Environmental Protection Authority

Annual Report 2016-17

Letter to the Minister

Hon. Stephen Dawson

Minister for Environment

In accordance with section 21 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 2017.

Dr Tom Hatton
CHAIRMAN, EPA

2 October 2017

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Front cover images: Image 1, Morning Iris *(Orthrosanthos laxus)* (Image: H Mills). Image 2, Red eared firetail finch *(Emblema oculata)* (Image: R Hughes). Image 3, Dewatering discharge from the Gabion, Weeli Wolli (Image: H Mills). Image 4, Blue sky and cloud, Jingemia Cave (Image: H Mills). Image 5, Liveable street, Perry Lakes (Image: L Rohl)

Environmental Protection Authority

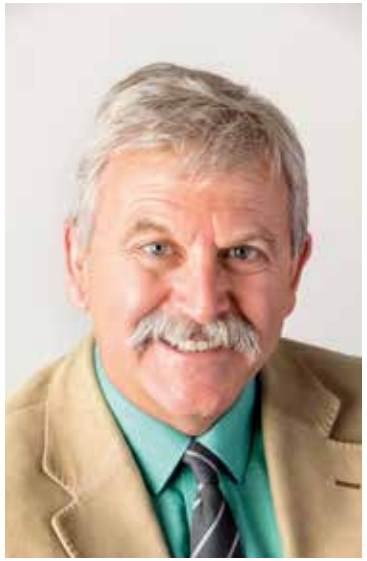
Annual Report 2016–17

October 2017

Perth, Western Australia

Twenty eight parrot *(Barnardius zonarius)* (Image: R Hughes)

Message from the Chairman



I take pleasure in presenting the annual report of the Environmental Protection Authority to the Minister for Environment and to the Parliament.

This year, as well as providing strategic advice to the Western Australian Government and community, we significantly advanced our Strategic Plan 2016–2019, improving the robustness and transparency of our environmental assessments.

The level of public engagement with the development of EPA advice and public scrutiny of our assessment process have greatly increased in recent times, reflecting the value and importance that society places on our work and our role.

Taking stock

This year, our development assessments covered an unusually large number of complex projects attracting high public interest. Our experience in assessing these proposals highlights the ongoing need for good stakeholder understanding of the scope of our authority under the *Environmental Protection Act 1986* (EP Act), and the limits to what information may be considered.

Effective application of the EP Act depends on good environmental information. Environmental assessment in WA is hindered by deficiencies of our information systems.

The EPA is strongly of the view that we are not getting the full value from the immense amount of environmental data collected in WA because we have not seized opportunities to capture, share and re-use this information. We are actively supporting efforts to correct this.

The EPA is committed to continually improving our advice and effectiveness in protecting the environment. This year, we completed projects evaluating the adequacy of mine closure plans and the capacity of environmental impact assessment (EIA) to predict the effects of mining activities on the Weeli Wolli spring and creek in the East Pilbara, with lessons learnt that can be applied more broadly. We found that mine closure plans improve outcomes and most captured issues identified in EIAs. We found the condition of the Weeli Wolli spring and creek to be good, and close to what was predicted through EIAs.

A key element of our Strategic Plan is to 'foster strategic and regional consideration of potential short and long-term environmental impacts'. As a consequence, we are paying greater attention to the 'big picture' and to advice regarding the condition and trend of environments under pressure, and associated recommendations for their protection.

The Perth and Peel regions are projected to grow to 3.5 million people by 2050—an increase of almost 70 per cent on our current population. In 2015, the State Government prepared the Perth and Peel Green Growth Plan for 3.5 million to meet this challenge. We continue to track development of the plan, which remains our most significant opportunity to advise on protecting the biodiversity and liveability of the region.

As always, the EPA remains available to the government to provide quality advice on environmental matters. This year, we were called upon by the State Government to provide strategic advice on the health and amenity risks posed by dust in a specific planning conflict.

We also acknowledge the expectation that we identify for ourselves significant environmental issues that merit our strategic consideration and advice. Native vegetation clearing and degradation is one of these. The impact and mitigation of climate change is another.

Focused on improvement

A willingness to internally review, change and modernise is essential for any organisation but especially for one whose work impacts governments, financial institutions, corporations and communities on a daily basis. During the year, we completed a major update to our principal guidelines and administrative procedures, making them clearer and simpler to understand and follow. We restructured our website, making it far easier for proponents and the community to access our information and to track the assessment of proposed projects.

These reforms reflect our commitment to the transparent and responsive operation of the Authority. We continued to seek the counsel of stakeholders and technical experts in testing the new guidelines and procedures over their first year of implementation, and the feedback to date has been overwhelmingly positive and entirely constructive.

Acknowledgements

The EPA continued to enjoy the highly professional and committed support of the Office of the EPA over the past year. As part of the incoming government's public sector reforms, this support is now organised through the Department of Water and Environmental Regulation. The EPA sees this change as an opportunity to improve clarity in the operation of Part IV and Part V of the EP Act, as well as giving the EPA access to a broader range of technical expertise in support of our advice. We express our gratitude to Kim Taylor and Mike Rowe for ensuring this transition will not diminish the EPA's effectiveness nor its independence.

Finally, we acknowledge and appreciate the excellent working relationships with the previous Minister for Environment, the Hon. Albert Jacob MLA, and the current Minister, the Hon. Stephen Dawson MLC.

Dr Tom Hatton
CHAIRMAN, EPA

Dasypogon sp., Hill River Nature Reserve (Image: H Mills)

Contents

Peak Head looking towards Goode Beach and Albany (Image: R Hughes)

Acronyms

BIF	Banded Iron Formation
CSMC	Cockburn Sound Management Council
DAA	Department of Aboriginal Affairs
DMIRS	Department of Mines, Industry Regulation and Safety (from 1 July 2017)
DMP	Department of Mines and Petroleum (Department of Mines, Industry Regulation and Safety from 1 July 2017)
DoP	Department of Planning (Department of Planning, Lands and Heritage from 1 July 2017)
DoW	Department of Water (Department of Water and Environmental Regulation from 1 July 2017)
DPaW	Department of Parks and Wildlife (Department of Biodiversity, Conservation and Attractions from 1 July 2017)
DPIRD	Department of Primary Industries and Regional Development (from 1 July 2017)
DWER	Department of Water and Environmental Regulation
EIA	Environment Impact Assessment
ENGO	Environmental Non-Government Organisation
EP Act	*Environmental Protection Act 1986*
EPA	Environmental Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)
ERF	Emissions Reduction Fund
GHG	Greenhouse gas emissions
KADZ	Kimberley Aquaculture Development Zone
MCP	mine closure plan
MNES	Matters of national environmental significance
MWADZ	Midwest Aquaculture Development Zone
OEPA	Office of the Environmental Protection Authority (Department of Water and Environmental Regulation from 1 July 2017)
RDA	residue disposal area
SDA	service delivery agreement
UWA	University of Western Australia
WA	Western Australia
WABSI	Western Australian Biodiversity Science Institute
WAMSI	Western Australian Marine Science Institute
WAPC	Western Australian Planning Commission

Spring wildflowers in the Midwest, Dudawa Road (Image: H Mills)

About the EPA

About the EPA

December 2016 marked the 45th anniversary of the commencement of the Environmental Protection Authority (EPA). The Authority comprises five board members appointed by the Governor on the recommendation of the Minister for Environment. The Authority is an independent statutory body and neither the Authority nor the Chairman can be subject to the direction of the Minister. This statutory independence is fundamental to the ability of the EPA to provide sound, robust and transparent advice.

Christmas Island Red Crab (Image: H Mills)

The *Environmental Protection Act 1986* (EP Act) states that the object of the EPA is to use its best endeavours:

- to protect the environment
- to prevent, control and abate pollution and environmental harm.

Relationship with the Minister

The EP Act outlines the functions of the EPA which, in summary, include:

- conducting environmental impact assessments (EIAs)
- providing recommendations to the Minister for Environment (the Minister) on whether a proposal or scheme may be implemented
- preparing statutory policies for environmental protection
- preparing and publishing guidelines for managing environmental impacts
- providing advice to the Minister on environmental matters generally.

Relationship with DWER

The support and service that the Office of the Environmental Protection Authority (OEPA) provided to the EPA over the past seven or more years has been one of a professional and exemplary nature. The EPA expects the newly created Department of Water and Environmental Regulation (DWER) will continue to provide the level of support needed by the EPA to execute its duties under the EP Act, and acknowledges the Director General of DWER for his commitment in this regard. DWER was created from the amalgamation of three agencies—OEPA, the Department of Water and the Department of Environment Regulation—as part of the incoming government's public sector reforms. It began operations on 1 July 2017.

Working with the Commonwealth

Matters of national environmental significance

A bilateral agreement between the Commonwealth and the State relating to environmental assessment (the bilateral agreement) allows the Commonwealth Minister for the Environment to rely on specified EIA processes of Western Australia in assessing actions under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

In early 2016, the EPA commissioned a review (the Legal and Governance Review) into the content, development and application of its policies and guidelines in fulfilling its statutory duties to undertake EIAs under the EP Act. In response to the review, the EPA updated a number of its procedures and guidelines, including the *Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2016*.

As a consequence, proposals assessed under the new administrative procedures are not assessable under the current bilateral agreement. Until a new bilateral agreement can be signed, s. 87 of the EPBC Act is being used, which allows the Commonwealth to accredit the EPA's assessment on a case-by-case basis.

Meanwhile, where a proposal that is likely to have a significant impact on matters of national environmental significance (MNES)—and the Commonwealth determines it to be a controlled action—the EPA and the Commonwealth liaise to decide whether the EPA's assessment of the proposal can be accredited. Agreed accreditation allows for one assessment process of both Commonwealth and State environmental matters rather than two.

As separate approvals are required from each Minister, the EPA's assessment report must provide enough information about the impacts on MNES for the Commonwealth to make an informed decision on whether or not to approve the action under the EPBC Act. In 2016–17, the EPA completed four Bilateral Assessments and one Accredited Assessment on behalf of the Commonwealth.

Christmas Island and Cocos (Keeling) Islands

Christmas Island is located about 1550 km off the north-west coast of WA. Its closest neighbour is the Cocos (Keeling) Islands, about 900 km to the south-west (see Figure 1).

Figure 1: Location of Christmas Island and Cocos (Keeling) Islands

Together, they are known as the Indian Ocean Territories of Australia and are administered by the Commonwealth Government.

The State Government asked the EPA in mid-2016 to consider providing environmental services to Christmas and Cocos islands on behalf of the Commonwealth, in relation to assessing scheme referrals under Part IV of the EP Act.

To enable this, the EPA has entered into a service delivery agreement (SDA) with the Commonwealth. The Department of Planning and the Western Australian Planning Commission (WAPC) currently have SDAs to deliver planning services as described in the *Planning and Development Act 2005* to these islands.

Now that DWER and the EPA have entered into these agreements, the planning process for Christmas and Cocos islands will be fully administered by State Government departments, commissions and authorities.

The SDAs relate to land planning scheme referrals under Part IV of the EP Act and do not apply to s. 38 referrals for developments, such as mining and infrastructure, as these are managed by the Commonwealth under the EPBC Act.

What does it mean when the EPA says 'no'?

One of the EPA's key roles is to provide government with advice on the environmental acceptability of development proposals and statutory planning schemes. Development proposals include proposals for mining and industry as well as infrastructure such as ports, railways and pipelines. Planning schemes include both statutory planning schemes and their amendments.

The EPA uses environmental principles, factors and associated objectives as the basis for assessing whether a proposal or land use planning scheme's impact on the environment is acceptable.

When assessing the impacts of a proposal on the environment, the EPA considers the scientific evidence, the nature and feasibility of management measures proposed, the values and sensitivity of the environment that would be impacted, advice from other government agencies and public input on pertinent environmental information.

The EPA then provides its advice and recommendations to the Minister. However, these recommendations are based only on impacts to the environment, and cannot take into consideration any economic or social benefits that might arise. These potential impacts include damage to the physical or biological values of a place but also how that damage might harm the aesthetic, cultural, economic and social surroundings of people. In some cases, the EPA may conclude that the impacts from a proposal are so significant that they are not manageable and not acceptable. In this situation, the EPA would recommend to the Minister that the proposal should not be implemented.

EPA Strategic Plan

The EPA is now entering the second year of its Strategic Plan 2016–2019. The plan sets out four strategic objectives:

- provide sound advice
- provide robust advice
- provide transparent advice
- foster strategic and regional consideration of potential short- and long-term environmental impacts.

Over the past year, the EPA has made further progress under the plan, including:

- seeking additional peer reviews to assist in determining impacts where technical advice provided to the EPA on an environmental issue differ
- implementing the recommendations of the Legal and Governance Review with the assistance of the EPA's Stakeholder Reference Group
- restructuring the website to provide easy access to the case history of past proposals as well as those under assessment, improving our standards of transparency
- evaluating outcomes of EPA advice.

The EPA is progressing its fourth strategy objective through the development of strategic advice on key areas of the State under development pressure, such as the Perth and Peel regions, and addressing emerging policy or environmental issues (e.g. see 'Towards comprehensive native vegetation management' on page 24 and 'Biodiversity information management' on page 40).

Looking north at the Cliff Top Walk Lookout, Windy Harbour (Image: R Hughes)

2016-17 in review

2016–17 in review

Assessments

In 2016–17, 32 development proposals were referred to the EPA for consideration. The EPA determined that 19 of these proposals required formal assessment under s. 38 of the EP Act while 13 proposals were not assessed. Of those not assessed, the EPA released public advice on four proposals. During this period, the EPA also received 25 requests to amend conditions under s. 46 of the EP Act.

The EPA provided the Minster for Environment with reports on 32 development proposals. These were not the same 32 proposals outlined above but included 16 reports referred to the EPA in previous years. Of the 32 proposals reported on in 2016–17, 12 were assessed as Public Environmental Review, five as Assessment on Proponent Information – Category A, and one as Assessment on Referral Information. All but three were considered environmentally acceptable, subject to strict conditions. A further 14 were reports on changes to implementation conditions of approved proposals requested under s. 46.

Uranium

The EPA assessed three (one expansion and two new) uranium mine proposals in the past year. These were complex assessments each of which included a number of stages of public consultation and input, site visits, ongoing communication with the proponents and members of the public, and the careful examination of key environmental factors. The EPA considered that its environmental objectives could be met for the Extension to the Wiluna Uranium Project and the Mulga Rock Uranium Project, subject to a number of environmental conditions. For the Yeelirrie Uranium Mine, the EPA considered that its environmental objectives could not be met for the factor Subterranean Fauna. The EPA considered that in all cases potential impacts from radiation could be managed within the limits specified by regulatory bodies and international advisory groups.

Banded Iron Formations

The EPA assessed and made recommendations for four Banded Iron Formation (BIF) mine proposals in the Mid West and Yilgarn regions during the year. These were also complex assessments which included public consultation and input, site visits, ongoing communication with the proponents and members of the public, and the careful examination of key environmental factors. Two of these have Ministerial Statements defining strict design and operations conditions. Two were subject to appeal at the time of writing.

Vulnerable species Mason's Darwinia *(Darwinia masonii)* planted on waste dump (Image: R Gilmour)

Strategic activities

Streamlined guidelines and procedures framework

A simpler framework for EIA guidelines and procedures has been established to make it easier for proponents, consultants and members of the community to understand the EIA process. The reforms followed recommendations of the independent Legal and Governance Review in May 2016, which recommended a revamped and simplified policy framework.

The new guidelines and procedures, published on the new EPA website in December 2016, are clearer, better organised and more closely aligned with the EP Act. Overall, the EPA considers the new framework underpins its commitment to increasing the soundness, robustness and transparency of its advice.

The new guidelines are organised into two sets:

- documents that apply to the EPA's assessment of proposals and schemes (documents to support EIA)
- documents published by the EPA or State Government to inform environmental management and protection (advice and reference material).

The EIA guidelines are further separated into two streams—those related to the procedures and process of EIAs, and those that relate to how environmental matters are considered in EIAs.

Documents to support EIA stream

The overall procedures and process of EIA are described in the Administrative Procedures *(Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2016*—the highest level document under the EP Act.

The Administrative Procedures contain strictly procedural content, setting out the essential procedures for EIA in five key stages, closely reflecting the EP Act and providing for more flexibility in how proposals are assessed. The Administrative Procedures are now supported by a single Procedures Manual *(Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual)*, which contains more detailed information on each stage of the process with links to relevant instructions and forms.

Environmental factors are those parts of the environment that may be impacted by an aspect of a proposal. They provide a systematic approach to organising environmental information for the purpose of EIA and a structure for the assessment report. The EPA has 14 environmental factors, organised into five themes: Sea, Land, Water, Air and People.

The EPA's Statement of Environmental Principles, Factors and Objectives (the Statement), is the key document underpinning the EPA's environmental considerations in an EIA. The Statement:

- identifies how the EPA uses environmental factors and objectives to organise and systemise impact assessments and reporting
- outlines the matters the EPA considers are significant when deciding whether or not to assess a proposal or scheme
- outlines the matters the EPA considers when recommending whether or not an assessed proposal or scheme may be implemented or is acceptable.

The EPA reviewed its previous themes, factors and objectives and implemented the following three changes:

- removed the 'integrating factors' theme. The factors that fell under this theme are now dealt with under different instruments. 'Offsets' are addressed in the Procedures Manual and the Administrative Procedures, and 'Rehabilitation and decommissioning' are dealt with under each relevant factor under the remaining five themes
- introduced a new factor, Social Surroundings, which incorporates the previous Amenity and Heritage factors. The Social Surroundings factor closely reflects the definition in the EP Act
- revised the environmental objectives for all factors to closely align with the principles of the EP Act.

A dedicated Environmental Factor Guideline has been prepared for all 14 factors, communicating how each is considered by the EPA in the EIA process.

Some factors also have a specialised Technical Guidance (e.g. Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment) describing the methodologies and techniques to apply in preparing information for an EIA. The EPA will ensure these factor documents remain current and useful.

Advice and reference material stream

The framework's second set of guidelines covers documents published by the EPA or the State Government to inform environmental management and protection. These include:

- EPA strategic advice to the Minister for Environment under s. 16(e) of the EP Act
- State Government policies, including environmental policies developed under s. 17(3)(d) of the EP Act; environmental protection policies established under Part III of the EP Act; and the environmental offsets policy and guidelines
- other advice, such as discussion papers
- reference documents of a technical or scientific nature, which cover a range of matters related to environmental protection in WA
- *State of the Environment* reports.

Advice on health and amenity impacts of dust in Mandogalup

On 2 August 2017, the EPA released strategic advice on the size of a buffer for urban development in Mandogalup, a suburb in the City of Kwinana. The potential effect of dust from Alcoa's Kwinana residue disposal area (RDA), and sand and limestone quarrying in the area, was a concern.

The advice, requested by the Minister for Environment in June 2016, stemmed from the previous government's proposal to extend the existing buffer between Alcoa's RDA and a proposed residential development by 1.5 km. The Government asked the EPA to investigate.

The EPA's report, *Consideration of potential health and amenity impacts of dust in determining the size of a buffer for urban development in the Mandogalup area*, was provided under s. 16(e) of the EP Act.

In developing its advice, the EPA met with landowners, government and industry stakeholders and considered technical reports, meteorological data, air-quality monitoring, 57 public submissions and information from neighbouring Alcoa. This included environmental licence compliance reports and the company's long-term residue management strategies for the RDA.

In its analysis of the data, the EPA found that the potential for health and amenity impacts from dust varied across the Mandogalup area and was primarily dictated by the prevailing winds. The report said the area in question was 'located sufficiently away from Alcoa's bauxite residue disposal area and outside the predominant wind field that generates dust'. It said there was 'negligible health risks to residents in that area, and low likelihood of "unreasonable" amenity impacts'.

The key findings in the EPA's advice include:

- There is negligible health risk and low likelihood of unreasonable amenity impacts in the eastern area of Mandogalup because it is located sufficiently far away from the RDA and is outside the predominant wind field that generates dust from the RDA.

- Air quality in the north and north-east Mandogalup area does not appear to meet recently revised national air quality goals for particulates. If the eastern portion of the RDA were to close, then some of the Mandogalup area immediately downwind may meet the national air quality goal in the future; however, further investigations would be required to confirm this.
- It is unlikely there is a health risk or unreasonable amenity impacts around the Mandogalup townsite. However, there is currently no air quality monitoring in the area and modelling results are not as reliable. Air quality monitoring should be undertaken to confirm these findings.

While the EPA's advice was limited to impacts of dust, other planning considerations may influence the Government's determination of the final buffer.

References and further reading

EPA 2017. *Consideration of potential health and amenity impacts of dust in determining the size of a buffer for urban development in the Mandogalup area:* http://www.epa.wa.gov.au/Mandogalup-s16e

Mandogalup (Image: OEPA)

Evaluating EIA outcomes

In 2016 the EPA initiated a set of internal projects to evaluate the effectiveness of its advice. The EPA reported its findings on the effectiveness of its public advice on development proposals and on planning schemes in last year's annual report. The findings of two more evaluation projects were reported to the EPA Board in 2016–17, with a further project on the effectiveness of environmental management plans anticipated in 2017–18.

Adequacy of mine closure plans

Mining is a temporary activity lasting from a few years to several decades. The EPA assesses mine closure when a shutdown proposal is likely to have a significant environmental impact that will require specific actions or if the proposal is not subject to the *Mining Act 1978.*

In 2011 the Department of Mines and Petroleum (DMP) and the EPA jointly released the *Guidelines for Preparing Mine Closure Plans*, which required mine closure plans (MCPs) for all new mining operations. A revised version was issued in May 2015.

In 2016 the EPA evaluated the efficacy of MCPs as effective tools for mine closure and examined whether EIAs had been captured in closure plans. The project focused on hard rock mines and the EPA undertook site visits in the South West and Pilbara regions as part of its evaluation.

The key findings were:

- MCPs generally conformed to the current Guidelines for Preparing Mine Closure Plans.
- Most MCPs had captured issues identified in EIAs.
- MCPs had differing levels of detail. Some plans did not provide enough information on uncertainty or a contemporary understanding and knowledge of success of rehabilitation.
- MCPs appeared to improve mine closure outcomes and were used in a variety of ways, from information capture and transfer through to operations (when incorporated into standard procedures).
- Multiple drivers were critical for the development of appropriate research, knowledge capture and effective mine closure strategies. These included requirements for liability reporting on the stock exchange, financial requirements, social licence and regulatory conditions.

References and further reading

DMP & EPA 2015. *Guidelines for Preparing Mine Closure Plans*: http://www.dmp.wa.gov.au/Documents/Environment/ENV-MEB-121.pdf

Protecting Weeli Wolli Creek

Weeli Wolli Creek in the central Hamersley Range area of the East Pilbara (see Figure 2) has high environmental value. Under natural conditions, the Weeli Wolli Spring supports permanent pools and a perennial flow downstream of the spring.

Due to the permanent water source and diverse topography, a unique vegetation community of high biodiversity value has been established over time. The creek and spring also have cultural and heritage significance, with large trees especially valued by Aboriginal people.

The Weeli Wolli Creek catchment contains extensive iron ore deposits, and consequently hosts a number of mining projects in various stages of development. Activities from operating mines put cumulative pressure on the creek mainly through dewatering (where groundwater levels are lowered to access the ore body i.e. 'groundwater drawdown') and discharge (where surplus dewater is discharged to creeks).

The overall question asked by the EPA was:

> *'Is Weeli Wolli Creek responding as was predicted through the EPA's environmental impact assessment from mining that has occurred in the catchment?'*

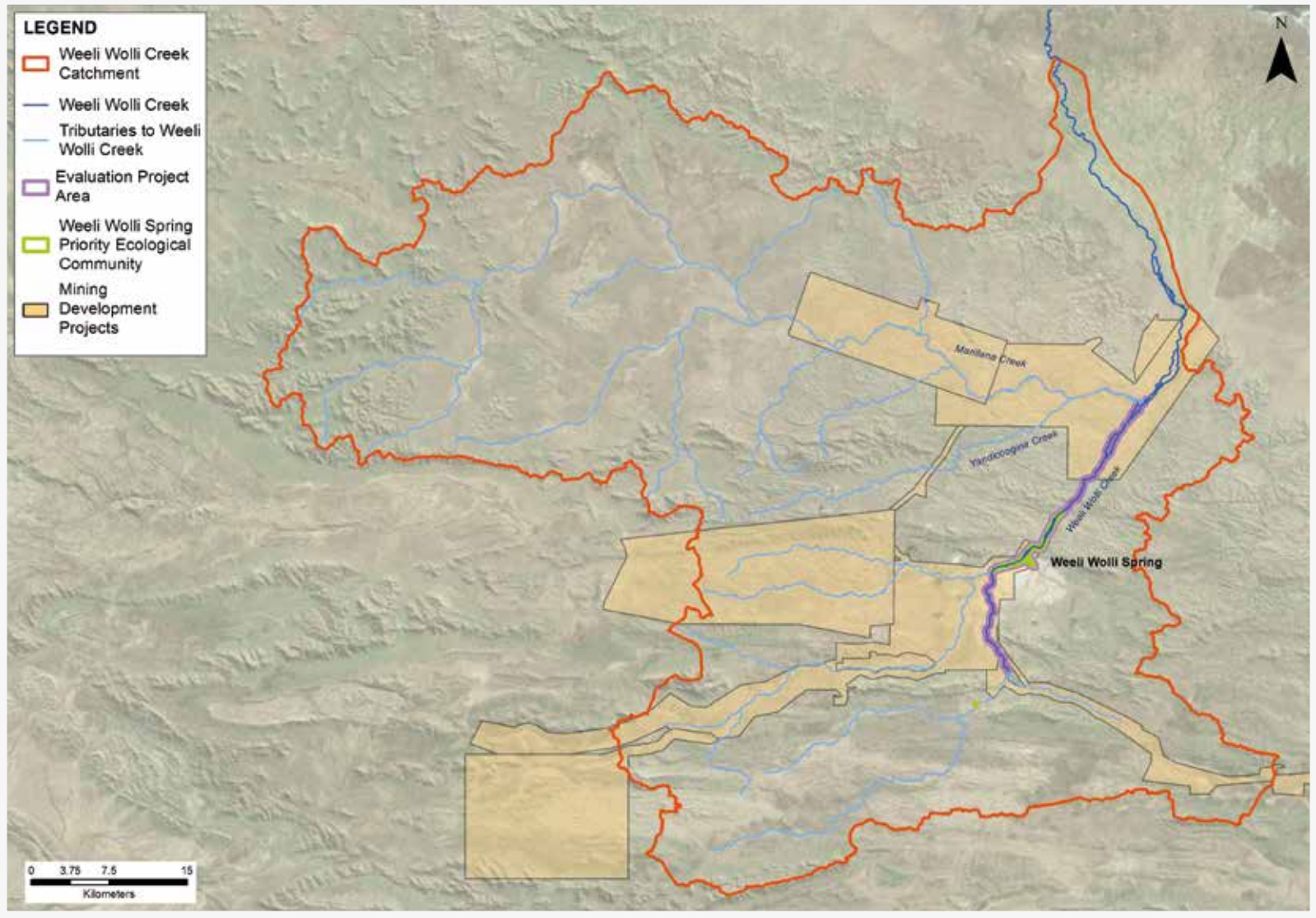
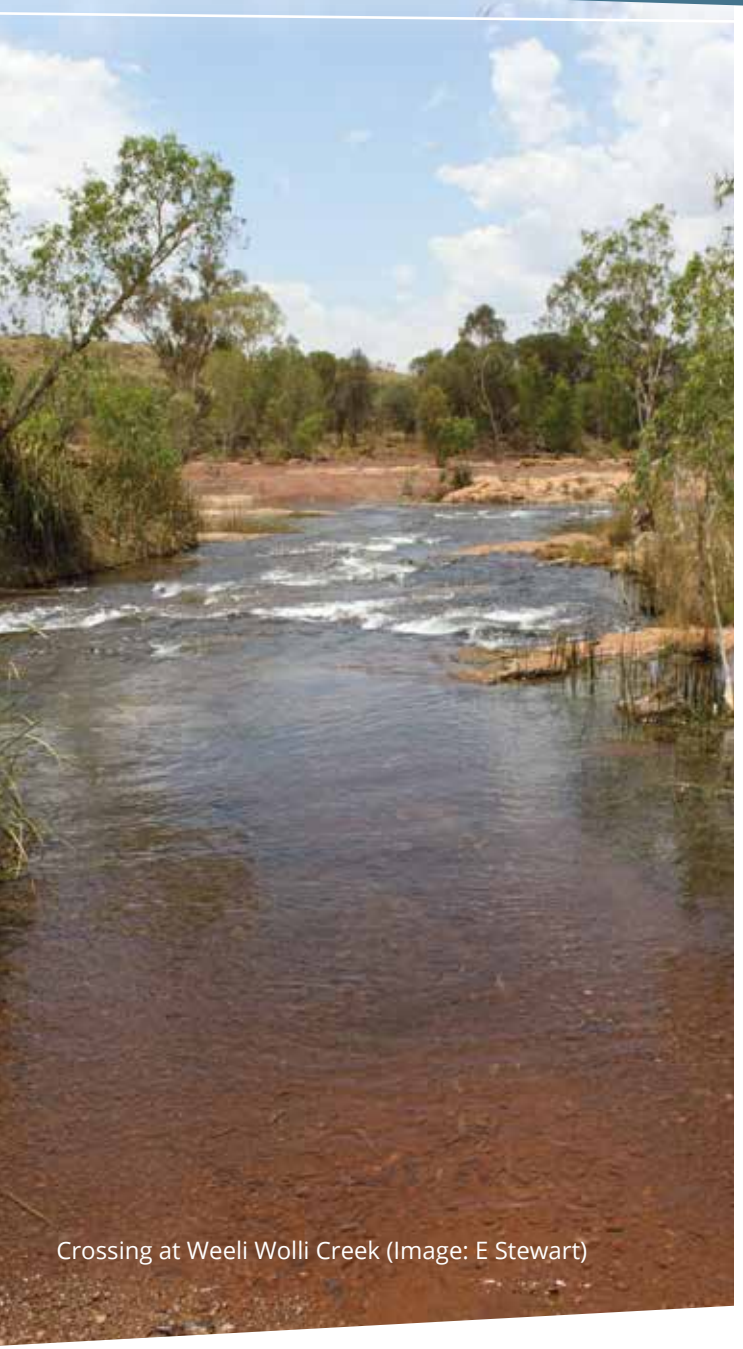


Figure 2: Weeli Wolli Creek catchment and evaluation project area



Crossing at Weeli Wolli Creek (Image: E Stewart)

Specific questions considered were:

- whether the environmental values and condition of Weeli Wolli Creek changed during the time the mines have been operating
- to what extent any changes in environmental values and condition are attributable to impacts of mining proposals assessed by the EPA
- whether the changes are consistent with the impacts that were predicted through the EPA's environmental impact assessment process.

The EPA found that the creek ecosystem is broadly functioning with no serious ecosystem impacts observed to date. The current environmental condition is close to what was predicted through EIAs at this stage of mining development. The EPA noted that changes in groundwater and creek flow can be directly attributable to mining projects; however, it is more difficult to attribute changes in vegetation to mining projects.

Other important findings were:

- Conditions imposed on the mining projects have helped achieve the predicted environmental outcomes.
- Adaptive management has been important where mitigation measures did not work as predicted.
- Vegetation monitoring and reporting should be improved to better understand understorey floral diversity.
- There does not appear to be cumulative impacts on the key environmental values from dewatering to date (i.e. drawdown extents from individual mines do not overlap).

New Holland honeyeater *(Phylidonyris novaehollandiae)* on firewood banksia *(Banksia menziesii)* (Image: R Hughes)

Continuing issues

Continuing issues

Competing demands upon the environment are complex, subject to developments in technology and innovation in policy. This section highlights current issues in environmental protection and management of interest to the EPA and stakeholders.

Management of mine pit lakes

Pit lakes form when open-cut mining operations cease and the remaining pit fills with ground, surface and rainwater. While posing risks to water quality and biodiversity, pit lakes can also deliver significant community and environmental benefits, if remediated.

The *EPA Annual Report 2013–14* highlighted the potential for pit lakes to create environmental risks and become legacy issues if not managed appropriately, noting the difficulty with predicting the future issues that pit lakes may create without appropriate investigation.

The EPA subsequently developed guidance for pit lakes, which form Appendix H of the *Guidelines for Preparing Mine Closure Plans* (2015). The guidance was developed from the EPA's experience of closure assessment and was the first regulatory guide in Australia for the investigation and management of pit lakes.

It provides a risk-based assessment approach that allows regulators and industry to manage pit lakes on a site-specific basis while taking the iterative process of mine closure into account.

The guidance recognises that pit lakes can be complex systems that require a multidisciplinary approach, including an understanding of chemistry, hydrology, climate and biology. It emphasises the development of a conceptual model (see Figure 3) and the use of a risk framework to assess the likelihood and consequence of a pit lake causing impacts on the environment. The framework provides a number of scenarios with potential actions that can be undertaken to manage the risk to acceptable levels.

The EPA recognised the need to advance the science on pit lakes and has advised research groups over a number of years. Research has been undertaken by the Co-operative Research Centre for Contamination Assessment and Remediation of the Environment, CSIRO, the Minerals Research Institute of Western Australia, and ChemCentre.

The need for research is ongoing because of current limitations in the range of tools for investigating and managing pit lakes.

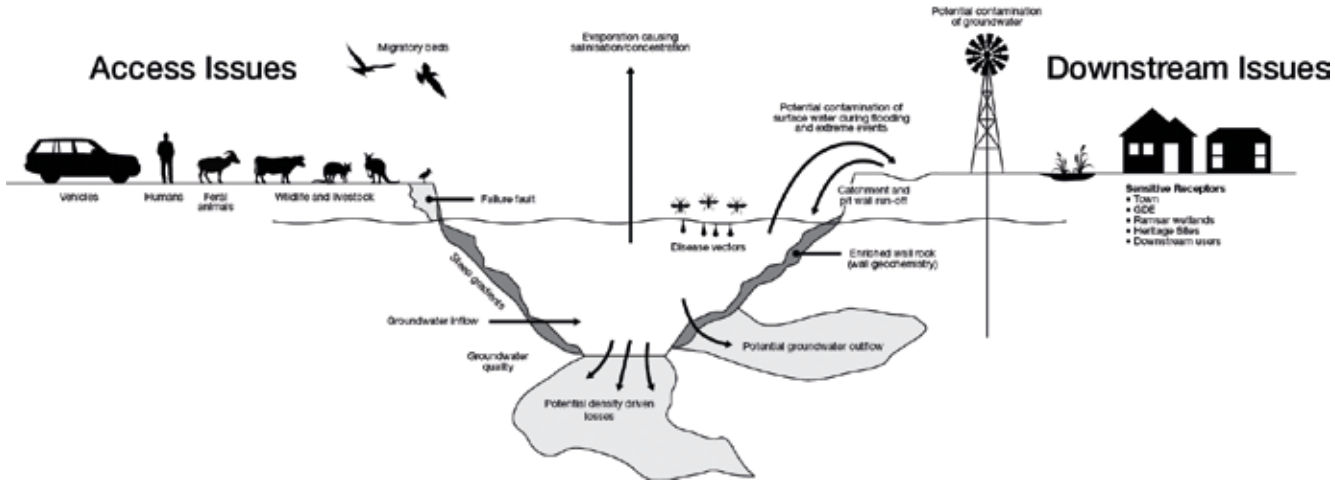


Figure 3: Conceptual model of a pit lake (adapted from McCullough and Lund, 2006)

Great Bingin pit lake (Image: D Risby)

For example, pit lakes often do not mimic natural water bodies and can occur in areas where water is naturally scarce. For this reason, they can develop an unusual chemistry and very high salinity. Current methods of predicting future water quality (modelling with computer software) have limited accuracy when different geologies are exposed to high salinity, and this can make planning for a future pit lake difficult for mine operators.

One research project is testing how a range of geologies will leach or retain metals when exposed to high salinities. The research will:

- identify likely mechanisms for leaching of metals to improve predictions of long-term water quality in pit lakes
- provide new tools for industry and consultants
- apply to a number of contexts across Australia
- fit the requirements of the Guidelines for Preparing Mine Closure Plans (2015), where there is a strong emphasis on planning for closure of operations to avoid legacy issues
- help determine the potential for recovery of metals from legacy pit lakes, which can result in the remediation of water quality and the capture of metal concentrates for use by industry.

The recovery of metals is of particular importance as it has the potential to create an important synergy between management of water quality at legacy sites and the development of an industry focused on rehabilitation of the environment. Again, this work has the potential to be applied across Australia.

References and further reading

McCullough C & Lund M 2006. 'Opportunities for sustainable mining pit lakes in Australia'. *Mine Water and the Environment*, vol. 25, pp. 220–226.

DMP & EPA 2015. *Guidelines for Preparing Mine Closure Plans*: http://www.dmp.wa.gov.au/Documents/Environment/ENV-MEB-121.pdf

Towards comprehensive native vegetation management

Clearing of native vegetation has been, and remains, a necessary part of WA's development. In some regions, the degree of clearing has reached a point where there is concern about its impact on biodiversity and landscape health. Yet, there is still no comprehensive system for monitoring and reporting on the remaining extent of native vegetation and how it is changing.

Impacts of development on native vegetation

Clearing of native vegetation has the direct and immediate effect of removing native flora and fauna and their habitat. In addition to direct clearing, native vegetation is also subject to degrading processes, such as weed invasion, too-frequent fire, and disturbance from both domestic and feral animals. Although direct land clearing is the immediate pressure, ongoing degradation can lead to similar outcomes.

The *EPA Annual Report 2015–16* highlighted concerns about the cumulative impacts of clearing native vegetation and the lack of current data on the scale and extent of the practice. The EPA has previously advised the Minister of its concerns in specific areas, such as the Perth–Peel, Agricultural and Pilbara regions.

An accurate and contemporary understanding of the extent of clearing is vital to assessing the significance of the remaining native vegetation, its management and protection. It is hoped that a shared quantitative frame of reference and better measurement will provide a basis on which to evaluate decisions. Accurate benchmarks would have important implications for the State's development assessments, policy innovation, decision making and conservation outcomes.

There has been little progress in comprehensively capturing and collating this information in the past year.

Regulation of native vegetation clearing

Approval of vegetation clearing in WA currently takes place in a complex regulatory environment, and there is a disconnection between individual clearing decisions and the information used for large-scale conservation planning, monitoring and assessment of cumulative impacts.

The EP Act requires that any person clearing native vegetation on private or public lands must hold a permit, unless they qualify to clear under an exemption. DWER administers the clearing of native vegetation under the EP Act and the Department of Mines, Industry Regulation and Safety (DMIRS) has a delegation to administer clearing for mining and petroleum activities.

Where the scale or impact of proposed clearing is potentially significant, the approval may be referred to the EPA for assessment under Part IV of the EP Act. Any approval for clearing that results from this assessment is granted by the Minister for Environment through a Ministerial Statement.

In addition to the approvals given by the EPA, DWER and DMIRS, further approvals given by the WAPC, Forest Products Commission, Pastoral Lands Board, local governments and others can allow clearing of native vegetation for different purposes.

Exemptions under the EP Act allow for clearing to take place without a clearing permit. There are almost 40 types of clearing permit exemptions in WA. These include exemptions necessary for emergencies such as clearing for fires and for low-impact projects—such as building a house, collecting firewood and use as fencing material. Exemptions also allow for clearing for urban development (subdivisions) approved by the WAPC.

Understanding the current extent of native vegetation

The consequence of having multiple bodies involved in clearing approvals is that no single database captures all of the clearing (permitted and exempt) that takes place in WA. In order

to have a comprehensive understanding of the extent of native vegetation, data would also need to be captured for types of clearing that are not regulated.

The DPIRD maintains remnant vegetation mapping, which is used by a number of agencies for conservation policy and planning. However, there are significant differences between areas of the State in terms of the age and resolution of the mapping. For example, in the Perth–Peel region and around many regional centres mapping is based on fine-scale, contemporary aerial photography and so is reasonably accurate and could be used for monitoring the extent of native vegetation. Outside of these areas, remnant vegetation mapping is often based on old aerial photography. In addition, digitising remnant vegetation is resource-intensive, resulting in few areas having recent revisions of remnant vegetation mapping.

Managing native vegetation in the future

In this report, the EPA calls on the organisations that can approve activities that involve vegetation clearing to contribute to a single database. This should be facilitated by the recent amalgamation of some government departments, a renewed focus on intra-governmental collaboration and the State Government's proposed one-stop-shop for environmental regulation. A single database will allow more efficient management of clearing at the landscape scale.

The EPA regards clearing and degradation of native vegetation as a key issue for the State. In consultation with stakeholders, it is developing a report on the status of native vegetation clearing and frameworks to inform management at a landscape level. This will assist government to manage native vegetation in conjunction with the future economic and social development of the State.

References and further reading

EPA 2015. *Perth and Peel @ 3.5 million: environmental impacts, risks and remedies.* Interim strategic advice of the Environmental Protection Authority to the Minister for Environment under s.16(e) of the *Environmental Protection Act 1986*. EPA, Perth: http://www.epa.wa.gov.au/interim-strategic-advice-perth-and-peel-35-million-environmental-impacts-risks-and-remedies

EPA 2014. *Cumulative environmental impacts of development in the Pilbara region.* Advice of the Environmental Protection Authority to the Minister for Environment under s.16(e) of the *Environmental Protection Act 1986*. EPA, Perth: http://www.epa.wa.gov.au/cumulative-environmental-impacts-development-pilbara-region

The EPA regards clearing and degradation of native vegetation as a key issue for the State

Beaufortia aff. *incana* (grey-leafed beaufortia) (Image: H Mills)

Managing clearing and degradation of native vegetation in the Pilbara

The EPA tracks native vegetation clearing approvals in the Pilbara. Within the Pilbara bioregion, the rate, scale and nature of development, combined with the impacts of other land uses and threatening processes, have raised the EPA's concerns regarding cumulative land clearing and degradation of native vegetation.

In 2014 the EPA published strategic advice to the Minister for Environment on the cumulative environmental impacts of development in the Pilbara region. In the three years since this advice was published, clearing approvals have been granted for a further 74,000 ha.

The full extent and location of clearing footprints associated with mining and development in the Pilbara over the past 50 years are not known, largely due to the complicated history of approval systems associated with clearing activities, state agreements and inconsistent data capture.

Records show that the amount of clearing approved under Parts IV and V of the EP Act to December 2016 is more than 300,000 ha (see Figure 4). The actual amount of clearing on-ground would be significantly higher than this, as these figures do not include:

- clearing undertaken before 1997
- clearing undertaken before the introduction of the Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (Regulations) and not assessed under Part IV
- clearing that is exempt under Part V of the EP Act
- clearing undertaken under state agreements that have not been subject to Part IV or Part V EP Act approval.

The EPA is concerned about the impacts of land clearing combined with pastoralism, feral animals, weeds and climate change in the Pilbara, and the lack of reliable information on the extent and condition of native vegetation at a regional scale.

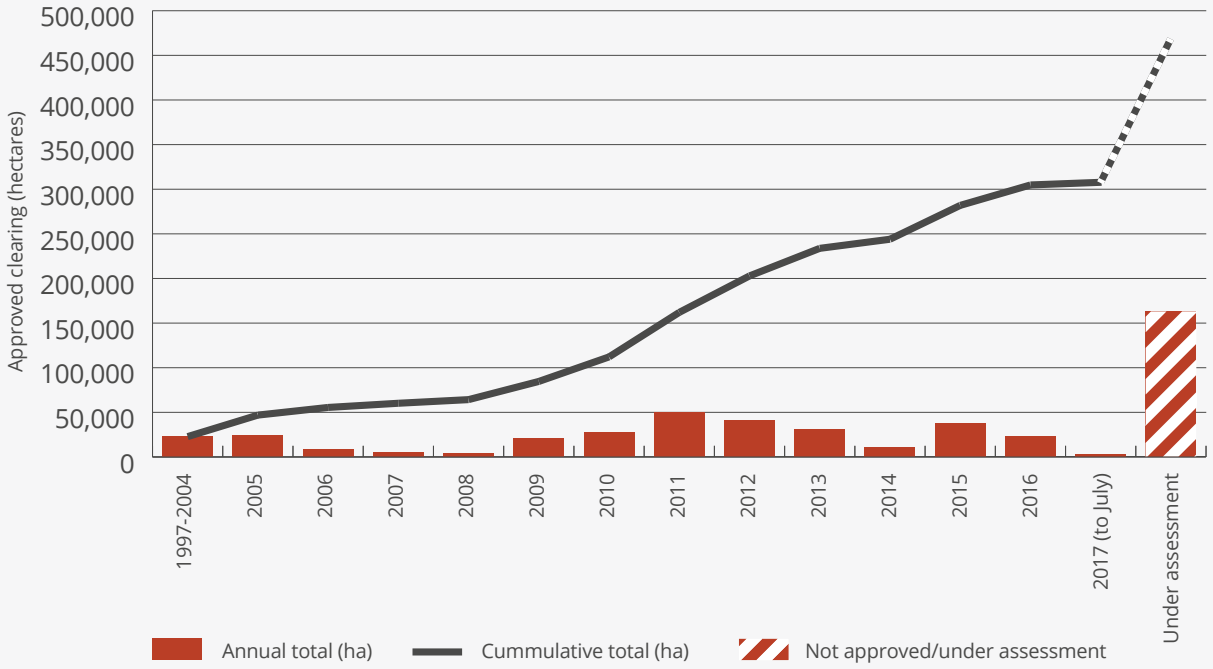


Figure 4: Approved clearing within the Pilbara bioregion under Parts IV and V of the EP Act since 1997

Separating polluting industries from sensitive environments

Buffer zones are spaces that separate polluting industries from sensitive environments such as residential suburbs. The application of adequate separation distances between industry and sensitive land uses can ensure that industrial emissions do not adversely affect people's health and amenity.

While separations and buffers are ultimately a responsibility of planning, the EPA has consistently advocated a whole-of-government approach.

The *EPA Annual Report 2014–15* stressed that separation distances were an important consideration for planning authorities to avoid land-use conflict. It also encouraged the establishment of land-use planning mechanisms early in the planning process and through the strategic planning processes that guide statutory planning. Further, the EPA highlighted the importance of land-use planning buffers in its interim strategic advice on *Perth and Peel @3.5 million*.

The role of separation distances

Separation distances provide guidance on the closeness of a source of emissions to sensitive land uses to protect health and amenity. Separation distances are based on scientific information, where available, and technical knowledge about the types of emissions associated with various industries and their potential impacts on people. These distances vary based on the scale and size of the industry, location, topography, prevailing winds and other factors.

The application of separation distances does not replace the responsibility of industry operators to avoid or minimise emissions through best practice design and operation of their facilities. Nor does it negate the need for site-specific studies on the predicted impacts, acceptable criteria and proposed management, where deemed necessary. It is the expectation of the EPA that industry premises should be designed and operated to avoid or minimise emissions beyond the boundary of the premises. Separation distances are applied to provide for the risk of 'unintended' emissions that may occur from time to time.

Modern pollution control technology is capable of significantly reducing offsite impacts. The EPA is encouraged by the innovation demonstrated in the ongoing reduction of emissions by industry leaders. An example of this is the Gidji roaster shutdown by Kalgoorlie Consolidated Gold Mines Pty Ltd, as described in last year's annual report.

Since 2005, the EPA has provided guidance on generic separation distances between polluting industries and sensitive environments. These distances are based on single point source emissions and do not take into account cumulative impacts or non-typical emissions.

The role of buffers

Buffers protect both people and industry, by designating land in which sensitive land uses are constrained. Avoiding future land-use conflicts through the application of buffers is best undertaken early in the planning process as the ability to separate conflicting land uses at a later stage (such as at the time of subdivision) is often constrained by other land uses and mitigation may not be possible.

Buffers are not intended to 'sterilise' land from development. Planning authorities can make decisions on appropriate current and future non-sensitive land uses within the buffer. However, this type of decision can be contentious and the request for EPA advice on the size of the Kwinana buffer at Mandogalup is an example of the sort of contentious issue that may arise (see 'Advice on health and amenity impacts of dust in Mandogalup' on page 16).

Managing conflicts

Pressure to develop land for both industrial and residential land uses has the potential to erode buffers, with adverse consequences for people and the environment. The EPA is aware of a number of circumstances where land-use conflict has arisen due to insufficient separation between

industry and sensitive land uses. This conflict has been difficult to manage. The EPA expects that proposals which involve siting expansions or new industry near sensitive land uses (or new sensitive land uses near existing or future industry) demonstrate how adequate planning measures have been applied to address potential or actual impacts from industrial emissions to avoid future land-use conflict.

To reduce conflict, strategic industrial areas, such as Kemerton and Ashburton North, have been established to allow for heavy industrial land uses. These areas are strategically located for industry and incorporate buffers where sensitive land uses are restricted. Appropriate land uses are allowed within the buffer area as detailed in the relevant planning schemes. Both the EPA and the WAPC are involved in the assessment of these areas from an environmental and planning perspective.

The EPA understands that the WAPC is reviewing the State Planning Policy 4.1 State Industrial Buffer Policy, which is intended to prevent land-use conflict earlier in the planning framework, including planning schemes and strategic planning documents. The EPA anticipates the revised policy will ensure that appropriate statutory buffers are implemented around industrial or extractive industry areas prior to planning for further development.

References and further reading

EPA 2005. Separation Distances between Industrial and Sensitive Land Uses: www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/GS3-Separation-distances-270605.pdf

WAPC 2016. State Planning Policy 2.5 Rural Planning: www.planning.wa.gov.au/publications/8269.aspx

WAPC 1997. State Planning Policy 4.1 State Industrial Buffer: www.planning.wa.gov.au/publications/1176.aspx

EPA 2015. *Perth and Peel @ 3.5 million: environmental impacts, risks and remedies*. Interim Strategic Advice of the Environmental Protection Authority to the Minister for Environment under s. 16(e) of the *Environmental Protection Act 1986*: www.epa.wa.gov.au/interim-strategic-advice-perth-and-peel-35-million-environmental-impacts-risks-and-remedies

Waste management and the environment

The EPA recognises that minimising the generation of waste and the environmental consequences of waste management are issues of great importance. The work of the EPA in respect of this includes the assessment of environmentally significant waste management proposals under Part IV of the EP Act and, more broadly, in providing advice to the Minister for Environment under s. 16(e) of the Act.

Broader advice on waste-to-energy facilities was provided to the then Minister for Environment in April 2013. This advice was prepared jointly by the EPA and the Waste Authority. The advice considered the environmental and health performance of waste-to-energy technologies and made recommendations on the EPA's expectations for the establishment of new facilities.

Since the release of this advice, the EPA has undertaken formal assessments of a number of proposals for waste-to-energy facilities. These include proposals for large municipal waste-to-energy plants in Kwinana and East Rockingham and a commercial waste-to-energy project in Port Hedland as well as smaller proposals targeting wood waste and end-of-life tyres. The joint s. 16(e) advice has proven useful for framing the EPA's expectations and subsequent assessment of waste-to-energy proposals.

References and further reading

EPA & Waste Authority 2013. *Environmental and health performance of waste to energy technologies*. Advice of the Environmental Protection Authority to the Minister for Environment under s. 16(e) of the *Environmental Protection Act 1986*: www.epa.wa.gov.au/environmental-and-health-performance-waste-energy-technologies-report-1468

Karri forest, Quinninup (Image: R Hughes)

Emerging opportunities

Emerging opportunities

Environmental quality of Perth's coastal waters

Many people in WA enjoy the marine estate through activities such as diving, swimming or fishing, or rely upon its environmental assets for their livelihood, such as a commercial fishing or tourism businesses. The region also has significant conservation value, including two marine parks (Shoalwater Islands and Marmion), the Rottnest Island Reserve and the Cottesloe Fish Habitat Protection Area, all of which rely on a clean and healthy environment for their sustainability. Fremantle is an important shipping port and Garden Island supports a national naval base.

To ensure that we, as a community, can continue to enjoy these benefits and many others, the EPA has long recognised the need for a well-designed environmental quality monitoring and management framework for Perth's coastal waters.

In 2000 the EPA outlined an environmental quality management framework titled *Perth's Coastal Waters: Environmental Values and Objectives*. The EPA included a recommendation to both update and extend this framework to include all marine waters of the Perth and Peel regions in *Perth and Peel @3.5 million*. A revised framework would help identify and manage impacts of individual proposals as well as the cumulative impacts of broader regional development.

The EPA reinforces its call for an effective monitoring and management framework to assign environmental values ahead of development to address potential impacts in the context of a changing climate and other external drivers. The key elements that need to be considered are the environmental values and quality objectives to be adopted, the areas to which the objectives should apply, and the criteria by which environmental quality will be judged.

A review of the EPA's *Perth's Coastal Waters: Environmental Values and Objectives* would provide the basis for a renewed monitoring and management framework. Development of the revised framework should complement planning of significant coastal developments, such as a Fremantle Outer Harbour or further desalination plants.

Environment under pressure

The marine environment is faced with a number of threats. These include:

- urbanisation
- discharge of domestic and industrial waste
- climate change.

The population of the Perth and Peel regions is predicted to increase to 3.5 million people by 2050, almost doubling the current population. This increase and the development of associated infrastructure are expected to significantly increase pressure on the adjacent marine environment.

Into our coastal waters flow wastewaters such as domestic and industrial effluents. There are also secondary impacts associated with urbanisation of the coastal hinterland, such as contaminants entering the marine environment through groundwater and stormwater flows.

Despite the cumulative effects of all these activities, the quality of the marine environment off Perth is mostly in relatively good condition, due in large part to the exposed and well-flushed nature of most of the coastline and past efforts to manage pollution.

Places where the marine quality has deteriorated are generally localised and less well-flushed, such as Cockburn Sound or ports and marinas.

Cockburn Sound

Industrial discharges and port development in the 1960s and 1970s led to significant deterioration in water quality and loss of about 80 per cent of seagrass meadows in Cockburn Sound.

The State Government established the Cockburn Sound Management Council (CSMC) in 2000 and released the State Environmental (Cockburn Sound) Policy 2015 to help protect the marine environment and report on the state of the Sound. Industry also responded by closing a number of industrial wastewater outfalls

While Cockburn Sound remains a relatively clean and vital environment, the positioning of Perth's major industrial and shipping precinct on its shores makes it important for the State to continue to manage the system closely

discharging into the Sound, significantly reducing the load of contaminants.

Water quality has improved over time but the seagrass meadows have been slow to recover.

While the EPA is pleased that Cockburn Sound remains a relatively clean and vital environment, the positioning of Perth's major industrial and shipping precinct on its shores makes it important for the State to continue to manage the system closely.

The CSMC recently accepted the recommendations of an independent scientific panel aimed at more efficient and effective monitoring of the health of the Sound. The EPA awaits the findings of comprehensive seagrass mapping and the next Cockburn Sound Report Card.

Desalination

Since 2000, two large seawater desalination plants have been constructed in WA and are producing about 145 billion litres of freshwater a year (about 47% of Perth's current water needs), with more desalination plants likely to be required as the population grows. The existing plants are located at Kwinana and Binningup.

The waste product of the desalination process is large volumes of brine that are discharged back into the marine environment, creating potential pressures on benthic communities over a localised area.

Ocean warming

Climate change has the potential to dramatically alter the integrity of our marine ecosystems, which in turn support our lifestyles and livelihoods.

Five years ago, evidence began to emerge of unusually warm waters spreading southwards along the Western Australian coastline.
By February 2011, it was clear that a significant warming event was taking place, with widespread reports of fish kills and of tropical species being

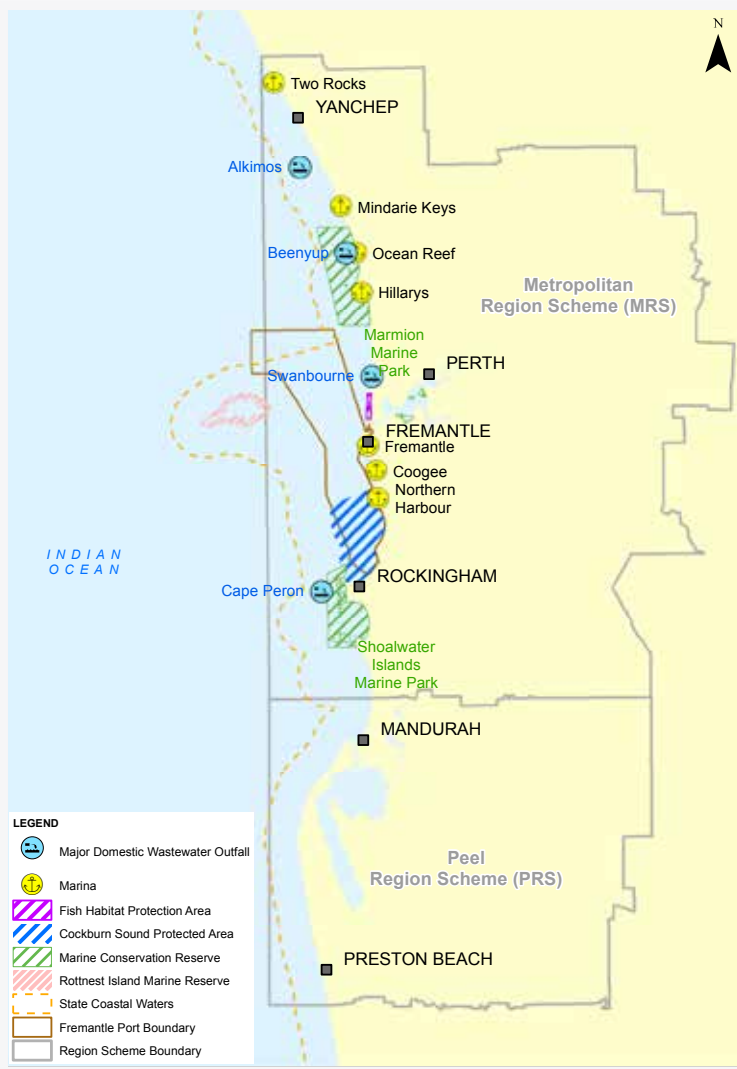


Figure 5: Perth's coastal waters

found further south than their normal range. The term 'marine heat wave' was coined to describe the unprecedented event.

In last year's annual report, the EPA detailed the longer term impacts of marine heat waves on coastal waters. Temperatures in coastal waters have risen by 2–5°C in some years and this in turn has affected the distribution of marine plants and animals along the coastline and caused the closure of some fisheries.

Ocean warming is likely to permanently change marine communities and ecological processes in ways that are difficult to predict. The phenomenon may also have unexpected consequences for localised impacts associated with coastal developments, which is a concern to the EPA.

Recycled wastewater

The Water Corporation is proposing to treat domestic wastewater discharged through its Beenyup treatment plant to recover the majority of the fresh water from the facility's waste stream. This water will be reinjected into the groundwater aquifer and ultimately recovered as potable water.

The treatment process for fresh water recovery includes the removal of bacteria and other pathogens, providing a rare opportunity to significantly reduce our impact on the marine environment, particularly recreational water quality and the quality of seafood.

References and further reading

Cockburn Sound Management Council website: www.der.wa.gov.au/about-us/cockburn-sound-management-council

State Environmental (Cockburn Sound) Policy 2015 and related documents: www.epa.wa.gov.au/policies-guidance/state-environmental-cockburn-sound-policy-2015

EPA 2000. Perth's Coastal Waters: Environmental Values and Objectives: www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/1982_PerthsCoastalWaters.pdf

EPA 2015. *Perth and Peel @ 3.5 million: environmental impacts, risks and remedies.* Interim Strategic Advice of the Environmental Protection Authority to the Minister for Environment under s. 16(e) of the *Environmental Protection Act 1986*: www.epa.wa.gov.au/interim-strategic-advice-perth-and-peel-35-million-environmental-impacts-risks-and-remedies

EPA 2016. Technical Guidance – Protecting the Quality of Western Australia's Marine Environment: www.epa.wa.gov.au/policies-guidance/technical-guidance-protecting-quality-western-australia%E2%80%99s-marine-environment

The resulting waste stream discharged back into the ocean will be more concentrated than previously but the EPA expects the smaller volume will be quickly diluted to acceptable levels.

Liveability in the spotlight

In August 2015, the EPA released interim advice for the Perth and Peel strategic assessment, *Perth and Peel @3.5 million: environmental impacts risks and remedies*. The EPA will provide its final advice after the State Government has publicly released the final plans and reports. In the meantime, the EPA continues to work with State Government agencies and the WAPC to underline the importance of liveability in planning our communities.

Keeping Perth liveable with a growing population

In 2016, and again in 2017, the Economist Intelligence Unit rated Perth as the seventh most liveable city in the world. A 'liveable' city is one that meets the physical, emotional and social needs of its residents. The Perth and Peel regions of WA are growing, with population expected to increase to 3.5 million by 2050. Planning to accommodate this growth needs to both protect the natural environment and maintain Perth's liveability and attractiveness as a global destination.

About 380,000 of the new homes required to accommodate the projected increase in

population are earmarked for urban infill areas, close to key attractions and with access to services. Smart urban infill should consider location and innovative design and be close to transport and services such as employment, education, recreation areas, footpaths and cycle ways. When well planned and executed, urban infill may reduce dependency on cars and improve health and wellbeing. Smart infill can also improve urban tree canopy cover, which has local environmental benefits, including reduced local temperatures.

The protection of human health and social surroundings from environmental impacts are important considerations for the EPA, which supports city planning and design to enable people to live within their surroundings without unreasonable interference in their health, welfare, convenience and comfort.

The importance of planning for a liveable city

To maintain and increase liveability, planning should evaluate recreation and the ecological functions of public open space, accessibility to public and active transport, and effective separation from land uses that affect amenity through noise, odour and dust.

Maintaining local places for people to enjoy their environment will become increasingly important as density increases. Current developments require 10 per cent of areas be set aside for

Perth city skyline (Image: L Rohl)

public open space, a 1950s measure based on town planner Gordon Stephenson's concept that the large backyards associated with Australian homes reduced the need for large public recreation areas. But as backyards get smaller and more apartments are developed for urban infill, the benefits, services and requirements of public open space need to be revisited.

Open space needs to ensure a balance between drainage requirements, functionality, active spaces, nature play areas and nature conservation. People need space for recreation, social activities and access to nature for their health and wellbeing. Experiencing nature in the city, especially close to our homes, can lower levels of stress. Nature areas in the city also reduce the urban heat island effect, providing ecosystem services, improving air quality and creating a social interface for communities.

The integration of transport, land-use planning and higher residential density can reduce congestion across the Perth and Peel regions, thereby improving air quality. Air quality in congested areas is intensified when the surrounding built-up area prevents dispersion of pollutants from 'hotspots'.

The WAPC's Liveable Neighbourhoods policy provides concepts to assist industry to develop new residential areas. This policy is currently under review and a draft has been advertised for public comment. The EPA supports the intention of the WAPC in its efforts to raise liveability in the development communities.

References and further reading

EPA 2015. *Perth and Peel @ 3.5 million: environmental impacts, risks and remedies*. Interim strategic advice of the Environmental Protection Authority to the Minister for Environment under s. 16(e) of the *Environmental Protection Act 1986*. EPA, Perth: www.epa.wa.gov.au/interim-strategic-advice-perth-and-peel-35-million-environmental-impacts-risks-and-remedies

DoP 2009. Liveable Neighbourhoods: www.planning.wa.gov.au/dop_pub_pdf/LN_Text_update_02.pdf

DoP 2015. Draft Liveable Neighbourhoods: www.planning.wa.gov.au/Liveable-neighbourhoods.aspx

The EPA will deliver its final advice on the Strategic Assessment of the Perth–Peel Region once the planning frameworks are finalised, and we continue to look for the best and most secure long-term protection of the region's environment and liveability

Strategic Assessment of the Perth–Peel Region

The EPA commends the Government's decision to continue working towards planning frameworks under the Perth and Peel Green Growth Plan for 3.5 million and the associated Strategic Assessment of the Perth–Peel Region.

In addition to responding to 2016 public consultations, development plans and impact assessments must now incorporate the Government's commitment to METRONET.

The Government has indicated that METRONET is not solely a transport plan but will involve land-use planning around new rail and road corridors. Each project will be designed to marry the best transport outcomes with optimised land-use outcomes. Future plans will need to be reflected in the final WAPC subregional planning frameworks.

The EPA will deliver its final advice on the Strategic Assessment once the planning frameworks are finalised, and we continue to look for the best and most secure long-term protection of the region's environment and liveability.

In 2017–18, the EPA will increase its interaction with the State Government's *Perth and Peel @3.5 million* planning process to ensure environmental considerations are appropriately considered.

Marine aquaculture

Aquaculture, the farming of aquatic plants and animals, is one of Australia's fastest growing primary industries. The State Government is committed to the sustained development of the aquaculture industry, which will provide economic growth and diversification to regional areas.

A key element of this development is the establishment of designated areas of coastal waters considered suitable for marine aquaculture. Aquaculture development zones significantly reduce the investment risk and cost associated with aquaculture development and can streamline the environmental approval process.

Zoning allows the EPA to consider projects at a strategic level rather than individual proposals on a case-by-case basis. Individual aquaculture operators proposing a project in an established zone subsequently refer their project to the EPA, which determines if the proposal is consistent with the approved strategic proposal and whether it would meet the required environmental outcomes, if implemented. If accepted by the EPA as a valid 'derived' proposal, the proponent does not need to go through a full EIA. In this way, the EPA proactively manages the potential cumulative impacts of multiple smaller proposals.

Kingfish (Image: Oceanwide Images)

To date, the EPA has assessed two aquaculture zones for farming marine finfish in sea cages. The Kimberley Aquaculture Development Zone (KADZ) allows for production of up to 20,000 tonnes of fish and was established in August 2014. The KADZ is located in Cone Bay, at the northern end of King Sound, about 215 km north-east of Broome. The Midwest Aquaculture Development Zone (MWADZ) allows for production of up to 24,000 tonnes of fish and was approved by the Minister for Environment in July 2017. The MWADZ is located at the Houtman Abrolhos Islands, about 65 km west of Geraldton.

The KADZ already has two derived proposals approved within it, while the MWADZ is yet to be developed. The strategic proponent and zone manager for the KADZ and the MWADZ is the Fisheries Division of DPIRD.

The EPA's recent strategic assessment of the MWADZ examined potential impacts on three key environmental factors:

- marine environmental quality
- benthic communities (animals and plants that live on the seabed) and their habitats
- marine fauna.

The main environmental risk from the proposed zone is to the sea floor immediately beneath and adjacent to the sea cages, namely through impacts of deposited organic material from fish faeces and uneaten fish feed. Modelling of aquaculture production predicted the 'most likely worst-case' impacts from organic enrichment of the seabed. These included potentially large changes to biological communities and sediment chemistry extending over 100 m from the cages.

However, the modelling also indicated that the extent, severity and duration of impacts—including the time required for full recovery of the sea bed—can be reduced and managed by limiting standing biomass and stocking density and by fallowing of sea cage sites.

The EPA considered that with good adaptive farm management, future derived proposals should be able to achieve an acceptable level of ecological protection within 300 m of the cages. 'Acceptable' in this context recognises small changes in sediment quality and fauna abundance or biomass but no change in the diversity of the biological communities and a high level of ecological protection outside that 300 m boundary. This approach will also protect the local benthic communities and habitats within the MWADZ.

The EPA's assessment of potential impacts to marine fauna from the MWADZ focused mostly on populations of seabirds and the Australian sea lion. Sea lions at the Abrolhos Islands were identified as particularly vulnerable to potential impacts from proposed aquaculture. To ensure risks to marine fauna were reduced to very low levels, the EPA has required that future aquaculture proponents demonstrate that they apply contemporary best practice in their design and operations, particularly in relation to the design of sea cages, maintenance and predator exclusion measures.

Ultimately, the EPA recommended seven conditions for the MWADZ. These conditions include requirements for monitoring and management plans for industry to avoid or minimise impacts on the marine environment. The plans are risk based and have been designed to minimise the impact footprint and level of marine fauna interactions around the sea cages, to provide an evidence base to inform future monitoring and management of the zone, and to collect information that ensures compliance.

Environmental and compliance issues associated with sea-cage aquaculture, such as those seen in recent times in the Australian salmon farming industry, have the potential to damage the reputation of the industry. The EPA is confident that the environmental monitoring and management frameworks applied to the KADZ and MWADZ will ensure significant impacts are prevented, noting that these zones are located in marine environments off the WA coast that are well flushed with good water circulation and dispersion.

The Fisheries Division of DPIRD is responsible for ensuring that aquaculture operators implement monitoring and management plans correctly. Transparent, consistent and effective stewardship of both the KADZ and the MWADZ is fundamental. In this regard, the EPA and DWER support Fisheries by providing technical advice relating to the collection, interpretation and assessment of proponent monitoring data as well as enforcing compliance with Ministerial Conditions.

References and further reading

Department of Fisheries 2015. Aquaculture in Western Australia: www.fish.wa.gov.au/Documents/Aquaculture/aquaculture_statement_of_commitment.pdf

EPA 2016. Environmental Factor Guideline – Marine Environmental Quality: www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/Guideline-Marine-Environmental-Quality-131216_2.pdf

EPA 2016. Technical Guidance – Protecting the Quality of Western Australia's Marine Environment: www.epa.wa.gov.au/policies-guidance/technical-guidance-protecting-quality-western-australia%E2%80%99s-marine-environment

EPA 2017. Mid West Aquaculture Development Zone: www.epa.wa.gov.au/sites/default/files/EPA_Report/Rep%201593%20MWAZ%20PER%20030417.pdf

The EPA is confident that the environmental monitoring and management frameworks applied to the KADZ and MWADZ will ensure significant impacts are prevented

Numbat *(Myrmecobius fasciatus)*, south west WA (Image: R Hughes)

Looking forward to 2017-18

Looking forward to 2017–18

Ongoing evaluation of new policies and guidance

EPA activities in 2017–18 will focus on consolidating the solid foundations established by the new guidelines and procedures framework released in December 2016. A comprehensive review of how the guidelines and framework worked in the first year of operation will ensure continuous improvement.

Other reference materials and technical advice will be reviewed in the year ahead, ensuring that our advice to government and the community continues to be contemporary and effective.

The EPA recognises that improved environmental outcomes are often achieved at the strategic level rather than through individual assessments. Strategic environmental assessment is a systematic process for evaluating the environmental consequences of proposed polices, plans or programs. The objective is to ensure initiatives are fully included and addressed at the earliest appropriate stage of decision making, on a par with economic and social considerations. It is therefore a process not a product. In short:

- EIAs focus on public and private projects; strategic environmental assessment focuses more generally on public policies, plans and programs.
- Consideration of alternatives is limited in EIA; strategic environmental assessment has a broader sectoral range.
- There is a better opportunity to prevent cumulative impacts in strategic environmental assessment.

The EPA is commencing a program of strategic advice on a number of topics, including the important areas of mine rehabilitation and environmental information capture. Beyond these initiatives, the EPA will continue to consult with its Stakeholder Reference Group on emerging focus areas.

Expected workload on assessments

In 2017–18 the EPA will assess proposals for developments of iron ore, mineral sands and key infrastructure, as well as irrigated agriculture projects in the north of the State.

There are currently 20 active assessments before the EPA; 19 being assessed as Public Environmental Review and one as an Assessment on Referral Information.

Each year the EPA receives and considers approximately 260 referrals of planning schemes and scheme amendments from across the State. This includes region, local, improvement and redevelopment schemes and scheme amendments. The EPA anticipates it will receive a similar number of referrals in 2017–18.

The EPA will continue to provide environmental advice to the WAPC, local governments, the Metropolitan Redevelopment Authority and LandCorp to seek better environmental outcomes and improve liveability. The EPA will also continue to collaborate with the relevant planning authorities to promote environmental protection early in the planning process.

Call for review of State climate policy

Emissions of greenhouse gas (GHG) contribute to our changing climate. The EPA's Environmental Factor Guideline – Air Quality encourages proposal design, technology and operation that minimise emissions.

While the EPA can act and advise independently on issues associated with climate change, mitigation is a global issue that requires a policy framework and leadership at international and national levels to effect a genuine difference to GHG emissions and global impacts. To date, the EPA has therefore nested its response to GHG within the Commonwealth and State policy framework.

Current State policy

The State of Western Australia published its overarching climate policy, *Adapting to our changing climate* in October 2012.

The policy acknowledged the nature of WA's changing climate and the pressures this brings to bear upon our environment, economy and lives. It also identified appropriate state-level responses. In particular, it emphasises actions that *complement* programs and policies of the Australian Government.

At the same time, the policy stated the State Government's view that decisions on 'design, implementation and timing of the regulation of GHG emissions, and support for new low emission technology, are primarily matters for the Australian Government and the Federal Parliament.' The EPA's own guidance on considerations of climate change in environmental protection has reflected, and respected, State policy in this regard.

Changing national policy

Since the publication of *Adapting to our changing climate* five years ago, the policies of the Australian Government setting a national framework for GHG emissions (including plans for a carbon tax or emissions trading scheme) have changed or disappeared, replaced by the $2.55 billion Emissions Reduction Fund (ERF).

Looking towards Golden Gate Beach from West Cape Howe (Image: R Hughes)

The ERF safeguard mechanism, designed to ensure emissions reductions are not offset by significant increases in emissions elsewhere in the economy, covers a number of WA facilities in the oil and gas, mining, power generation, manufacturing and transport sectors. However, the safeguard mechanism offers many exemptions and in itself does not require any reduction of business as usual.

The Commonwealth's climate change policies are also currently under review, a process that is not expected to conclude until the end of 2017.

In addition, new scientific information is becoming available on the likely nature of the climate challenges we face, the technologies available to help us meet those challenges, and the probability that some environmental changes are inevitable.

References and further reading

EPA 2016. Environmental Factor Guideline – Air Quality: epa.wa.gov.au/policies-guidance/environmental-factor-guideline-air-quality

WA Government 2012. *Adapting to our changing climate:* www.der.wa.gov.au/your-environment/climate-change/254-adapting-to-climate-change

The EPA considers it timely for the State to ensure its climate policy remains appropriate, effective and contemporary and calls for its review

Contemporary response

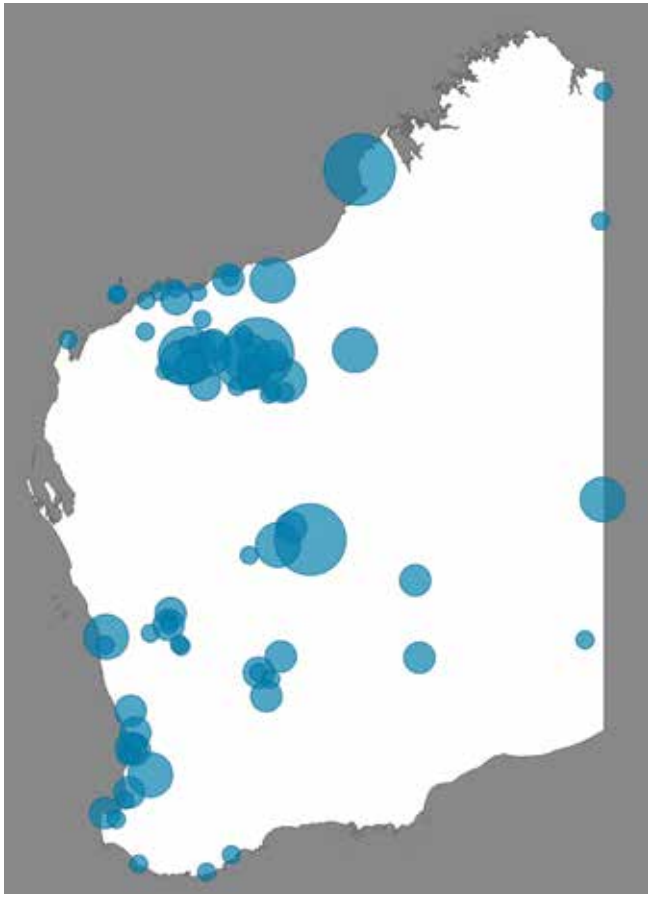
The EPA considers it timely for the State to ensure its climate policy remains appropriate, effective and contemporary and calls for its review. In particular, clarity is sought on:

- benchmarks for lower-emissions technologies
- the role, if any, for WA-based GHG emissions targets or offsets
- expectations on minimum emissions reporting requirements and transparency
- differentiation between GHG emission policies and actions for electricity generation versus other sources of emissions.

The EPA also calls for particular consideration of how our environment will likely change with climate and the consequent need to review natural resources policy and management. Climate change will likely change our forests, fisheries, agricultural productivity and water availability. We must anticipate adapting our management and protection of natural resources in light of these changes.

Biodiversity information management

The EPA recognises the importance of accurate data and information to enable effective decision-making processes at all levels, and the need to promote improved access to relevant data, information and knowledge.



The process of EIA requires an understanding of the consequences of actions *before* they are taken based on sound environmental information. The development of capacity for data collection and use is vital if the EPA and stakeholders are to evaluate the potential consequences of proposed actions.

Current information management systems in the sector are fragmented and inadequate. The manner and rate at which terrestrial biodiversity data, in particular, is being obtained and consolidated is not keeping pace with increases in the scale, complexity and cumulative impacts of development proposals.

Historically, biodiversity data to support EIA has been obtained on a case-by-case basis with limited re-use or sharing of information. Studies may therefore overlap or be duplicated. Resources are often exhausted on gathering basic information when they could instead be spent on more useful higher level studies founded on existing data. This ad hoc system is time-consuming and costly.

An integrated approach to biodiversity data collection and management of environmental studies is required. The following activities aim to address these concerns.

1. Improved standardisation of biodiversity data collection

Expense is incurred when conducting environmental studies yet considerable value is lost if the resulting data are not readily comparable across studies or have not been collected with a view to long-term utility. The ability

to acquire detailed metadata with modern data capture techniques is under-used in WA.

While not all aspects of data collection can be standardised, where opportunities exist they should be taken. The EPA is exploring opportunities for improved standardisation of environmental data collection in collaboration with industry, government and other stakeholders.

2. Better alignment of processes for biodiversity data supply

Environmental authorities and regulators across Australia and the State include the Commonwealth Government, the EPA, DWER, DMIRS and WAPC. Each has a need for environmental data to support their operations, but they lack common data standards. Data collection is neither coordinated nor consistently shared.

Better alignment of processes and requirements for the supply and management of environmental data is not necessarily complicated or expensive. Clearly defining some agreed standards for collecting environmental data, and facilitating their sharing, offers huge benefits to all stakeholders. In conjunction with its focus on data standardisation, the EPA is investigating options for more efficient lodgement of biodiversity data that can support multiple end-users.

3. Improved access to biodiversity data for all stakeholders

The EPA supports the establishment of a central accessible repository for the consolidation of the State's biodiversity data. Increased availability of this information will support baseline understandings of proposal areas, reducing the need for repeated or potentially overlapping ad hoc surveys. This information will also direct the research sector toward areas of higher uncertainty, which in turn will allow more robust environmental conditioning for approved proposals.

To illustrate the potential of a terrestrial biodiversity data repository, the EPA notes that at least 486 flora and vegetation, terrestrial fauna and subterranean fauna field surveys were conducted to support 81 formal assessments conducted in the five-year period from 2012 to 2016. These surveys, which are estimated to collectively represent over 20,000 person-days of effort, obtained important data regarding plant and animal assemblages, threatened species, vegetation condition, invasive species and other aspects of biodiversity throughout WA. Due to the lack of a central database, however, the detailed results of these surveys are not publicly accessible in any consolidated location.

Scarlet robin *(Petroica boodang)* (Image R Hughes)

The benefits of a shared biodiversity database are considerable. A shared database will enable transparency, increase new knowledge and allow proponents to conduct more targeted studies that are built on existing baseline data.

Progress towards more consolidated open science has already begun elsewhere in WA. For example, in the marine biodiversity field, the 2016 Western Australian Marine Science Institute (WAMSI) Blueprint for Marine Science Initiative aims to improve the consistency and sharing of key information, given the cost of collecting data and the need for better baseline datasets.

The Blueprint Initiative has support from government, the oil and gas sector, consultants, the fisheries industry and the research sector. It will provide a strong foundation for future higher level studies, decrease costs to proponents and increase public confidence in the rigour of the assessment process. Consolidation has only been made possible by the willingness of proponents to share baseline data and contribute to a central, accessible repository.

The EPA understands there may be reticence about releasing biodiversity data that carry a perceived proprietary value or risk of being misinterpreted. However, during discussions for the WAMSI Blueprint Initiative, it was apparent to all stakeholders that in an increasingly high-cost operating environment the benefits of sharing environmental data now outweigh any proprietary value or potential risk.

Agreement on the need for a similar level of sharing of terrestrial biodiversity data led to the launch of an information management node within the Western Australian Biodiversity Science Institute (WABSI).

In collaboration with the EPA, government, the mining industry, consultants and other stakeholders, the WABSI information management node has initiated a process to facilitate the central capture of biodiversity information from future environmental surveys, and will identify pathways to broader mechanisms for standardising and sharing terrestrial biodiversity data.

The EPA strongly supports the work of WABSI and WAMSI and will play an active role in furthering their data-sharing initiatives. The Chairman of the EPA is the sponsor and chair of a new WABSI steering group tasked with the improvement of terrestrial biodiversity information. Further, the participation of three department heads and the Chief Scientist in this group demonstrates the State Government's clear support. The EPA has also encouraged the DWER–EPA Strategy and Guidance Division to provide leadership to the WAMSI Blueprint Initiative working group on marine data baselines and standards.

The EPA believes that this direct investment of effort will convert current momentum in advancing information management into tangible outcomes that will benefit all stakeholders. The EPA calls on industry, the research and consulting sectors and the Commonwealth to work with the State Government to improve the availability and sharing of biodiversity information, and in doing so support the delivery of improved environmental outcomes for WA.

In areas where robust, contemporary data have not been previously captured, the EPA will continue to require detailed surveys that address gaps in baseline knowledge. The aim will be to share this data with other stakeholders and multiple end-users.

References and further reading

Western Australian Biodiversity Science Institute:
www.wabsi.org.au

Western Australian Marine Science Institution:
www.wamsi.org.au

Blueprint for Marine Science Initiative:
www.marinescienceblueprint.org.au

Banded Iron Formations in the Midwest (Image: R Gilmour)

The Authority

The Members

Dr Tom Hatton

Chairman

Dr Hatton was appointed to the Board of the EPA in November 2014 and began a five-year term as Chairman from 5 November 2015.

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 NSW, he joined the CSIRO as an environmental scientist, working on 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, Dr Hatton retired as CSIRO Group Executive for Energy, responsible for national facilities and capabilities in renewable and non-renewable energy, and mining R&D.

In 1999 he 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 he 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 chaired the WA Marine Parks and Reserves Authority (2012–15) and chaired the 2011 Australian State of the Environment Committee. He is an adjunct professor at UWA and serves on their Oceans Institute Advisory Board, as well as the International Centre for Radio Astronomy Research Board. He also serves on the Board of the Western Australia Parks Foundation.

In 2017 Dr Hatton was made a Fellow of the Australian Academy of Technology and Engineering.

Mr Robert Harvey

Deputy Chairman

Mr Harvey has degrees in engineering and a Masters in Business Administration from the University of Western Australia.

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. At the Department of Justice, 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 WAPC and completed his term in late 2016. He joined the Board of the EPA as Deputy Chairman in 2012 and was reappointed in 2015.

Ms Elizabeth Carr

Ms Carr's background incorporates both the private and public sectors. She has worked in senior executive positions for IBM and Macquarie Group and at senior levels of politics and government in NSW, WA, PNG and the US.

Ms Carr is a full-time Non-Executive Director with a board portfolio covering government, private and not-for-profit organisations in both WA and NSW. She chairs the South Metropolitan TAFE (WA), St Mary's Anglican Girls School (WA), St Catherine's Aged Care Services (NSW), Seton Villa Disabilities (NSW), the icare Foundation, and the Department of Family and Community Services Audit and Risk Committee (NSW) and Vice-Chair. She is also a Director of icare (NSW), and Vice-Chair of the Kokoda Track Foundation; plus the audit and risk committee for Urban Growth Development Corporation (NSW) and Western Australian Council member for the Harvard Club of Australia.

Ms Carr has a Bachelor of Arts (Hons) from UWA and a Masters in Public Administration from Harvard University. She is a Fellow of the Australian Institute of Company Directors.

In the 2017 Queens Birthday Honours she was recognised as a recipient of the Order of Australia (AM) 'for significant service to the community through voluntary contributions to the health, aged care, education and social services sectors'.

Ms Carr's term began in October 2011 and she was reappointed to the Board in 2014.

Mr Glen McLeod

Mr McLeod is an environmental and town planning lawyer with almost 40 years' experience. He has held senior positions in major Australian, English and American law firms. In July 2012, he established his independent niche firm, Glen McLeod Legal, where he practises in the areas of environmental and town planning law.

Mr McLeod is a member of the Waste Authority and the WA Law Society's Environment Town Planning and Local Government Committee and is the immediate past Chair of the International Bar Association's Environmental, Health and Safety Committee.

An Adjunct Professor at Murdoch University, he teaches units in environmental and town planning law. He is a member of the Advisory Group to the Murdoch Dean of Law and a Fellow of the Royal Society of Arts. He was the recipient of the 2016 WA Law Society's Lawyer of the Year Award.

Mr McLeod is the General Editor of the national loose-leaf publication *Planning Law in Australia* and an editor of the *Local Government Law Journal*.

His term on the Board began in October 2013.

Dr Jim Limerick

Dr Limerick has extensive experience in strategic policy and planning, and was awarded the Australian Public Service Medal in 2008.

He is currently a member of the advisory board to the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) and Chair of the Fremantle Port Authority. He was formerly a member of the WAPC and the WA Technology and Industry Advisory Council. Until 2008, he was Director General of the former Department of Industry and Resources.

Dr Limerick has a PhD and BSc. (Hons) in metallurgy from the University of NSW and a Graduate Diploma in Business from Curtin University. He is a graduate member of the Australian Institute of Company Directors.

He was appointed to the Board on 5 November 2015 for a three-year term.

EPA meetings and stakeholder engagement

The EPA met 13 times during 2016–17. During the meetings, the EPA met with proponents of development projects to discuss assessments. As part of our ongoing commitment to stakeholder engagement, the EPA also conducted site visits and forums, invited public submissions on assessments, and regularly met with our Stakeholder Reference Group.

Meetings of the Board

	Tom Hatton	Robert Harvey	Elizabeth Carr	Glen McLeod	Jim Limerick
21/7/16					
18/8/16					
15/9/16					
20/10/16					
17/11/16					
15/12/16					
19/1/17					
16/2/17					
16/3/17					
20/4/17					
18/5/17					
15/6/17					
21/6/17					
Participation	**13**	**12**	**13**	**13**	**12**

Site visits

Site visits are an opportunity for the EPA to gain a first-hand appreciation of the environmental setting and constraints of proposals, to listen to community concerns, and to discuss aspects of proposals in the field with subject matter experts, leading to more informed environmental advice being provided to the Minster for Environment.

In July 2016, accompanied by officers from the OEPA, the Chairman met representatives of proponents on two sites. Aspects of interest in the Voyager II operation included implementation of offsets, noise and dust impacts associated with the quarry operation, which is located within the Perth–Peel Strategic Assessment Area. Environmental factors of particular interest to the Chairman and associated with the Red Hill Granite Quarry are Heritage, Landforms, Terrestrial Fauna, Hydrological Processes and Amenity.

In September, the EPA Chairman and officers of the OEPA visited the proposed sand mine site at Bush Forever Site 390 in Banjup. Environmental factors of particular interest to the Chairman and associated with the proposal are Flora and Vegetation, Terrestrial Fauna, Hydrological Processes, Inland Water Environmental Quality and Social Surroundings.

In October, EPA members visited the Koolanooka mine area and the Blue Hills mine site with officers from the OEPA, DPaW and representatives of the proponent. The guided tour included an aerial view of the Mungada Ridge.

In November, accompanied by officers from the OEPA, DPaW, DMP, DoW, DAA and representatives of the proponent, EPA members flew over the Helena–Aurora Range en route to the East Jaurdi airport. They then travelled by road to the proponent's operating Carina mine site (and viewed progress in rehabilitation) before inspecting the Jackson 5 and Bungalbin East proposal areas.

Later in November, the Chairman and officers of the OEPA visited BHP's existing operations near Newman to discuss environmental management. Potential future proposals associated with the Pilbara Expansion Strategic Proposal were discussed.

In May 2017, EPA members, officers of the OEPA and representatives of the proponent visited the site of the proposed Thunderbird Mineral Sands Project, about half way between Broome and Derby. The members also visited Broome and Derby ports, and consulted with the shires and other stakeholders.

Later in May, the Chairman and officers of the OEPA visited the Keysbrook Mineral Sands Project to gain an understanding of site operations, particularly the monitoring and management measures being implemented to mitigate noise emissions.

In June, the Chairman and officers of the OEPA met the proponent and representatives for a guided tour of Sino Iron operations and to see proposed expansion areas.

Date	Destination	EPA participants
8/7/16	Red Hill Granite Quarry, Gidgegannup (Hanson Construction Materials Pty Ltd) and Voyager II Quarry (BGC (Australia) Pty Ltd)	Tom Hatton
1/9/16	Proposed sand mining operation, Lot 467 Jandakot/Warton Road, Banjup, Hanson Australia Pty Ltd	Tom Hatton
28/10/16	Blue Hills Mungada East Expansion Project, Sinosteel Midwest Corporation Limited	Tom Hatton Robert Harvey Jim Limerick
4/11/16	Jackson 5 and Bungalbin East Iron Ore proposal, Mineral Resources Limited	Tom Hatton Robert Harvey Elizabeth Carr
24–25/11/16	Pilbara Expansion Strategic Proposal, BHP, East Pilbara	Tom Hatton
4–5/5/17	Thunderbird Mineral Sands Mine, Dampier Peninsula, Sheffield Resources Limited	Tom Hatton Jim Limerick
24/5/17	Keysbrook Mineral Sands Mine, MZI Resources	Tom Hatton
6/6/17	Sino Iron Continuation proposal, Korean Steel Pty Ltd and Sino Iron Pty Ltd	Tom Hatton

Stakeholder Reference Group

The EPA's Stakeholder Reference Group (SRG) met five times during the year to provide input to the EPA on matters of policy, process and performance. At the end of the financial year, core membership of the SRG comprised:

Conservation, health and water

- Conservation Council of WA
- The Wilderness Society of WA
- Department of Parks and Wildlife
- Department of Environment Regulation
- Environmental Defenders Office WA (Inc)
- World Wildlife Fund
- Environment Institute of Australia & New Zealand
- Department of Health
- Department of Water

Resources industry

- Association of Mining and Exploration Companies
- Australian Petroleum Production and Exploration Association
- Chamber of Commerce and Industry of WA
- Chamber of Minerals and Energy of WA
- Department of Mines and Petroleum
- Department of State Development

Other industry

- Urban Development Institute of Australia WA Division Inc
- WA Local Government Association
- Department of Planning
- Environmental Consultants Association (WA) Inc.

At the invitation of the EPA Chairman, membership may also include individuals who have relevant experience in environmental protection and related matters.

Have your say

Providing opportunities for public participation is important for environmental impact assessment and developing sound environmental protection policies in WA. The EPA publishes documents open for public comment online at: https://consultation.epa.wa.gov.au. Members of the public are encouraged to submit their comments through this 'consultation hub'. The public and stakeholders can also subscribe on the hub to be notified of new items by email.

This year, the EPA called for public comment and submissions on assessments 46 times (compared with 49 in 2015–16), with a total of 1202[1] responses (compared with 475 the previous year).

1 This figure does not include proforma or campaign responses.

Environmental Non-Government Organisation Forum

The EPA conducted its annual Environmental Non-Government Organisation (ENGO) Forum on 16 November 2016 at the State Library. Representatives of the Conservation Council of WA, the Environmental Defenders Office, Greening WA, the PEW Charitable Trust, Southwest Species Conservation, the Urban Bushland Council, the Wilderness Society and the Wildflower Society of WA attended.

The forum is an opportunity for all five EPA members to meet with ENGO representatives and discuss topics of interest. Several issues were raised and the EPA committed to reporting on these expectations in the annual report. Table 1 lists actions taken on each of the issues.

The next ENGO Forum is scheduled for 8 November 2017.

Table 1: EPA follow-up on key issues raised by ENGOs

	Key issues raised by ENGOs	EPA actions
1	Greater use of assessment under Part IV of the *Environmental Protection Act 1986* for clearing proposals v. use of Part V clearing provisions, with the Water for Food initiative as an example.	• The EPA is closely following clearing issues in WA, particularly those associated with the Water for Food and northern irrigated agriculture more generally. • The DWER has recommended that Water for Food proponents conduct flora and vegetation surveys according to EPA guidance, and has sought pre-referral meetings with proponents. • Irrigation proposals are being directed to the EPA, with one proposal under formal assessment as of August 2017.
2	Need for a central database to house the data from flora and vegetation surveys conducted to support EPA assessments.	• The EPA has supported recent initiatives by WABSI to progress a central database for biological survey data. • On behalf of WABSI, the EPA Chairman established an advisory committee that includes key department heads and the Chief Scientist, demonstrating whole-of-government acknowledgement.
3	Need for improved timeliness in listing threatened species and communities, and in addressing some non-listed species and communities that are considered to be under threat.	• Listing threatened species is not at the EPA's discretion. When considering species that are not listed but are nonetheless identified as significant, the EPA continues to obtain expert advice and adopts a cautious approach. • The EPA has identified non-listed but potentially at-risk species as significant in recent assessments. The EPA has also identified range-restricted species to be significant in recent assessments, e.g. subterranean fauna species that, despite not being listed as 'threatened' or 'priority', formed the basis for the EPA's recommendation on the Yeelirrie Uranium Project.
4	Concern for delivery of outcomes for the endangered black cockatoo that are consistent with recovery plans in the Strategic Assessment of the Perth–Peel Region.	• The EPA has initiated a review process to ensure the science that underpins conservation of the black cockatoo is robust and adequate.
5	Preference for the EPA to contribute to the Strategic Assessment of the Perth–Peel Region by way of a formal assessment of the proposal rather than provision of s. 6(e) advice to the Minister for Environment.	• The EPA has closely tracked development of the Strategic Assessment, including outcomes for the black cockatoo and other significant environmental issues. • The EPA continues to advise on and help inform the Strategic Assessment, particularly in relation to the long-term protection of the Swan Coastal Plain.

	Key issues raised by ENGOs	EPA actions
6	Lack of support for the EPA also undertaking Commonwealth environmental approvals, particularly for projects where the State is the proponent (due to a potential for conflict of interest).	• The EPA has sought and received assurances, from both Government and DWER, regarding its continued independence and the ongoing availability of resources required to fulfil its obligations under the EP Act. • The EPA has an ongoing dialogue with the Commonwealth regarding implementation of bilateral assessment arrangements. However, there are no current negotiations involving EPA oversight of Commonwealth approvals.
7	Support for a role for the EPA in the assessment of (and recommendations for) conditions for Scope 1, 2 and 3 GHG emissions associated with referred proposals.	• The EPA has retained guidelines related to consideration of Scope 1 and 2 emissions in the Environmental Factor Guideline – Air Quality. These policies have been reflected in a number of assessments in the past year. • Currently, the EPA believes Scope 3 emissions are beyond the reach of the EP Act. The Environmental Factor Guideline – Air Quality, which includes GHG emissions, is under review.
8	Concern about the effectiveness of environmental offsets. In particular, their enforceability when third-party land transfers are required, and the potential benefits of a strategic approach to implementing offsets. Preferred approach would focus on high-priority biodiversity values, require transparency and involve no cost shifting.	• Over the past year, the EPA has been actively engaged in the development of the Pilbara Strategic Conservation Fund, which will pool offset funds from proposals approved under Part IV of the EP Act. • In a number of recent assessments, the EPA has forewarned that some residual environmental impacts cannot be offset.
9	Need for quality assurance processes to ensure EPA standards are met if environmental factors are deferred to other regulators.	• The EPA has revised its approach and definitions used to identify likely significant impacts and effects on the environment. • In December 2016, the EPA released the Statement of Environmental Principles, Factors and Objectives, which identifies criteria used to determine whether a proposal is likely to have significant impacts, and should therefore be assessed by the EPA rather than deferred elsewhere.
10	Need to investigate adequacy of environmental water flows from Darling Scarp dams to the Ramsar-listed Peel–Yalgorup System (comprising the Peel Inlet, Harvey Estuary and nearby lakes and wetlands).	• The EPA expects issues related to the health of the Peel–Harvey system will be addressed through the Strategic Assessment.

EPA website redevelopment

During 2016–17, the EPA completed a major redevelopment of its website. Launched on 13 December 2016, to coincide with and reinforce the new policy and guidance framework, the website features:

- 'case views' of proposals and schemes, with all public documents relating to a single assessment on the same page
- addition of key information about proposals, including the relevant environmental factors, industry sector, region, and more
- the ability to subscribe to individual projects to keep up-to-date with the progress of assessments
- links to the EPA's consultation hub for all opportunities for public comment and submissions
- a comprehensive list of active assessments
- a step-by-step-guide to the EIA process
- improved searches.

The 'Our 2017 focus' area of the website highlights the overarching issues that are currently at the forefront of the EPA's consideration.

The structure of the new policy and guidance framework helped inform the architecture of the new website, and separates policy and guidance documents into two EIA streams—those related to the procedures and process of EIA, and those related to how environmental matters are considered in EIA. It is also clear from the structure that the EPA provides advice and reference material not directly related to EIA.

The new website has been designed to be responsive and easy to read and navigate on multiple devices, including desktop computers, tablets and smartphones.

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 May 2017, the prize was awarded to Merryn Pryor of the Perth suburb of Wilson. Having completed a double degree in Conservation and Wildlife Biology and Biological Sciences, Merryn is now employed by the Conservation Council of WA to conduct research on restoration and the effects it has on bird and insect diversity.

Merryn's research focuses on ecological monitoring that measures the outcomes of different revegetation approaches in farmland within the Gondwana Link, with local landcare groups, property owners and volunteers.

Merryn Pryor with EPA Chairman

Spring wildflowers in the Midwest, Dudawa Road (Image: H Mills)

Appendices

Appendix 1: Completed assessment reports 2016–17

Public environmental review

Report No.	Title	Proponent	Release date
1570	Mt Gibson Range Mine Operations, Iron Hill Deposits	Mount Gibson Mining Limited	18 July 2016
1573	Yandicoogina Iron Ore Project – Pocket and Billiard South deposits	Hamersley Iron – Yandi Pty Limited	1 August 2016
1574	Yeelirrie Uranium Project	Cameco Australia Pty Ltd	3 August 2016
1575	Cyclone Mineral Sands Project	Lost Sands Pty Ltd	8 August 2016
1576	Mulga Rock Uranium Project	Vimy Resources Limited	15 August 2016
1580	Extension to the Wiluna Uranium Project	Toro Energy Limited	6 September 2016
1581	Yilgarn Operations, Koolyanobbing Range F Deposit	Cliffs Asia Pacific Iron Ore Pty Ltd	12 September 2016
1588	Solomon Iron Ore Project – Sustaining Production	Fortescue Metals Group Limited	23 November 2016
1593	Mid West Aquaculture Development Zone	Department of Fisheries	3 April 2017
1598	Blue Hills Mungada East Expansion	Sinosteel Midwest Corporation Limited	28 June 2017
1599	Jackson 5 and Bungalbin East Iron Ore Project	Mineral Resources Limited	28 June 2017

Assessment on proponent information – Category A

Report No.	Title	Proponent	Release date
1571	Eastern Ridge Iron Ore Proposal – Extension to Orebodies 24, 25 and 32	BHP Billiton Iron Ore Pty Ltd	25 July 2016
1582	Pilbara Bulk Ore Transportation System	Mineral Resources Limited	19 September 2016
1585	Iron Valley Below Watertable Project	BC Pilbara Iron Ore Pty Ltd	17 October 2016
1587	Gruyere Gold Project	Gold Road Resources Limited	21 November 2016
1592	Balannup Wastewater Pressure Main	Water Corporation	23 January 2017

Assessment on referral information

Report No.	Title	Proponent	Release date
1597	Perth Groundwater Replenishment Scheme Stage 2	Water Corporation	29 May 2017

Changes to conditions – s. 46 reports

Report No.	Title	Proponent	Release date
1572	Gidgegannup Granite Quarry, Gidgegannup, City of Swan – inquiry under s. 46 of the *Environmental Protection Act 1986* to amend Ministerial Statement 861	Hanson Construction Materials Pty Ltd	19 July 2016
1577	Marillana Creek (Yandi) Life-of-mine proposal – inquiry under s. 46 of the *Environmental Protection Act 1986* to amend Ministerial Statement 679	BHP Billiton Iron Ore Pty Ltd	22 August 2016
1578	Subdivision of Lot 48 Furnissdale Road, Furnissdale – inquiry under s. 46 of the *Environmental Protection Act 1986* to amend Ministerial Statement 778	G-Daisy Pty Ltd	2 September 2016
1579	Magellan Lead Carbonate Project – inquiry under s. 46 of the *Environmental Protection Act 1986* to amend Ministerial Statement 905	Rosslyn Hill Mining Pty Ltd	1 September 2016
1583	Port Rockingham Marina – inquiry under s. 46 of the *Environmental Protection Act 1986* to amend Ministerial Statement 826	Aureus Commercial Pty Ltd	19 September 2016
1584	Final Superlot Subdivision (various lots, Patterson Road, Rockingham – WAPC subdivision application 153179) – inquiry into whether or not the conditions relating to the derived proposal should be changed	Western Australian Land Authority trading as LandCorp	3 October 2016
1586	Cape Lambert Port A & B developments, City of Karratha – inquiry under s. 46 of the *Environmental Protection Act 1986* to amend Ministerial Statements 741 & 840	Robe River Mining Co Pty Ltd	14 November 2016
1589	Marillana Iron Ore Project – inquiry under s. 46 of the *Environmental Protection Act 1986* to amend Ministerial Statement 855	Brockman Mining Australia Pty Ltd	19 December 2016
1590	Industrial subdivision of Lot 21 Webster Road Forrestfield – inquiry under s. 46 of the *Environmental Protection Act 1986* to amend Ministerial Statement 841	Alison Papagioftsis; Marilyn Cacavas; Robert Peters	30 December 2016
1591	Multi-user Iron Ore Export (Landside) Facility, Port Hedland – inquiry under s. 46 of the *Environmental Protection Act 1986* to amend Ministerial Statement 891	NWIOA Ops. Pty Ltd (trading as North West Infrastructure)	30 December 2016
1594	Champion Lakes Masterplan Development Lake Road, Armadale – inquiry under s. 46 of the *Environmental Protection Act 1986* to amend Ministerial Statement 632	Western Australian Sports Centre Trust	3 April 2017
1595	Point Grey Marina proposal – inquiry under s. 46 of the *Environmental Protection Act 1986* to amend Ministerial Statement 906	Point Grey Development Company Pty Ltd	10 April 2017
1596	Parker Range (Mount Caudan) Iron Ore Project, Shire of Yilgarn – inquiry under s. 46 of the *Environmental Protection Act 1986* to amend Ministerial Statement 892	Cazaly Iron Pty Ltd	15 May 2017
1600	Cape Riche Seawater Desalinisation Plant Proposal – inquiry under s. 46 of the *Environmental Protection Act 1986* to amend Ministerial Statement 904	Grange Resources Limited	28 June 2017

Appendix 2: New framework list of guidelines and procedures

1. Procedures of environmental impact assessments (EIA)

Administrative Procedures

- Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2016 (PDF)

Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual

- Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual (PDF)

2. Environmental considerations in EIA

Statement of Environmental Principles, Factors and Objectives

- Statement of Environmental Principles, Factors and Objectives (PDF)

Factor guidelines and technical guidance: Sea

- Environmental Factor Guideline – Benthic Communities and Habitats
- Environmental Factor Guideline – Coastal Processes
- Environmental Factor Guideline – Marine Environmental Quality
- Environmental Factor Guideline – Marine Fauna
- Technical guidance – Environmental Impact Assessment of Marine Dredging Proposals
- Technical Guidance – Protection of Benthic Communities and Habitats
- Technical Guidance – Protecting the Quality of Western Australia's Marine Environment

Factor guidelines and technical guidance: Land

- Environmental Factor Guideline – Flora and Vegetation
- Environmental Factor Guideline – Landforms
- Environmental Factor Guideline – Subterranean Fauna
- Environmental Factor Guideline – Terrestrial Environmental Quality
- Environmental Factor Guideline – Terrestrial Fauna
- Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment
- Technical Guidance – Sampling Methods for Terrestrial Vertebrate Fauna
- Technical Guidance – Subterranean Fauna Survey
- Technical Guidance – Sampling Methods for Subterranean Fauna
- Technical Guidance – Terrestrial Fauna Surveys
- Technical Guidance – Sampling of Short Range Endemic Invertebrate Fauna

Factor guidelines and technical guidance: Water

- Environmental Factor Guideline – Hydrological Processes
- Environmental Factor Guideline – Inland Waters Environmental Quality

Factor guidelines and technical guidance: Air

- Environmental Factor Guideline – Air Quality

Factor guidelines and technical guidance: People

- Environmental Factor Guideline – Human Health
- Environmental Factor Guideline – Social Surroundings

3. Advice and reference material (non-EIA) – all retained from previous framework

- Strategic advice
- State Government policies
- Other advice
- Technical and reference documents
- *State of the Environment* reports

Gloucester Tree, Pemberton (Image: R Hughes)

Appendix 3: Migration of former policy and guidance to the new framework

Title (current pre-13 December 2016)	Location of relevant content in new framework (13 December onwards)	Replaced (Y or N)	Title of new document/s, if replaced (13 December onwards)
Environmental Assessment Guidelines			
EAG 17 – Preparation of Management Plans	Procedures of EIA	Y	Procedures Manual (and Instructions)
EAG 15 – Protecting the Quality of WA Marine Environment	Environmental considerations in EIA		Factor Guideline – Marine Environmental Quality Technical Guidance – Protecting the Quality of Western Australia's Marine Environment
EAG 16 – Referral of a Proposal	Procedures of EIA	Y	Procedures Manual (and Instructions)
EAG 14 – Preparation of an API-A Document	(Removed)	N	–
EAG 13 – Environmental Impacts from Noise	Environmental considerations in EIA	Y	Factor Guideline – Social Surroundings
EAG 11 – Recommending Environmental Conditions	Procedures of EIA	Y	Procedures Manual
EAG 10 – Scoping a Proposal	Procedures of EIA	Y	Procedures Manual (and Instructions)
EAG 12 – Subterranean Fauna	Environmental considerations in EIA	Y	Environmental Factor Guideline – Subterranean Fauna Technical Guidance ¬– Subterranean Fauna Considerations in EIA
EAG 9 – Significance Framework	Environmental considerations in EIA	Y	Statement of Environmental Principles, Factors and Objectives
EAG 8 – Environmental Principles, Factors and Objectives	Environmental considerations in EIA	Y	Statement of Environmental Principles, Factors and Objectives
EAG 1 – Defining the Key Characteristics of a Proposal	Procedures of EIA	Y	Procedures Manual (and Instructions)

Title (current pre-13 December 2016)	Location of relevant content in new framework (13 December onwards)	Replaced (Y or N)	Title of new document/s, if replaced (13 December onwards)
EAG 7 – Marine Dredging Proposals	Environmental considerations in EIA	Y	Factor Guideline – Benthic Communities and Habitats Technical Guidance – Environmental Impact Assessment of Marine Dredging Proposals
EAG 2 – Changes to a Proposal after Assessment	Procedures of EIA	Y	Procedures Manual (and Instructions)
EAG 6 – Timelines for EIA	Procedures of EIA	Y	Procedures Manual
EAG 5 – Protecting Marine Turtles from Light	Advice and reference material (non-EIA) / Other Advice	N	–
EAG 3 – Protection of Benthic Primary Producer Habitat	Environmental considerations in EIA	Y	Factor Guideline – Benthic Communities and Habitats Technical Guidance – Benthic Communities and Habitats
Guidance statements			
GS 54a – Sampling Methods and Survey Considerations for Subterranean Fauna	Environmental considerations in EIA		Technical Guidance – Subterranean Fauna Surveys
GS 1 – Protection of Tropical Arid Zone Mangroves	Advice and reference material (non-EIA) / Other Advice	N	–
GS 3 – Separation Distances	Advice and reference material (non-EIA) / Other Advice	N	–
GS 6 – Rehabilitation of Terrestrial Ecosystems	Advice and reference material (non-EIA) / Other Advice	N	Technical Guidance – Rehabilitation
GS 7 – Protection of Western Swamp Tortoise Habitat	Advice and reference material (non-EIA) / Other Advice	N	–

Title (current pre-13 December 2016)	Location of relevant content in new framework (13 December onwards)	Replaced (Y or N)	Title of new document/s, if replaced (13 December onwards)
GS 10 – Level of Assessment for Natural Areas within System 6	Environmental considerations in EIA	Y	Factor Guideline – Flora and Vegetation
GS 20 – Sampling of Short Range Endemic Invertebrate Fauna	Environmental considerations in EIA	Y	Technical Guidance – Sampling of Short Range Endemic Invertebrate Fauna
GS 28 – Protection of Lake Clifton Catchment	Environmental considerations in EIA	Y	Factor Guideline – Inland Waters Environmental Quality
GS 33 – Environmental Guidance for Planning and Development	Advice and reference material (non-EIA) / Other Advice	N	–
GS 41 – Assessment of Aboriginal Heritage	Advice and reference material (non-EIA) / Other Advice	N	–
GS 49 – Assessment of Development Proposals in Shark Bay	(Removed)	N	–
GS 51 – Terrestrial Flora and Vegetation Surveys	Environmental considerations in EIA	Y	Environmental Factor Guideline – Flora and Vegetation Technical Guidance – Flora and Vegetation Considerations in EIA
GS 55 – Implementing Best Practice in EIA	Environmental considerations in EIA	Y	Statement of Environmental Principles, Factors and Objectives
GS 56 – Terrestrial Fauna Surveys for EIA	Environmental considerations in EIA	Y	Environmental Factor Guideline – Terrestrial Fauna Technical Guidance – Terrestrial Fauna Considerations in EIA

Title (current pre-13 December 2016)	Location of relevant content in new framework (13 December onwards)	Replaced (Y or N)	Title of new document/s, if replaced (13 December onwards)
Environmental Protection Bulletins			
EPB 24 – Greenhouse Gas Emissions	Environmental considerations in EIA	Y	Factor Guideline – Air Quality
EPB 23 – Landforms	Environmental considerations in EIA	Y	Factor Guideline – Landforms
EPB 22 – Hydraulic Fracturing	Advice and reference material (non-EIA) / Other Advice	N	–
EPB 1 – Environmental offsets, Biodiversity	Procedures of EIA	Y	Procedures Manual
EPB 21 – Guidance for Wind Farms	Environmental considerations in EIA	Y	Factor Guideline – Social Surroundings
EPB 20 – Protecting Naturally Vegetated Areas from Planning and Development	Advice and reference material (non-EIA) / Other Advice	N	–
EPB 19 – EPA Involvement in Mine Closure	Procedures of EIA	Y	Procedures Manual
EPB 18 – Sea Level Rise	Procedures of EIA	Y	Factor Guideline – Coastal Processes
EPB 17 – Strategic and Derived Proposals	Procedures of EIA	Y	Procedures Manual (and Instructions)
EPB 16 – Minor and Preliminary Works	Procedures of EIA	Y	Procedures Manual (and Instructions)
EPB 14 – Benthic Primary Producer Habitat in Port Hedland	Environmental considerations in EIA	Y	Technical Guidance – Benthic Communities and Habitats
EPB 13 – Albany Regional Vegetation Survey	Environmental considerations in EIA	Y	Technical Guidance – Flora and Vegetation Surveys
EPB 12 – Swan Bioplan	Advice and reference material (non-EIA) / Other Advice	N	–
EPB 11 – Consultation on Conditions	Procedures of EIA	Y	Procedures Manual

Title (current pre-13 December 2016)	Location of relevant content in new framework (13 December onwards)	Replaced (Y or N)	Title of new document/s, if replaced (13 December onwards)
EPB 10 – Geraldton Regional Flora and Vegetation Survey	Environmental considerations in EIA	Y	Technical Guidance – Flora and Vegetation Surveys
EPB 6 – Natural Values of Whicher Scarp	Advice and reference material (non-EIA) / Other Advice	N	–
EPB 5 – Inland Drainage Proposals in the Wheatbelt	Environmental considerations in EIA	Y	Factor Guideline – Inland Waters Environmental Quality Factor Guideline – Hydrological Processes
EPB 2 – Port Hedland Dust And Noise	Environmental considerations in EIA	Y	Factor Guideline – Social Surroundings
Position Statements			
PS 4 – Environmental Protection of Wetlands	Environmental considerations in EIA		Factor Guidelines – Flora and Vegetation, Hydrological Processes, Inland Waters Environmental Quality, Terrestrial Fauna
PS 3 – Terrestrial Biological Surveys	Environmental considerations in EIA	Y	Factor Guideline – Flora and Vegetation, Terrestrial Fauna Technical Guidance – Flora and Vegetation Surveys
PS 2 – Environmental Protection of Native Vegetations	Environmental considerations in EIA	Y	Factor Guideline – Flora and Vegetation
Other			
Joint Guidelines for Preparing Mine Closure Plans (DMP, EPA)	Advice and reference material (non-EIA) / Other Advice	N	–
Technical Guide – Flora and Vegetation Surveys for EIA (Joint with DPaW)	Environmental considerations in EIA	Y	Technical Guidance – Flora and Vegetation Surveys for EIA
Technical Guide – Vertebrate Fauna Surveys for EIA (Joint with DPaW)	Environmental considerations in EIA		Technical Guidance – Vertebrate Fauna Surveys for EIA

Index

The following is a subject index for the EPA's annual reports since 2013, referencing the year and relevant page numbers. It is not exhaustive, but indicates major topics for each year.

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Acknowledgements

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