NRM. The approach aims to reduce the risk of human movement of the disease within priority areas.

The goal of the project is to be strategic and target specific priority areas for all stakeholders to invest in disease control and management. A *State Phytophthora Dieback Management and*

*Investment Framework* for Western Australia has been developed which has identified 'Priority Protection Areas' (PPAs), the most significant examples of ecosystems that are vulnerable to, or threatened by, Phytophthora Dieback. These areas are either uninfested locations with high biodiversity value, uninfested high value landscapes or infested locations with high biodiversity value. The framework is available for use by all stakeholders, including the public, to prioritise threat abatement activities and investment over the next 50 years.

All data from the project has been compiled into a central information database known as the Dieback Information Delivery and Management System and available online at [www.dieback.net.au](http://www.dieback.net.au). The Framework and the Priority Protection Areas will be an important tool for people or organisations involved in land management or conservation in south-western Australia.

As Australia's only international biodiversity hotspot, the threat of Phytophthora Dieback to south-western Australia's biodiversity is of national importance. The scale and challenges of the problem are such that it should be treated with the same gravity and degree of national focus as the environmental issues around the

**... it is estimated that the area affected [by *P. cinnamomi* dieback] continues to increase by approximately 20,000 hectares each year.**



Murray-Darling Basin. Controlling the threat of *Phytophthora Dieback* in south-west Australia would relieve a significant threatening factor for more than 70 matters of national environmental significance listed under the EPBC Act (61 species and nine ecological communities) and prevent the future listing of many more. The Western Ground Parrot, a species threatened by the spread of dieback, was identified as a priority for action in the Commonwealth *Threatened Species Strategy Action Plan 2015–16*. The EPA calls upon the national Threatened Species Commissioner to bring a national focus and influence to bear on the problem of *Phytophthora Dieback* in south-western Australia.

**The EPA calls upon the national Threatened Species Commissioner to bring a national focus and influence to bear on the problem of *Phytophthora Dieback* in south-western Australia.**

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*Main photograph – Mondurup Peak, Stirling Range National Park after dieback infestation.*  
*Photographer: Damien Rathbone.*

*Background photograph – Mondurup Peak, Stirling Range National Park before infestation.*  
*Photographer: Rob Oliver. Supplied by South Coast NRM.*











### Key issue

## Pastoral lease exclusions

The EPA has been interested in, and encouraged the uptake of, sustainable pastoral management for a long time. Much of the Extensive Land-use Zone is Crown land, with approximately 35 per cent occupied by pastoralists under leases.

The success of the pastoral industry is largely dependent on the health of the environment. Many factors influence the condition of the land, including climate and rainfall, as well as grazing by domestic and feral animals. Recent reports on the condition of the rangelands suggest that – particularly in the Southern Rangelands – shrub density is declining and, without a reduction in the number of stock, there may be permanent changes to native vegetation and its associated biodiversity.

The Commissioner of Soil and Land Conservation regularly reports on the condition of rangelands based on the results of the Western Australian Rangeland Monitoring System (WARMS) which monitors rangeland condition trends at a regional scale. The Commissioner's most recent statement (DAFWA, 2014) reports generally declining rangeland condition.

For the Pilbara, while rangeland condition is variable across the five land conservation districts, three of the five districts have continually declined in condition since 2000. This is despite generally favourable season conditions in recent years indicating that current levels of stocking are impacting on the productive perennial grass

species. The Commissioner expressed concern about the risk of land degradation occurring, but as lease-level range condition data is no longer collected he was unable to make a more definitive statement.

For the southern rangelands, the Commissioner reports ongoing negative trends in rangeland condition and a steady decline in the carrying capacity of these rangelands.

The Commission concludes that

in the Pilbara and southern rangeland districts, the declining frequency of desirable perennial species occurring on WARMS sites reported in previous years suggests ongoing declining resource condition.

The EPA is encouraged by a number of recent initiatives and announcements regarding pastoral land reform.

On 1 July 2015 most existing pastoral leases were renewed, with the exception of a number not considered for renewal owing to considerations regarding their viability (mostly in the south-west) or the land having been identified for a public purpose (e.g. conservation, national parks). As a result of the renewal process, 35 areas were removed from over 32 leases.

During 2004, ten areas in the Pilbara were identified for exclusion in agreements between the relevant leaseholders and the then Department of Conservation and Land Management (now the Department of Parks and Wildlife). The exclusion of these areas was approved by the then Minister for Lands for stated purposes including 'Conservation of flora

IBRA SUB-REGION	CURRENT % IN CONSERVATION RESERVE OR UNDER DPAW MANAGED LAND	% WITH POTENTIAL PASTORAL EXCLUSION AREAS ADDED
Chichester	6.54%	6.54%
Fortescue	0.90%	10%
Hamersley	14.27%	16%
Roebourne	6.70%	7%
Pilbara	8.40%	10%

**Table 1: Opportunities for increases in the conservation reserve system**

and fauna', 'Protection of wetlands', 'Reservation for Conservation Park' or additions to Karijini or Millstream-Chichester national parks.

These ten exclusion areas provide a once-in-a-lifetime opportunity for the State Government to increase the conservation reserve system within the Pilbara region, particularly the Fortescue subregion, which is severely under-represented (Table 2).

All leases or parts of leases that have not been renewed have become unallocated Crown land, administered by the Department of Lands. The EPA acknowledges that the removal of pastoral tenure is only one step in a long process to convert the land to conservation tenure. Nevertheless, it is an important first step in addressing biodiversity conservation issues in the region. Given the timeframes and processes involved in converting land to conservation tenure it is important that, in the interim, the State Government put in place processes and funding

for the management of these exclusion areas to ensure that the environmental values are not allowed to degrade.

The EPA believes these exclusions, if managed appropriately, provide an opportunity to protect and conserve the biodiversity of the individual rangelands.

In addition to these exclusions, the Western Australian Government has committed to introducing pastoral tenure reform to enable options for diversification to be explored, and specifically to allow for rangelands leases. Rangelands leases would facilitate the management of the lease or areas within the lease for conservation purposes. The EPA strongly supports the inclusion of leases for conservation purposes. This would provide a mechanism to address sustainability of the rangelands and offer opportunities for pastoralists to improve their viability with alternative income sources such as conservation offsets.

The EPA outlined its concerns with development in the Pilbara in its strategic advice to the Minister for Environment in August 2014. The advice, *Cumulative environmental impacts of development in the Pilbara region*, focuses on identifying solutions for a pathway to sustainable development of the Pilbara and the long-term protection of its unique biodiversity and other environmental values.

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*Lerista neviniae*: the Pilbara's most restricted terrestrial vertebrate species  
Photo: ©Brian Bush



## Success story – *Lerista neviniae*

### Assessing impacts on poorly known terrestrial fauna including newly described species.

Determining the likely impact of proposed development on a newly discovered species, while not always difficult, can be complex and challenging where little information is available on distribution or habitat preferences. The EPA regularly provides advice on avoiding impacts on newly discovered species.

The following describes the challenges faced when a new lizard species was discovered during an environmental impact assessment for a development proposal in our State's north.

The lizard was a tiny skink in the genus *Lerista* – the second largest lizard genus in Australia, with over 80 known species, of which more than 50 have been recorded in Western Australia. These lizards are difficult to survey as they mostly live in leaf litter or in the top few centimetres of sandy soils. Many species are difficult to identify and require careful examination in the field.

A detailed examination of hundreds of unidentified specimens in museum collections was carried out in 2007 by scientists at the Western Australian and South Australian museums. They used colour patterns, body and scale measurements, as well as genetic data, to identify and name nine new species. One of these new species, *Lerista neviniae*, was represented by only two specimens in the WA Museum collection. These were collected in 2007 on a coastal dune between Point Samson and Cape Lambert.

The recorded habitat of *Lerista neviniae* was intersected by a development proposal near Cape Lambert, which was being formally assessed by the EPA. As part of the environmental impact assessment the proponent carried out baseline fauna surveys, which included targeted surveys for the newly described lizard. These surveys indicated a likelihood that this species occurred only on pale marine deposited sands with Coastal Spinifex (*Spinifex longifolius*) grassland on coastal dunes. This habitat was restricted to about 330 ha within a total distance of only 5.8 km.

To provide additional contextual information on the distribution and status of *Lerista neviniae* the proponent commissioned further surveys of all the dune areas between Karratha in the west and Cossack in the east, covering a distance of about 50 km. The survey resulted in a much better understanding of the significance of the habitat that would be lost, had the development proceeded as originally planned.

These studies indicated that *Lerista neviniae* was a Short Range Endemic species with a total linear distribution of only about 14 km. Within this distribution its total preferred habitat was calculated to be approximately 360 ha of which 32.1 ha, or 8.9 per cent, was intersected by the proposal. A subsequent survey increased the extent of the documented habitat to 489.9 ha.

As a result of the information, the proposal design was adjusted to minimise impacts. The EPA assessed the revised proposal in

2010 and recommended approval subject to implementation of several environmental conditions, primarily aimed at protecting the habitat of *Lerista neviniae*.

The development was subsequently approved by the Minister for Environment on 30 September 2010, and included a condition dealing with *Lerista neviniae* management and monitoring. To comply with these conditions the proponent commissioned a management plan which specifically set out how project design, construction, and operational management measures would reduce impacts on individuals, populations, and the habitat of *Lerista neviniae*.

Due to concerns regarding possible cumulative impacts of future proposals in the Cape Lambert area, a technical meeting with expert representatives from the Department of Environment and Conservation, the OEPA, and fauna consultants was convened in March 2010 to discuss the ecology and conservation requirements of *Lerista neviniae*. The meeting concluded that there now existed sufficient information available for the State Threatened Species and Communities Consultative Committee (TSCC) to provide recommendations on its conservation status.

Following the recommendations of the technical meeting, the TSCC listed *Lerista neviniae* as a Priority 1 fauna species and recommended to the Minister for Environment that it be listed as threatened fauna. *Lerista neviniae* was listed as a threatened (Vulnerable) species under the *Wildlife*



*Conservation Act 1950* in February 2012. The listing also led the Department of Environment and Conservation to develop a project plan to document and guide implementation of priority actions for its conservation and management of the species.

To achieve these goals a number of studies were proposed including a 10-year ecological and demographic study, and a three-year study of population genetics to determine if gene flow within the species was restricted by natural or disturbance-caused barriers. Investigating the practicality of a captive breeding and translocation program in conjunction with Perth Zoo was also recommended.

The ultimate outcome of this project is a greater understanding of the Pilbara's most restricted terrestrial vertebrate species enabling better conservation in the long term.

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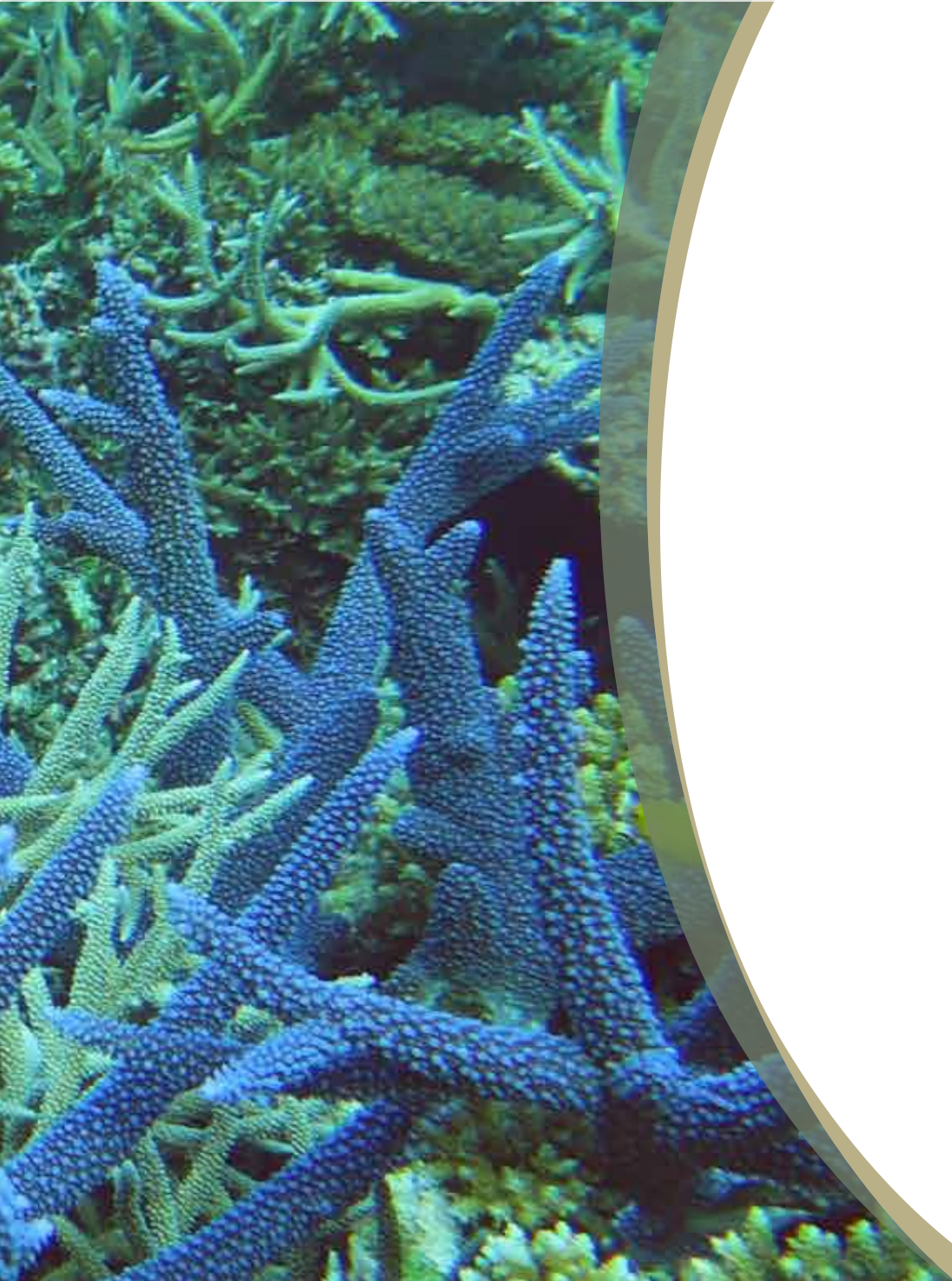
*Lerista neviniae's coastal dune habitat at Anketell.*  
*Photo: © API Management Pty Limited*





*Acropora coral at Scott Reef*  
Photo: © Australian Institute of Marine Science (AIMS)





# Sea





*Tube anemone*  
*Photo: Office of the EPA*

## Sea

The coastline of Western Australia is 20,781 km long (about one third of Australia's coastline), with 12,889 km of mainland coastline and 7,892 km associated with the State's 3,747 islands. The adjacent coastal waters cover an area of over 117,000 km<sup>2</sup>, spanning a range of climatic regimes ranging from cold temperate along the south coast, warm temperate in the lower west coast, sub-tropical in the Gascoyne, arid tropical in the Pilbara and wet tropical in the Kimberley and Timor Sea.

The biological communities that occur in our marine waters are largely shaped by the climatic regime, underlying geological structures, and the intensity of – and exposure to – wave and tidal energy. The range of ecosystems, coupled with the relative isolation of Western Australia, has resulted in a very high diversity of marine life, much of which is found nowhere else in the world.

Our coastal waters are considered nutrient-poor by world standards, and productivity is dominated by benthic communities (e.g. algae, seagrass, coral and mangroves) compared to other parts of the world where pelagic communities (e.g. phytoplankton) provide the primary energy source to support the marine food web. Nonetheless, these ecosystems support a diverse range of specially protected and culturally and commercially important biota that have adapted to these conditions, including prawns, fish, seabirds, and marine turtles, and marine mammals such as sea lions, dugong, dolphins and whales.

As such, the potential for impact on marine benthic habitats and communities is an important factor to consider when assessing marine and coastal development proposals. The EPA also

considers other key 'Sea' factors including marine environmental quality, marine fauna, and coastal processes, and develops policies for ensuring that impacts are managed within acceptable levels.

In terms of benthic habitats, there have been losses of temperate seagrass meadows in the south of the State due to nutrient pollution and coastal infrastructure development, and losses of tropical benthic communities such as mangroves and corals in the north-west. Losses in the Pilbara, in particular, have been due primarily to port and coastal infrastructure developments associated with bulk commodity and petroleum/LNG export facilities, as well as solar salt works.

The environmental quality of WA's marine environment is generally very good. Areas of reduced environmental quality are mainly localised and related to discharges of treated wastewater, contaminated stormwater flows and groundwater seepage, and shipping and port operations. However, apart from relatively small areas associated with treated sewage outlets, there are no areas within the State's coastal waters where the community cannot recreate or consume seafood caught or grown there due to pollution.

## EPA objectives

**Benthic communities and habitat** – to maintain the structure, function, diversity, distribution and viability of benthic communities and habitats at local and regional scales.

**Coastal processes** – to maintain the morphology of the subtidal, intertidal and supratidal zones and the local geophysical processes that shape them.

**Marine environmental quality** – to maintain the quality of water, sediment and biota so that the environmental values, both ecological and social, are protected.

**Marine fauna** – to maintain the diversity, geographic distribution and viability of fauna at the species and population levels.





The main sources of acute pressure on marine fauna are also localised and associated with coastal infrastructure development and the associated loss of critical habitat (e.g. dredging), increased vessel traffic and noise and percussion generated by construction activities such as pile-driving and blasting. Assessing the potential impacts and risks associated with these activities is hampered by incomplete knowledge. For example, the population sizes, distribution and habitat usage requirements of important marine fauna such as dugong and turtles are not well understood and for some types – such as coastal dolphins – there are very large gaps in understanding.

Coastal structures, such as solid breakwaters, can alter the natural processes that shape the coast and cause localised erosion/deposition. Left unmanaged, they can threaten seabird and turtle nesting on beaches, as well as the integrity of man-made structures on and adjacent to the coast.

There is a renewed focus on investigating the development of northern Australia as a way of driving economic growth in the region. Some of the developments being contemplated include coastal infrastructure projects such as new or upgraded ports, desalination plants, and marine aquaculture. This potential development and the environmental pressure it will generate will require careful planning and consideration if we are to have both sustainable economic growth and protection of the relatively pristine Kimberley coastal and marine environment.

In the absence of a solid understanding of key critical habitats and how natural environments behave and fluctuate naturally over time, it is possible that projects or activities could be planned and approved in inappropriate locations or times, or conversely ‘impacts’ wrongly attributed to an activity when they may be ‘natural’ (see **The Importance of Understanding Natural Variability**).

As well as the ongoing development of its marine policies to address emerging threats, one of the key statutory functions of the EPA under section 16(c) of the EP Act is to encourage and carry out studies, investigations and research into the problems of environmental protection. This is reflected in the EPA’s key strategy “to build a science and knowledge base for environmental advice” and ideally this should occur in advance of development pressures.

The EPA is a strong supporter of sharply focused scientific programs designed to fill identified knowledge gaps and facilitate continual improvements in the EIA process and policy development. Many of the contemporary gaps identified by stakeholders are identified in the WA Marine Science Institute’s *Blueprint for Marine Science 2050\**. The EPA looks forward to playing a role in implementing the blueprint, and points to the existing WAMSI Dredging Science and Kimberley nodes and its proposed Marine Wildlife node as examples of how this can be done efficiently and effectively.

\* <http://www.wamsi.org.au/a-blueprint-marine-science>

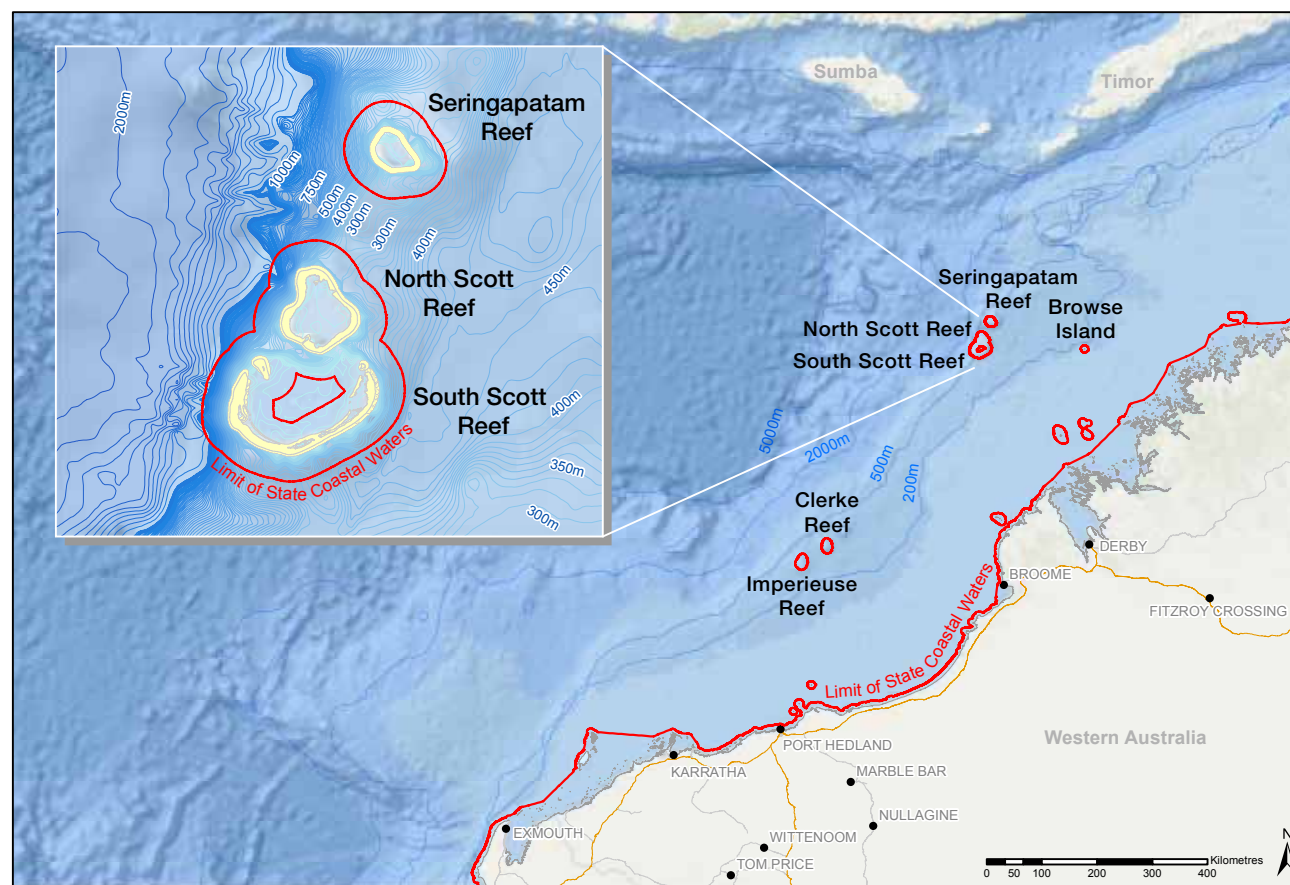


### Key issue

## Establishing environmental quality objectives for the marine waters of offshore islands and atolls

Many people would be aware of the vast hydrocarbon reserves of the North-West Shelf and Browse Basin off the Pilbara and Kimberley coasts. But it is probably less well known that in the same area – at the very edge of the continental shelf – there are a number of unique coral atolls that are part of Western Australia. These offshore atolls include the Rowley Shoals, North and South Scott Reef and Seringapatam Reef, and are home to a range of highly diverse marine communities of exceptional conservation value.

Unlike most oceanic coral atolls that form on the tops of submerged volcanos, these are classified as shelf atolls – they are ancient reefs sitting on the continental shelf and built entirely by living organisms over millions of years. They started growing on the bed of a shallow sea in the mid-Miocene when sea levels were several hundred metres lower than today. Some drowned but a few managed to keep up with sea-level rises and these reefs now rise out of waters about 500 m deep and have near vertical sides from the seafloor up to the surface. In the case of South Scott Reef, drilling has indicated that this atoll started growing about 15 million years ago and has grown nearly 2,000 m vertically, with the majority of it now buried below the accumulated sediments on the seafloor.



**Figure 3: Location of Rowley Shoals (Clerke and Imperieuse Reefs), North and South Scott Reef and Seringapatam Reef showing the limit of Western Australian coastal waters.**

Islands have formed on some of the atoll reefs: Clerke and Imperieuse Reefs of the Rowley Shoals, North and South Scott Reef, and Seringapatam Reef. As a result, the islands, reefs, and surrounding waters are deemed to be part of Western Australia and fall under the State's jurisdiction. Although over 200 km from the mainland coast, these waters are formally termed 'Coastal Waters' and extend three nautical miles

from the low water mark of the intertidal coral reefs to the very deep waters surrounding the reefs.

These atolls are bathed by the warm oceanic waters of the Indonesian Through Flow (a north-east to south-west flowing current) and, due to their distance offshore, they are largely unaffected by activities that occur on the mainland. Some



of these areas are fished by Indonesian fishers using traditional non-motorised vessels, but there has been no industrial development and the water, sediment, and biota that live there are uncontaminated and essentially of pristine quality.

Marine communities found on the reefs and in their lagoons are extremely biodiverse with exceptional conservation value. Biological surveys suggest that each reef has its own unique benthic floral and faunal assemblages, and many invertebrate species are not known to occur anywhere else in WA. The lagoon of South Scott Reef is about 50 m deep, which is typically too deep to support hard coral communities that need sunlight to survive. However, the water is so clear that coral communities have developed and thrive – largely carpeting the lagoon floor.

Studies undertaken by the Western Australian Museum suggest that the fish life in the area is the richest in the State, with more than 50 per cent of species recorded only around the offshore reefs, and as little as 20 per cent of species shared with adjacent near-shore waters of the Kimberley coast. In addition to seabirds, the area surrounding these reefs is used by a range of marine reptiles and mammals such as turtles, sea snakes, Blue Whales, Humpback Whales, and priority dolphin species.

The location of these atolls – midway between the Australian mainland and the islands of the Indonesian archipelago – makes these reefs important stepping stones for the dispersion and recruitment of larvae of corals, fishes, and other biota from the Indo-West Pacific region to the coral reefs off the WA coast. For example,

studies on Coral Trout (*Plectropomus leopardus*) have shown a relatively strong gene flow directly from Scott Reef to the Abrolhos Islands – a distance of about 2,000 km – presumably resulting from larvae transported from Scott Reef by the Indonesian Through Flow and then down the west coast by the Leeuwin Current to the Abrolhos.

A potential risk to the marine communities of these atolls is the rapid increase in exploration and development of oil and gas fields, primarily in Commonwealth waters off the north-west of Western Australia, but including State waters as well.

Operational discharges such as cooling water, desalination brine, produced formation water, hydrotest fluids, and other process chemical releases could cause long-term chronic effects in adjacent marine waters if not managed appropriately. Hydrocarbon spills, although considered unlikely, also pose a significant risk of acute effects. Simulation modelling often shows the potential for oil slicks to extend tens of kilometres from the source, in some cases reaching these offshore atolls.

Responsibility for regulating all safety, well integrity, and environmental issues associated with offshore petroleum activities outside State Waters rests with the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA). To obtain regulatory approval, petroleum title-holders must demonstrate that the impacts and risks associated with their activities are both ‘as low as reasonably practicable’ and also ‘acceptable’. To demonstrate acceptability,

the title-holder sets environmental objectives for the areas that might be affected, and describes how it will monitor and manage its activities to meet those objectives. In order to set the environmental objectives, each title-holder is required to consult with all relevant persons, organisations and/or agencies. In the absence of a clearly articulated and common set of objectives, it is possible that different objectives could be set by different titleholders for the same environmental asset, including assets in State waters (eg. Scott Reef).

The Chairman of the EPA and the CEO of NOPSEMA have discussed opportunities for streamlining the consultation process by establishing a single set of environmental quality objectives and performance measures for offshore State Coastal Waters that might be impacted by petroleum developments in adjacent Commonwealth waters.

With the exception of the Clerke and Imperieuse reefs of Rowley Shoals (which have been gazetted as the Rowley Shoals Marine Park), there are currently no established environmental quality objectives for protecting and managing the marine environments of the State’s offshore atolls.

Recently the EPA signalled to petroleum title-holders and regulators its expectations for the protection of these offshore atolls in State Waters, through its public advice on Woodside Energy’s Torosa Subsea Development.

The Torosa gas field partly lies beneath North and South Scott Reef and the Torosa Subsea Development is the State waters component of

the larger Browse Floating Liquified Natural Gas Development that is primarily in Commonwealth waters. In its advice, the EPA recognised the risks posed by the development to the unpolluted nature and exceptional natural values of the reefs and surrounding waters and recommended that the proponent and regulators ensure that the Environmental Values of Ecosystem Health, Fishing and Aquaculture, and Recreation and Aesthetics are recognised and protected within all State Waters, and that a 'maximum' level of ecological protection should apply throughout.

The EPA also recommended that the proponent use the framework established through the National Water Quality Management Strategy – and adapted in its *Environmental Assessment Guideline for Protecting the Quality of Western Australia's Marine Environment* (EAG 15) – to describe, assess and manage impacts of routine waste discharges and to provide spatially-defined and measurable performance objectives for spill contingency plans.

Published in early 2015, and discussed in last year's annual report, EAG 15 sets out the environmental quality management framework the EPA expects to be used to assess and manage development proposals affecting marine environments in State Waters. It includes some overarching principles for determining the environmental values to be protected and levels of ecological protection to be achieved.

The EPA is of the view that a policy statement clearly setting out the environmental values, environmental quality objectives and levels of ecological protection for offshore State





Coastal Waters would help streamline the stakeholder consultation process and ensure a more consistent approach to the management of these offshore areas and – in turn – be of benefit to petroleum titleholders and regulators alike. This general approach was successfully applied to Pilbara Coastal Waters in 2006 and has since been used to guide port and coastal infrastructure development in that area.

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### Key issue

## Conservation values of the east coast of Exmouth Gulf

For over 40 years the EPA has advocated for the protection of one of the most extensive, outstanding and intact examples of a Western Australian arid zone coastal salt flat ecosystem; the east coast of Exmouth Gulf.

The area is recognised for its conservation significance by its listing as a wetland of national importance in A Directory of Important Wetlands. The listed wetland encompasses 120,000 hectares of the east coast of Exmouth Gulf from Giralia Bay to Urala Creek near Locker Point and includes shallow marine waters, tidal mudflats and broad saline coastal flats that vary from five to fifteen kilometres wide. The wetland is internationally significant habitat for migratory shorebirds and waders listed under the Japan-Australia and the China-Australia Migratory Birds Agreements such as the Grey-tailed Tattler, Greater Sand Plover, Bar-tailed Godwit, Ruddy Turnstone and Sanderling.

The east coast of Exmouth Gulf is characterised by over 80 kilometres of coastal and arid land components that are largely intact and interconnected. The shores and nearby habitats of the western side of the Gulf are quite different to those of the east with extensive sandy beaches and adjacent development, particularly in the north around Exmouth townsite.

This near pristine tidal wetland system supports extensive benthic primary producer habitats including regionally significant mangroves, high-

intertidal cyanobacterial mats, seagrasses, algal beds, and coral communities. The system has the largest discrete areas of mangroves in the State south of the Kimberley region. Six species of mangroves are present, of which three are at their southern limits of distribution – an important factor when considering the implications of a changing climate.

The east coast of Exmouth Gulf is a key resting area and important habitat for Humpback Whales (in particular mothers and calves) and provides important feeding habitats for other conservation significant species such as marine turtles, Dugongs, Australian Snub-nose Dolphins, Indo-Pacific Humpback Whales, Spinner Dolphins, sea snakes, sawfish and sharks (including the Whale Shark). Its eastern and southern shores are dominated by marginal and mudflat habitats of great importance for sustaining a nursery area supporting the prawn and other local fisheries in the Gulf.

Exmouth Gulf is an important foraging habitat for Green, Hawksbill and Loggerhead turtles particularly among the inshore seagrass, cyanobacterial mat and mangrove communities where juvenile turtles are found. It also provides habitat for turtles that nest at Shark Bay, along the Ningaloo coast, and on Pilbara islands including Barrow Island.

The Dugong is a species of State, national and international conservation significance and is specially protected under the *Wildlife Conservation Act 1950*. The Dugongs that occur in the north-west of Western Australia form part of the largest population in the world which is







considered to be of vital importance on a world scale due to declining populations elsewhere. Exmouth Gulf provides the second largest known Dugong habitat in Western Australia, beside Shark Bay, and the long term maintenance of this population may be important for the conservation of the Western Australian Pilbara coastal and Shark Bay populations.

Although the east coast of Exmouth Gulf has significant conservation values, the area also contains the potential for solar salt, limestone, and gypsum production. The activities associated with the production and export of these materials would present a significant threat to the east Exmouth Gulf region. A temporary Ministerial Reserve was granted across the majority of the area in the 1970s for solar salt and gypsum production. In 2008, the EPA formally assessed a solar salt proposal over the area and concluded that it is environmentally unacceptable to locate a large salt field within a wetland of national importance. In addition, the EPA advised that these flats form an integral part of the wetland ecosystem and land unit supporting the cyanobacterial mats and mangroves which underpin the productivity of the wetland and Exmouth Gulf.

The EPA maintains the view that any proposal to develop any part of the east coast of the Exmouth Gulf for salt production (or any other purpose) would need to demonstrate that the environmental values and intact nature of the area will be adequately protected and maintained. Proponents of future proposals for salt farms in this area are encouraged to locate their activities outside the boundary of the wetland of national importance.

The east coast of Exmouth Gulf is considered one of the last remaining near-pristine areas in the Pilbara where wilderness experiences and nature-based activities can occur in the absence of large scale industrial development. There are also no high-intertidal cyanobacterial mat communities, such as those found on the east coast of the Exmouth Gulf, represented within the State's conservation reserve system.

The EPA therefore recommends that the east coast of the Exmouth Gulf be considered for reservation for conservation, under the *Conservation and Land Management Act 1984*, and in-depth consideration be given to reserving the adjacent marine and intertidal areas as a marine park.

**The EPA recommends that  
the east coast of the  
Exmouth Gulf be considered for  
reservation for conservation ...**



## Key issue

### The importance of understanding natural variability

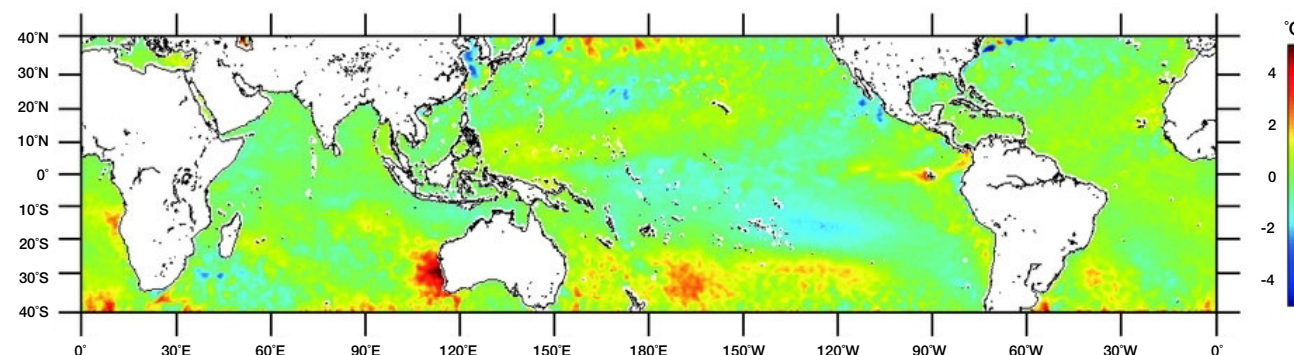
Large scale unexpected, but ‘natural’ events can have significant effects on the marine environment that, in turn, pose significant challenges for natural resource managers and project proponents alike.

A good understanding of environmental variability and key habitats is acknowledged as critical to both the planning and management of marine related development and – importantly – to the sustainability of healthy and biodiverse marine ecosystems.

In Western Australia in recent years, ocean warming has proven to be one of these ‘challenges’ and has caused very significant, widespread impacts and regional scale mass mortalities of marine biota never observed before (Moore et al, 2012).

During the summer of 2010–11, sea water temperatures along the coast reached unprecedented levels due to near-record La Niña ocean and atmospheric conditions. This occurred simultaneously with a very strong Leeuwin Current which drove the superheated water south to temperate reefs, and as far along the coast as Albany (as shown in Figure 4 from Feng et al, 2013).

Peak sea surface temperatures during a two week period were 5°C higher than normal, which was considered highly significant and extraordinary from a global perspective. Mass



**Figure 4. Global sea surface temperature anomalies during a two week period from 21 February 2011 – 6 March 2011 at the peak of the extreme warming event (Feng et al., 2013)**

mortalities of fish, crustaceans, and molluscs, including economically important species, were recorded along the central west coast, coincident with the areas experiencing these abnormally high water temperatures (e.g. Pearce et al, 2011).

Although temperature elevations in the Pilbara were not as extreme, corals in this region survive near their thermal upper limit naturally, and so experienced severe thermal stress. In addition to thermal stress (which occurred again in 2013), these coral reefs were also subjected to unusually high levels of physical stress caused by tropical cyclones Bianca and Carlos traversing the Pilbara coast around the same time.

This combination of factors, thought to be exacerbated by a changing climate, resulted in very widespread and severe coral bleaching and subsequent mortality. For example, environmental monitoring conducted by industry showed the average live coral cover on reefs in the inner west Pilbara (offshore from Onslow) dropped from approximately 45 per cent to about 5 per cent. The effect is starkly apparent when comparing

underwater videos of the same reefs taken in 2009 and again in 2012.

Although these events are unusual, they can and do occur – highlighting the importance of having a well-developed science and knowledge base to support good decision-making.

Had this convergence of events occurred during the construction phase of a large development, it is possible that the impacts may have been wrongly attributed to the development activity or, at the least, resulted in a great deal of difficulty differentiating development impacts from the natural perturbations. The large loss of mature corals in the region is likely to have resulted in a reduction in larval production rates, but there is insufficient knowledge to determine the scale and significance of any such effect.

Serving as an interesting example is the 1989 freak combination of events which caused the death of more than a million fish and 3 km<sup>2</sup> of coral in just one night in Bill's Bay (also known as Coral Bay) on the Ningaloo Reef.





Many theories to explain the phenomenon were put forward in the media - mainly suggesting pollution as a cause. In reality, this event was entirely natural and coincided with the annual mass coral spawning event which had been recently discovered and which, ironically, is a process designed to provide life and replenish reefs.

Fortunately, marine scientists present at the time to study the coral spawning were able to dispel the pollution theory and explain how the death of marine life was actually due to oxygen starvation caused by a trapped coral spawn slick. The decomposing spawn slick depleted the waters of oxygen so rapidly that even normally resilient pelagic fish and sharks could not escape. This serves as another example where science and knowledge were invaluable in differentiating between human-induced and natural events.

In the context of Western Australia's Pilbara region, a better understanding of the spatial extent and health of surviving corals is considered crucial, as are the factors and processes influencing the recruitment and re-establishment of coral communities in this arid-tropical environment. An improved science and knowledge base will ultimately lead to better informed decisions on matters that otherwise may have inadvertently affected the health and recovery potential of impacted coral reefs.

*Coral spawn slick trapped in Coral Bay, on the Ningaloo Reef, in March 1989. This unusual but entirely natural event resulted in the death of over one million fish from 80 different species, and extensive mortality of corals and other reef animals over an area of about 3 km<sup>2</sup>.  
Photo: © Ray Masini, Office of the EPA*

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## Success story – New understandings on the impacts of dredging

Strong scientific and government support for the Dredging Science Node (DSN) continues, with a cornerstone research conference showcasing the preliminary findings, including new scientific discoveries of dredging effects on coral spawning, a highlight of the year.

The DSN – originally established in 2013 within the Western Australian Marine Science Institution (WAMSI) – continues its important work to enhance the capacity of Government and industry to predict and manage the impacts of dredging.

In March, the Premier and Science Minister Colin Barnett reiterated the State Government's strong support for the DSN at the 2015 WAMSI Conference. Mr Barnett acknowledged the DSN's important role as a genuine collaboration between industry, government and research institutions in addressing uncertainties and knowledge gaps related to the prediction and management of dredging impacts.

Initially funded from the combined offsets of three major dredging projects totalling \$9.5 million, DSN funding has grown to \$19 million through co-contributions from WAMSI research providers. Mr Barnett said:

There are millions of cubic metres of dredging needed to support our economy. But because we don't know the full impact of dredging, we have to take quite a precautionary approach when setting conditions on companies to have confidence the environment is protected. This leads to perhaps unnecessarily complex monitoring

and management programs. The research to be shown at the WAMSI Conference will help reduce uncertainty and better protect our marine environment, as well as reduce any unnecessary management burdens on industry.

The 2015 WAMSI Research Conference showcased the work of more than 50 collaborative scientists from the Institution's 10 research partners, with a series of new scientific papers presented and published in the conference proceedings.

The DSN research program has been divided into nine different themes addressing best-practice prediction of dredging pressures, the impacts of dredging on corals, seagrass and filter feeder communities, and the potential impacts of dredging on reproductive processes of corals, fin fish and other common marine biota.

Phase one of the research program is now complete and involved a review of relevant literature along with examination of some large environmental monitoring datasets from recent dredging projects provided by Chevron Australia, Woodside Energy and Rio Tinto Iron Ore.

The reviews led to improved understanding of the pressure/response relationships with research teams now entering a second phase of developing and testing these relationships through field and laboratory studies.

Current field studies are focused on three seagrass species across the Pilbara (*Cymodocea serrulata*, *Halodule uninervis* and *Halophila ovalis*), and filter feeder communities in the vicinity of the

Wheatstone development near Onslow.

Laboratory studies are also examining the effects of suspended sediments, light reduction and sediment deposition under controlled conditions. Studies on corals and filter feeders are being undertaken at the National Sea Simulator in Townsville and on seagrasses at the Seagrass Growth Facility at the University of WA.

Although in the early stages, and studies set to continue through until 2016–17, some early findings suggest that:

- Sediment deposition is increasingly acknowledged as the key cause-effect pathway associated with mortality of corals during dredging programs. A range of new instruments and analytical methods is being developed and tested to better estimate sedimentation and quantify the relationship with coral mortality.
- Coral morphology influences the susceptibility of corals to different dredging pressures with massive corals impacted more heavily by sediment deposition and branching corals by light reduction.
- Coral larval settlement is significantly reduced by very thin layers of deposited sediment, or if encrusting coralline algae has been bleached by previous sediment depositions.
- Seagrass seasonality is variable between regions with consequences for timing of seagrass surveys.

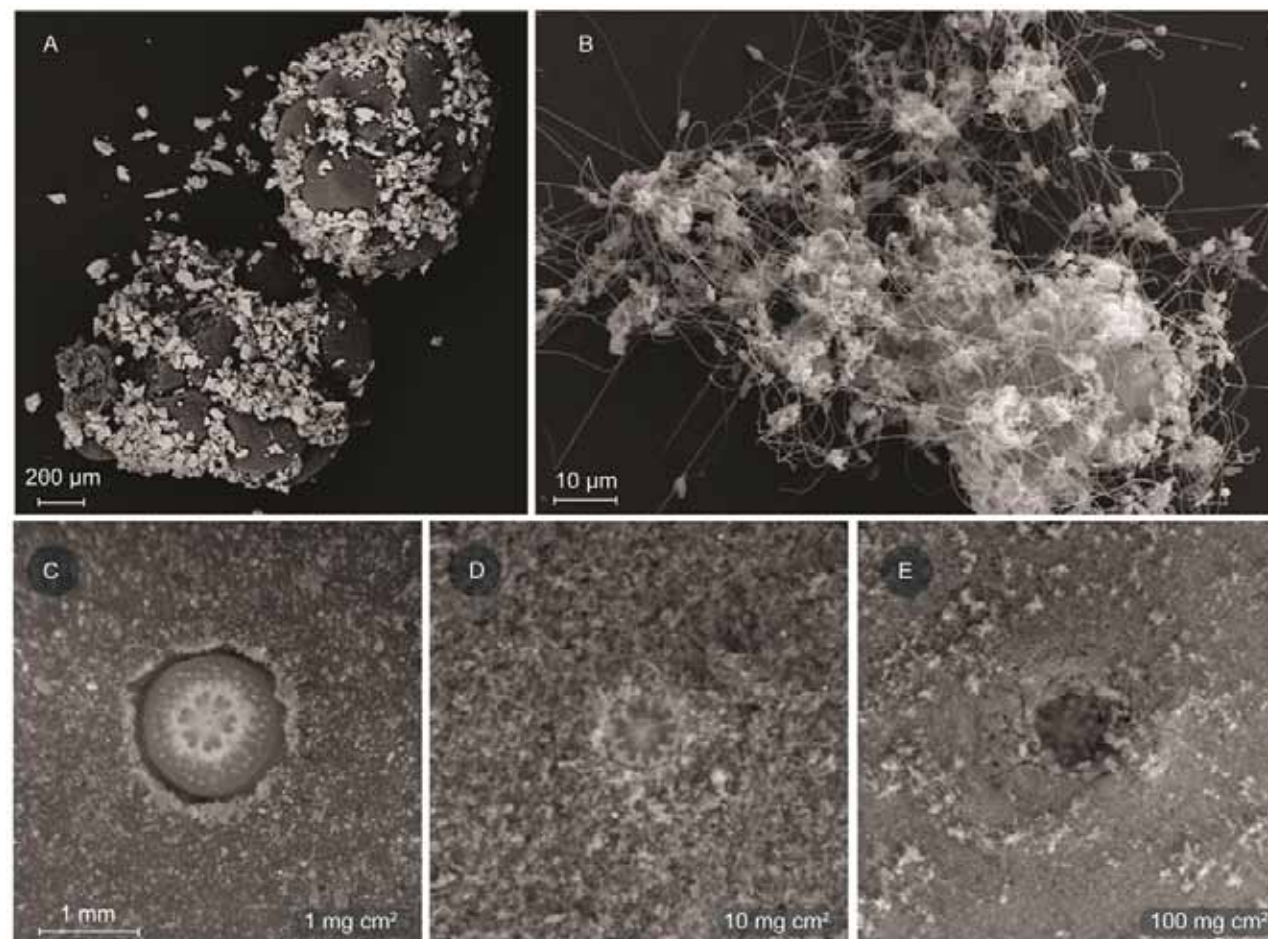


- Chronic light reduction is considered a greater influence on seagrass survival than burial from sediment deposition. Significant mortality was observed after 9 – 12 weeks of shading.
- Filter-feeder communities found in north-west WA are not found anywhere else in the world and dominate the benthos between reef areas with sponges the most common type of filter-feeder in these communities.
- Sponges are largely tolerant of less than four weeks of dredging pressures, with massive and cup morphologies more sensitive to sediment deposition, and phototrophic species sensitive to light reduction (bleaching). Recovery potential is variable between species.

One new scientific discovery of particular note is that dredge plumes can impact on coral spawning in ways not known before. High levels of sediment in the water caused by dredging can stick to the buoyant egg/sperm bundles released by corals during spawning. This can either slow their ascent or cause them to sink and prevent them reaching the water surface where fertilization occurs.

Sperm released from these bundles can also become entangled with sediments and the subsequent sinking of the sediment can effectively 'strip' the sperm from the upper water column, again reducing opportunities for fertilisation to take place.

Scientists from WAMSI are continuing to investigate the significance of this finding and whether it may adversely impact on the overall recruitment of new corals to local reefs.



**Figure 5:** (A) Silt and clay sized sediment attached to the mucous-layer of an intact and a partially dissociated egg-sperm bundle of *Acropora nasuta*. Attachment of the negatively buoyant sediment to the bundles could reduce their buoyancy reducing ascent rate and at high concentrations even preventing them reaching the surface (Image: Gerard Ricardo) (B) Sperm from *Acropora millepora* intertwined with silt and clay sized sediment particles. Sediments could act as a barrier and impediment to sperm movement and sediments with attached sperm could settle out of suspension potentially stripping them from the upper water column hence reducing egg-sperm contact time (Image: Gerard Ricardo). (C, D,E). Recently settled coral larvae (*Pocillopora actua*) 3 days after exposure to single sediment deposition event of 1 mg cm<sup>2</sup>, 10 mg cm<sup>2</sup> and 100 mg cm<sup>2</sup> of fine sediments (median grain size of ~50 µm), showing the successful clearance of sediments from the polyp's surface under 1 mg cm<sup>2</sup>, but a progressive smothering of the polyps at higher concentrations (Image: Gerard Ricardo).



It is the intention of the Dredging Science Node to create a 'compendium of best practice' where all final results of laboratory and field studies and key findings relevant to the prediction, monitoring and management of environmental impacts associated with dredging programs, will be summarised and collated. This is in addition to expected publications in a range of scientific publications.

The compendium will be the penultimate output of the DSN and will package the important outcomes into a set of specific guidelines and protocols, to be published and made available to proponents, consultants and regulators.

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<http://www.wamsi.org.au/>

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<http://www.wamsi.org.au/wamsi-research-conference-2015-proceedings>

*Coral morphology influences the susceptibility of corals to different dredging pressures with massive corals impacted more heavily by sediment deposition and branching corals by light reduction.*  
Photo: © Nick Thake, AIMS





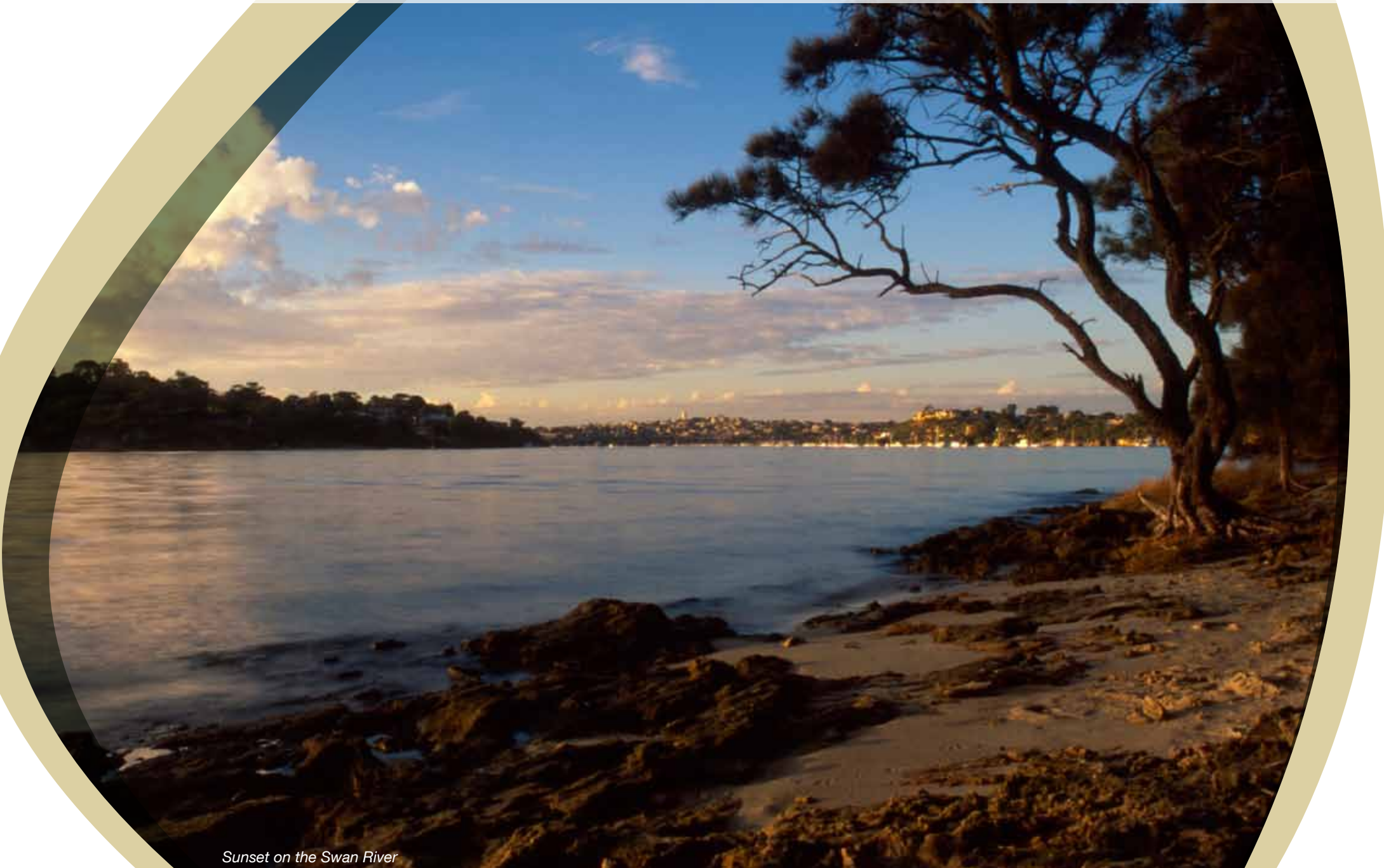


*Ramsar wetlands, Peel-Harvey Estuary.  
Photo: © David Rennie, courtesy of the Peel-Harvey Catchment Council*



# Water





*Sunset on the Swan River*  
Photo: © BockyTandiono, iStock 12518681

## Water

**Western Australia is a largely arid state, with only the Kimberley and South West regions receiving regular seasonal rainfall. However, the south-west part of the State has experienced a progressively drying climate over the past 35 years, manifested through less rain days and a reduction in the amount of rainfall received during extreme events. In some areas of the south-west, average annual rainfall reduction has been in the order of 20 per cent.**

Our arid and further drying climate highlights the value of the State's water-related environments. Western Australia is fortunate to have extensive groundwater aquifers which support numerous groundwater-dependent ecosystems such as wetlands, as well as many estuaries and rivers which are important environmental and recreational assets for the State.

Many of the State's aquatic systems remain at risk from climate change, nutrient pollution, and clearing or modification due to development.

The key focus for the EPA during 2014–15 in relation to water has been developing its advice to the Minister for Environment on the development of the Perth and Peel regions to accommodate 3.5 million people.

In particular, the EPA has provided recommendations on how water-dependent ecosystems can be protected under an increasingly drying climate and with growing demand for water.

Strategies recommended by the EPA include the increased use of urban stormwater and wastewater through groundwater recharge, and developing fit-for-purpose water supplies. The current practice of using high quality groundwater and surface water sources for non-potable uses is not sustainable.

The EPA has also provided advice on how the management of both the Swan River and Peel Harvey estuarine systems can be enhanced to reduce the risks associated with nutrient pollution and reduced rainfall.

Elsewhere in the State, the EPA continues to keep a watching brief on the development of the onshore shale and tight gas industry and its potential impacts on water resources, and on the impacts on waterways in the Pilbara of the disposal of dewatered groundwater associated with mining activities.

## EPA objectives

**Hydrological processes** – to maintain the hydrological regimes of groundwater and surface water so that existing and potential uses, including ecosystem maintenance, are protected.

**Inland waters environmental quality** – to maintain the quality of groundwater and surface water, sediment and biota so that the environmental values, both ecological and social, are protected.





## Pressure point The Peel-Harvey Estuary

The Peel Inlet and Harvey Estuary system is one of the many coastal estuaries which occur around the coast of south-west Western Australia. Like many of the estuaries, the Peel-Harvey has a long history of environmental issues associated with changes to the hydrological regime and nutrient pollution. However, the Peel-Harvey is arguably unique in the scale and longevity of the issues, the size of the population which lives around and uses the estuary, and the extensive research and implementation investment that has occurred to understand and manage the problems.

The Peel-Harvey system is highly valued by the community for environmental, recreational, and commercial purposes. It forms part of the internationally recognised Peel Yalgorup Ramsar site, and the urban population around the system and in the catchment continues to grow rapidly.

Drainage works in the Peel-Harvey catchment first began in the early 1900s, with 'desnagging' of creeks to enable water to flow more freely as a method to reduce flooding and open up land for agriculture. A range of drainage works continued through the first decades of the 1900s, including to provide more land for the Group Settlement Scheme after World War 1. During the Depression of the early 1930s, the Harvey River diversion drain was constructed to divert the Harvey River directly to the sea, again to reduce flooding. Significant drainage works continued into the 1960s and '70s, with new drains constructed and old drains widened and deepened.

Over the first half of the 20th century, the original sand bar at the mouth of the Peel Inlet also became more actively managed, and by the late 1950s it was maintained with a permanent opening to the sea.

These changes to hydrological function and the development of broad-acre agriculture as the predominant land use through the 1900s gave rise to significant nutrient pollution issues. From as early as 1946 and 1947 there was concern about a pink slime weed growing in profusion in the estuary, fouling fishing nets. This was the start of a period during which algae growth started to increase significantly and the types of algae started to change.

The most significant macro algae growth occurred from the 1960s to the 1980s – first *Cladophora*, then *Chaetomorpha* and other species. The macro algae accumulated on the beach, creating odours as it decomposed and a haven for mosquito breeding. The huge growth of algae was thought to be associated with the large-scale application of superphosphate fertiliser in the catchment during the 1960s, when fertiliser prices were very low. Blooms of the phytoplankton (or micro algae) *Nodularia* became a significant problem in the Harvey Estuary and around the mouth of the Serpentine River in the 1970s and 1980s.

The growing macro algae problems through the 1960s led to the establishment of the first coordinating group concerned with the health of the system. The Peel Inlet Conservation Advisory Committee was formed in 1971, later evolving to become the Peel Inlet Management Authority.

The Community Catchment Centre opened in Pinjarra in 1990 to assist community landcare efforts, later evolving to become the Peel-Harvey Catchment Council. The Council continues today as the lead natural resource management (NRM) group for the catchment, facilitating NRM planning and community involvement to deliver on-ground action.

Management (and research) efforts began in earnest through the 1970s and 1980s, with harvesting of macro algae and a focus on fertiliser management, culminating in the construction of the Dawesville Channel in 1994.

The construction of the Channel has again changed the hydrological and salinity regimes of the estuary system, and this – in turn – has changed the nature of the water quality issues. Macro and micro algae blooms in the main estuary water body have declined and micro algae blooms have increased in the lower tidal reaches of the Serpentine and Murray river systems, in particular. However, there is particular concern that over the last few years micro algae blooms are again occurring in the Harvey Estuary, and this is being seen as an indicator that the health of the system is continuing to decline.

Despite the long history of nutrient pollution and a strong (but intermittent) focus on management over the last 45 years, the input of phosphorus from the catchment has not declined and the health of the system remains a significant concern. The Peel-Harvey Catchment Council has provided consistent strategic direction and has implemented many on-ground projects to improve the condition of natural resources in the

catchment, but funding has been inconsistent and the response has not been at a scale sufficient to manage nutrient input to the estuary system.

The EPA has developed recommendations on improved management of the system as part of its strategic advice on the development of the Perth and Peel regions to support a population of 3.5 million people. In particular, the EPA is concerned that decision making and implementation of actions to reduce phosphorus input to the catchment have not been well coordinated or consistent.

The EPA has recommended that a whole of Government policy position be established for the protection of the Peel-Harvey system to ensure that decision making across Government is to a common, shared goal. The EPA has also recommended that an ongoing coordinating group be established across relevant agencies, and that there is ongoing and consistent implementation of actions to minimise and reduce phosphorus loss from the catchment.

**... the input of phosphorus from the catchment has not declined and the health of the system remains a significant concern.**



*Ramsar wetlands, Peel-Harvey Estuary.  
Photo: © David Rennie, courtesy of the Peel-Harvey Catchment Council*





## Key issue Shale and tight gas

Developing a comprehensive regulatory framework for the shale and tight gas industry has progressed significantly since the EPA first raised hydraulic fracturing as a key issue in its successive 2012–13 and 2013–14 annual reports.

The Petroleum and Geothermal Energy Resources (Environment) Regulations were introduced by the Department of Mines and Petroleum in 2012, following two onshore petroleum and geothermal safety related regulations introduced in 2010. Draft Petroleum and Geothermal Energy Resources (Resource Management and Administration) Regulations are currently being considered, which will complete the suite of work required to ensure that the industry is well regulated.

In December 2014, the EPA released its Environmental Protection Bulletin 22 *Hydraulic fracturing for onshore natural gas from shale and tight rocks* (EPB 22). This Bulletin updates the EPA's previous policy and has an increased focus on post-exploration stages of the industry. In particular, it describes the scope of information required by the EPA to fully consider potential environmental impacts of larger scale developments targeting gas from shale and tight rocks using hydraulic fracturing.

In June 2015, the United States Environmental Protection Agency (US EPA) released for public comment and peer review its draft assessment of the potential impacts of oil and gas hydraulic

fracturing activities on the quality and quantity of drinking water resources in the US. The draft assessment is a culmination of scientific studies, literature reviews and input from academic and non-government organisations over several years.

The US EPA outlined both above and below ground mechanisms by which hydraulic fracturing activities have the potential to impact drinking water resources. These mechanisms include: spills of hydraulic fracturing fluids and produced water; fracturing directly into underground drinking water resources; below ground migration of liquids and gases; and inadequate treatment and discharge of wastewater.

However, the US EPA also concluded that it did not find evidence that these mechanisms have led to widespread, systemic impacts on drinking water resources in the US. While it found specific instances where one or more mechanisms led to impacts on drinking water resources, the number of cases was small compared to the number of hydraulically fractured wells.

The US EPA findings confirm the Western Australian EPA's views that an understanding of the various groundwater basins and aquifer systems where hydraulic fracturing is to be undertaken is fundamental to support a thorough risk-based assessment.

During 2013–14, one proposal involving hydraulic fracturing was referred to the EPA – the West Erregulla 2 Exploration Well. The EPA determined that the proposal did not require formal environmental impact assessment, but provided public advice on the proposal on 20 January 2015. The public advice comments on the

EPA's environmental factors of Hydrological Processes and Terrestrial Environmental Quality, recommending that they can be managed and mitigated to meet the EPA's objectives under the requirements of the *Petroleum and Geothermal Energy Resources Act 1967* and the Regulations.

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*Wandoo (Eucalyptus wandoo)*  
*Photo: © Hugh Warren, iStock 64012613*



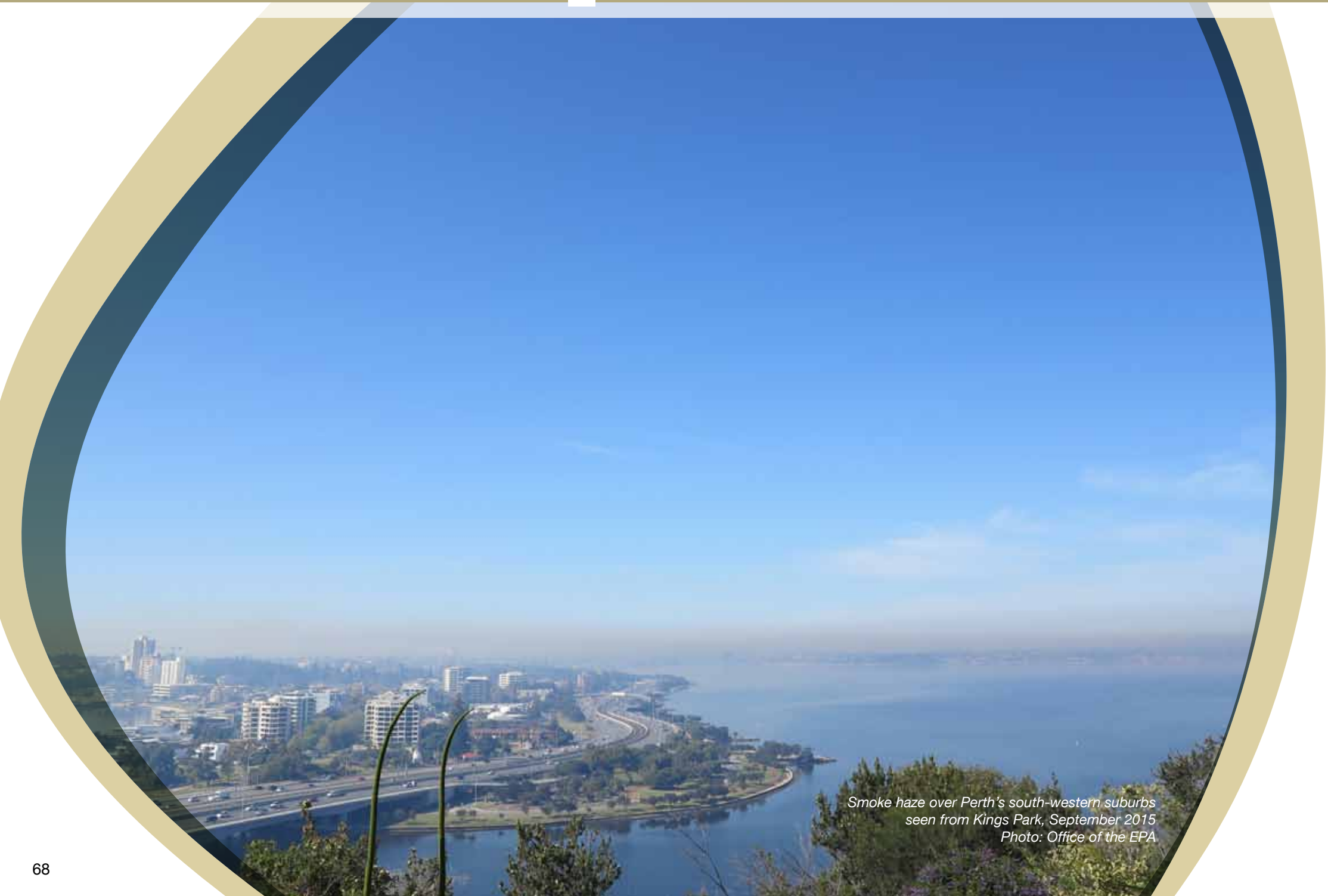


*The Superpit at Kalgoorlie. The two roasters at KCGM's Gidji Processing Plant were closed in 2015.  
Photo: Ints, Fotolia # 37483859*



# Air





*Smoke haze over Perth's south-western suburbs  
seen from Kings Park, September 2015  
Photo: Office of the EPA*

## Air

**The quality of the air we breathe is important for our health and amenity and contributes to a liveable city. Air quality is currently of a high standard in Perth compared to other Australian and international cities. Poor air quality events are often associated with bushfires and dust storms.**

It is important to ensure that we continue to enjoy high standards of air quality in the future. Substantial health and amenity benefits can be gained through minimising population exposure to air pollution.

The Department of Environment Regulation (DER) maintains an ambient air quality monitoring network with a number of sites in the Perth metropolitan area, Busselton, Bunbury, Collie, Geraldton and Albany. Monitoring is undertaken to meet the State's requirements under National Environment Protection Measure (NEPM) standards and is generally representative of the measured levels of key air pollutants in the ambient air, rather than measuring emissions from specific sources.

Current air quality standards both in Australia and around the world are based on the protection of human health and wellbeing. Urban air pollution is a significant cause of death and illness, with at least 3,000 deaths per year in Australia directly attributable to the long and short term effects of urban air pollution. The health effects linked to urban air pollution include heart disease, lung cancer, stroke and a number of respiratory conditions.

While national air quality standards are in place to protect human health, it is well recognised that for many air pollutants, such as particulates, ozone and sulfur dioxide, there is no threshold

below which health effects are not observed. The recent review of the NEPM standards considered evidence on the health effects of airborne particle pollution and a strengthening of the reporting standards for airborne fine particles are expected to be in place by the end of 2015. Further work is being undertaken to review the current NEPM standards for ozone, nitrogen dioxide and sulfur dioxide, based on new evidence on the health effects of these air pollutants.

An increase in temperature, resulting from both the urban heat island effect and a changing climate, is highly likely to have a significant influence on air quality in the future. The urban heat island effect is a phenomenon in which the ambient air temperature is higher in urban areas than surrounding rural areas. Increased temperatures will affect the composition and interaction between air pollutants and increase the formation of ground level ozone and photochemical smog. The increased bushfire risk with a changing climate will also have air quality implications.

The EPA supports the use of best practice measures to avoid or minimise the creation and release of pollutants from point sources.

## EPA objectives

**Air quality and atmospheric gases** – To maintain air quality for the protection of the environment and human health and amenity, and to minimise the emission of greenhouse and other atmospheric gases through the application of best practice.





### Key issue

#### **EPA approach to considering greenhouse gas emissions through the EIA process**

The EPA expressed concern about greenhouse gas emissions and the consequent impacts of a changing climate in its last two annual reports, and it remains concerned.

A changing climate is already affecting Western Australia through reduced rainfall in the south west, increasing temperatures, and increased sea levels. These changes have already impacted on the ecological values of the State, particularly on water regimes in waterways and wetlands and the biological values that they support.

Increasingly, a changing climate will impact on the economy and the health of the community, with changes such as increased coastal erosion, greater heat-stress related health issues and mortality, reduced agricultural production, and higher frequency of bushfires and droughts.

The EPA continues to consider both greenhouse gas emissions and the impacts of a changing climate through the environmental impact assessment of proposals, where relevant. In doing so, the EPA will not duplicate any Commonwealth requirements.

In relation to emissions, the EPA's primary guiding and well-established principle is the application of best practice to minimise greenhouse gas emissions to as low as reasonably practical. The EPA will expect the proponents of greenhouse gas intensive industries to identify and quantify

greenhouse gas emissions from their proposals and demonstrate that the proposal is designed, and will be operated, in a manner which maximises energy efficiency and minimises emissions as far as practicable.

In relation to the impacts of a changing climate, there are two aspects that the EPA may consider through the assessment process, particularly for proposals which have multi-decade operational lifetimes:

1. The environmental impacts of the proposal in light of projected changes to environmental factors such as flora and fauna and water quality and quantity as a result of a changing climate. For example, the impacts of high water-using proposals may be exacerbated through future projected reductions in rainfall.
2. Whether the risk profile and resulting potential impacts of a proposal may change through its lifetime as a result of changes in environmental conditions. For example, sea level rise, more intense storms, or floods may increase the risk of infrastructure damage (such as burst pipelines), which in turn may give rise to environmental impacts.

The EPA may require proponents to address such issues through the EIA process including undertaking desktop analysis to quantify and document potential consequences (using the most authoritative and widely accepted scientific projections available) and developing management strategies to address the potential consequences.

The EPA continues to keep a watching brief on the progress of emissions reduction policy at a Commonwealth level and will adapt its own policy position on assessments accordingly.



### Key issue EPA advice on air quality in the Perth and Peel regions

The EPA's interim s16e strategic advice to the Minister for Environment on the Perth and Peel regions – part of the Strategic Assessment of the Perth and Peel regions – is considered one of the most important pieces of EPA advice in recent decades.

Impacts to air quality are a crucial consideration of the State assessment and the EPA has provided recommendations to address future air quality issues for the ongoing development of the Perth and Peel regions.

The EPA's strategic advice identifies opportunities in relation to both land use and transport planning to positively influence air quality in the Perth and Peel regions. The advice focuses on strategies to address key knowledge gaps, align land use and transport planning and to promote and expand existing air quality management arrangements in the Perth Air Quality Management Plan (2000).

With an expected population growth to 3.5 million people in the region, an increase in both direct and diffuse sources of air pollution is expected, as well as an increase in the number of people exposed to air emissions.

The EPA supports the continuation and expansion of the Perth Air Quality Management Plan as a whole of government initiative to improve air quality and to protect human health and amenity. Rapid population growth and industrial development particularly in the Peel region reinforces the need to expand existing air

quality management arrangements.

The EPA's advice highlights the particular role of land use planning in protecting human health and amenity, through the careful location and good design of land uses to both improve air quality and reduce community exposure to air pollutants. The WA Planning Commission's focus on increasing housing density around major transport connections will demand careful consideration of air quality implications. Similarly, sensitive land uses such as residences, hospitals, schools and shopping centres will need to be adequately separated from cumulative air emissions likely to arise from industrial areas.

A key planning strategy to ensure that communities are not exposed to unacceptable levels of emissions from point sources is the establishment of buffers and setbacks. The EPA has identified the need for a whole-of-government policy approach to implementing buffers around industrial land uses through the land use planning system, to protect air quality, human health and amenity. In Strategic Industrial Areas, a precautionary approach is recommended to avoid setting inappropriate buffers that might constrain future industrial development. Guidance is also required for setbacks from major roads for very sensitive land uses such as new hospitals, childcare and aged care centres and schools.

Effective management of vehicle emissions is a key issue that the EPA believes should be addressed through the Strategic Assessment of the Perth and Peel regions. The EPA is particularly concerned about traffic congestion, as this can lead to increased emissions. It also



strongly supports the ongoing implementation of strategies to promote and facilitate greater use of low emission transport options such as cycling, walking and public transport. It is recommended that the State Government implement a long-term integrated transport plan for the Perth and Peel regions, including undertaking air quality assessment to enable better planning of major roads and strategic transport routes.

Heat is also expected to have a significant impact on air quality in urban areas. Higher temperatures from the combined impact of the urban heat island effect and a changing climate will increase the creation of ground level ozone and photochemical smog. The urban heat island effect is caused by the combination of heat produced by urban sources such as air conditioners and vehicles and the uptake of heat from the sun by the built environment including roads and buildings. Increasing the amount of trees and quality green spaces in urban areas will provide a cooling effect via shading and evapotranspiration. The development of a greening strategy for the Perth and Peel regions provides an important opportunity to counteract air quality, human health, and amenity implications of increasing heat in urban environments.

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*Sunrise over Perth.*  
*Photo: © BWA\_IMAGES, iStock 63384233*





*Separation buffers are an important tool in land use planning*  
Photo: © opium\_rabbit, iStock 46263346





# People





*Drilling cores at the Kintyre Uranium Project  
Photo: Office of the EPA*

## People

**Some of the most contentious proposals considered by the EPA are those that have the capacity to affect people's health and amenity, or impact on the cultural or historic heritage that they value.**

The EPA can consider and assess the potential impact of a proposal or scheme on people's health, amenity or heritage through the provisions of the EP Act. Under the EP Act it is the objective of the EPA to use its best endeavours to protect the environment, and the definition of the environment includes the social surroundings of man – "his aesthetic, cultural, economic and social surroundings to the extent that those surroundings are affected by his physical and biological surroundings".

It is the EPA's view that a proposal's impact on people factors is an important consideration in environmental impact assessment. In 2014–15, human health was considered to be a key environmental factor in the assessment of two proposals.

During the assessment of the Kintyre Uranium Project, the EPA considered radiation exposure as a potential human health impact through transport, public exposure and worker safety.

For the Koodaideri Iron Ore and Infrastructure Project, the EPA considered the risks to human health from asbestos during the construction of the rail line that was proposed to cross the Wittenoom Asbestos Management Area.

The EPA assesses heritage where it is linked to the physical or biological part of the environment, and where the protection and management of those parts is threatened as a result of a proposal or scheme. Heritage related to Aboriginal culture is a common key environmental factor in EPA assessments.

## EPA objectives

**Amenity** – to ensure that impacts to amenity are reduced as low as reasonably practicable.

**Heritage** – to ensure that historical and cultural associations, and natural heritage, are not adversely affected.

**Human health** – to ensure that human health is not adversely affected.





## Key issue

### Separation distances

Separation distances are an important tool to guide land use planning and ensure emissions from industrial land uses do not impact on the health and amenity of people. Conversely, a separation distance can also assist in avoiding land use conflict where the operation of industry is constrained by the encroachment of nearby sensitive land uses.

Separation distances are recommended distances that are an important consideration for planning authorities in implementing land use planning mechanisms, such as buffers, to avoid land use conflict. A buffer becomes the planning instrument that provides a designation of land in which sensitive land uses are constrained.

The EPA believes that, in order for land use conflict to be avoided, appropriate land use planning mechanisms must be implemented and should be established as early in the planning process as possible. For example, strategic planning documents should include indicative buffers to provide a guide to statutory planning and district and local structure plans. It is for planning authorities to make a judgement on an appropriate buffer, based on the EPA's recommended separation distances as well as current and future land uses, but with a precautionary mindset.

The EPA welcomes and supports the review of the Department of Planning (DoP) State Planning Policies (SPPs) addressing rural and industrial land uses. These will help clarify expectations in the establishment and implementation of buffers.

The EPA is reviewing its guidance on separation distances and has been working with a range of agencies – and particularly the DoP – to ensure that issues in relation to land use conflict are addressed and a consistent outcome is achieved. The proposed guidance will apply to all schemes and scheme amendments referred to the EPA, and will provide recommended separation distances between sensitive land uses and industries that emit gaseous and particulate material, odour, dust and noise.





*Refinery*  
Photo: © Ngataringa, iStock 5882644





*Albany coastline: one of the biggest threats to biodiversity in the south-west of Western Australia is *Phytophthora Dieback*.  
Photo: © Paul Morton, iStock 20039584*





# Other issues





*Perth from Kings Park*  
*Photo: © Robyn Mackenzie, iStock 19632872*



### Key issue

## ***Planning and Development Act 2005 reforms and scheme referrals***

The *Planning and Development Act 2005* currently requires all planning schemes and scheme amendments to be referred to the EPA. Planning schemes zone or reserve land for certain land uses and establish planning controls such as residential densities and development standards.

These arrangements were set up to ensure that planning schemes and scheme amendments that have the potential to impact the environment are considered by the EPA. This is very important, as identifying and avoiding potential environmental impacts early in the planning process is often far more cost effective than trying to mitigate environmental impacts at the development stage of a proposal.

However, not all planning schemes and scheme amendments have the potential to impact the environment. For example, in 2014–15 the EPA received a scheme amendment to allow offices to be built on a site currently occupied by a squash court, and another to allow a showroom to be built within an existing warehouse.

Neither of these scheme amendments, nor many like them, has any potential to impact the environment. In fact, the Office of the EPA has analysed some 4,500 planning schemes and scheme amendments referred to the EPA since July 2000 and found that nearly 70 per cent did not warrant public advice or formal assessment by the EPA.

As early as 1997, the EPA stated in its Annual Report that:

there is a strong case to revise the planning legislation so that only those schemes and scheme amendments with the potential to significantly impact the environment are referred to the EPA.

The Government has announced that, as part of its *Planning Makes it Happen* reforms, the *Planning and Development Act 2005* will be amended so that only planning schemes and scheme amendments not exempted by regulations made under the EP Act have to be referred to the EPA. A consequential amendment to the EP Act will provide the head of power to make the regulations.

The EPA supports this reform, which will ensure that the EPA still considers schemes and scheme amendments that might impact the environment, but does not need to see those that have no potential to impact the environment.

### References and further reading

Department of Planning 2013, *Planning Makes it Happen: Phase Two Planning Reform Discussion Paper*, (September 2013), Perth, WA.

Department of Planning 2014, *Planning Makes it Happen: Phase Two Planning Reform* (August 2014), Perth, WA.





## Key issue

### Strategic Assessment of the Perth and Peel regions

The 2011 announcement of the Strategic Assessment of the Perth and Peel regions under the *Environment Protection and Biodiversity Conservation Act 1999*, kicked off work on one of the most important pieces of strategic advice undertaken by the EPA in recent decades.

The original announcement of a joint State and Commonwealth Government assessment was made in August 2011 by the then WA Minister for the Environment, in conjunction with the Minister for Planning and the Commonwealth Minister for Sustainability, Environment, Water, Population and Communities.

The strategic assessment considers the environmental impacts from anticipated future development, and ways to avoid, manage and offset these impacts, to meet the needs of a population of 3.5 million people. It also focuses on protecting matters of national environmental significance (MNES), such as Carnaby's Black Cockatoo, Ramsar wetlands, and threatened ecological communities.

To ensure State environmental matters were also considered alongside MNES, in July 2012 the then Minister for the Environment asked the EPA to provide strategic advice in relation to:

- a. the strategic environmental implications of the proposed future development for a city of 3.5 million people; and
- b. policy and guidance that can be used to optimise subsequent approval processes to

ensure environmental outcomes are delivered in the most efficient and timely manner.

In April 2015 the Western Australian Planning Commission (WAPC) released the *Perth and Peel @ 3.5 Million* report and accompanying Sub-regional Planning Frameworks. The report outlines a vision for future land uses and a more liveable, prosperous, connected, sustainable and collaborative community, and the strategic assessment has played a major role in the development of the draft Sub-regional Planning Frameworks. The frameworks will be finalised as Perth and Peel Sub-regional Structure Plans.

The EPA's August release of its interim strategic advice provides vital input into the Sub-regional Structure Plans, and will help inform the final product of the strategic assessment – the overarching Strategic Conservation Plan – providing a genuinely integrated approach to conservation in the 9,000 square kilometre Perth and Peel regions.

The EPA's strategic advice covers the pivotal environmental areas of water and air quality, impacts to human health, and biodiversity matters such as wetlands and bushland conservation.

It is the EPA's view, learned over time, that case by case assessments are not the best way to achieve strategic environmental outcomes. This is particularly true in urban areas involving a range of cumulative environmental impacts. This advice and the Strategic Assessment of the Perth and Peel regions provide an opportunity to resolve long-standing land use conflicts with greater certainty for government, developers and the community.

The EPA considers that the WAPC's proposal in the draft frameworks for a more compact city is the single most significant step towards avoiding environmental impacts, particularly on the urban fringes. The environmental cost of continuing the urban sprawl is incalculable and will be increasingly unacceptable to the community. The efficient use of existing cleared land, and smart infill, sensitive to the amenity of surrounding residents, will also deliver a city that is more liveable and sustainable.

The EPA believes the most important areas for biodiversity should be given a high level of protection.

Overall, the Strategic Assessment of the Perth and Peel regions and the EPA's strategic advice will:

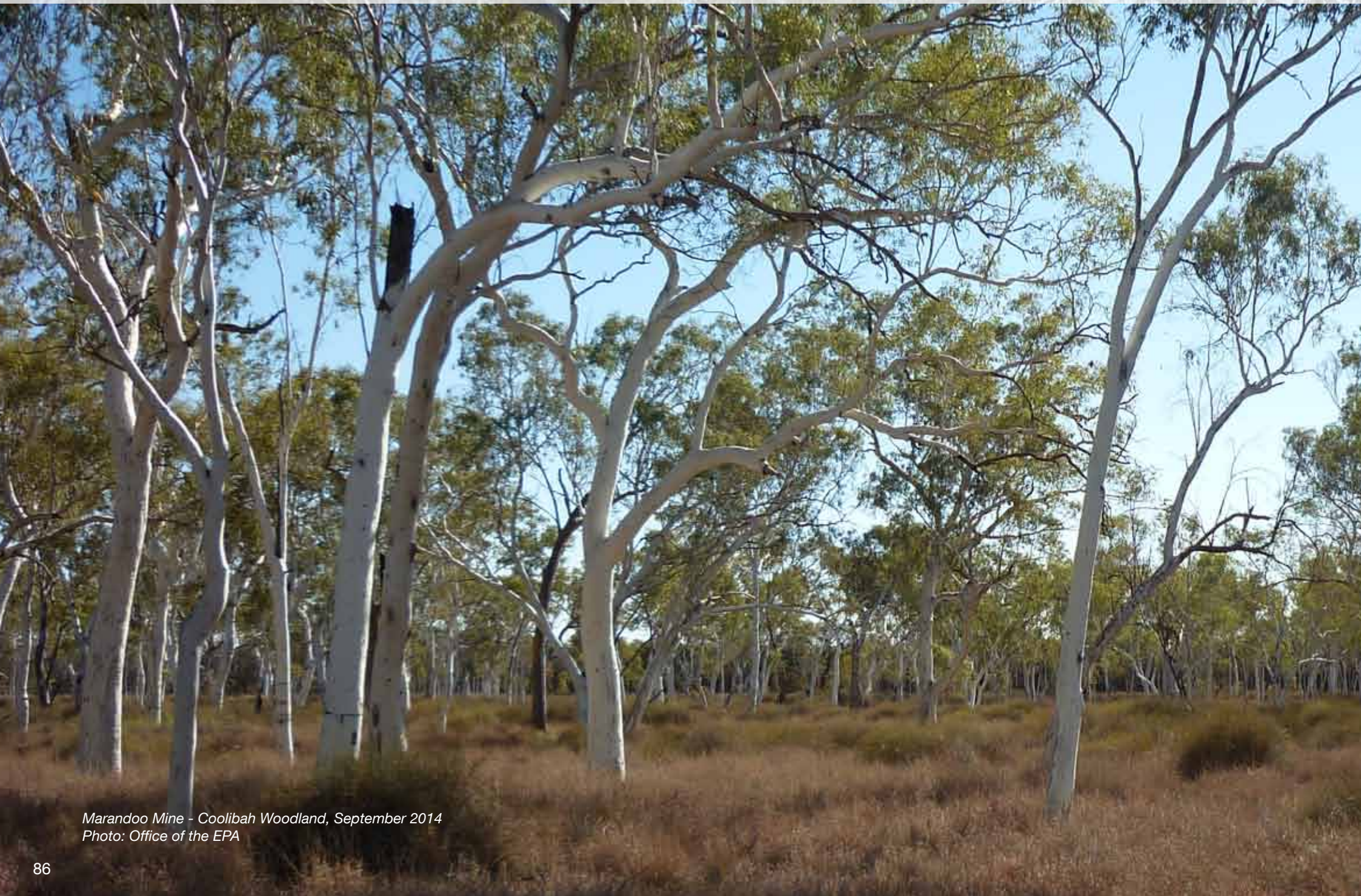
- reduce the need for project by project assessment;
- implement effective long term and strategic responses to key environmental issues;
- provide greater certainty to industry regarding land use and avoidance/mitigation measures; and
- provide certainty in terms of long-term land supply (urban and industrial), basic raw materials supply, and infrastructure corridors.

Importantly, it can build on the environmental successes of the past and provide greater certainty for the environment, with tangible and long-lasting environmental outcomes.









*Marandoo Mine - Coolibah Woodland, September 2014  
Photo: Office of the EPA*





# The Authority





*Members of the EPA on a site visit in the Peel-Harvey region (L-R) Ms Elizabeth Carr, Deputy Chairman Mr Robert Harvey, Mr Glen McLeod, Dr Tom Hatton, Chairman Dr Paul Vogel  
Photo: Office of the EPA*

## The EPA Board

### Chairman – Dr Paul Vogel

Prior to his appointment as Chairman of the Western Australian EPA in November 2007, Paul was the Chief Executive and Chairman of the South Australian Environmental Protection Authority from November 2002.

From 2001 to 2002, Dr Vogel was Director of Environmental Policy with the WA Department of the Premier and Cabinet and was Director of Environmental Systems with the then WA Department of Environmental Protection from 1995 to 2001.

Dr Vogel has worked across the three tiers of government, business and community and has extensive experience and knowledge in organisational and regulatory reform and strategic and collaborative approaches to sustainability, natural resources management, waste management, air and marine quality, site contamination, and radiation protection.

He is a board director of the Cooperative Research Centre for Contamination and Remediation of the Environment (CRC CARE), a director of the ATN Research Impact Advisory Board and a member of the Australian Institute of Company Directors

Dr Vogel's term began in November 2007.

### Deputy Chairman – Mr Robert Harvey

Mr Robert Harvey has degrees in engineering and a Masters in Business Administration from The University of Western Australia (UWA).

Mr Harvey began his career as an engineer in the then Water Authority, specialising in resource management, planning and policy. His last position in the Authority was as Director Water Resources Planning. He was Executive Director of the Department of Justice from 1999 to 2003. In the Department he was responsible for community corrections, juvenile justice and correctional policy.

From 2003 to 2009 Mr Harvey was Pro Vice-Chancellor and Dean of Business and Law at Edith Cowan University. He was a member of the Water Corporation Board from 2007 to 2012. On behalf of the Board of the Water Corporation, he convened a scientific panel to review the State's 50 year water plan – *Water Forever*.

He is the Regional Director for the Winston Churchill Memorial Trust.

In 2010 Mr Harvey was appointed as a member of the Western Australian Planning Commission. Mr Harvey's term began in November 2012. He was reappointed Deputy Chairman in 2015.

### Ms Elizabeth Carr

Ms Elizabeth Carr is a non-executive director with senior management experience in Investment Banking (Macquarie Group), Technology (IBM) and government sectors (WA, NSW, USA). With over 20 years board experience in the private, government, education and community sectors, her current roles include – Chair Challenger Institute of Technology (WA), Chair Macular Disease Foundation Australia, Chair St Catherine's Aged Care Services (NSW), Chair Seton Villa Disabilities (NSW), and Chair of the Department of Family and Community Services (NSW) Audit and Risk Committee. She is also a Director of Safety Return to Work and Support (NSW) – now known as Insurance and Care NSW, Director Kokoda Track Foundation, Director St Mary's Anglican Girls School (WA), Member of the Harvard Club of Australia Council and a member of a number of government audit and Risk Committees.

Ms Carr has a bachelor of Arts (Hons) from UWA and a Masters in Public Administration from Harvard University and a Diploma (and Fellow) from the Australian Institute of Company Directors. She undertakes annual professional development, including with Harvard University.

She received Rotary's Paul Harris Fellow Award for services to the community in 2002, and St Mary's Anglican Girls School Woman of Distinction – Career Award in 2010. Ms Carr's term began in October 2011.



## Mr Glen McLeod

Mr Glen McLeod is a well-respected lawyer with 38 years of local and international experience in environmental, planning infrastructure, government and the climate change law. He continues to practice in those areas.

Mr McLeod is an Adjunct Professor at Murdoch University, where he teaches environmental and town planning law. He is also a member of the Dean's Advisory Group in the Murdoch School of Law.

He is Chair of the International Bar Association's Environmental Health and Safety Committee and a member of the WA Law Society's Environment Town Planning and Local Government Committee. He is also a Fellow of the Royal Society for Arts, Manufactures and Commerce.

Mr McLeod is the General Editor of the Thomson Reuter service *Planning Law in Australia* and Co-editor of the Australia-wide *Local Government Law Journal*.

His term began in October 2013.

## Dr Tom Hatton

Dr Hatton has a Bachelor of Science (summa cum laude) and Master of Science in Natural Resources from Humboldt State University, and a doctorate from the College of Natural Resources at Utah State University.

Following post-doctoral studies in mathematics at the University of New South Wales he joined the CSIRO as an environmental scientist, working on the many water-related challenges facing Australia. Over a 25-year career at the CSIRO, he directed the Water for a Healthy Country Flagship as well as the Wealth from Oceans Flagship, Australia's largest water and marine research portfolios, delivering research directly underpinning the efficient and responsible development of Australia's natural resources while ensuring the conservation of the environmental and social values. In 2014, Tom retired as CSIRO Group Executive for Energy, responsible for national facilities and capabilities in renewable and non-renewable energy, and mining research and development.

In 1999, Tom was awarded the inaugural WE Wood Award for scientific excellence in the field of salinity research, and the Utah State University Alumni Professional Achievement Award. In 2008, Tom received the CSIRO Chairman's Medal and the Australian Public Service Medal for his contributions to the management of Australia's water resources.

Dr Hatton chairs the Western Australian Marine Parks and Reserves Authority and chaired the 2011 Australian State of the Environment Committee. He is an adjunct professor at the

University of Western Australia and serves on their Oceans Institute Advisory Board, as well as the International Centre for Radio Astronomy Research Board.

## EPA meetings and stakeholder engagement

In February 2015, the EPA visited the proposed site for the Yoongarillup Mineral Sands Mine, 17 kilometres south-east of Busselton. The proposal is located on the Whicher Scarp, which is home to highly biodiverse ecosystems. The EPA members were briefed on the key environmental factors, issues raised in submissions, and the proponent's preliminary responses to submissions. The members also visited the potential offset site.

In May 2015, the EPA toured the Western Australian Museum Molecular Systematics laboratory and the subterranean fauna collections. The Western Australian Museum is the official repository for the state's collection of subterranean fauna, which consists of several million specimens. Members were briefed on morphological and genetic identification of subterranean fauna species and the issues for EIA when specimen data is not available in the State collection. The laboratory uses modern techniques, including next generation sequencing, to facilitate the rapid identification of subterranean fauna in Western Australia and elsewhere, including those identified found during surveys for environmental impact assessment.

In May the EPA Chairman visited a proposed limestone and sand quarry at Preston Beach. The site visit provided the Chairman with important context in relation to the environmental values surrounding the proposal site, and a better understanding of the concerns raised during appeals on the level of assessment.

The EPA visited the Peel-Harvey Catchment in June to gain a deeper understanding of the extent of the issues in the area, to better inform their strategic advice on the Perth and Peel regions. The members undertook a flyover of key features such as the Peel Main Drain, Lake Goegrup, the confluence of the Murray and Serpentine rivers, Point Grey, Lake Clifton and Preston Beach. This was followed by a road trip taking in the residential developments at South Yunderup and Austin Cove, Lake Goegrup and the Peel Main Drain.

Site visits and meetings with stakeholders provide the EPA with an appreciation of the environmental setting and constraints of proposals and community concerns, leading to more informed environmental advice being provided to the Minister for Environment.

**Table 2: EPA meetings and member participation**

DATE	PAUL VOGEL	ROBERT HARVEY	ROD LUKATELICH	ELIZABETH CARR	GLEN McLEOD	TOM HATTON
17/7/14						
20/8/14						
21/8/14						
18/9/14						
16/10/14						
20/11/14						
11/12/14						
22/1/15						
19/2/15						
19/3/15						
16/4/15						
21/5/15						
18/6/15						
Meeting participation	13	13	5	13	10	8



DATE	DESTINATION	HIGHLIGHTS	EPA ATTENDEES
9–10/7/14	Duchess Paradise Project, West Kimberley, Rey Resources	Accompanied by representatives of Rey Resources and the OEPA, toured the mine, Fitzroy River Barrage and the truck route  In Derby, travelled the transport route through town to the port; toured the Derby Export Facility  Met with representatives of the Shire of Derby-West Kimberley, Environs Kimberley and the Kimberley Land Council and traditional owners	Paul Vogel Robert Harvey Rod Lukatelich Elizabeth Carr Glen McLeod
16/2/15	Yoongarillup Mineral Sands Mine, Doral Mineral Sands Pty Ltd	Accompanied by representatives of Doral Mineral Sands, the OEPA and the Department of Parks and Wildlife  Travelled Sues Road to the Whicher Scarp to inspect the proposal area and the offset site	Robert Harvey Elizabeth Carr Glen McLeod Tom Hatton
7/5/15	Western Australian Museum	Accompanied by Dr Mark Harvey (WAM) and representatives of the OEPA  Tour of the terrestrial invertebrate laboratory and the molecular systematics laboratories	Paul Vogel Elizabeth Carr Tom Hatton
5/5/14	Limestone and sand quarry, Preston Beach, Doyles Lime Services Pty Ltd	Accompanied by representatives of Doyles Lime Services and the OEPA  On-ground inspection of the proposed site	Paul Vogel
22/6/15	Peel-Harvey	Accompanied by representatives of the Peel-Harvey Catchment Council, the Department of Water, and the OEPA. Met with representatives of the Shire of Murray  Aerial tour of the Peel-Harvey region. On-ground tour of residential development and the Peel Main Drain	Paul Vogel Robert Harvey Elizabeth Carr Glen McLeod Tom Hatton





(L-R) Dr Paul Vogel, Glen McLeod, Jan Star (Peel-Harvey Catchment Council), Robert Harvey, Rod Peake (Shire of Murray), Dr Tom Hatton and Elizabeth Carr during the Peel-Harvey site visit, 22 June 2015



## Stakeholder Reference Group

The EPA's Stakeholder Reference Group (SRG) is an effective means of consultation with key stakeholders and peak industry bodies. The SRG currently meets quarterly to provide input to the EPA on matters of policy, process and performance, including implementation of the review of EIA process.

The core membership of the SRG is:

Association of Mining and Exploration Companies  
Australian Petroleum Production and Exploration Association

Chamber of Commerce and Industry

Chamber of Minerals and Energy

Conservation Council of WA

Department of Environment Regulation

Department of Health

Department of Mines and Petroleum

Department of Parks and Wildlife

Department of Planning

Department of State Development

Department of Water

Environmental Consultants Association

Environmental Defenders Office

Urban Development Institute of Australia

WA Local Government Association

World Wildlife Fund

The membership may also include individuals invited at the request of the EPA Chairman who have relevant experience in environmental protection and related matters.

## Public consultation

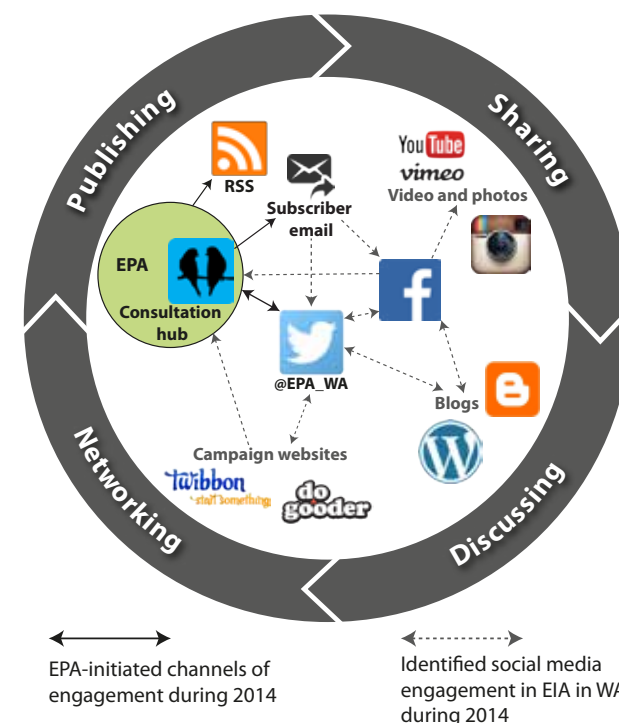
Since August 2012, all opportunities for public comment on EPA business have been published on the EPA's consultation hub at <https://consultation.epa.wa.gov.au>. At the time of writing this report, there have been 210 invitations for public comment with nearly 19,000 responses, all of which are taken into consideration by the EPA when making decisions or recommendations.

At the same time, the EPA started using Twitter to publish notifications, and currently has 376 followers and has 'tweeted' over 700 announcements.

Both initiatives are an acknowledgement of the changing face of communication, and the public expectation that information will be online, accessible, immediate, and transparent.

In early 2015, OEPA officers undertook a qualitative analysis of the EPA's online engagement and social media during the previous year, to determine whether that engagement is effective in positively influencing assessment processes and outcomes. They described the case study approach taken, and weighed the effectiveness of that approach against EIA best practice principles (Sutton and Weston, 2015).

During 2014 there were 81 consultations with a total of 16,335 responses. Responses to three consultations relating to shark mitigation accounted for 14,794 (90.6%) of this total. Iron ore mining proposals on the highly biodiverse banded iron formation of the Mid West accounted for a large proportion of the remaining responses.



**Figure 6: The EPA's approach to Social Media in EIA (adapted from Cromity, 2012 and Nagle and Pope, 2013).**

The analysis showed that social media can be an important tool for the EPA's public consultation in that it positively influences the EIA processes through:

- communicating a clear purpose for EIA and providing stakeholders with opportunities to directly inform decision makers and receive immediate feedback;
- enabling efficient and cost-effective large-scale public participation;
- allowing greater adaptability during the public consultation process;

- iv. providing broader participation by targeting interested and affected members of the public, particularly youth;
- v. enhancing credibility by demonstrating that decision makers are providing an objective, fair and rigorous process; and
- vi. showing greater transparency by providing open and immediate access to information on the EIA requirements and the key factors that would be taken into account in decision making.

The results of the analysis demonstrate the benefit of the EPA's approach to online engagement and social media as a tool to inform public participation in EIA. While the EPA's social media presence is appropriately conservative and primarily one-way, it enables a quick response when information on assessment procedures and guidance, or clarification on steps in the EIA process, is required.

### References and further reading

Cromity J 2012, *The Impact of Social Media in Review*. New Review of Information Networking. 17(1):22-33.

Nagle T and Pope A 2013, *Understanding social media business value, a prerequisite for social media selection*. Journal of Decision Systems. 22(4):283-297.

Sutton A and Weston D 2015, *Influence of Social Media in Australian EIA*, in *Proceedings of IAIA15, Impact Assessment in the Digital Era*, International Association of Impact Assessment. Florence, Italy, April 2015.

### Student support

Each year a graduating Murdoch University student is presented with the EPA Prize in Conservation Biology, awarded for the best average score in core units of Conservation and Wildlife Biology.

In April 2015, the prize was awarded to Bianca Dekker. Having completed a double degree in Conservation and Wildlife Biology and Marine Science, Bianca is now undertaking an Honours degree, investigating controls for blooms of the toxic microalgae *Karlodinium veneficum*, to find solutions applicable to the Swan and Canning estuaries.

The EPA continues its long-term support of post-graduate research that falls within the scope of EPA activities.



*Bianca Dekker, winner of the 2014 EPA Prize in Conservation Biology being presented with her award by Professor Phil Nicholls, Murdoch University, 29 April 2015*



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*Cover image*

*Intertidal coral reef – Kimberley, north-west Western Australia.*

*Marine communities found on these reefs and in their lagoons are extremely biodiverse with exceptional conservation value.*

*The EPA has recently provided an environmental quality management framework it expects to be used to assess and manage development proposals affecting marine environments in State Waters.*

*Photo: Office of the EPA*