Ningaloo Coast

2020 Conservation Outlook Assessment

SITE INFORMATION

Country: Australia  
Inscribed in: 2011  
Criteria: (vii) (x)

The 604,500 hectare marine and terrestrial property of Ningaloo Coast, on the remote western coast of Australia, includes one of the longest near-shore reefs in the world. On land the site features an extensive karst system and network of underground caves and water courses. Annual gatherings of whale sharks occur at Ningaloo Coast, which is home to numerous marine species, among them a wealth of sea turtles. The terrestrial part of the site features subterranean water bodies with a substantial network of caves, conduits, and groundwater streams. They support a variety of rare species that contribute to the exceptional biodiversity of the marine and terrestrial site © UNESCO

SUMMARY

2020 Conservation Outlook  
Finalised on 02 Dec 2020  
GOOD WITH SOME CONCERNS
This relatively recently (2011) inscribed World Heritage site remains overall well preserved. Climate change poses the greatest threat to the long-term conservation of the site. The coral reefs within the Ningaloo Coast appear to have escaped the coral bleaching event which affected many other coral reef areas in 2016, however concerns are still high regarding their future. Increasing visitation, recreational use and associated pressures on marine, coastal and terrestrial habitats within and adjacent to the site continue to remain major threats. With increases in recreational fishing, there are also concerns over short term impacts on populations of some species and longer term impacts on the broader ecosystem. There is a managed risk of oil spills from vessels and production platforms and collisions with reefs, marine wildlife and other vessels adjacent to the site. Both urban and industry development need to be considered for potential future threats. However, in general, the Ningaloo Coast site remains well-protected. It has an effective range of management plans and qualified staff. An increase in overall management resources has recently been implemented by the Western Australian Government through the Department of Biodiversity, Conservation and Attractions (DBCA). An Indigenous Land Use Agreement (ILUA) was finalised between the Department of Biodiversity, Conservation and Attractions and the Gnulli native title holders to formalise the joint vesting and ongoing joint management of the Ningaloo Marine Park and Cape Range National Park and the Ninggulu Coastal Reserve, which will support the integrity of the World Heritage site and conservation of the natural and cultural values within and adjacent to it. It will be important to ensure that the management programs addressing the various threats facing this site, particularly building resilience to climate change, are sustained and if necessary supported by additional resources.
FULL ASSESSMENT

Description of values

Values

World Heritage values

- Exceptional landscape combining arid terrestrial and marine features
  The landscapes and seascapes of the property are comprised of mostly intact and large-scale marine, coastal and terrestrial environments. The lush and colourful underwater scenery provides a stark and spectacular contrast with the arid and rugged land (World Heritage Committee, 2011; State Party of Australia, 2010; IUCN, 2011).

- One of the largest documented aggregation of whale sharks in the world
  The property supports rare and large aggregations of whale sharks (Rhincodon typus) along with important aggregations of other fish species and marine mammals. The mass coral spawning and seasonal nutrient upwelling cause a peak in productivity that leads to aggregations along the Ningaloo Coast of approximately 300-500 whale sharks, making this one of the largest documented aggregation in the world (World Heritage Committee, 2011; State Party of Australia, 2010; IUCN, 2011).

- High diversity of marine fish
  High marine diversity of more than over 700 reef fish species and large number of marine pelagic species including whale sharks (World Heritage Committee, 2011; State Party of Australia, 2010; IUCN, 2011). Manta rays are abundant in the reserve and are found on the outer reef and in the lagoon. Nineteen species of shark including the black-tip reef shark, white-tip reef shark, hammerhead shark, tawny nurse shark, oceanic white tip shark, tiger shark, blue shark- and grey reef shark - occur in the lagoon and deeper waters. The open ocean supports large aggregations of fish, including trevally, tuna, mackerel, marlin and sailfish, many of which are found much closer to shore than in other parts of the world due to the narrow continental shelf (State Party of Australia, 2010; IUCN, 2011).

- High diversity of reptiles
  Situated at an ecotone between tropical and temperate waters, the Ningaloo Coast hosts an unusual diversity of marine turtle species with an estimated 10,000 nests deposited along the coast annually (World Heritage Committee, 2011; State Party of Australia, 2010; IUCN, 2011). Marine reptiles include six recorded marine turtle species (with 4 species recorded nesting, although only 3 species nest in significant numbers), and the olive sea snake. The Carnarvon Xeric Scrub ecoregion is recognized for its high levels of species richness and endemism, particularly for birds and reptiles (World Heritage Committee, 2011; State Party of Australia, 2010; IUCN, 2011).

- High diversity of marine mammals
  Twenty cetacean species have been recorded in the property with frequent observations of dugong and dolphins (most commonly bottlenose and Australasian humpback dolphins) in the lagoons and other marine areas, and at least eight species of whales: Notable are the presence of humpback whales migrating through on their annual migration from feeding grounds in Antarctica to calving grounds along the Western Australian coast into the Kimberley. Blue and sperm whales have been observed in the offshore regions of the nominated area, as have minke, brydes, southern right and killer whales (State Party of Australia, 2010; IUCN, 2011).
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**High diversity of cave (troglomorphic) diversity**
Criterion: (x)

The combination of relict rainforest fauna and small, fully aquatic invertebrates within the same cave system is exceptional. The subterranean fauna of the peninsula is highly diverse and has the highest cave fauna (troglomorphic) diversity in Australia and one of the highest in the world (World Heritage Committee, 2011; State Party of Australia, 2010; IUCN, 2011).

**Noteworthy arid-zone vascular flora**
Criterion: (x)

Terrestrial arid-zone vascular plant diversity is noteworthy (World Heritage Committee, 2011; State Party of Australia, 2010).

**High diversity of marine invertebrates and algae**
Criterion: (x)

More than 50 per cent of Indian Ocean coral species (over 300 species in 54 genera), at least 650 mollusc species, 600 crustacean species, 155 sponge species and an undocumented number of echinoderms including 25 new to science together provide an exceptional diversity of marine invertebrates, supplemented by more than 1,000 species of marine algae (World Heritage Committee, 2011; State Party of Australia, 2010; IUCN, 2011).

**Other important biodiversity values**

**Noteworthy birds**

With at least 200 bird species in the property, eleven of these are at the northern or southern limits of their range, or are otherwise isolated from their main populations. Examples include the western bowerbird (Chlamydera guttara), rufous-crowned emu-wren (Stipiturus ruficeps) and the painted firetail finch (Emblema picta) (State Party of Australia, 2010). The Cape Range Peninsula belongs to an arid ecoregion recognized for its high levels of species richness and endemism, particularly for birds and reptiles (World Heritage Committee, 2011; IUCN, 2011).

**Assessment information**

**Threats**

**Current Threats**

Climate change poses the most significant threat to the long-term conservation of this World Heritage site and it is expected to significantly increase, most notably perhaps causing coral bleaching. The effectiveness of the site’s management regime minimises threats where possible. Human disturbance, including from recreational activities, continues to be a threat, and although visitation levels are increasing, this threat is currently appropriately managed. Pressure from recreational fishing remains, particularly as visitation in general and recreational fishing are increasing. This is putting increasing pressure on populations of certain species, as has been documented by recent research, which showed declining population trends of key target species such as emperors, both inside and outside sanctuary zones (Vanderklift et al. 2019). Unmanaged visitor access to the property and visitor recreation activities within and adjacent to the property; introduced plants and animals and cyclonic activity continue to remain major threats.

**Mining/ Quarrying**

*(Limestone quarrying)*

Proposed activities that have a significant impact on values are subject to assessment processes (State Party of Australia, 2010). Limestone quarrying currently taking place in an extraction lease at a modest scale is not posing a risk (IUCN, 2011).
The Ningaloo Coast is situated in an isolated location with a small regional population and insignificant urban development, so direct threats from human activities are low. The arid climate results in extremely low levels of runoff. In addition, the Ningaloo Coast Regional Strategy Carnarvon to Exmouth, a 30-year strategic land-use plan, limits significant development to the towns of Exmouth and Carnarvon, both of which are outside the nominated area (State Party of Australia, 2010). The Ningaloo Coast Regional Strategy Carnarvon to Exmouth is currently being reviewed (DPLH, 2019). Furthermore National Park and Conservation reserves have recently (October 2020) been established along the Ningaloo coast providing a long term buffer from residential and urban development.

Risk preparedness strategies for natural disasters are in place (State Party of Australia, 2010). However, there is a risk from the increasing intensity and frequency of cyclones with decreasing recovery times for corals between them (IUCN Consultation, 2017).

Invasive alien species, most importantly foxes, cats, goats and weeds on land and some marine species are satisfactorily monitored and controlled (IUCN, 2011). With management effort, goat and fox numbers have been reduced to negligible numbers in the past six years. Feral cats, although reduced in number, continue to persist throughout the terrestrial area and have become a focus of control work (IUCN Consultation, 2020).

Fire, historically part of local indigenous management, is a threat to the terrestrial vegetation and must be monitored and controlled (IUCN, 2011). Cape Range National Park Management Plan details the fire management regime (State Party of Australia, 2010; CALM, 2005). Fires from artificial sources, increased severe weather (lightning strikes) and burning through altered landscapes remain a threat (IUCN Consultation, 2017). A prescribed burning program is in place to mitigate the risk of bushfire, there are a number of prescribed burns planned over the next 5 years (IUCN Consultation, 2020).

There is a risk of oil spills from vessels and production platforms and collisions with reefs, marine wildlife and other vessels adjacent to the World Heritage site. There are several offshore oil and gas extraction operations near the site and a number of pending on- and offshore project proposals, which potentially pose a significant impact of the World Heritage values. Potential impacts include effects on migratory species, connectivity and ecological linkages within and adjacent the site, cumulative impacts including effects on migratory species from seismic testing, drilling, and operations. Offshore petroleum incidents, such as accidental discharge of oil or other pollutants pose a significant and most likely irreversible threat to the marine life and ecosystems. Certain components of the marine fauna found in the Ningaloo Coast World Heritage site could be lost forever in the event of an oil spill, especially coral reefs and sessile invertebrates (IUCN Consultation, 2017). The National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) carefully assesses the environmental impacts and risks from petroleum activities through Environment Plans and Oil Pollution Emergency Plans prepared by titleholders. The onus is on the proponent to show where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason to postpone
measures to prevent environmental degradation in any proposal or activity. The Western Australian Government and the Ningaloo Coast World Heritage Advisory Committee provide advice to industry on activities and environment plans that have the potential to impact the Outstanding Universal Value of the World Heritage site (IUCN Consultation, 2020).

**Tourism/ Recreation Areas**

Increasing visitation and pressures on natural values, sensitive coastal habitats and ecological communities continue to remain major threats to the property. Since the last assessment, visitor numbers have continued to increase together with associated pressures, such as increased recreational fishing and direct impacts on sensitive coastal ecological communities (IUCN Consultation, 2020). Pressure from recreational fishing, wildlife interactions and associated wildlife behavioural change remains, particularly as visitation in general is increasing. Unmanaged visitor access to the property and visitor recreation activities within and adjacent to the property continue to remain major threats to the property. These threats are mitigated by comprehensive management plans and management programs (IUCN Consultation, 2020). DBCA in partnership with the Nganhurra Thanardi Garrbu Aboriginal Corporation (NTGAC) Prescribed Body Corporate (PBC) continue to implement on ground operational works to mitigate impacts from unmanaged visitor access and recreations within and adjacent the southern portion of the property (IUCN Consultation, 2020).

**War, Civil Unrest/ Military Exercises**

Learmonth Air Weapons Range Facility covering about 18,954 hectares within the World Heritage site is used as a defence training area. It includes an ancient reef-complex and cave fauna of exceptional importance (IUCN, 2011).

**Ocean acidification, Temperature extremes, Storms/Flooding**

Climate change poses the biggest threat to the long-term conservation of the property. While Ningaloo is one of only three (of 29) World Heritage–listed coral reefs not expected to experience bleaching at least twice per decade by 2041 (a frequency that is likely to cause total mortality) under Representative Concentration Pathway (RCP) 8.5 climate projections (Heron et al. 2017); the same models predict that bleaching will occur at least twice per decade after 2041, a frequency that will rapidly kill most corals present and prevent successful reproduction necessary for recovery of corals and annual bleaching by 2049 (Heron et al. 2018). Above average sea surface temperatures in 2011 and 2013 were correlated with bleaching and loss of corals in the northern area of the property (Depczynski et al. 2013, Holmes et al. 2017). Strategies to increase resilience of ecosystems are being explored, but the risk is expected to increase (Fulton et al., 2014; Caputi et al., 2014; Lafraatta et al., 2015; Feng et al., 2015; Davies et al., 2016; Jones, 2019; DBCA, 2019; NOAA, 2020). Since the risk of future bleaching events is high, strategies and ongoing investment are required to improve understanding and develop resilience (Davies et al, 2016; IUCN Consultation, 2017; Jones, 2019; DBCA, 2019). Recently, the Ningaloo Coast has joined the Resilient Reefs Initiative to enhance existing resilience strategies and employ new innovative and coordinated approaches to build resilience in the natural environment and local communities (IUCN Consultation, 2020).

**Fishing / Harvesting Aquatic Resources**

Recreational shore-based and boat fishing is currently one of the most popular and widespread human uses in the region (Sumner et al 2002; Ryan et al 2013). Recreational fishing can potentially have significant ecological impacts (Stevens et al 2000; McPhee et al 2002; Lewin et al 2006). Some more recent studies note that recreational fishing in Ningaloo Marine Park is extensive (Davies et al., 2016; Mitchell et al 2018) and has likely reduced the abundance of some targeted species outside of sanctuary zones (Cresswell et al., 2019) and possibly inside (Vanderklift et al., 2019). Recreational
fishing effort and potential impacts on the marine environment are managed through a suite of measures including: Ningaloo Marine Park’s zoning scheme including sanctuary zones which prohibit recreational and commercial fishing; protected species; recreational catch and bag limits which are enforced by the Western Australian Government. With the exception of spearfishing, the same rules for recreational fishing apply in Ningaloo Marine Park (Commonwealth waters) (IUCN Consultation, 2017). However, recent data shows that the populations of key fish species in the Ningaloo Marine Park are declining, even within protected sanctuary zones (Vanderklift et al., 2019). The loss of catch to sharks (depredation) is causing human-shark conflict in this area, which leads to increased pressure on fish populations and intentional injury/killing of sharks by fishers (Mitchell et al., 2018a, b, 2019).

### Potential Threats

The Ningaloo Coast site is predicted to become increasingly vulnerable to climate change impacts (Fulton et al., 2014; Caputi et al., 2014; Lafratta et al., 2015; Feng et al., 2015; Davies et al., 2016; Jones, 2019), and hence the greatest potential threat to the site is further effects of climate change. These impacts include drought, change in cyclone frequency, increased wave energy, increase seawater temperature, coral bleaching, ocean acidification, and sea level rise – all of which can have a substantial impact on the site's biodiversity (e.g., coral, seaweed/seagrass, fish and other marine fauna species) and the site's World Heritage values. Fires from artificial sources and increased severe weather also remain a threat. Increases to on- and offshore oil and gas extraction resources operations near the site pose a significant threat to the World Heritage values. Potential impacts include effects on migratory species, boat strikes with marine species, connectivity and ecological linkages within and adjacent the property, cumulative impacts including effects on migratory species, sound impacts from seismic testing, drilling, and operations combined with the impacts of minor or major oil leaks. Increasing visitation, increased coastal erosion, damage and pressures on natural values, sensitive coastal habitats and ecological communities continue to remain major threats to the site.

#### Ocean acidification, Temperature extremes, Storms/Flooding (Climate change)

The greatest potential threat is the further unknown effects of climate change that could result in the risk of drought, catastrophic fire, change in cyclone frequency, increased wave energy, change in the temperature of seawater, coral bleaching, ocean acidification, and sea level rise and its associated impacts on coastal communities and habitat (i.e nesting habitat for turtles) – all of which would impact biodiversity (coral, seaweed/seagrass, fish and other marine fauna species) World Heritage values greatly (Moore et al., 2012; Fulton et al., 2014; Caput et al., 2014; Lafratta et al., 2015; Feng et al., 2015; Davies et al., 2016; Frolicher & Laufkotter, 2018., Jones, 2019; DBCA, 2019; Perry et al., 2018).

#### Oil/ Gas exploration/development (Further potential oil and gas exploration in the region)

The continued development of oil and gas exploration in this region, which has been approaching closer to the boundary of the Ningaloo Marine Park over the last 5-10 years, is of concern. However, large areas off the Ningaloo coast initially proposed by industry for potential exploration have not been included in the recently released 2020 Offshore Petroleum Exploration Acreage Release (https://www.industry.gov.au/data-and-publications/2020-offshore-petroleum-exploration-acreage-release). Uncertainty remains about the Subsea 7 oil and gas pipeline project in the Exmouth Gulf, which has now been put on hold (https://www.perthnow.com.au/news/wa/oil-and-gas-pipeline-near-ningaloo-reef-put-on-hold-until-2021-ng-b881651777z).

#### Overall assessment of threats

With its relative remoteness, the Ningaloo Coast has a high degree of natural protection. However, impacts from climate change including increases in sea temperatures, air temperatures and ocean acidification pose a significant threat to the site's values. Climate change impacts, particularly
Increases in seawater temperatures, which result in coral bleaching, have already had some impact on the site. Of most concern is that the threat of climate change and its effects on the site's World Heritage values is predicted to increase in the future. These effects include increased frequency of extreme marine heat-wave events, increased water depth (sea level rise), increased wave energy, increased coral bleaching, and ocean acidification. Other threats include increasing visitation and pressures on natural values, sensitive coastal habitats and ecological communities, which remain a concern. Unmanaged visitor access to the site and visitor recreation activities within and adjacent to the property and introduced plants and animals continue to remain major threats to the property. There is a risk of oil spills from vessels and production platforms and collisions with reefs, marine wildlife and other vessels adjacent to the site. However, there are resilience, conservation, visitation management programmes, risk assessments and emergency plans in place. Therefore, most of the threats could be considered of low concern, with the exception of already observed and predicted climate change impacts, future oil and gas or coastal development.

Protection and management

Assessing Protection and Management

► Management system

Mostly Effective

Given the various governmental levels and agencies involved and the differentiation between terrestrial and marine parts of the property, effective coordination of the multiple plans in an overall management framework is critical. The individual management plans and their respective governance arrangements are combined under the Ningaloo Coast Strategic Management Framework (IUCN, 2011; World Heritage Committee, 2011). The Director of National Parks (Australian Government) is responsible for the Ningaloo Marine Park (Commonwealth waters) and works cooperatively with the Western Australian Government. The Department of Biodiversity, Conservation and Attractions (DBCA) (formally the Department of Parks and Wildlife) is the lead Western Australian Government agency for the management of the property (IUCN Consultation, 2017). The Shire of Exmouth and The Department of Defence jointly manage tenure within the site. The recently formed Joint Management Body ensures the protection of cultural and natural values within and adjacent the property. DBCA is committed to building strong relationships to work in partnership with traditional owners to care for country, through the creation of the Nyinggulu Coastal Reserves and continued employment through the Aboriginal Ranger Program, clerical staff and cultural advisory staff (IUCN Consultation, 2020). An Indigenous Land Use Agreement (ILUA) has been finalised between the Nganhurra Thanardi Garrbu Aboriginal Corporation (NTGAC) Prescribed Body Corporate (PBC) and State parties. The ILUA formalises the joint vesting and ongoing joint management of the Ningaloo Marine Park and Cape Range National Park with traditional owners and the creation of 48,456 ha of national park and conservation reserve abutting the Ningaloo coast.

► Effectiveness of management system

Highly Effective

A need for ongoing management of fisheries and visitation and careful planning of resource extraction with corresponding monitoring and disaster preparedness to protect the values of the site has been recognised at the time of its inscription (World Heritage Committee, 2011; IUCN, 2011). Currently, the Ningaloo Coast has comprehensive management plans and staff in place to guide management and address these issues (DBCA, 2019). Emergency preparation in the case of an accidental oil spill is kept up to date (IUCN Consultation, 2017).

► Boundaries

Mostly Effective

Boundaries are sufficient to ensure integrity of the site. Some areas originally included in the nomination were referred back to the State Party to allow further collaboration with stakeholders,
including holders of private leases within these areas. The World Heritage Committee noted that these areas could be considered via a subsequent minor boundary modification (World Heritage Committee, 2011). The Committee also recommended that the State Party “Consider inclusion of the Exmouth Gulf on the grounds of ecological linkages between the Ningaloo Reef and the Gulf, in particular the extensive mangrove stands and other shallow water habitats that function as nurseries and adult foraging grounds for many species” (World Heritage Committee, 2011).

The creation of conservation and recreation reserves along the Ningaloo Coast (adjacent to the World Heritage site), as well as an extension to Cape Range National Park and intertidal portions of Ningaloo Marine Park will support the integrity of the site and support the protection and conservation of the natural and cultural values within and adjacent to the site. With the finalisation of an ILUA and the creation of the Nyinggulu Coastal Reserves, the Western Australian Government will consider a minor boundary modification to the World Heritage site (IUCN Consultation, 2020).

Integration into regional and national planning systems

While overall the integration into regional and national planning systems appears effective, some studies indicated that consideration of climate change might not be adequately integrated into management planning (Davies et al., 2016). The Ningaloo Coast Regional Strategy (NCRS) has been an important guidance document for planning in the region since its release in 2004 and was a significant reference document in the Ningaloo Coast World Heritage nomination process. It is currently being reviewed (DPLH 2019). There is a need to reinforce the NCRS as the overarching strategy for guiding development proposals along the Ningaloo Coast for all planning, in support of an integrated planning approach to the NCWHA (IUCN Consultation, 2020).

Relationships with local people

There is a strong commitment to conserve the World Heritage values of the property among all stakeholders involved including traditional owners, community, scientists, local businesses, tourism operators, volunteers, Western Australian and local government agencies. An Indigenous Land Use Agreement (ILUA) was finalised between the Department of Biodiversity, Conservation and Attractions and the Gnuli native title holders to formalise the joint vesting and ongoing joint management of the Ningaloo Marine Park and Cape Range National Park and the Nyinggulu Coastal Reserve (IUCN Consultation, 2020).

Legal framework

The entire, mostly Western Australian Government-vested World Heritage site is comprehensively protected and managed, including by an overarching strategic management framework. (World Heritage Committee, 2011; Nomination, 2010; IUCN, 2011). The relevant legislation includes the Environment Protection and 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 proposal within or adjacent to the property will be subject to assessment and approval under the EPBC Act if an action is considered likely to have significant impacts on World Heritage values and other protected matters, such as threatened species. At the Western Australian Government level, the Environmental Protection Act 1986 (Western Australia) provides a framework for considering potential environmental impacts of developments which may affect World Heritage values (IUCN Consultation, 2017).

Law enforcement

Enforcement of relevant regulations is considered effective (IUCN Consultation, 2017).

Implementation of Committee decisions and recommendations

The World Heritage Committee referred some of the areas proposed in the original nomination back to the State Party, which required further consultation with stakeholders, particularly holders of private leases, noting that they could be considered again via a subsequent minor boundary modification.
The Western Australian Government in negotiation with private lease holders along the Ningaloo Coast defined a reserve adjacent to the World Heritage property to be excised from the private lease boundaries, to ensure protection across the reserve and that it remains accessible to the public now and for future generations (IUCN Consultation, 2020).

The recently formed Joint Management Body (JMB), which is chaired by Gnulli members and contains members of DBCA, ensures the protection of cultural and natural values within and adjacent the property. An Indigenous Land Use Agreement (ILUA) was finalised between the Department of Biodiversity, Conservation and Attractions and the Gnulli native title holders to formalise the joint vesting and ongoing joint management of the Ningaloo Marine Park and Cape Range National Park and the Nyinggulu Coastal Reserve (IUCN Consultation, 2020).

**Sustainable use**

There is a need for ongoing assessment of effects of recreational fisheries to ensure management frameworks remain effective to protect the values of the site (World Heritage Committee, 2011). Recent research investigating the population status of important fish species in the Ningaloo Marine Park has indicated declining population trends for some species, including emperors, both inside and outside sanctuary zones (Vanderklift et al. 2019; Cresswell et al., 2020). However the degree to which this is attributable to fishing activities is not clear, with declines in targeted fish possibly influenced by additional factors such as large scale variation in climate (IUCN Consultation, 2020).

**Sustainable finance**

The Australian Government currently provides a budget of AUD $140,000 per annum for five years from July 2018 for employment of a Project/Executive Officer and the conduct of the World Heritage Advisory Committee. All other finance is via Western Australian Government agencies, or non-Government organisations (IUCN Consultation, 2020).

**Staff capacity, training, and development**

DBCA currently has 43 staff (equivalent full-time positions) that work in and around the World Heritage site (IUCN Consultation, 2020). DBCA has recently dedicated a marine ranger and a conservation employee to southern portions of the property, based in Coral Bay. A senior operations officer has been appointed to oversee southern operations. Additionally, an operations officer and three Indigenous conversation employees, a part time clerical officer and cultural advisor have also been appointed to work across the district including southern portions of the property (IUCN Consultation, 2020).

**Education and interpretation programs**

Visitor education programmes are well developed (State Party of Australia, 2010; IUCN, 2011). Opportunities for community education and involvement are high, with significant volunteer programmes involving people in the management and monitoring of the property. DBCA implements a number of local education and interpretation programmes that inform local community members and visitors of World Heritage values, management strategies and research outcomes (IUCN Consultation, 2017).

**Tourism and visitation management**

Tourism in the area is highly focused on nature based or World Heritage values based tourism (IUCN Consultation, 2017). This is managed to a high standard by DBCA. DBCA continues to incorporate World Heritage interpretive information across the World Heritage area with a continual review of the following visitor information including Ningaloo Marine Park zoning signage, Jurabi Turtle Centre, Milyering Discovery Centre, Coral Bay Information Centre, Marine Park and National Park entry signage, visitor information – multimedia and hard copy print (IUCN Consultation, 2020).

**Monitoring**

DBCA has a monitoring program coordinated by the Marine Science Program with with sites at Ningaloo
Strategic and targeted monitoring of sea turtles, shorebirds, humpback whales and whale sharks is coordinated locally by DBCA to strategically support and inform on-reserve management actions. In addition, understanding of the marine values of Ningaloo is supported by a large number of external research organisations including AIMS, the CSIRO and numerous Australian Universities (IUCN Consultation, 2020). Monitoring and mapping the colonies of black-flanked rock wallabies has also been occurring throughout the area over the past eight years, with a number of new colonies identified and existing strongholds monitored. Community participation is encouraged to develop stewardship for these World Heritage values (IUCN Consultation, 2020).

Research

A long list of research projects is provided in the nomination (2010). Research activities continue in and around the property, including applied research projects in terrestrial and marine environments conducted by DBCA (IUCN Consultation, 2020).

Overall assessment of protection and management

The Ningaloo Coast has an effective range of management plans and qualified staff. Programmes ensuring management and control of invasive species, emergency preparation in the case of an accidental oil spill and management strategies to mitigate pressures from increasing visitation are in place to ensure the protection and conservation of natural values. At the time of inscription some concerns were expressed with the regards to the adequacy of staff numbers and available funding compared to the scale of management activities. An increase in overall management resources has been implemented by the Western Australian Government through the Department of Biodiversity, Conservation and Attractions (DBCA). DBCA now has a total of 43 staff (equivalent full-time positions) including specialist staff to manage the natural values of the property and adjunct land tenure. Management is strengthened through formal joint management arrangements with the Gnulli native title holders. The finalisation of an Indigenous Land Use Agreement (ILUA) formalises the joint vesting and management of the Ningaloo Marine Park and Cape Range National Park and the Nyinggulu Coastal Reserve by DBCA and the Traditional Owners. This will also support the integrity of the World Heritage site and conservation of the natural and cultural values within and adjacent to it. Communication between DBCA and the Department of Primary Industries and Regional Development, and other research organisations (CSIRO, AIMS, UWA and other WA universities) is important for shared knowledge to inform management.

Assessment of the effectiveness of protection and management in addressing threats outside the site

Due to its remoteness and the appropriateness of its boundaries, the site is not subject to significant threats originating from outside its boundaries, with the exception of climate change and possible oil spills or boat strikes. To this end, the management authority has recognized the need to identify and protect potential climate change refugia; limit the impact of other key threatening processes; incorporate climate change science into strategies; and facilitate adaptation (DBCA, 2019) - although some research has indicated that adaptation may be insufficient in Western Australian waters (Moore et al., 2012). It is also recognized that it will be important to build resilience through minimizing other impacts, such as by increasing the number of ‘no-take areas’ (marine reserves), and better representation of reserves to encompass areas (potential refugia) most resilient to climate change (Davies et al., 2016); and by reducing the impacts of seagrass and coral damage and overfishing (Jones, 2019). It is noted that the management authority is very good at mitigating conflicts such as those related to recreational fishing and marine wildlife tourism (Jones, 2019). Other threats from outside the site include oil and gas extraction, with some concerns relating to commercial fishing and recreational fishing (Cresswell et al., 2020) – both of which appear to be effectively controlled as legislation is in place to ensure activities outside of the site will not threaten World Heritage values. The risks involved in oil and gas extraction, that occurs...
Best practice examples

The property hosts one of the largest reliable whale shark aggregations in the world. DBCA manages a licensed tourism activity for whale shark interactions within the property (Ningaloo Marine Park (State waters). The management of the whale shark tourism industry based around this exceptional phenomenon is acknowledged globally as best practise and considered a successful model for sustainable natured-based tourism, inspiring other countries to establish similar conservation management programs to protect their aggregations (Norman, 2002; Rowat & Brooks, 2012; Sanzogni et al., 2015).

State and trend of values

Assessing the current state and trend of values

World Heritage values

▶ Exceptional landscape combining arid terrestrial and marine features

Overall the values of the property remain in good condition (IUCN Consultation, 2017). The outstanding aesthetic attributes of the property remain well preserved and the property continues to feature an exceptional combination of unique marine, coastal and terrestrial environments of striking contrast.

▶ One of the largest documented aggregation of whale sharks in the world

Ningaloo Coast supports rare and large aggregations of whale sharks (Rhincodon typus), with approximately 300-500 whale sharks reported at the time of inscription (World Heritage Committee, 2011; IUCN, 2011). DBCA has implemented a number of measures to manage encounters between operators, tourists and whale sharks, thereby mitigating potential impacts on the animals (Sanzogni et al., 2015). Intentional and unintentional mortality outside Australian waters is the most significant threat to the whale sharks. In Australia, boat strikes from large vessels and habitat disruption constitute the most significant threats, these are mitigated through the comprehensive management program (IUCN Consultation, 2020).

▶ High diversity of marine fish

With increases in recreational fishing, there are concerns over short term impacts on populations of some species and longer term impacts on the broader ecosystem (Cresswell et al., 2020). Specifically, recent research has identified declines in target and non-target fish species, not only in fished areas but also in Ningaloo Marine Park sanctuary zones. This may be due to a combination of fishing and environmental/habitat related factors (Vanderklift et al. 2019). Any impacts to the corals will also likely have strong flow-on effects to the fish and declines in various groups have been noted in some areas.

▶ High diversity of reptiles

It’s considered that these values have remained well preserved since the inscription of the property (IUCN Consultation, 2017). Sea turtles have been well-studied along the Ningaloo coast since 2002. Numbers of nesting females vary greatly among years, but no long-term trends of decline have been
identified (IUCN Consultation, 2020). Although no specific surveys have been done within the World Heritage site, reptiles are believed to be in good condition with the recent successes with feral animal control programs (IUCN Consultation, 2020). Climate change is a significant future threat.

**High diversity of marine mammals**

A recent study on humpback whales distribution and abundance recorded a total of 2772 humpback whales in Exmouth Gulf between 08 August and 02 November 2018 and confirmed that Exmouth Gulf is an important resting area for the Breeding Stock D humpback whales (Irvine and Kent, 2018). The same study recorded a total of 605 dugongs and a total of 556 dolphins.

**High diversity of cave (troglomorphic) diversity**

The blind cave eel (Ophisternon candidum), found in the subterranean waters of the Cape Range Peninsula is listed as “vulnerable” under the Biodiversity Conservation Act 2016 (Western Australia) (September 2018 list) and assessed as “endangered” by the IUCN Red List (Moore, 2019). Some studies conclude that subterranean species globally are particularly sensitive to climate change (Mammola et al., 2019). However, no comprehensive data has been found to determine current trends specifically for Ningaloo Coast.

**Noteworthy arid-zone vascular flora**

Coastal vegetation communities suffer impacts of increased visitation, Unmanaged visitor access and recreation, combined with weeds, are the main ongoing pressures (IUCN Consultation, 2020).

**High diversity of marine invertebrates and algae**

The Ningaloo Coast coral reef ecosystems are considered as being likely to be very vulnerable to climate change (Fulton et al., 2014), and coral bleaching (and flow-on impacts on marine species) have been recorded at the site in the past, particularly associated with a severe ocean heat-wave event that impacted the site in 2011. The coral reefs within Ningaloo Coast appear to have escaped the coral bleaching event which affected many other coral reef areas in 2016, however concerns are still high regarding their future. The risk of future bleaching events remains high (Fulton et al., 2014; Caputi et al., 2014; Lafratta et al., 2015; Feng et al., 2015; Davies et al., 2016; Jones, 2019; DBCA, 2019; NOAA, 2020).

### Summary of the Values

**Assessment of the current state and trend of World Heritage values**

The values of this World Heritage site have so far been largely maintained and remain in good condition. Tourism, grazing and feral species are having some impacts on some terrestrial values of the site, however, these impacts remain small in scale and localized. The concerns are greater for the Ningaloo Coast site’s marine areas, with climate change impacts in particular registering as a significant threat. The Ningaloo Coast coral reef ecosystems are considered as being likely to be very vulnerable to climate change (Fulton et al., 2014), and coral bleaching (and flow-on impacts on marine species) have been recorded at the site in the past, particularly associated with a severe ocean heat-wave event that impacted the site in 2011 (Holmes et al, 2017). The coral reefs within the Ningaloo Coast appear to have escaped the coral bleaching event which affected many other coral reef areas in 2016 (Hughes et al 2017), however concerns are still high regarding their future as the risk of future bleaching events remains high (Fulton et al., 2014; Caputi et al., 2014; Lafratta et al., 2015; Feng et al., 2015; Davies et al., 2016; Jones, 2019; DBCA, 2019; NOAA, 2020). During
IUCN World Heritage Outlook: https://worldheritageoutlook.iucn.org/
Ningaloo Coast - 2020 Conservation Outlook Assessment

In the summer of 2010/2011 a marine heat-wave event caused substantial fish deaths, and a temporary southward range extension of tropical fish species, whales and manta rays off Western Australia (Pearce & Feng, 2012), noting that this was largely detailed outside the property. Some concerns exist with regards to the aggregations of whale sharks as this species is under pressure from different threats, especially in areas outside Australian waters. With increases in recreational fishing, there are also concerns over short term impacts on populations of some species and longer term impacts on the broader ecosystem. Recent research has identified declines in target and non-target fish species, not only in fished areas but also in Ningaloo Marine Park sanctuary zones.

Assessment of the current state and trend of other important biodiversity values

Good
Trend: Data Deficient

Although birds were not considered as contributing to the Outstanding Universal Value of the site under criterion x, they were assessed as noteworthy in the evaluation and merit monitoring in future. No comprehensive data is available to determine current trends. Significant numbers of internationally recognised shorebirds (RAMSAR), including critically endangered species such as the eastern curlew, bar tailed godwit, curlew sandpiper and great knot have been recorded within Exmouth Gulf (BirdLife Western Australia, 2020).

Additional information

Benefits

Understanding Benefits

Direct employment
Provision of revenue and jobs through tourism and park management.

Outdoor recreation and tourism
Beneficiaries include local and regional businesses that rely on tourism, and the tourists themselves.

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

The diversity of landscapes and ecosystems in the Ningaloo Coast World Heritage site offers many opportunities for recreation and tourism. As such, this region is one of the premier tourist destinations in the whole of Western Australia. However, the threats outlined in this assessment could cause substantial damage to these areas of outstanding natural beauty and biodiversity, negatively impacting the tourism sector, particularly marine tour businesses.

Fishing areas and conservation of fish stocks
Areas of mangroves provide a nursery site for fish within and outside the protected area. Well-established sanctuary zones can have a positive effect on maintaining populations of fished species.

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

Climate change and loss of habitat could have negative effects on key fish habitats, specifically
mangroves and coral reefs.

▶ **Access to drinking water, Commercial wells**

The water supply for Exmouth is obtained from extraction from an aquifer underneath the World Heritage site. Uses bottling and municipal drinking water.

▶ **Sacred natural sites or landscapes**

There are Aboriginal burial grounds and mythological and numerous midden sites in the site which are considered sacred. Cultural sites have recently been identified through a series of heritage surveys within and adjacent to the World Heritage site (IUCN Consultation, 2020).

▶ **Sustainable extraction of materials (e.g. coral, shells, resin, rubber, grass, rattan, etc)**

Coral and specimen shell collecting is allowed in certain areas with a license.

▶ **Importance for research, Contribution to education**

Important area for research, both marine and terrestrial, as well as archaeological studies. Opportunities for community education and involvement are high, with significant volunteer programmes operating involving people in the management and monitoring of the site. There are significant local education and interpretation programmes that inform local community members and visitors of World Heritage values, management strategies and research outcomes (IUCN Consultation, 2017).

▶ **Soil stabilisation, Coastal protection, Flood prevention, Water provision (importance for water quantity and quality)**

Large natural terrestrial and marine areas provide important environmental services including coastal protection, soil stabilisation, wetland protection, and groundwater renewal.

▶ **Tourism-related income, Provision of jobs**

Provision of revenue and employment through tourism and park management. Beneficiaries include local and regional businesses that rely on tourism, and the tourists themselves. Tourism in the area is highly focused on nature based or World Heritage values based tourism. Industries revolve around camping, diving and interacting with the marine megafauna within the World Heritage site. The whale shark industry in Ningaloo Marine Park had a record 1814 tours during the 2018 season (1 March to 31 July). Passenger numbers increased from 29,197 in the 2017 season to 32,054 in the 2018 season resulting in tens of millions of dollars of revenue for the local community (DBCA, 2019).

**Summary of benefits**

The site benefits the local and global community by protecting wildlife and wilderness values, providing environmental services and allowing people to experience the special values of the site. The mangrove areas and no-take sanctuary zones provide a nursery for fisheries outside of the World Heritage site, and tourism provides important benefits to tourists as well as revenue and jobs to the local population. Park management also provides jobs, and research undertaken in the World Heritage site increases scientific knowledge and education. Management of the site provides benefits to the local Aboriginal community, through generation of jobs and cultural connections to country.

**Projects**
## Compilation of active conservation projects

<table>
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<tr>
<th>№</th>
<th>Organization</th>
<th>Brief description of Active Projects</th>
<th>Website</th>
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<tbody>
<tr>
<td>1</td>
<td>ECOCEAN Inc.</td>
<td>Conservation of whale sharks around the world, working in collaboration with other nongovernmental organisations such as Earthwatch, individual volunteers in the community, and DEC in Australia, as well as scientists in the United States.</td>
<td><a href="http://www.whaleshark.org/">http://www.whaleshark.org/</a></td>
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<tr>
<td>3</td>
<td>Department of Biodiversity, Conservation and Attractions</td>
<td>Integrated feral animal control programs, weed control programs and monitoring of threatened species and communities.</td>
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<td>4</td>
<td>Department of Parks and Wildlife</td>
<td>Regional turtle conservation project.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Cape Conservation Group Ltd Department of Biodiversity, Conservation and Attractions</td>
<td>North West Cape Feral Animal Trapping Program.</td>
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<td>34</td>
<td>National Native Title Tribunal (no date). Application details: Gnulli. <a href="http://www.nntt.gov.au/searchRegApps/NativeTitleClaims/Page">http://www.nntt.gov.au/searchRegApps/NativeTitleClaims/Page</a>...</td>
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