Purnululu National Park

2020 Conservation Outlook Assessment

SITE INFORMATION

Country: Australia
Inscribed in: 2003
Criteria: (vii) (viii)

The 239,723 ha Purnululu National Park is located in the State of Western Australia. It contains the deeply dissected Bungle Bungle Range composed of Devonian-age quartz sandstone eroded over a period of 20 million years into a series of beehive-shaped towers or cones, whose steeply sloping surfaces are distinctly marked by regular horizontal bands of dark-grey cyanobacterial crust (single-celled photosynthetic organisms). These outstanding examples of cone karst owe their existence and uniqueness to several interacting geological, biological, erosional and climatic phenomena. © UNESCO

SUMMARY

2020 Conservation Outlook

Finalised on 02 Dec 2020

GOOD

Purnululu National Park was inscribed for its outstanding landscape and geological value. It also has significant biological importance, with a species of relict vegetation identified as contributing to its Outstanding Universal Value. Thanks to a low level of threat and good protection and management, including the proposed creation of more conservation lands around the site, threats appear to be at a low level. Relevant values appear to be stable. However, the outdated management plan (1995-2005) pre-dates inscription of the site in 2003, is out of date, and does not consider the impacts of many emerging issues, such as climate change. It is believed that the uncertainty created by a long-running native-title claim will be resolved in 2020, paving the way for the formal update of the management plan under joint-management arrangements with Traditional Owners.
FULL ASSESSMENT

Description of values

Values

World Heritage values

► Outstanding beautiful landscape of sculpted and banded sandstone

Spectacularly incised landscape of sculptured rocks which contains superlative examples of beehive-shaped karst sandstone rising 250 metres above the surrounding semi-arid savannah grasslands. These dramatically sculptured structures, unrivalled in their scale, extent, grandeur and diversity of form anywhere in the world, undergo remarkable daily and seasonal variation in appearance, including striking colour transition following rain and with the positioning of the sun (World Heritage Committee, 2012).

► Outstanding example of cone karst in sandstones

Unique depositional processes and weathering have given the cone karst towers their spectacular black and orange banded appearance. Nowhere else is the process of cone karst formation on sandstone so clearly demonstrated, including an exceptional degree of evidence of geomorphic processes of dissolution, weathering and erosion in an ancient, stable sedimentary landscape. The Bungle Bungle Ranges of the Park also display to an exceptional degree evidence of geomorphic processes of dissolution, weathering and erosion in the evolution of landforms under a savannah climatic regime within an ancient, stable sedimentary landscape (World Heritage Committee, 2012).

Other important biodiversity values

► Mammals including some threatened species and others at the edge of their range

Mammals considered to be poorly known, rare or near-threatened in Western Australia’s Priority List for fauna include the Northern Short-tailed Mouse (Leggadina lakedownensis) and the Rock Ringtail Possum (Petropseudes dahli). Non-threatened mammals include the Ningbing Antechinus (Pseudechinus ningbing) and at least four species of Macropod, the Northern Nail-tail Wallaby (Onychogalea unguifera), Common Wallaroo (Macropus robustus), Agile Wallaby (M. agilis) and Short-eared Rock-wallaby (Petrogale brachyotis). The Large-footed Mouse-eared Bat Myotis adversus reaches the southernmost (inland) limit of its range (Woinarski, 1992; CALM, 1995).

► Birds including some threatened species

Bird species include the Western Purple-crowned Fairy-wren (Malurus coronatus coronatus) (Endangered), the Grey Falcon (Falco hypoleucos) (Vulnerable) and the previously Endangered (now listed as Near Threatened) Gouldian Finch (Erythrura gouldiae). The Australian Bustard (Ardeotis australis), previously believed threatened, is now classified as Least Concern. All these are rare grassland species. The Oriental Plover (Charadrius veredus) and Peregrine Falcon (Falco peregrinus) are specially protected in WA under the Biodiversity Conservation Act 2016, the former as a migratory species. Also the southern (inland) limit for Bar-breasted Honeyeater (Ramsayornis fasciatus) (State Party of Australia, 2002; Woinarski, 1992; CALM, 1995; Birdlife, 2012).

► Rich reptile fauna

Species recorded from the World Heritage site include many species of skinks and the nocturnal Western Soil Crevice Skink (Proablepharus reginae), said to be a relict species. Other large reptiles
include the Kimberley Rock Monitor (Varanus glauerti), King’s Goanna (V. kingorum), Spiny-tailed Monitor (V. acanthurus) and undescribed species of gecko Gehrya sp nov., skink Lerista sp nov. and turtle Chelodina sp nov. (Woinarski, 1992; CALM, 1995).

► Important number of frogs with restricted distribution

12 species of frogs recorded from the property, conservation status not checked. Copland’s Rock Frog (Litoria coplandi) and Splendid Tree Frog (L. splendida) are both LC (Woinarski, 1992; CALM, 2006; Hero et al., 2004).

► Transitional vegetation and relict and endemic species

Vegetation between the northern tropical monsoonal savannah and inland arid desert biogeographical realms includes some 619 species of vascular plants (Woinarski, 1992). Its transitional location has made the Park a centre of endemism for spinifex grass Triodia spp., resulting in the highest density of spinifex species in Australia, including T. bunglensis, which is endemic to the Park. The southernmost penetration of monsoonal savanna species bring relict species, including the fern Taenitis pinnata, resurrection grass (Micraira spp.) and tall palms Livistona victoriae, all which grow in micrenvironments of the deeper valleys (Morton et al., 1995). 13 plant species are considered to be relict species. Several plant species exist in the Park which were previously not recorded in Western Australia or are of very limited occurrence (Figgs and Moseley, 1988; State Party of Australia, 2002; Woinarski, 1992; Woinarski, 2012.; CALM, 1995; CALM, 2006). Nine plant species have only been recorded from the Park and are considered to be poorly known and possibly threatened (Acacia zatrichota, Doodia caudata, Eriachne imbricata, Grevillea psilantha, Lindernia eremophiloides, Stephania japonica var. japonica, Taenitis pinnata, Triodia bunglensis and Triumfetta aspera).

Assessment information

Threats

Current Threats  Low Threat

There is a paucity of information pertaining to the threats to the site from changed fire regimes due to climate change, invasion of alien species, increasing visitor numbers and potential mining. Despite this, the overall level of threat still appears low.

► Fire/ Fire Suppression  Data Deficient

(Wildfires)

Changing fire regimes due to climate change are a potential threat to most terrestrial World Heritage sites in Australia (Bowman, 2016; Scheiter et al., 2015). The Livistona fan palms that occur in Purnululu's gorges are part of the site's documented OUV that is potentially vulnerable to increased fires. Concern has been expressed about the impact of fires on the friable sandstone walls of the karst features (Mann, 2013). The Australian and Western Australian governments have put programmes in place to manage these threats. Purnululu Conservation Park and the Ord River Regeneration Reserve located adjacent to the Park allow for controlled burning to be undertaken to mitigate bushfires, which are a key threatening process to the vegetation of the massif. Previously fires were monitored, and action was only implemented when fires progressed toward infrastructure or access roads. Alternative suppression techniques have recently been practiced in the Kimberley Region with “Remote Insertion” (use of helicopter) of ground resources. This so far has proved successful and allowed efficient, direct attack on fires to prevent them from developing in size (IUCN Consultation, 2020).

Continuation of a prescribed burning programme is necessary to reduce the extent and intensity of wildfires (IUCN Consultation, 2017). Prescribed burning has been reported from time to time (DBCA, 2014).
Livestock Farming / Grazing
(Feral animals and stray livestock)

Grazing was an issue inside the Park until feral animals and livestock (some 25,000 cattle, 4,000 donkeys and several camels) were removed from the Park in the 1980-90s. Overgrazed areas that are still under rehabilitation are vulnerable to further damage from feral animals if their numbers are not controlled. However, areas of ex-pastoral lands adjoining Purnululu Conservation Reserve are adding considerable buffer areas surrounding the World Heritage site (UNESCO, 2011). As of 2019, feral camels, horses, pigs, donkeys and cats still represent an ongoing threat, however, these are subject to regular control actions (IUCN Consultation, 2020).

Tourism/ visitors/ recreation
(Tourist impacts)

Special karst features are vulnerable to damage from inappropriate or excessive use (Dingwall, 2003). However, these features are regularly monitored and are managed with strategies including interpretive signage and markers delineating track routes (IUCN Consultation, 2020). In 2013, a Walk Trails Project was funded under the Australian Government Caring for Our Country program where trails were rerouted and created to reduce the risk of erosion and loss of vegetation caused by tourism pressure (IUCN Consultation, 2017). Visitor numbers from 2012 to 2016 averaged 24,659. 2018 numbers averaged 28,990 per year (IUCN Consultation, 2020). Any significant increase over these numbers would require increased measures to ensure the remote wilderness experience sought by visitors would be maintained.

Invasive Non-Native/ Alien Species
(Invasive plants)

Weeds were identified as a problem in the 1995 management plan (CALM, 1995). Seventeen weed species (2.8% of the flora) were recorded in the Bungle Bungle area, several of which constitute a substantial management problem (Woinarski, 1992). This report expressed particular concern with the effects of feral animals and exotic plants on the Park’s ecology and their relationship to rehabilitation of degraded lands. Weeding programmes (including during the wet season) are being implemented to reduce the spread of weeds and eradicate new infestations (IUCN Consultation, 2020). A wet-season weed program is ongoing in the park as part of normal operations along with reduction of feral herbivores from ongoing culling and fencing operations.

Invasive Non-Native/ Alien Species
(Invasive Cane Toads)

The imminent arrival of cane toads in the World Heritage site was identified as a threat in 2011 (UNESCO, 2011). Since then, the presence of cane toads has been confirmed within the park and increased measures are required to address this threat (IUCN Consultation, 2017). While invasive Cane Toads represent a threat to the site’s biological values, steps are being taken to manage this problem in Western Australia through the government’s cane toad strategy (Department of Parks and Wildlife, 2014). Despite this effort, cane toads continue to move westward across the Kimberley and it is now clear that this movement cannot be stopped using any of the methods currently available. Research will continue in the hope of discovering long-term effective cane toad management solutions, while ensuring satellite populations of toads do not establish elsewhere in Western Australia (IUCN Consultation, 2017). The Western Australian government’s cane toad strategy document (above) is dated 2014-2019, so an update is required as well as an assessment of its efficiency to date.

Potential Threats

The risks of catastrophic wildfire and alien plant or animal invasion, compounded by climate change, are threats whose significance continues to mount as climate change progresses. The absence of an updated management plan (the previous plan applying for the period 1995-2005) exacerbates this situation. While previous management provisions remain in place, it is not possible to assess how these arrangements are
IUCN World Heritage Outlook: https://worldheritageoutlook.iucn.org/
Purnululu National Park - 2020 Conservation Outlook Assessment

protecting the site from these increasing threats.

► **Habitat Shifting/ Alteration, Temperature extremes, Storms/Flooding**

*(Climate change)*

Exacerbated climatic extremes could affect the values of the site. Reduced rainfall, higher land temperatures and increased risk of extreme weather events such as flash flooding and cyclonic activity may cause changes in the abundance and distribution of native flora and fauna populations or alter underlying geological and geomorphologic values (Australian National University, 2009). In 2015, Australia's leading government scientific organisation, the CSIRO, released a set of climate-change projections. These indicated that the monsoonal north-west region will increase in average temperatures across all seasons and while changes in rainfall are unclear, extreme rainfall events are projected to be more intense but with fewer occurrences of tropical cyclones (CSIRO, 2015). Local conditions such as wind, erosion and cyclones will need to be monitored to gauge the effects of these processes, which are likely to increase due to climate change (IUCN Consultation, 2017). An altered fire regime could adversely affect both relict vegetation and the surfaces of many of the karstic sandstone cones (Mann, 2013).

► **Water Pollution**

*(Mining effluents)*

At the time of inscription of the site on the World Heritage List, it was noted that the existing park boundaries are not ideal, being mainly water courses rather than watershed boundaries which could potentially allow incursion of undesirable impacts from neighbouring areas in catchments upstream of the park, such as waste effluent from mining activities (IUCN, 2003; World Heritage Committee, 2012). Concerns were also expressed about the intention of Tusk Mining to establish a coal mine six kilometres from the World Heritage site (UNESCO, 2011); this does not appear to have eventuated and the website given for Tusk Mining appears to be defunct. However, no official information about the status of this proposal could be found.

► **Invasive Non-Native/ Alien Species**

*(Invasive plant species and cane toads)*

New invasions will always be a risk to the landscape and biological values of the site. Provision in the Management Plan to avoid new introductions and manage current problems is made. For example, cats are prohibited in the park, including in residential areas, and staff may keep dogs only under special permit (CALM, 1995).

Overall assessment of threats

Low Threat

Despite a paucity of information, current threats appear to remain low thanks to good management and the site's fundamental characteristics (low visitation due to remoteness; park closed during the wet season; robustness of most landforms). The risks of catastrophic wildfire and alien plant or animal invasion, compounded by climate change, are potential threats whose seriousness is progressively increasing as climate change worsens.

**Protection and management**

Assessing Protection and Management

► **Management system**

Mostly Effective

The approved management plan for Purnululu National Park is the 1995-2005 plan (Government of
Western Australia, 2020). It has therefore not yet been revised despite consideration of its revision in 2011. The reason for this is because of a long-running, complex native title case. Once native title has been determined the park management plan can be updated. As for the management structure, the Department of Biodiversity, Conservation and Attractions (DBCA) is the main Western Australian government agency responsible for the management of the site. The Purnululu World Heritage Advisory Committee includes several indigenous representatives, a scientific representative, a tourism representative and a representative of local government (Government of Western Australia, 2019b).

Effectiveness of management system

The fact that the revision of the management plan has not been completed yet raises concerns. The 1995-2005 management plan was prepared before inscription of Purnululu National Park as a World Heritage site and it does not refer to the site's OUV. Additionally, it also does not fully address some of threats and issues that have emerged since, such as climate change and fire regimes and the clear threat of cane toads to fauna. A review of the management plan carried out in 2008 and re-assessed in 2010 raised a number of issues with respect to staffing, implementation of the plan, stakeholder engagement (including traditional owners), visitor impacts, and the lack of a fire management plan (Department of Environment and Conservation, 2010). The most recent World Heritage Committee decision to deal with management and protection from 2011 called for an interim management plan (World Heritage Committee, 2011). Since these points remain to be addressed, the overall effectiveness of the site's management is difficult to assess at this stage.

Boundaries

Purnululu National Park includes the full extent of the Bungle Bungle Range, which is buffered by protected land on all sides including spinifex- and mulga-dominated sand plains within the Park to the north, south and east. In the west the dominant feature is that of the Osmond Ranges which lie within the adjoining Purnululu Conservation Park (PCP). At the time of nomination, it was noted that the existing park boundaries are not ideal, being mainly water courses rather than watershed boundaries; this could potentially allow incursion of undesirable impacts from neighbouring areas in catchments upstream of the park, such as waste effluent from mining activities; the State Party was therefore encouraged to incorporate the PCP into the national park and World Heritage site (IUCN, 2003). In 2011, the State Party reported that 46,875 ha had been added to the PCP with another 15,583 ha scheduled for addition in 2015 (UNESCO, 2011). While these reserved lands form a practical buffer zone, they have not been yet officially added to the buffer zone of the inscribed World Heritage site. While there were no permanent inhabitants within the site at time of inscription, today there is seasonal visitation by traditional owners in two of the three areas designated as special “Living Area Leases” (World Heritage Committee, 2012).

Integration into regional and national planning systems

The State Party reported in 2011 that a complex native title claim affecting the World Heritage site was being assessed (UNESCO, 2011). The process is still ongoing as of 2020 (IUCN Consultation, 2020). At the national level, proposed developments within the World Heritage site are covered by the EPBC Act.

Relationships with local people

Two Aboriginal groups (the Gidja and Jaru) have made competing native title claims over Purnululu National Park. Both claims are being assessed by the National Native Title Tribunal and the process is still ongoing in 2020 (IUCN Consultation, 2020). In its Decision 35 COM 7B.9 the World Heritage Committee encouraged the State Party of Australia “to develop an interim management plan, in order to give due consideration to the property’s indigenous cultural values while the native title case is ongoing, and to address traditional landowners’ concerns, by considering potential stricter regulations on tourism access to culturally significant sites” (World Heritage Committee, 2011). The management plan for Purnululu National Park was supposed to be updated in 2017 which would have been undertaken in consultation with the native title claimant groups. The Purnululu National Park World Heritage Advisory
Committee, which held its first meeting in 2015, includes members representing the two Aboriginal groups (IUCN Consultation, 2017). The Advisory Committee provides advice to the Western Australian and Australian governments on matters related to the protection, conservation, presentation and management of the World Heritage site, as well as identifying research priorities (IUCN Consultation, 2020).

**Legal framework**

Mostly Effective

The relevant legislation includes the Australian Government Environment Protection Biodiversity Conservation Act 1999 (EPBC Act) which provides a legal framework to protect and manage nationally and internationally important heritage places, including World Heritage sites (http://www.environment.gov.au/epbc). Any new development proposals within the World Heritage site will be subject to assessment and approval under the EPBC Act if they are considered likely to have significant impacts on World Heritage values and other protected matters, such as threatened species. The Australian Government's administration of the EPBC Act with respect to developments within World Heritage sites has been recently criticised and successfully challenged in the courts by conservation groups elsewhere in the country (Jarvie, 2019).

The World Heritage site is protected and managed under the Western Australian Conservation and Land Management Act 1984 any major developments that may affect World Heritage sites in Western Australia must undergo environmental impact assessment under the Environmental Protection Act 1986 (IUCN Consultation, 2020). Threatened and other specially protected species are also protected in Western Australia under the Biodiversity Conservation Act 2016.

**Law enforcement**

Mostly Effective

Enforcement of the relevant legislation is effective.

**Implementation of Committee decisions and recommendations**

Data Deficient

Some points raised in the Decision 35 COM 7B.9 of the World Heritage Committee in 2011, particularly those related to the development of an interim management plan (World Heritage Committee 2011), appear to remain pending.

**Sustainable use**

Highly Effective

The use of the site for tourism and recreational purposes appears to be sustainable (IUCN Consultation, 2017).

**Sustainable finance**

Mostly Effective

It has been previously noted that Purnululu National Park World Heritage site was not funded to the same level as some of Australia's other World Heritage sites due to overall resilience of its values and low levels of visitation (UNESCO, 2011). The Australian Government currently provides AUD $140,000 per annum for five years, from July 2018, for employment of a Project/Executive Officer and to support the World Heritage Advisory Committee. All other finance is via Western Australian government agencies, or NGOs (IUCN Consultation, 2020).

**Staff capacity, training, and development**

Mostly Effective

An employee development program is in place and implemented with all rangers undertaking certificates in Conservation and Land Management. The National Park currently employs 8 staff members that include a Senior Ranger, Ranger, three seasonal rangers and three seasonal visitor centre staff (IUCN Consultation, 2020). Numerous additional district staff are utilised for projects directly related to the National Park including monitoring, prescribed fire, civil works operations, feral animal control and administrative support.
Education and interpretation programs
Highly Effective
Interpretative and educational materials provided by DBCA through government websites are generally excellent and well integrated with on-the-ground signage (DPCA, 2018). There has been a successful introduction of various education programs including an interactive activity book for children to maximise their learning experiences when visiting the park (IUCN Consultation, 2020).

Tourism and visitation management
Mostly Effective
The number of visits to Purnululu National Park virtually doubled between 1995 and 2006 from 13,000 pa to over 24,000 (Department of Environment and Conservation, 2010). While the numbers have probably remained at manageable levels due to the remoteness of the site; some concerns have previously been expressed about impacts of visitation on culturally sensitive sites (Department of Environment and Conservation, 2010). However, overall, Tourism appears to be effectively managed, particularly vehicle access to the Park via Spring Creek Track since tenure was secured via an easement in 2017. It is maintained as a 4wd track while upgrading track integrity to conserve the wilderness experience that remoteness brings (IUCN Consultation, 2020).

Monitoring
Mostly Effective
Increased monitoring would be beneficial in order to address some threats more effectively, particularly those posed by invasive species (IUCN Consultation, 2017). However, overall monitoring appears adequate and evidence of actions that enhance management of the World Heritage site can be found in the annual reports of the DBCA.

Research
Data Deficient
The Purnululu World Heritage Advisory Committee identifies research priorities which will contribute to the conservation of the site’s OUV and defines the scientific basis of management principles (IUCN Consultation, 2017). However, no up-to-date information on current research programmes could be found.

Overall assessment of protection and management
Mostly Effective
Overall, the site is well managed and protected by Western Australian and Australian Government legislation and management planning documents. However, an evaluation of the effectiveness of management by the State Party and World Heritage authorities will be needed during the process of revising the 1995-2005 management plan. Updating this plan has been delayed by the legal processes involved with adjudicating competing native title claims for the area. While the old management plan remains valid and provides some guidance, it is of concern that some of the emerging threats and issues might not be effectively addressed by the management plan that is more than 20 years old now. Combined with the trajectory of climate change, consequent changes in fire regimes, and the escalating invasion of the site’s precincts by cane toads, these factors give cause for concern beyond the short term.

Assessment of the effectiveness of protection and management in addressing threats outside the site
Mostly Effective
Increase in conservation lands surrounding the World Heritage site is very positive. However, mining and mineral exploration are permitted inside the conservation reserves that constitute the buffer. Updating the management plan has been delayed by the legal processes for native title determinations.
State and trend of values

Assessing the current state and trend of values

World Heritage values

▶ Outstanding beautiful landscape of sculpted and banded sandstone  
Good  
Trend: Data Deficient

Landscapes and their aesthetic values remain well preserved (IUCN Consultation, 2020). No decline of their features has been reported, either through formal processes (UNESCO, 2011) or in the general media.

▶ Outstanding example of cone karst in sandstones  
Good  
Trend: Data Deficient

No decline in geological features of the site has been reported, either formally through World Heritage processes (UNESCO, 2011) or in the general media. However, the absence of recent monitoring information or an updated management plan mean that it is not possible to determine whether the trend remains stable.

Summary of the Values

▶ Assessment of the current state and trend of World Heritage values  
Good  
Trend: Data Deficient

No decline in the geological features of the site or in the aesthetic values of its landscapes has been recorded and all these values continue to be well preserved.

▶ Assessment of the current state and trend of other important biodiversity values  
Good  
Trend: Data Deficient

An assessment of the threats from a changed fire regime due to climate change and from invasion by alien species such as cane toads will be essential. In the meantime, it appears that biodiversity values of Purnululu National Park are stable.

Additional information

Benefits

Understanding Benefits

▶ Wilderness and iconic features

Despite much of the visitation being conducted by helicopters and light aircraft which might destroy some of the wilderness value, vast areas of the site are still wilderness accessible only by foot. Protection of wilderness character is one of the objectives of management (CALM, 1995).

Factors negatively affecting provision of this benefit:
- Climate change: Impact level - Low, Trend - Continuing
- Invasive species: Impact level - Low, Trend - Continuing

▶ Direct employment

Direct employment in park management appears to remain low, restricted to one full-time ranger and 3-4 part-time rangers as well as two staff in the visitors centre (DEC, 2010). Additional employment is
generated by tourism in accommodation and companies that run tours by aircraft and bus. In 2009, an economic consultant calculated total direct and indirect employment generated by the Purnululu World Heritage site at about 55 jobs (Gillespie Economics and BDA Group, 2009).

Factors negatively affecting provision of this benefit:
- Climate change: Impact level - Low, Trend - Continuing

► History and tradition

The cultural values of the hunter-gatherer society among the Aboriginal traditional owners of Purnululu are highly significant (State Party of Australia, 2002). Customary activities such as hunting and gathering for food and medicine, ceremonial events and cultural activities are permitted within the Park under Customary Activity provisions in Western Australian government legislation.

An updated management plan is required to clarify joint management arrangements and to describe traditional practices authorised within the site.

Factors negatively affecting provision of this benefit:
- Climate change: Impact level - Low, Trend - Continuing
- Overexploitation: Impact level - Low, Trend - Continuing
- Invasive species: Impact level - Low, Trend - Continuing

► Outdoor recreation and tourism

Tourism is moderately increasing with visitor numbers from 2012 - 2016 averaging 24,659 per annum, where from 2017 - 2018 numbers averaged 28,990 per annum. There are numerous websites pertaining to outdoor recreation that refer to Purnululu National Park in glowing terms. The remoteness helps protect the site's values and contributes to the sense of achievement experienced by visitors.

Factors negatively affecting provision of this benefit:
- Overexploitation: Impact level - Low, Trend - Continuing

► Importance for research

The site is important for building knowledge and disseminating information at a local and non-local scale, although currently this is relatively minor. Purnululu appears in recent literature with research pertaining to biodiversity (Rosauer et al., 2018), tourism (Strickland-Munro & Moore, 2014), invasive species (Rollins, Richardson & Shine, 2015), geomorphology and landscape.

Factors negatively affecting provision of this benefit:
- Climate change: Impact level - Low, Trend - Continuing
- Invasive species: Impact level - Low, Trend - Continuing

Summary of benefits

Purnululu National Park benefits are principally the conservation of a stunning landscape with high biodiversity, geological and cultural values. There are some monetary benefits from tourism and provision of jobs for maintaining the site, although benefits for local (Indigenous) people are largely intangible and non-pecuniary (e.g. transmission of cultural knowledge).
REFERENCES

<table>
<thead>
<tr>
<th>No.</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>CSIRO (2015). Climate change in Australia: Projections for Australia’s NRM regions.</td>
</tr>
<tr>
<td>№</td>
<td>References</td>
</tr>
<tr>
<td>----</td>
<td>----------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>№</td>
<td>References</td>
</tr>
<tr>
<td>----</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>