



Cumulative environmental impacts of development in the Pilbara region

**Advice of the Environmental Protection Authority to
the Minister for Environment under Section 16(e) of the
*Environmental Protection Act 1986***

August 2014

Chairman's Foreword

The Pilbara biogeographic region of Western Australia has a wealth of biodiversity and other environmental values, evidenced by its diverse range of terrestrial, aquatic and marine landscapes, numerous flora and fauna species and communities, nationally listed wetlands, and ecological features found only in the Pilbara.

The region is also one of Australia's development hotspots, of substantial economic importance to both Western Australia and Australia. The region produced more than 27 per cent of Australia's and 80 per cent of the State's revenue from minerals and petroleum in 2012. Mining and infrastructure development has been rapid over the past decade, and the pace of development is forecast to continue.

Given the biodiversity values, economic importance, and rate of development in the region, the Environmental Protection Authority (EPA) believes it is timely to develop and implement strategies to ensure the important values of the region are protected. This advice identifies a range of opportunities to do this.

The key recommendation of this advice is that a whole-of-Government strategic plan for biodiversity conservation in the Pilbara be developed. The EPA believes that, through implementing this and other recommendations in this report, there is a pathway to sustainable development of the Pilbara and for the unique biodiversity and other environmental values of the region to be protected for the long-term.

Other recommendations in this advice relate to the importance of rehabilitation, knowledge sharing, and strategic implementation of offset funds to ensure landscape scale restoration and biodiversity protection.

Without intervention, the EPA is concerned that the increasing cumulative impacts of development and land use in the region will significantly impact on biodiversity and environmental values. We believe the strategies recommended in this advice are practical, timely, and will provide positive outcomes for the Pilbara region as a whole.



Dr Paul Vogel

CHAIRMAN

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EPA's recommended opportunities for biodiversity conservation in the Pilbara region

The Environmental Protection Authority (EPA) provides eleven recommendations to assist in ensuring sustainable development of the Pilbara region. The recommendations focus on four key opportunities to improve the assessment of impacts and protection of biodiversity and other environmental values in the Pilbara.

Strategic plan for biodiversity conservation in the Pilbara

The primary recommendation of the EPA is for the development of a strategic plan for biodiversity conservation in the Pilbara. The EPA believes that a clear government position on conservation goals for the Pilbara region is essential to balance the interests of development and biodiversity conservation. This could be achieved, through the development of a whole-of-Government plan, akin to the Kimberley Science and Conservation Strategy.

Such a plan would identify strategic objectives, priorities and high level strategies for biodiversity protection and incorporate infrastructure and development planning in the Pilbara. It would provide regulatory agencies with a framework to assist and guide the environmental impact assessment and approvals processes, while also providing clear direction and greater certainty for proponents. If such a plan is not developed the EPA is concerned that ad-hoc decision making may continue to significantly and inadvertently impact on biodiversity values in the Pilbara.

Of particular importance is the role of off-reserve conservation actions, considering the limited representation of biodiversity within the formal reserve system. The plan could provide a coordinated framework and provide guidance on how best to achieve biodiversity outcomes in conjunction with management of conservation reserves.

The plan should be developed by a lead agency in Government such as the Department of the Premier and Cabinet or the Department of Parks and Wildlife, with significant input from other agencies such as the Office of the Environmental Protection Authority, the Department of Mines and Petroleum, and the Department of State Development.

Recommendation: That a strategic plan for biodiversity conservation in the Pilbara be developed by Government.

The EPA notes that there are a number of initiatives that have been developed or are under development across Government which aim to encourage a strategic approach to planning and guiding the future development of the Pilbara. While the EPA considers that such initiatives are generally appropriate for balancing multiple interests, planning for the conservation of biodiversity should be an integral component of strategic planning.

The EPA considers that incorporation of biodiversity conservation targets, goals and strategies into strategic planning for development will help to enable protection of the region's ecological values for future generations.

Recommendation: That Government planning and development strategies for the Pilbara take account of biodiversity conservation targets, goals and strategies.

Enhancing protected areas - 2015 pastoral lease exclusions

With the 2015 pastoral lease renewal process, there is an opportunity to increase the comprehensiveness, adequacy and representativeness of the Pilbara reserve system. Currently only six per cent of the Pilbara biogeographic region is held in the formal reserve system, and this is not evenly distributed across the subregions – the Fortescue has only

about half of one per cent in formal reserves, the Roebourne approximately 3.5 per cent, the Chichester four per cent and the Hamersley approximately 13 per cent.

The EPA considers any opportunity to increase the formal reserve system and enhance the long term protection of biodiversity in the Pilbara should be pursued and the proposed pastoral lease exclusions provides a rare opportunity for this to be achieved.

Recommendation: That the proposed 2015 pastoral lease exclusion areas within the Pilbara, identified for management by the Department of Parks and Wildlife, be afforded the highest possible level of conservation tenure.

Strategic conservation initiative for the Pilbara

The EPA has proposed the establishment of a strategic conservation initiative for the Pilbara as a mechanism to pool offset funds to achieve broad scale biodiversity conservation outcomes. The initiative would align with principle 6 of the WA Environmental Offsets Policy to focus offsets on longer term strategic outcomes, which is important in this region given the constraints surrounding traditional offset approaches. The EPA first discussed this initiative in February 2012 in its report and recommendations to the Minister for Environment on Fortescue Metals Group's Cloudbreak proposal ([Report No. 1429](#)). Guiding the delivery of environmental offsets with such an initiative would provide an opportunity to develop agreed priority actions for investment and to pool funds to achieve targeted and priority outcomes.

The initiative would also provide a mechanism, consistent with the recommended strategic plan for conservation, to plan and coordinate activities across a range of potential partners. A regional conservation initiative may also be an opportunity to help achieve other government policy objectives, such as repairing the rangelands, and to leverage other funds which may be available in the future (e.g. Commonwealth programs).

A strategic conservation initiative requires strong governance and accountability, an agreed investment strategy and plan, the development of delivery partnerships, and monitoring of performance against agreed objectives.

Recommendation: That the EPA's proposal for a strategic, coordinated approach to environmental offsets in the Pilbara via a strategic conservation initiative be investigated by Government in consultation with industry.

Knowledge synthesis and sharing in environmental impact assessment

Knowledge synthesis and sharing is vitally important to assist with biodiversity planning, to understand cumulative impacts of development, and to support decision making by assessment and approval agencies, including the EPA. There are a number of opportunities to improve existing data capture systems or develop new approaches to knowledge sharing. The first set of recommendations relate to improved systems for data capture to improve the availability of information.

The EPA commends the Western Australian Government announcement of the development of a State Environmental Data Library, and notes that the proposal is broadly consistent with findings and recommendations of the Shared Environmental Assessment Knowledge (SEAK) Taskforce which reported to the Minister for Environment in August 2012. Depending on the approach to this initiative, the EPA believes that the Pilbara region would be a priority area for a pilot of the initiative.

In addition to this library, an improved arrangement for the recording of native vegetation clearing data would greatly enhance the ability of Government, the EPA and proponents to consider and understand the extent of cumulative impacts of clearing in the Pilbara. The public environmental offsets register provides a good framework for a system that could document and spatially capture all clearing activities across Western Australia.

Another existing system that could be boosted is the Department of Mines and Petroleum's MINEDEX database. This system already contains an abandoned mine sites inventory and an inventory of mine pit lakes could be added to this. This would greatly benefit understanding and management of mine pit lakes by identifying areas where concentrations of mine voids pose a cumulative risk to the environment. The inventory should identify the location and details of each mine pit lake, their relationship to aquifers, and existing or predicted water chemistry. The collation and analysis of this data would allow for a collective understanding of the issue and an assessment of the impacts both individually and collectively.

Recommendation: That a specific proposal be developed to trial the proposed State Environmental Data Library in the Pilbara Region.

Recommendation: That a central register (similar to the Offset Register) be developed to make information (including spatial information) on clearing and rehabilitation activities in Western Australia publicly available.

Recommendation: That a comprehensive inventory of current and potential mine pit lakes across the Pilbara be prepared and maintained by Government.

Recommendation: That a collaborative research program is established to improve understanding of the impacts of mine pit lakes.

There is a need for more collaboration between government agencies and industry on the matters of rehabilitation and mine closure. There are inherent difficulties associated with successful rehabilitation in the Pilbara due to natural characteristics of the Pilbara landforms, climate and species. While there have been a small number of successful examples of rehabilitation in the Pilbara, further work needs to be undertaken to improve broad scale rehabilitation techniques, including establishing the standard of rehabilitation that can reasonably be expected to be achieved. If established, the proposed Western Australian Biodiversity Science Institute could provide an opportunity to align current research and knowledge and improve understanding of how successful rehabilitation in the Pilbara can be achieved.

Another key aspect of knowledge sharing involves more proactive engagement from the EPA and other agencies in identifying high value ecosystems that are or may be under threat or impacted by development, with a view to progressively improving understanding of environmental values and management requirements of the Pilbara's important ecosystems. The EPA's [Environmental and water assessments relating to mining and mining-related activities in the Fortescue Marsh management area](#) is an example of specific guidance on the values and management strategies of a high value ecosystem. This advice sets a benchmark in aligning the management and decision-making across agencies to ensure a consistent approach by Government.

Recommendation: That there is greater investment and a coordinated approach to research and knowledge sharing on rehabilitation of Pilbara landscapes.

Recommendation: That a high level group comprising representatives of industry, research organisations and government agencies be convened to establish objectives for rehabilitation and mine closure in the Pilbara.

Recommendation: That strategic guidance outlining environmental objectives and management strategies, similar to that developed for the Fortescue Marsh, be developed for other high value ecosystems that may, in the future, be significantly impacted or under significant threat of development to guide and assist planning for future development in the region.

Glossary

| | |
|--------|---|
| DAFWA | Department of Agriculture and Food WA |
| DEC | Department of Environment and Conservation (now DPaW) |
| DMP | Department of Mines and Petroleum |
| DPaW | Department of Parks and Wildlife |
| DoP | Department of Planning |
| DoW | Department of Water |
| EIA | Environmental Impact Assessment |
| EPA | Environmental Protection Authority |
| EP Act | <i>Environmental Protection Act 1986</i> |
| GL | Gigalitre |
| IBRA | Interim Biogeographic Regionalisation for Australia |
| IUCN | International Union for Conservation of Nature |
| LAA | <i>Land Administration Act 1997</i> |
| UCL | Unallocated Crown Land |

1. Introduction

Background

The rate, scale and nature of current and future development, combined with the impacts of other land uses and threatening processes, have raised the Environmental Protection Authority's (EPA) concerns about cumulative environmental impacts in the Pilbara region.

This advice identifies the key environmental values of the region, the key threats to those values, and opportunities to protect the values within a highly developed mining region.

In the EPA's view, the economic resources and benefits of development in the region are well understood. However, the individual and cumulative environmental impacts of development over the last 50 years, combined with future proposed mining, are not well understood.

The advice recommends that a more strategic approach is required which identifies and considers cumulative environmental impacts, and outlines strategies to minimise and manage them.

Purpose

Consistent with its functions under the *Environmental Protection Act 1986 (the EP Act)*, the EPA has capacity to provide advice to the Minister for Environment on strategic matters impacting the environment. This advice is being provided for the consideration of Government in order to avoid adverse cumulative environmental impacts in the Pilbara region. It also provides the context for the EPA's advice on the environmental acceptability of significant developments.

The purpose of this advice is to:

- outline the cumulative impacts of development in the Pilbara;
- provide a context for the EPA's assessment of current and future proposals;
- discuss the rationale behind the EPA's recommendation for the establishment of a strategic conservation initiative to coordinate the delivery of offsets in the Pilbara; and
- recommend strategies and actions for a more strategic approach to the consideration of future proposals and protection of biodiversity in the Pilbara.

Scope

The advice focuses on the Pilbara region as defined by the Interim Biogeographic Regionalisation for Australia (IBRA) boundary (Figure 1). While the EPA recognises the high environmental values and significant development pressure on marine biodiversity, this advice is confined to the terrestrial landscape.

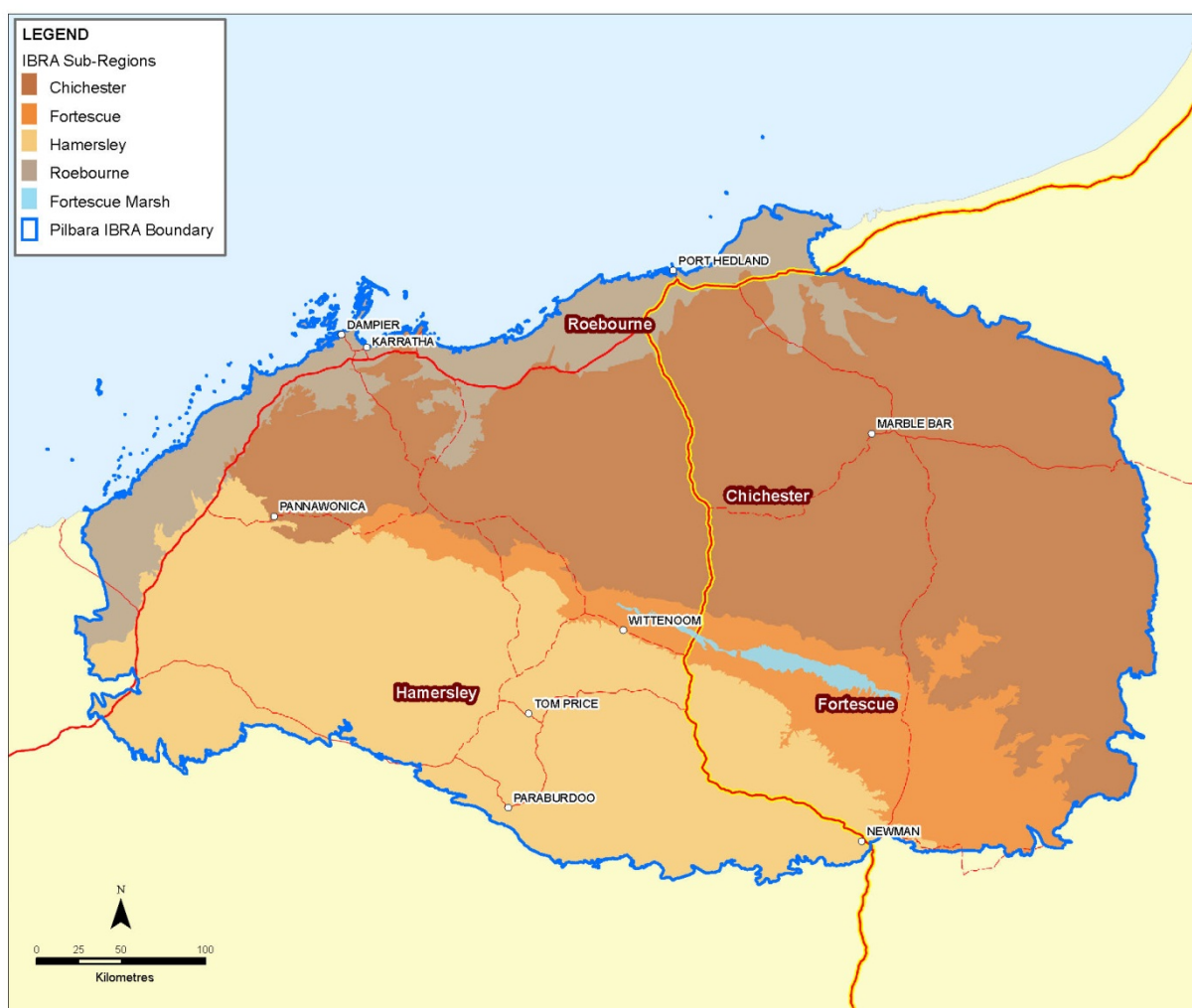


Figure 1: The Pilbara IBRA region and its four subregions

2. Current context

The environment

The Pilbara IBRA region is approximately 179,000 square kilometres and is characterised by ancient and striking landscapes. It consists of four IBRA subregions – the Fortescue, Hamersley, Chichester and Roebourne (Figure 1). The Pilbara has many diverse habitats, including mangroves, grassland savannahs, mountain ranges, gorges, wetlands and tropical woodlands. It is an area of very high biodiversity value, possessing high species richness, and many endemic flora and fauna species. It has 150 conservation significant flora species, the greatest reptile diversity in Western Australia and contains the richest known groundwater fauna diversity in Australia. The region is identified as one of only fifteen national biodiversity hotspots.

Flora in the Pilbara is dominated by arid plant species, but rainforest species persist in localised habitats. Over the last 25 years the number of known plant species from the Pilbara has increased by over 55 per cent to about 1,700 species (van Leeuwen, 2012). One hundred and fifty species are of conservation significance, and the majority of these are still poorly known, with further survey required to evaluate their correct status.

The rich faunal diversity of the Pilbara is still being described, with new species of vertebrates as well as large numbers of terrestrial and aquatic invertebrates being discovered. The high reptile diversity includes the greatest number of gecko species in

Australia as well as high numbers of goannas, dragons and skink species. Terrestrial invertebrates show high levels of diversity and endemism with 375 species of ground dwelling spiders (Durrant et al. 2009) and 429 beetle species.

The Pilbara contains the richest known groundwater and cave-dwelling faunal diversity in Australia with over 1,000 species. Although this fauna remains poorly understood it is apparent that these numbers are globally significant (Eberhard et al. 2009).

Although the Pilbara is in the arid zone it has an abundance of wetlands, ranging from springs and river pools to salt marshes, claypans, and rockpools. Aquatic invertebrates show high diversity for an arid zone with about one-fifth of all species encountered currently believed to be endemic to the region (Pinder et al. 2010). This high richness is considered to reflect the abundance of consistently fresh, permanent water maintained by freshwater aquifers. Of particular importance are the many groups of rare species that are restricted to a limited range of springs and spring-fed pools including those at Millstream Chichester National Park and Karijini National Park.

The ancient iron ore deposits of the Pilbara often support unique biodiversity values not present elsewhere in the region. Many of the links between the underlying geology and the biodiversity are still unknown.

Current land use

The Pilbara region is almost exclusively Crown land, with freehold land generally concentrated along the coastline. Layered over the Crown land are various land uses which overlap one another. These include mining tenements, pastoral leases, formal conservation reserves¹, informal conservation areas, Aboriginal Reserves and unallocated Crown land (Table 1). With so many competing land uses, major constraints apply to any further allocation of land for conservation. Many conservation reserves already have mining tenements over portions of them.

Table 1: Land use in the Pilbara region (note: the various tenures overlap one another)

| Area type | Area (square kilometres) | Percentage of IBRA region |
|---|--------------------------|---------------------------|
| Pilbara IBRA region | 178,213 | 100 |
| Mining tenements | 163,681 | 91.8 |
| Pastoral leases | 109,41,3 | 62.4 |
| Formal Conservation Reserve | 11,317 | 6.3 |
| Other DPaW managed land (including un-gazetted DPaW managed Unallocated Crown Land) | 3,623 | 2.1 |
| Unallocated Crown Land (not managed by DPaW) | 36,597 | 20.4 |
| Aboriginal Reserve | 7,314 | 4.1 |

¹ In Western Australia, the following categories under the *Conservation and Land Management Act 1984* (CALM Act) are considered part of the National Reserve System (NRS): national park, nature reserve and conservation park. Section 5(1)(g) and 5(1)(h) reserves under the CALM Act may be part of the NRS, depending on their statutory purpose. Collectively, these categories comprise "protected areas" under the formal conservation reserve system.

Currently, only six per cent of the Pilbara IBRA region is held in the formal reserve system, well below the 17 per cent recognised internationally for biodiversity protection. The conservation reserves are not proportionally distributed among the four subregions. By far the most threatened and least protected is the Fortescue subregion, with only 0.55 per cent currently reserved for conservation. The Chichester and Roebourne subregions are marginally better represented with 3.95 and 3.45 per cent respectively, and the Hamersley subregion has 12.88 per cent protected for conservation.

Pastoralism

Approximately 65 per cent of the Pilbara is grazed by livestock (Bastin and the ACRIS Management Committee, 2008). Van Vreeswyk *et al.* (2004) found that particular land systems have been considerably impacted as a result of preferential grazing by livestock. Preferential grazing can reduce or remove particular species and modify the composition of affected areas. This grazing has modified native vegetation communities in Western Australia's rangelands over many decades. In addition, grazing leads to erosion.

Cattle numbers in the Pilbara increased throughout 1993 – 2009 (DAFWA, 2012), with numbers more than doubling in the East Pilbara and De Grey Land Conservation Districts during this period. Land Conservation Districts are catchment-based districts formed under the *Soil and Land Conservation Act 1945*. Overstocking is occurring across a number of Pilbara pastoral leases (DAFWA, 2012). Some Pilbara leases are reported to be carrying two to three times their estimated carrying capacity (DAFWA, 2012). The EPA appreciates that, considering reported declines of the viability of pastoral industries in general, the sustainable management of the resources on which they depend becomes difficult.

Some mining companies have purchased pastoral leases which are coincident with their mining activities. Other leases are held by Aboriginal communities, Government departments and other public sector organisations. The Department of Parks and Wildlife (DPaW) also manages a number of ex-pastoral leases.

Mining

The mining and energy sectors make a very large contribution to economic activity in Western Australia and much of the activity occurs in the Pilbara. Figure 2 shows the mining tenements that exist in the Pilbara.

Over the past five years Western Australia's iron ore industry has experienced a time of unprecedented growth. On average, the growth in value of the State's iron ore industry during this period has been 34 per cent per annum, while an increase of 29 per cent occurred in 2011. In 2011, the value of Western Australia's mineral and petroleum industry reached a record high of \$107 billion (DMP, 2012).

In 2011, the Pilbara region produced more than 90 per cent of Australia's iron ore and approximately 95 per cent of the State's iron ore (DMP, 2012). In addition the Pilbara accounts for 80 per cent of the State's entire production value from minerals and petroleum (DMP, 2012). There has been a commensurate increase in proposals referred to the EPA for assessment during this five-year period. While 2012 saw a drop in revenue for iron ore due to its value per unit, the quantity extracted continued to increase, and the EPA has continued to receive referrals for new mines and expansions.

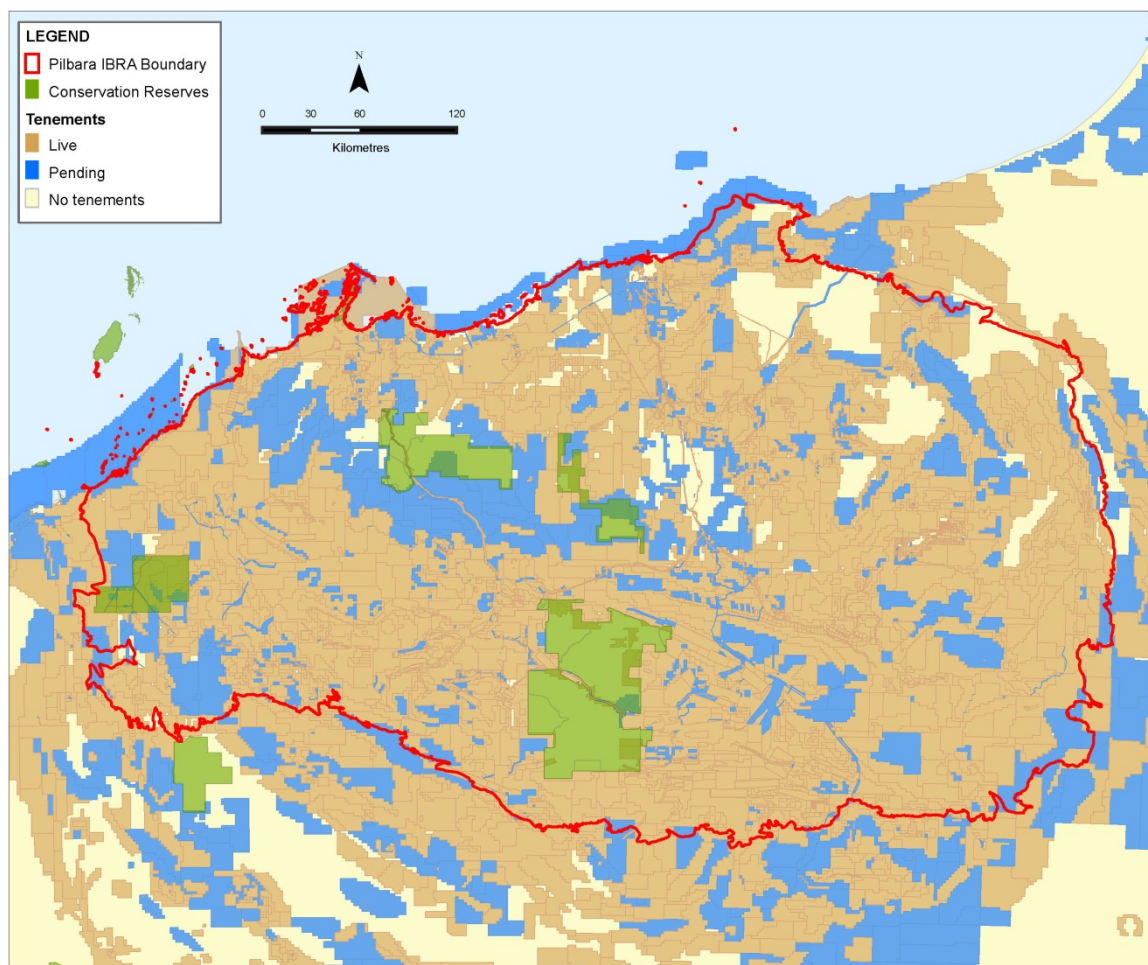


Figure 2: Mining tenements in the Pilbara

Infrastructure

There are approximately one billion tonnes per annum of approved mineral export capacity in either existing or approved ports on the Pilbara coast. Supporting this is a network of rail and road infrastructure connecting mine sites with these ports. There is more than 2,300 kilometres of rail infrastructure, comprising three major privately operated rail networks, as shown in Figure 3. In addition, there are also eight major rail projects approved totalling almost 1,300 kilometres, some of which are under construction.

Past EPA assessments

The EPA has assessed numerous proposals for iron ore mines, their associated infrastructure corridors and export facilities in the Pilbara. During the five year period between 2008 and 2012, the EPA assessed 67 projects in the Pilbara referred under section 38 of the EP Act. This resulted in the release of 55 Ministerial Statements giving conditional approval for projects that will result in around 1,000 square kilometres of vegetation clearing in the region.

In 2013, EPA recommendations to the Minister for Environment for proposals in the Pilbara generated the release of a further 14 Ministerial Statements, 12 of which are for new proposals. These proposals will result in a further 223 square kilometres of clearing. The rate of development approval in the region is unprecedented.

The proposals have largely been assessed individually, without full consideration of the impacts of other approved developments in the region. This type of approach does not always deliver the best outcomes for the State and the EPA recognises that a more strategic approach, which considers cumulative impacts and the likely environmental outcomes, is preferred.

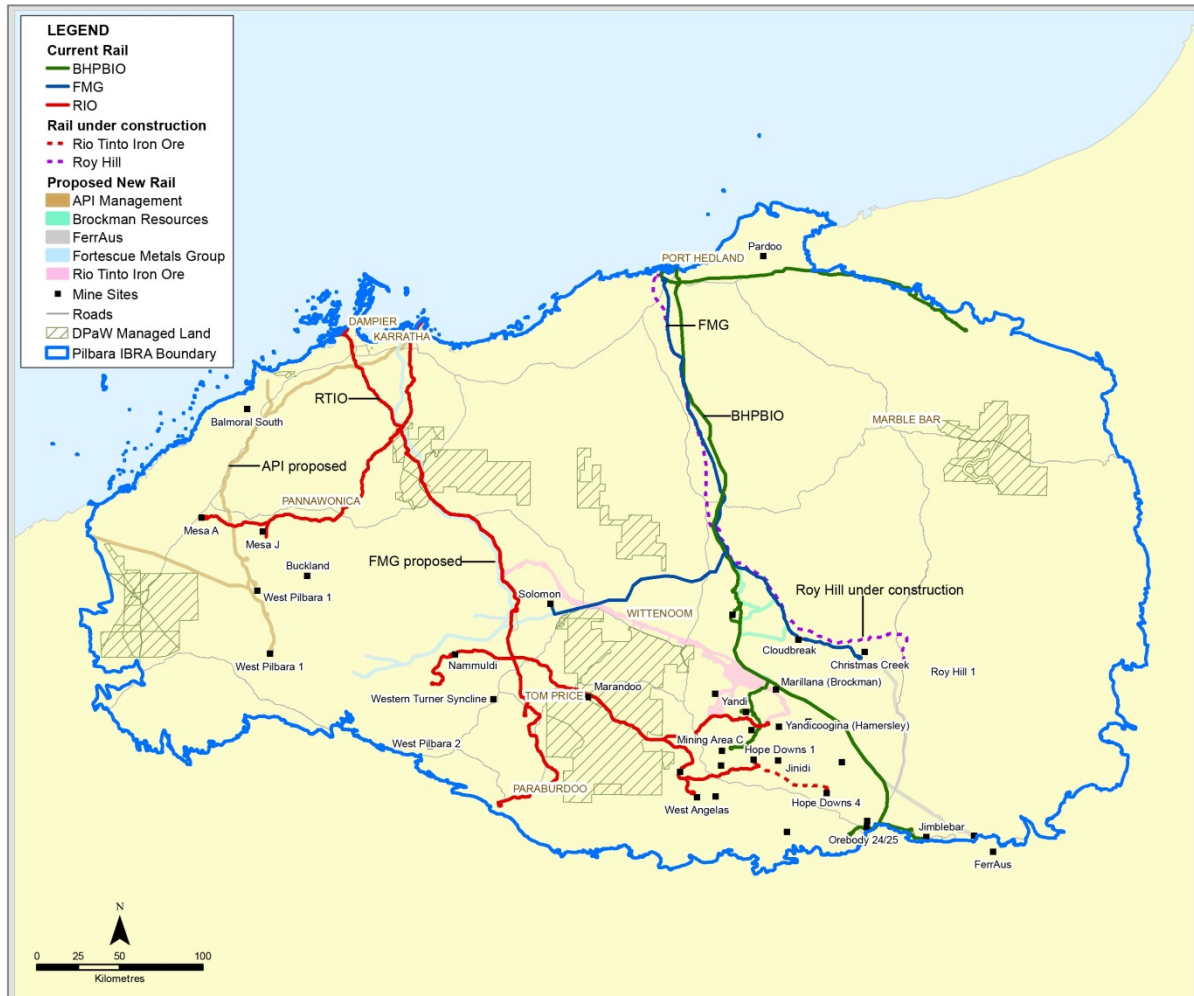


Figure 3: Rail infrastructure in the Pilbara

3. Future growth

With large reserves of iron ore, forecasts for future development indicate the Pilbara will remain the State's principal iron ore mining region for the next 50 years. At September 2012, Western Australia had an estimated \$177 billion worth of resource projects under construction or in the committed stage of development (DMP, 2012). A further \$151 billion has been identified as planned or possible projects in coming years.

As at 31 December 2013, the EPA is assessing a further 12 proposals in the Pilbara, including nine new mines, with over 690 square kilometres of clearing proposed. A further four rail projects and a major road proposal are also being assessed which will result in 600 km of new linear infrastructure.

BHP Billiton Iron Ore's (BHPB) strategic proposal is also being assessed proposes a further 10 new mining areas and associated infrastructure over the next fifty years. This proposes up to an estimated 1,200 square kilometres of clearing over the next fifty years. Other proponents are likely to refer strategic proposals to the EPA in the medium term.

In view of these prospective developments, the EPA considers a more strategic approach to environmental impact assessment is appropriate through evaluation of the cumulative environmental impacts of mining and related infrastructure proposals in the Pilbara.

4. Environmental impacts and risks

Gaps in understanding of biodiversity in the region

Recent and ongoing development in the Pilbara has not been matched by a commensurate growth in knowledge and understanding of the Pilbara's natural environment. Without the knowledge required to underpin planning for conservation, further growth of the region places the Pilbara's biodiversity values under significant threat.

While the region is known to have high biodiversity, a high occurrence of short range endemism, and many varied ecosystems and habitats, detailed understanding of these values is limited. New species are continually being discovered. These discoveries often occur as a result of biological surveys undertaken during the environmental impact assessment (EIA) of mining and infrastructure proposals. The assessment of the conservation importance of these species is often undertaken quickly during the EIA process, rather than through systematic evaluation.

Ideally, comprehensive and regional scale knowledge should underpin these assessments. A better regional context and broader understanding of the region's ecology is important for EIA of development proposals. The EPA believes that the following actions relating to the collation of information would make a significant contribution to improving understanding of the values of the region.

Completion of the Department of Parks and Wildlife's Pilbara biological survey

The Pilbara Region Biological Survey undertaken by the then Department of Environment and Conservation (now DPaW) is the most significant and systematic survey of the biodiversity values in the region. The purpose of the survey was to gain greater knowledge of the region's biodiversity and to provide the regional context necessary to underpin future nature conservation planning for the Pilbara.

The survey was conducted over five years (2002-2007) and was the first survey of its type for the region. Over 800 sites were surveyed, representing a cross-section of the region's soils, landforms and major geological formations, climate, and vegetation types.

The *Records of the Western Australian Museum – Supplement 78* is the major publication from the survey and is being published in two parts, the first of which was released in 2011 (Part A). Completion and publication of Part B will inform and greatly enhance the EPA's ability to understand cumulative impacts on the environment.

The EPA considers that the completion and release of the remainder of the survey should be a priority as it will greatly assist in broadening the understanding of the environmental values of the region.

Sharing and synthesising proponent information

In preparing documentation for the assessment of proposals, proponents undertake studies and investigations to understand the environmental impacts of these proposals. This information gathering contributes to a better understanding of the biology of the region. However, the information has generally been used solely for EIA of an individual proposal and is not documented in a way that would readily allow synthesis and sharing.

Knowledge synthesis and sharing play a crucial role in conservation, both in supporting decision-making by assessment and approval agencies and in building an understanding of cumulative impacts. Through the EIA process, the proponent is largely responsible for either gathering or sourcing the data and knowledge required to predict potential impacts associated with the proposal. Environmental studies conducted by proponents have led to

the generation of large quantities of information in the form of reports (e.g. terrestrial surveys for fauna and flora), text databases (e.g. species lists) and spatial information (e.g. vegetation mapping). It is currently a complex and difficult task to access this information for a wider purpose such as strategic analysis of cumulative impacts across a particular geographic area.

A number of reviews have identified the lack of access to this information as an impediment to better identification of impacts, consideration of impacts by proponents, and assessment of proposals by the EPA. The EPA supports the Government's plan to capture this information by developing the State Environmental Data Library, with the project to be led by the Department of Mines and Petroleum (DMP). The Library will allow online access to this information and will be accessible to the broader community. Importantly, the Library will be established across many government agencies and has the potential to enable environmental assessment processes to be more efficient and better informed.

A key part to the successful delivery of the Library will be the production of quality information and data acquired in accordance with appropriate guidelines and standards. The EPA has also begun requiring proponents to make information obtained during the environmental impact assessment publicly available. The capture of this data in the Library will make this process easier.

The EPA acknowledges the complexities involved in creating this Library and the considerable time and resources that will be required to build a system capable of allowing information to be synthesised to inform cumulative environmental impact assessments. The EPA suggests that the Pilbara region could be an appropriate pilot for this project.

Recommendation: That a specific proposal be developed to trial the proposed State Environmental Data Library in the Pilbara Region.

Inadequacy of the Pilbara's formal reserve system to conserve biodiversity

There is a lack of a comprehensive, adequate and representative reserve system in the Pilbara. Currently only six per cent of the Pilbara biogeographic region is held in the formal reserve system, well below the 17 per cent international target for biodiversity protection (Table 2). This target is set under the strategic plan for the Convention on Biological Diversity, to which Australia is a signatory. While Karijini National Park, Millstream-Chichester National Park and Mungaroona Nature Reserve are large and total approximately 9,000 square kilometres, they do not adequately represent the range of diversity present within each sub-IBRA region. Further, portions of existing Pilbara conservation reserves have mining tenements within their boundaries.

Table 2 Formal Conservation Reserves and Department of Parks and Wildlife managed land in the Pilbara region

| IBRA Sub-region | Formal Conservation Reserves | | Other DPaW managed land | |
|----------------------|------------------------------|------------|-------------------------|------------|
| | Area (ha) | % | Area (ha) | % |
| Chichester | 330,866 | 3.95 | 216,634 | 2.59 |
| Fortescue | 10,805 | 0.55 | 6,838 | 0.35 |
| Hamersley | 725,748 | 12.88 | 78,235 | 1.39 |
| Roebourne | 64,264 | 3.45 | 60,585 | 3.25 |
| Pilbara Total | 1,131,683 | 6.3 | 362,292 | 2.1 |

There are no conservation reserves within the Fortescue subregion with the exception of very small portions of the Millstream Chichester and Karijini National Parks. This is of particular concern considering the direct and indirect pressures on the Fortescue area from mining, other development and pastoral activities. There are also currently no conservation reserves in the distinctive sand plain granite boulder piles area of the central Chichester subregion.

The Department of Agriculture and Food (DAFWA) categorises the landscape into land systems based on the biophysical features including a combination of landform, geology, soils, landscape and Beard vegetation units. Using the DAFWA land systems, the lack of adequate conservation estate in the Pilbara is further illustrated. Of the 103 land systems occurring in the Pilbara, 53 are not represented in any DPaW managed land while a further 23 have less than five per cent managed by DPaW. Further, when considering only areas of the formal conservation reserve system, 71 of 103 land systems have no representation.

Native vegetation clearing

The EPA has identified an increase in the scale, rate and pattern of clearing for mining and infrastructure development in the Pilbara. The EPA also notes the limited understanding regarding the true extent and location of clearing footprints associated with mining and development. This is largely due to the complicated history of approval systems associated with clearing activities, state agreements and an inconsistent approach to data capture.

Extent of clearing

Although there are no readily available data on clearing between 1960 and 1997, records since then show that the amount of clearing approved under the EP Act is more than 2,300 square kilometres (to 31 December 2013). Over the last five years there has been an exponential increase with approximately 72 per cent of that area approved in that time (Figure 4).

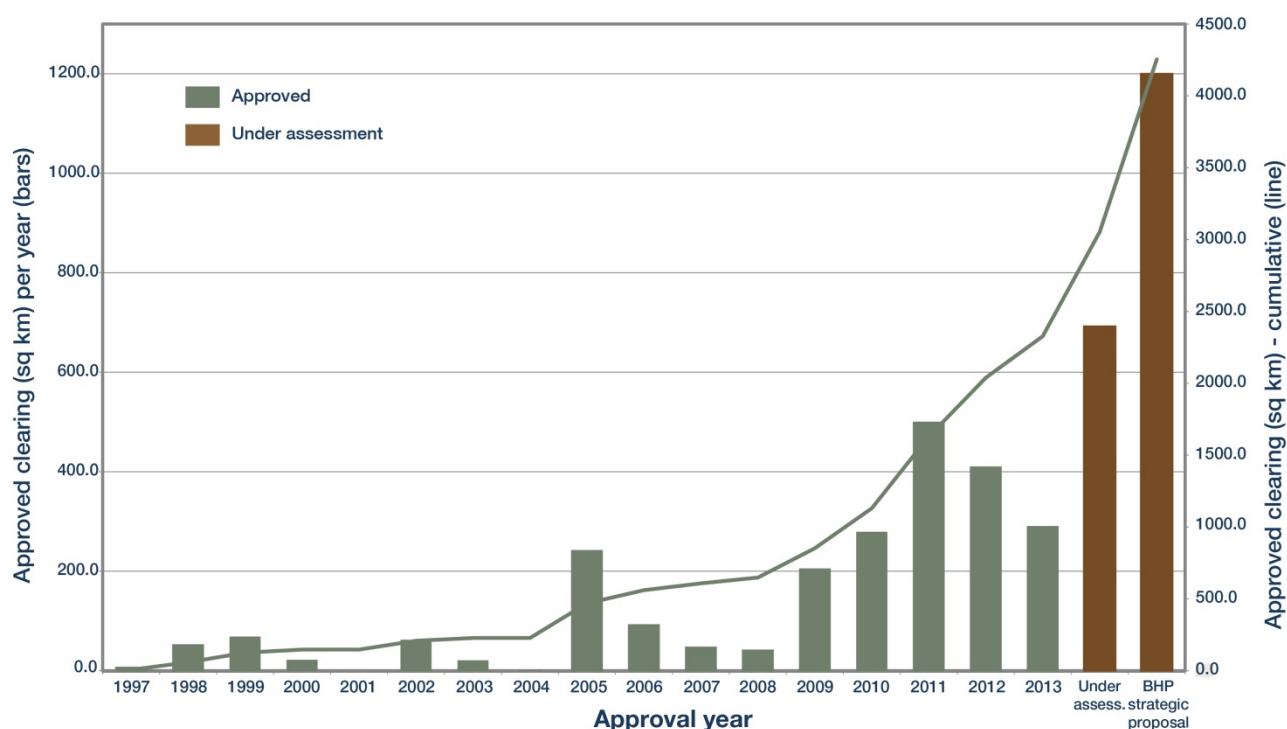


Figure 4 Amount of native vegetation cleared in the Pilbara since 1997 (BHP Strategic Proposal is the estimated footprint over the next 50 years).

To provide an indication of scale, Figure 5 shows the area of clearing approved between 1997 and the end of 2013 (2,300 square kilometres) superimposed over the Perth Metropolitan Area. This clearing does not include:

- more than 690 square kilometres of proposed further clearing that is currently subject to formal assessment by the EPA;
- BHPB's proposed clearing of up to 1,200 square kilometres over the next 50 years through implementation of its strategic proposal; or
- any other strategic proposals that may be forthcoming.

The actual amount of clearing is significantly higher, 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 the Environmental Protection (Clearing of Native Vegetation) Regulations 2004; or
- clearing undertaken under State Agreements that have not been subject to Part IV or Part V EP Act approval.

The EPA believes that there should be greater transparency of the rate and extent of clearing in the Pilbara, and that this could be achieved through establishing a public register of all approved clearing.

Recommendation: That a central register (similar to the Offset Register) be developed to make information (including spatial information) on clearing and rehabilitation activities in Western Australia publicly available.

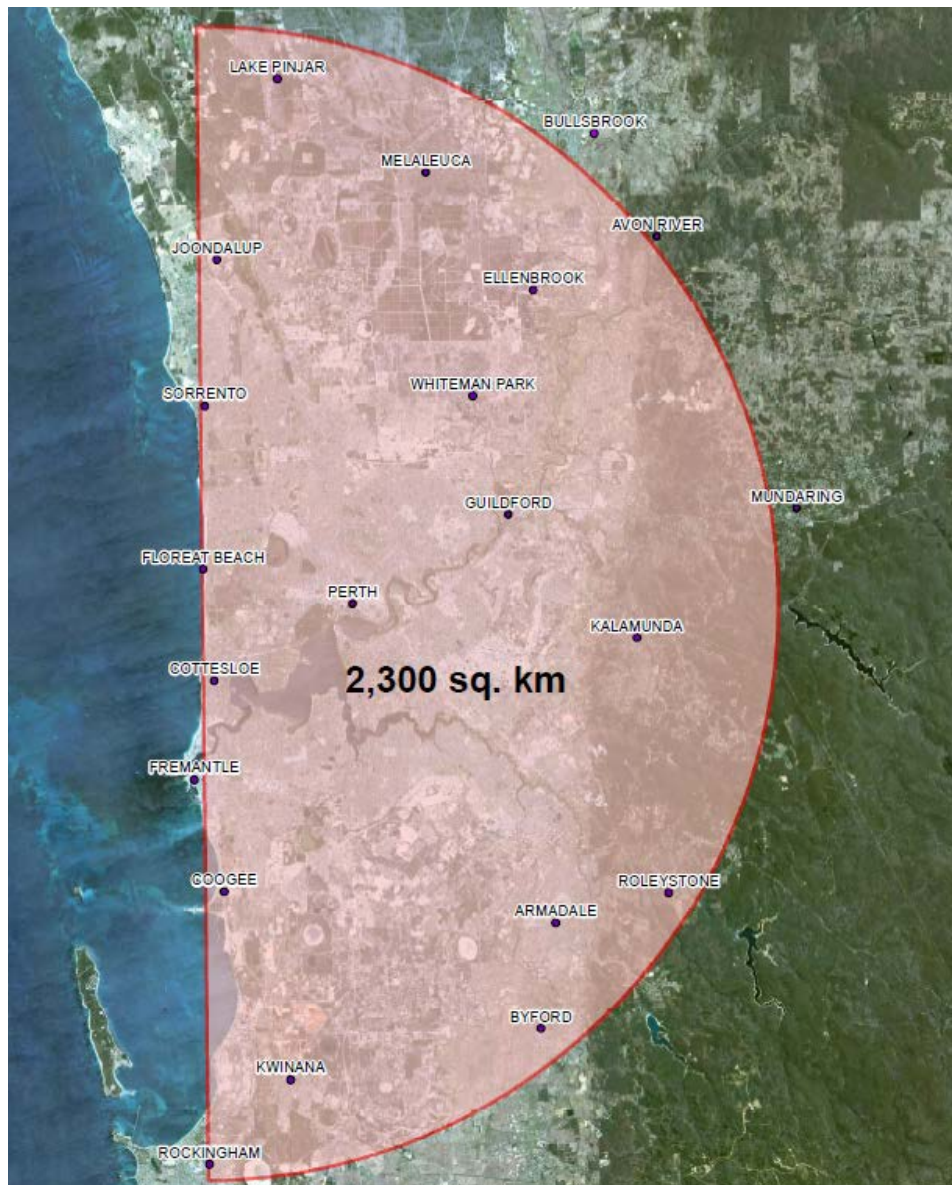


Figure 5 Extent of clearing approved between 1997 and the end of 2013 superimposed over the Perth Metropolitan Area

Patterns of clearing

In addition to the scale of clearing that has occurred across the region, particular landforms, such as banded ironstone formations, have been heavily targeted by mining activities. Some of these landforms are also known to include areas of high biodiversity value. The extent and nature of impacts on targeted landforms results in disproportionate impacts on the species and ecosystems that are restricted to them.

Analysis of DAFWA's rangelands survey of land systems supports the EPA's position on disproportionate impacts. Combining findings from these surveys with estimates based on clearing approvals indicates there are a number of land systems under threat.

Table 3 shows that some areas are in degraded condition, under development pressure, and have little representation within DPaW managed lands. More analysis is required to completely understand the impacts of cumulative clearing on particular land systems in the Pilbara.

Table 3 Land Systems with indicative development footprints overlain combined with DAFWA resource condition determination (*Low – 0-33%; Moderate 34-66%; High 67-100%)

| DAFWA Land System | Indicative extent of development footprint* | % Severely degraded and eroded/poor condition in DAFWA report | % of Land System within DPaW managed land | Predominant IBRA subregion |
|-------------------|---|---|---|----------------------------|
| Cowra | Low | 27% | 0% | Fortescue |
| Christmas | Low | 72% | 0% | Fortescue |
| Turee | Moderate | 69% | 1% | Fortescue |
| Fan | Low | 45% | 0% | Fortescue |
| Sylvania | High | 20% | 0% | Fortescue |
| Cadgie | Moderate | 0% | 0% | Fortescue |
| Jamindie | Moderate | 28% | 0% | Fortescue & Hamersley |
| Wannamunna | Moderate | 37% | 16% | Hamersley |
| Dune | High | 0% | 0% | Roebourne |
| Onslow | Moderate | 17% | 0% | Roebourne |
| Can | Low | 50% | 3% | Roebourne |
| Callawa | Moderate | 0% | 0% | Chichester |
| Paradise | Low | 24% | 0% | Chichester |

Rehabilitation of cleared areas

The environmental impact from clearing of vegetation is exacerbated by the lack of successful rehabilitation of mines in the Pilbara. Although there has been mining in the Pilbara for over 60 years, there is limited evidence that proponents have successfully rehabilitated any areas that have been subject to large-scale mining. While there has been a small number of successful examples of rehabilitation in the Pilbara, further work needs to be undertaken to improve broad scale rehabilitation techniques, including establishing the standard of rehabilitation that can reasonably be expected to be achieved. To date, the EPA's expectations of successful rehabilitation in the Pilbara have been the recreation or repair of ecosystem processes to support a self-sustaining ecosystem, not just creating a stable vegetated landform. Without confidence that successful rehabilitation can be achieved post-mining, the residual environmental impacts of proposals are likely to be significant.

The EPA has recommended a rehabilitation condition for most mining and associated infrastructure proposals in the Pilbara, requiring rehabilitation to this high standard. Three-quarters of current Ministerial Statements for the Pilbara have a rehabilitation condition, equating to more than 1,200 square kilometres of land which requires rehabilitation. In addition to this amount, all mine sites assessed by the DMP under the *Mining Act 1978* require rehabilitation.

However, the EPA, through advice from rehabilitation experts in industry and research organisations, has now come to understand the inherent difficulties associated with achieving successful rehabilitation post-mining to the standards it has previously sought. Mining usually removes a natural landform and replaces it with a constructed landform. Establishing vegetation on waste rock dumps or other constructed landforms presents significant challenges.

There is a lack of confidence that even the most common plant species can be restored in the Pilbara, raising the prospect of significant residual impacts. Of particular concern is the lack of successful rehabilitation of the common mulga and spinifex communities.

The EPA recognises that rehabilitation will not fully replace the lost landforms and the associated ecological values and functions. However, current rehabilitation efforts only achieve an estimated 15 per cent of the pre-mined biodiversity (Kingsley Dixon [Kings Park and Botanic Gardens Authority] 2013, pers. comm., 23 April and 27 September). While many companies are spending money on rehabilitation efforts (e.g. collecting seed) this effort may be poorly targeted because the techniques to successfully rehabilitate mined areas are not understood and procedures for implementing successful rehabilitation are not in place. Continued investment in research and the development of new techniques and procedures through collaboration across industry, government and research organisations is necessary to improve rehabilitation outcomes across Western Australia. With greater investment and research into upfront development of rehabilitation techniques and practices specifically for the Pilbara, a higher standard of rehabilitation may be achievable post-mining. The proposed Western Australian Biodiversity Science Institute may provide an opportunity to further these efforts.

Without confidence that rehabilitation can successfully restore a reasonable degree of ecological function post-disturbance at a large scale, rehabilitation alone has limited value as a mitigation option for reducing the environmental impact of proposals. Until there is greater confidence, alternative steps within the mitigation hierarchy (avoid, minimise, offset) may be more relevant to reduce or offset the impact. This means that avoidance and minimisation of impacts are of far greater importance in ensuring that a proposal is environmentally acceptable.

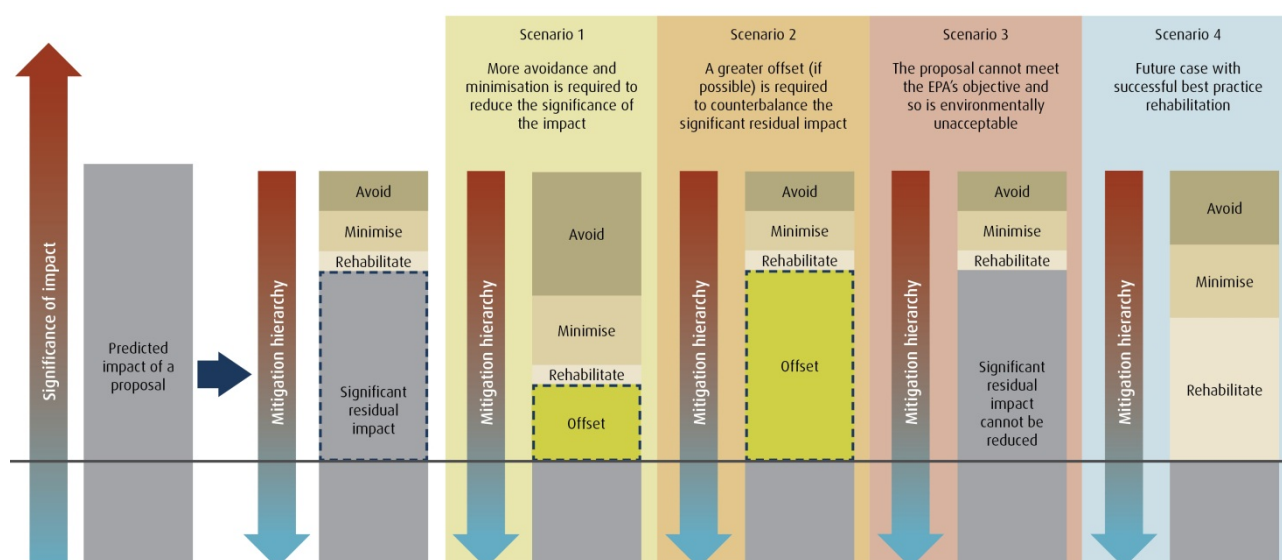


Figure 6 In the absence of successful rehabilitation, the importance of the other steps of the mitigation hierarchy become more important in reducing the significance of the impacts.

While current rehabilitation efforts have not been successful, rehabilitation is a vital part of mine closure and must be undertaken by proponents.

The EPA believes that it is important to establish clear objectives and success criteria for rehabilitation in the Pilbara. Further work and coordination is required across Government, industry and research organisations to establish these objectives. Having clear and achievable objectives will enable proponents to invest appropriately, rather than using resources to attempt rehabilitation beyond reality. It will also provide more confidence in knowing the true extent of impacts from mining and development, and the associated significant residual impact of a proposal.

Recommendation: That there is greater investment and a coordinated approach to research and knowledge sharing on rehabilitation of Pilbara landscapes.

Recommendation: That a high level group comprising representatives of industry, research organisations and government agencies be convened to establish objectives for rehabilitation and mine closure in the Pilbara.

Weeds and feral animals

Weeds

Historically, weeds in the Pilbara have been species introduced through pastoral activities or for domestic purposes. Invasive species such as Ruby Dock (*Acetosa vesicaria*) and Buffel Grass (*Cenchrus ciliaris*) have become widespread. Weeds such as Mesquite (*Prosopis* spp.) and Parkinsonia (*Parkinsonia aculeata*), introduced in the 1930s for domestic purposes, have become significant threats to biodiversity over large areas. Development activities can increase the spread of weeds through modification of landscapes and movement of soil.

As at 2010, 103 species of weeds were established in the Pilbara. This comprises 6.3 per cent of the region's flora species (Keighery, 2010). While the number of species is considered to be relatively low, the rate of weeds being introduced is increasing, with 19 new weed species introduced between 2004 and 2010. Fourteen species affect the region at a landscape scale by altering fire patterns, modifying soil characteristics or competing directly with native species. Another 21 significantly affect particular habitats (Keighery, 2010).

Intensive agricultural initiatives are also a developing contributing factor to the spread of weeds in the Pilbara, with recent projects involving clearing to grow introduced pasture species for fodder. Without careful management, proposed pasture species such as Rhodes grass (*Chloris gayana*) have the potential to become environmental weeds in the Pilbara. This is particularly an issue for riparian and other ecologically significant areas, which are susceptible to impacts from introduced species.

Coordination of management actions to control weeds is important to manage cumulative impacts on biodiversity. Every effort needs to be made to prevent the spread of pasture species as a result of new pastoral diversification initiatives.

Feral animals

Feral animals generally impact on biodiversity by degrading the landscape via heavy grazing, erosion through trampling, competition with native species for natural resources, or predation on native species.

While feral carnivores such as wild dogs and feral cats pose a risk to native fauna, they do not pose a significant risk to landscape and vegetation condition. However, herbivores such as donkeys can be found on many leases throughout the Pilbara and, where numbers are

high, trampling and heavy grazing can degrade vegetation condition and increase soil erosion.

Donkeys are understood to be present in significant numbers on some leases, including the ex-Meentheena pastoral lease (DEC, 2011). Goats are also present on some Pilbara leases but numbers have diminished significantly in recent years as wild dog numbers have increased. Variable, but generally low, numbers of camels are also found in the arid interior of the Pilbara (DEC, 2011).

In addition to the grazing impacts of domestic and introduced species such as sheep, cattle and goats, the development of artificial water sources and the control of dingoes and wild dogs have led to increased kangaroo numbers, which has exacerbated the impact of grazing on vegetation (DEC, 2011).

Controlling the spread of weeds and feral animals across the region will benefit biodiversity by reducing threats and competition to native species. Any activities to undertake this control should be actively encouraged.

Water management

Management of water is an essential component of many mining operations in the Pilbara. Mines which extract ore from below the watertable need to dewater aquifers to access the ore body. The mining industry is the dominant water user in the Pilbara, with mining operations, mine dewatering and other related water uses (including mine site and exploration camp irrigation and residential water uses) accounting for almost 90 per cent of all water abstracted or produced (DoW, 2013).

The use of water on mine sites presents two potential environmental issues. Firstly, groundwater drawdown through dewatering can impact on groundwater dependent ecosystems leading to indirect losses of vegetation and other ecosystem values. Secondly, disposal of excess dewater to local waterways can alter the hydrological regime, changing the intermittent seasonal flowing systems to permanently flowing systems. This significantly changes the ecology of the waterways and can lead to destabilisation and erosion of banks.

The Department of Water (DoW) is responsible for management and licensing of groundwater abstraction. Most mining activity is located in areas of fractured rock aquifers. The DoW assesses water availability and the impacts of dewatering in fractured rock aquifers on a case-by-case basis through the licencing process.

The DoW's *Pilbara Groundwater Allocation Plan* (DoW, 2013) describes its approach to managing groundwater. Before issuing a licence, the DoW requires proponents to define the end use or discharge of dewater (DoW, 2013b). The DoW's *Strategic Policy 2.09: Use of mine dewatering surplus* guides proponents on how to minimise surplus dewater so that impacts on the receiving environment are minimised.

Consideration of the whole-of-operation water needs provides a balanced approach to make use of dewater on-site and minimise the need to dispose to surface water systems. The DoW informs the EPA if a licence being sought is likely to have a significant impact on the environment.

A total of 730 gigalitres (GL) of water is licensed to be abstracted annually in the Pilbara. Currently, over 400 GL is being abstracted, with approximately 35 per cent (140 GL) discharged to surface water systems (Figure 7; DoW, 2013).

The DoW has predicted that water abstraction will increase to over 700 GL per year by 2042 under a medium growth scenario and to over 900 GL per year under a high growth scenario (DoW, 2013a). These projections are based on an assumption that water abstracted per tonne of ore produced will remain constant. However, if mining below the watertable is to increase then the volume of water abstracted per tonne of ore could increase and future water abstraction may have been underestimated.

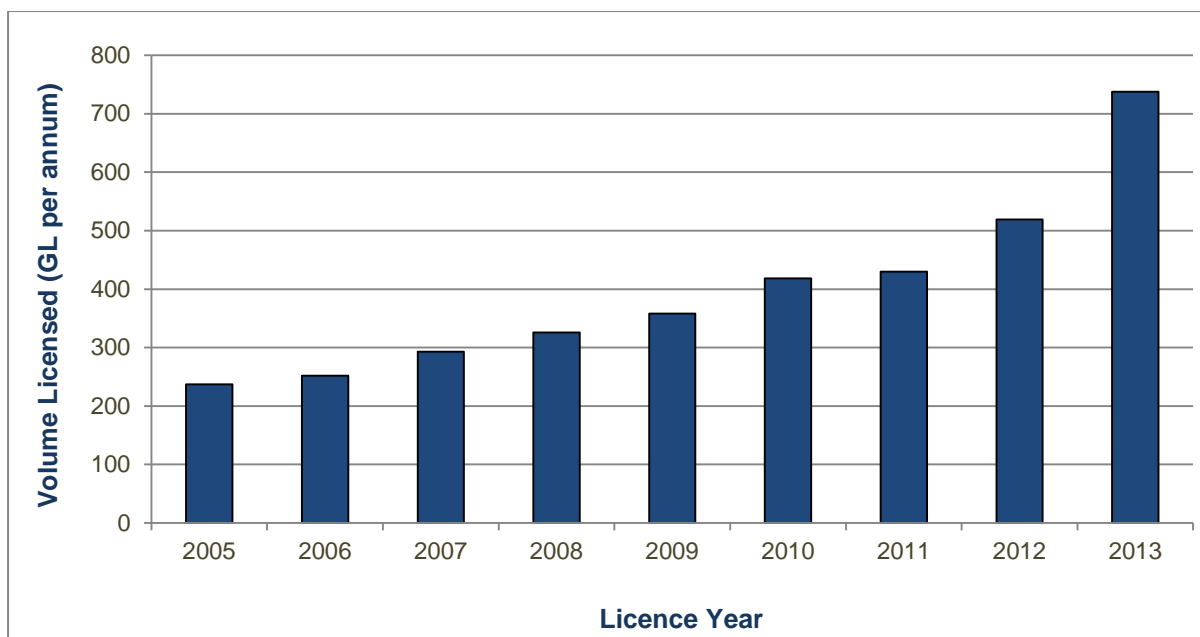


Figure 7 Volume (GL) of DoW Licensed Water Abstraction in the Pilbara Ground Water Area 2005-2013

The environmental acceptability of disposal to surface water systems depends on the ecology, hydrology and hydrogeology of the proposed disposal area. Where high volumes are likely, the potential for cumulative impacts should be considered in decision-making.

Some particular catchment areas have a significant quantity of dewater and surplus disposal occurring. Figure 8 illustrates the extent of dewater disposal in the south-east of the Pilbara, within the Fortescue Marsh Catchment.

The EPA is working with the DoW to identify areas that are currently or likely to be at risk of significant environmental impact from dewater disposal, with a view to developing future guidance for proponents.

A recent example of how cumulative impacts (including dewater impacts) have been addressed is the EPA's Section 16(e) advice to the Minister for Environment on [Environmental and water assessments relating to mining and mining-related activities in the Fortescue Marsh management area](#). It provides a framework to guide decision making in regards to impacts by outlining environmental objectives and management strategies for the various areas of the Marsh.

The EPA believes that the approach taken for the Fortescue Marsh provides a sound qualitative framework to enable cumulative impacts to be considered through decision-making on individual proposals. The EPA considers that there is benefit in developing similar qualitative or quantitative guidance for other high value ecosystems elsewhere in the Pilbara which may be at risk from development. This approach is relevant not just for water values, but other environmental values and key threats, such as weeds and feral animals.

Recommendation: That strategic guidance outlining environmental objectives and management strategies, similar to that developed for the Fortescue Marsh, be developed for other high value ecosystems that may, in the future, be significantly impacted or under significant threat of development to guide and assist planning for future development in the region.

Mine pit lakes

Mining for iron ore can leave a legacy of open pits. Pit lakes can form when mining below the water table ceases and the pit is no longer dewatered, allowing the pits to fill with groundwater. Pit lake waters are typically contaminated with metals, metalloids, saline, acidic or alkaline properties, and rarely approach natural waterbody chemistry (Kumar et al. 2009). The increase in mining below the watertable operations in the Pilbara over the last decade has increased the EPA's concerns regarding the potential for a significant legacy of pit lakes.

Assessing potential environmental impacts associated with pit lakes is difficult because the impacts will occur after the mine closes. Water levels in the pit may take hundreds of years to stabilise. Changes in water quality and water chemistry may occur over thousands of years. Underground saline plumes from mine voids may extend large distances and affect nearby groundwater resources and ecosystems. It is possible for a saline plume to extend for tens of kilometres from the pit lake (Johnson and Wright, 2003).

A significant risk from mine pit lakes occurs when there is a hydrogeological connection between the mine voids and important wetlands, waterways or groundwater resources. As few mines in the Pilbara have closed, little information is available on actual impacts. These features also permanently change the landscape, replacing the original vegetation which is permanently lost.

Using a combination of mine site data and aerial photography the EPA estimates that there are currently 97 pit lakes in the Pilbara and a further 178 proposed open pits. There are also an estimated 670 open pits in the Pilbara that have the potential to become pit lakes in the future. The lack of detailed data for pit lake numbers, location or water quality makes it difficult to accurately assess risks presented by existing and potential pit lakes. The EPA believes there is a need for additional research to understand the short and long-term impacts of mine pit lakes, which will assist in the assessment of individual proposals and their cumulative environmental impact.

The EPA considers that this research could be assisted by developing a detailed inventory of current pit lakes across the Pilbara. This inventory should build on existing work already undertaken by the DMP. The inventory should identify the location and details of each mine pit lake, their relationship to aquifers, and existing or predicted water chemistry. This would greatly benefit understanding and management by identifying where concentrations of mine voids pose a cumulative risk to the environment.

Recommendation: That a comprehensive inventory of current and potential mine pit lakes across the Pilbara be prepared and maintained by Government.

Recommendation: That a collaborative research program is established to improve understanding of the impacts of mine pit lakes.

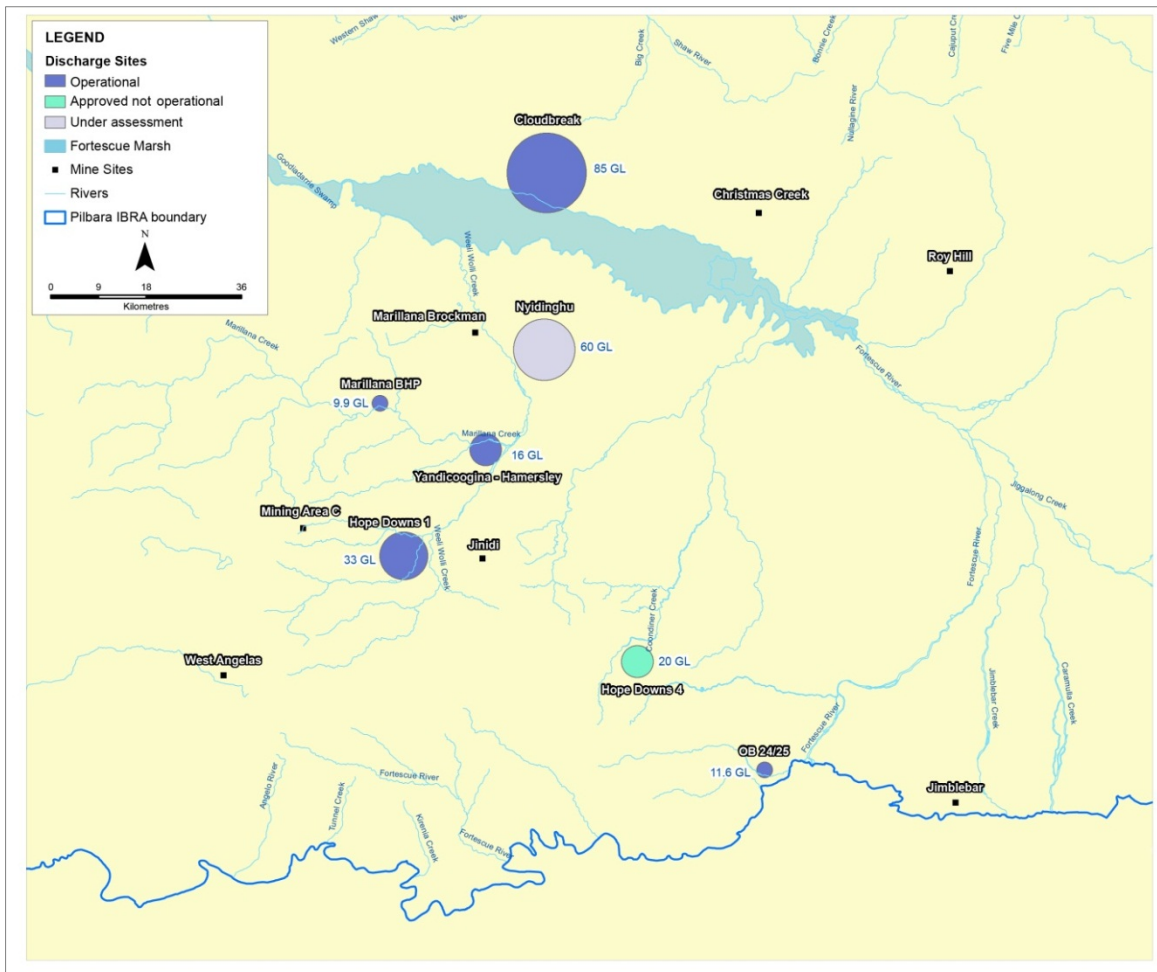


Figure 8 South-East Pilbara projects with significant dewater disposal

5. Opportunities to protect biodiversity and other environmental values in the Pilbara region

A strategic plan for biodiversity conservation to assist sustainable development

Historically, the Pilbara's mines, infrastructure and services have been developed by resource companies to meet the individual needs of the company. While the contribution of the private sector has been positive for the Pilbara's development it has also resulted in duplicated and fragmented infrastructure, particularly rail networks. The Pilbara has the largest privately owned and operated rail network in the world and the existing three privately owned networks are expected to expand to five during the next decade.

The scale, nature and number of Pilbara projects that are referred to the EPA indicate that the approach to development remains focussed on the needs of competing resource companies. While large-scale mining operations may require their own infrastructure to ensure operational autonomy, development of rail systems in common infrastructure corridors significantly reduces the cumulative environmental footprint.

The Department of Planning's (DoP) *Pilbara Planning and Infrastructure Framework* (2012) is an initiative that sets out a range of strategic goals, objectives and actions for development in the Pilbara. The EPA highlights priorities from the framework including promoting multi-user rail networks, infrastructure corridors and port facilities, and promoting responsible use of water. The EPA believes that such strategic region-wide approaches to planning are the best means to balancing development interests with conservation of the region's environmental values.

However, the EPA is concerned that there is no clear whole of government position on conservation goals for the Pilbara. This is in contrast to the Kimberley region where Government has developed the [Kimberley Science and Conservation Strategy](#). The absence of clear goals and an overarching strategic plan makes it difficult to balance the interests of conservation with that of economic development through planning frameworks such as those developed by the DoP.

Development of a strategic plan for biodiversity conservation would need to identify strategic objectives, priorities and high level strategies for biodiversity protection and incorporate infrastructure and development planning. It would provide regulatory agencies with a framework to assist and guide the EIA and approvals processes, and provide greater direction and certainty for proponents. If such a plan is not developed the EPA is concerned that ad-hoc decision making may continue to significantly and inadvertently impact on biodiversity values in the Pilbara. This may in turn influence its assessment and advice on individual proposals into the future.

Recommendation: That a strategic plan for biodiversity conservation in the Pilbara be developed by Government.

Recommendation: That Government planning and development strategies for the Pilbara take account of biodiversity conservation targets, goals and strategies.

2015 pastoral exclusions

All Western Australian pastoral leases expire in 2015. The EPA is of the view that the 2015 pastoral lease renewal process provides a rare opportunity for Government to build on the comprehensive, adequate and representative reserve system for the Pilbara.

Agreements were signed between the relevant leaseholders and the then Department of Conservation and Land Management (now DPaW) during 2004 regarding ten proposed pastoral lease exclusions scheduled for June 2015 in the Pilbara. The exclusion of these

areas was approved by the then Minister for Lands for stated purposes including “Conservation of flora and fauna”, “Protection of wetlands”, “Reservation for Conservation Park” or additions to Karijini or Millstream-Chichester National Parks. It is proposed that the DPaW will be the acquiring authority of these exclusion areas, which are shown in Figure 9.

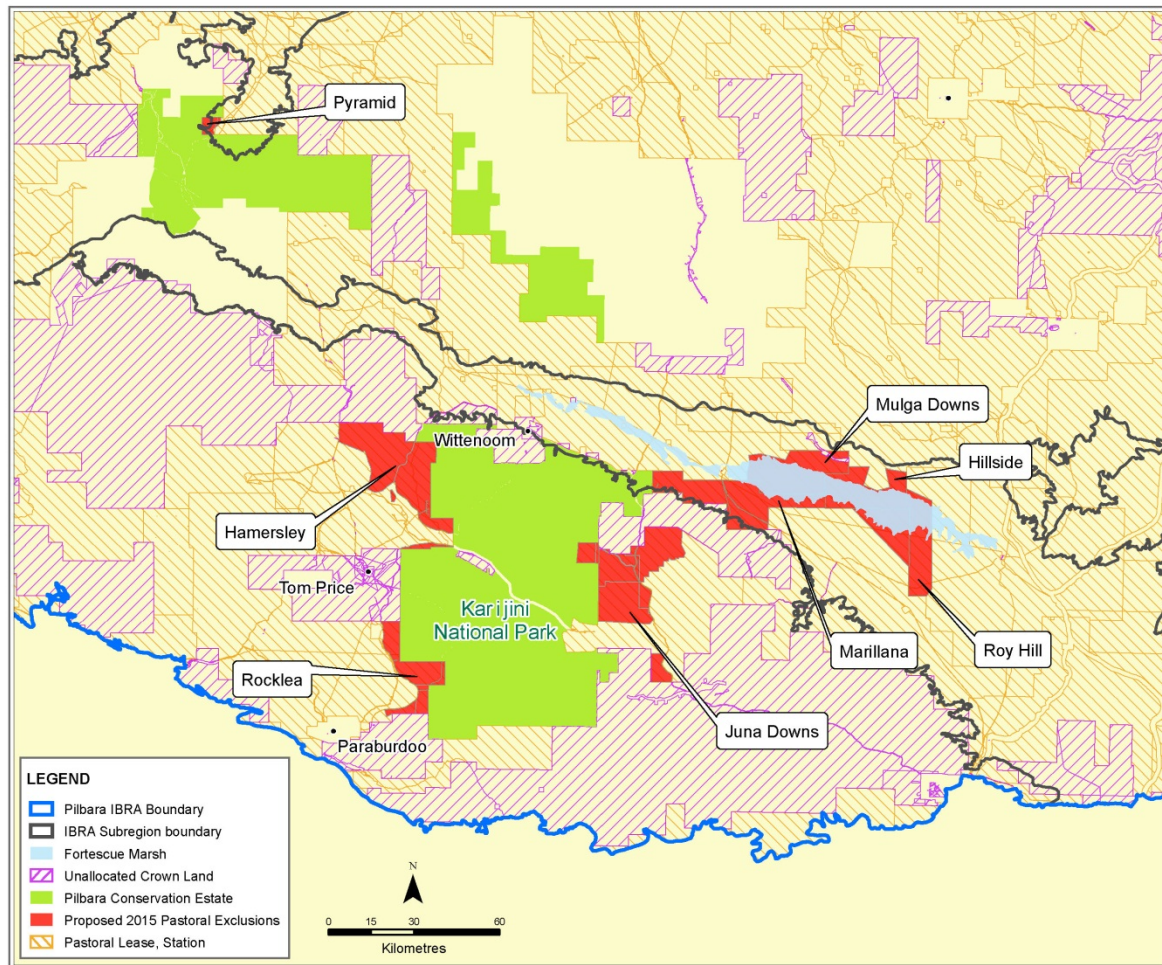


Figure 9 Pastoral lease exclusion areas near the Fortescue Marsh will increase the conservation of biodiversity in the Pilbara

These agreements are yet to be approved by Government. This needs to occur before land management and proposed tenure arrangements can be fully implemented. As at 1 July 2015, the approved pastoral lease exclusion areas will become Unallocated Crown Land and a formal referral process will be conducted by the Department of Lands, to ensure that agreement is obtained from various State and Local government agencies. The exclusion areas will remain Unallocated Crown Land until agreements are finalised. While the intent is that the DPaW will have management responsibility for the majority of these areas, without the appropriate tenure they will not be protected from inappropriate development, leaving investment in conservation of these areas at risk.

With the appropriate level of land tenure, the implementation of the proposed pastoral exclusions in June 2015 presents a significant opportunity to increase and improve the representativeness of the reserve system. This has the potential to significantly increase the quantity of DPaW managed land in the Fortescue sub-IBRA region from under one per cent up to ten per cent (Table 4).

Table 4 Potential conservation coverage with pastoral exclusion areas

| IBRA Sub-region | Current % in Conservation reserve or under DPaW Managed Land | % with potential pastoral exclusion areas added |
|-----------------|--|---|
| Chichester | 6.54% | 6.54% |
| Fortescue | 0.90% | 10% |
| Hamersley | 14.27% | 16% |
| Roebourne | 6.70% | 7% |
| Pilbara | 8.40% | 10% |

The EPA understands that it is unlikely that many of the proposed pastoral exclusion areas will be afforded Class A status, but recommends that each parcel be allocated the highest level of security possible to reduce threats to biodiversity, while recognising existing interests.

It is important to note that portions of pastoral leases that are intended to be handed over to the DPaW may have compromised values due to impacts caused by pastoralism and mining activities. While extensive landscape degradation caused by pastoralism could be reversed over time with ongoing active management, this would require significant resourcing. In addition, mining tenements and other interests remain over a portion of the proposed exclusion areas with some areas containing operating and proposed mines. Figure 10 shows an example of the overlap between mine sites and two 2015 pastoral lease exclusion areas.

Recommendation: That the proposed 2015 pastoral lease exclusion areas within the Pilbara, identified for management by the Department of Parks and Wildlife, be afforded the highest possible level of conservation tenure.

Diversification and Rangelands Leases

Diversification of pastoral land use could reduce reliance on grazing, consequently reducing pressure on the Pilbara's rangelands. Diversification of leases will increase flexibility in the use of these lands for other purposes.

Reforms to pastoral land tenure have been proposed via amendments to the *Land Administration Act 1997* (LAA) to provide an alternative option to the existing tenure of pastoral leases. The proposed option, known as a "rangelands lease" will allow for multiple uses, including conservation. This will enable management of part or whole leases for conservation, consistent with agreed conservation objectives.

The ongoing sustainable management of pastoral land is an important component of managing cumulative impacts on biodiversity in the Pilbara. The EPA encourages initiatives aimed at ensuring pastoral lands are stocked within their estimated carrying capacity, with consideration given for temporary destocking of areas that have been severely degraded or eroded so that ecological function can return.

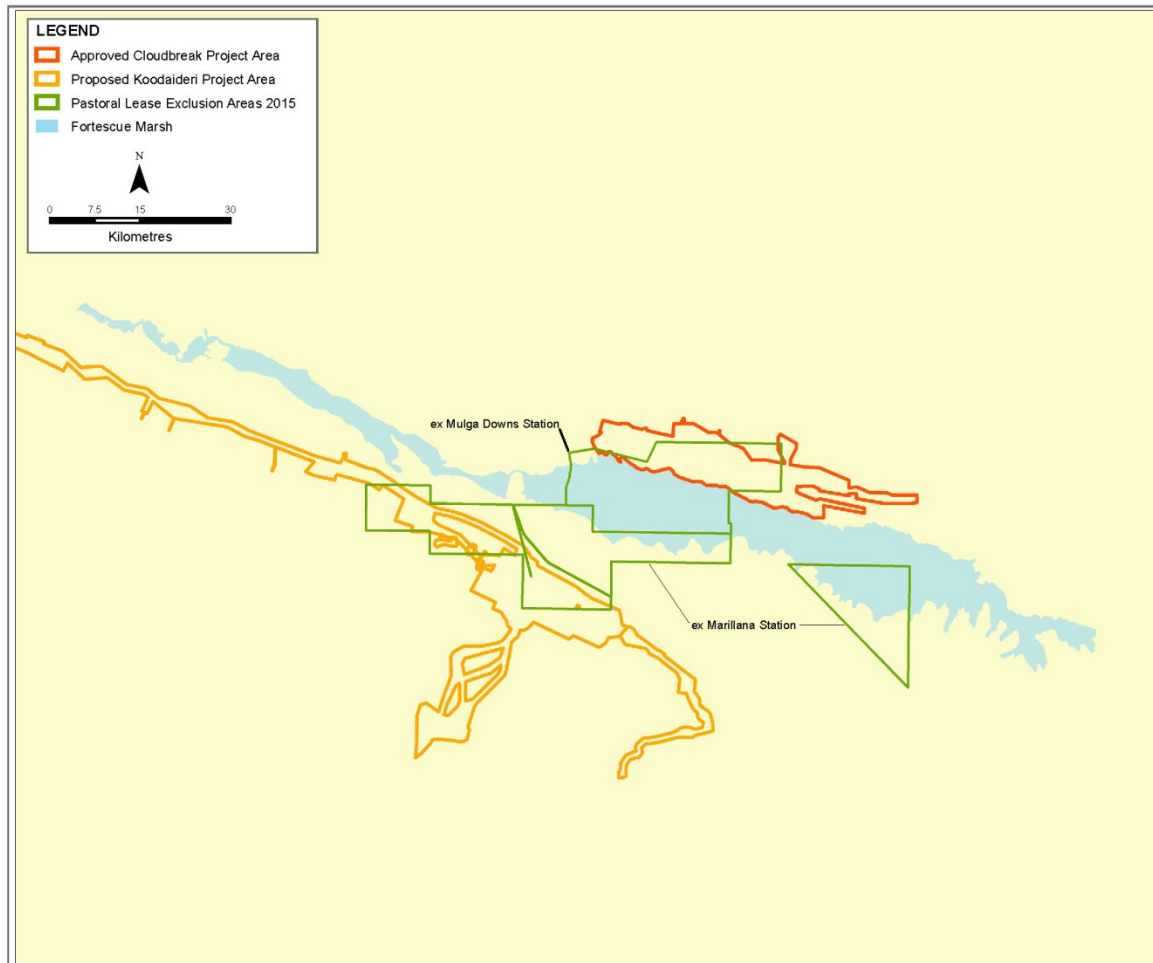


Figure 10 An example of where development footprints overlap proposed pastoral exclusion areas

Proposed strategic conservation initiative for the Pilbara region

Recently, the EPA has proposed the establishment of a strategic conservation initiative for the Pilbara as a mechanism to pool offset funds to achieve biodiversity conservation outcomes. Delivery of environmental offsets through such an initiative would provide an opportunity to develop agreed priorities for investment and to pool funds to achieve identified outcomes.

The Pilbara is mostly Crown land and, as such, traditional land acquisition offsets are not possible in the region. In addition, tenure constraints including pastoral leases and mineral tenements make it difficult to implement on-ground conservation actions to deliver long-term protection of biodiversity.

Establishment of a strategic conservation initiative for the Pilbara would provide the opportunity to:

- overcome tenure constraints by funding actions on a landscape scale in partnership with landholders;
- implement conservation actions in a coordinated way based on transparent investment decisions and targeted outcomes;

- focus on the highest priority biodiversity issues in the region;
- assist proponents by providing practical mechanisms for implementing environmental offsets; and
- further contribute to significant partnerships between government, industry, landholders and aboriginal communities.

It would also provide a mechanism, consistent with the strategic plan recommended by the EPA, to plan and coordinate activities across a range of potential partners. It may also assist in achieving other government policy objectives, such as repairing the rangelands and improving the condition of pastoral lease areas proposed for exclusion in 2015.

There is also potential to use the fund to leverage investment from other sources.

The EPA's recent approach to recommending environmental offsets to a strategic conservation initiative helps to ensure a consistent and transparent approach, with contributions based on an assessment of the significance of environmental impacts. It will be important to maintain such an approach to give clarity and certainty to proponents, and to ensure that offset decision-making is consistent with the principles described in the Western Australian Government Offset Policy (2011).

It is the EPA's view that the majority of funds be used for landscape-scale on-ground actions in the Pilbara. If funds are to be used for indirect actions (e.g. research), they should only be expended on those actions that will directly contribute to conservation outcomes in the Pilbara IBRA region.

Recommendation: That the EPA's proposal for a strategic, coordinated approach to environmental offsets in the Pilbara via a strategic conservation initiative be investigated by Government in consultation with industry.

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