

Greater Blue Mountains Area

2020 Conservation Outlook Assessment

SITE INFORMATION

Country: Australia

Inscribed in: 2000

Criteria: (ix) (x)



The Greater Blue Mountains Area consists of 1.03 million ha of sandstone plateaux, escarpments and gorges dominated by temperate eucalypt forest. The site, comprised of eight protected areas, is noted for its representation of the evolutionary adaptation and diversification of the eucalypts in post-Gondwana isolation on the Australian continent. Ninety-one eucalypt taxa occur within the Greater Blue Mountains Area which is also outstanding for its exceptional expression of the structural and ecological diversity of the eucalypts associated with its wide range of habitats. The site provides significant representation of Australia's biodiversity with ten percent of the vascular flora as well as significant numbers of rare or threatened species, including endemic and evolutionary relict species, such as the Wollemi pine, which have persisted in highly-restricted microsites. © UNESCO

SUMMARY

2020 Conservation Outlook

Finalised on 03 Dec 2020

SIGNIFICANT CONCERN

Seventy-one percent of the site was affected by fires that burned at greatly varying intensities for more than 3 months from end October 2019 to early February 2020. Many species that are attributes of the Outstanding Universal Value of the site were impacted by the fires; however, the impacts are still being assessed. Prior to the fires of 2019/20, most of the natural plant communities and habitats of the site remained close to pristine, and recovery from the impacts of the fires needs to be closely monitored. While management of the site itself and of the protected areas comprising it has been effective to date, the devastating fires in the Greater Blue Mountains in 2019/20 have raised new challenges for the World Heritage site. Better planning and adaptive management will be important to address threats, especially climate change and its unfolding effects including drought and uncontrollable fire. New management approaches to fire are needed, as conventional approaches are shown to be less effective than under previously experienced conditions. Impacts of developments adjacent to the site require ongoing vigilance. The large size and extensive perimeter of the site and the existence of major enclaves (inholdings) creates further management challenges.

FULL ASSESSMENT

Description of values

Values

Other important biodiversity values

► **Endangered Temperate Highland Peat Swamps on Sandstone**

The World Heritage site included endangered Temperate Highland Peat Swamps on Sandstone (THPSS), which are largely unique to the Blue Mountains. Their key values include floristic diversity, water retention in the upper landscape, habitat for two endangered fauna species and provision of base flow to downstream catchments (Cowley et al., 2019).

► **The Upland Basalt Eucalypt Forests of the Sydney Basin Bioregion**

The Upland Basalt Eucalypt Forests of the Sydney Basin Bioregion is typically tall open eucalypt forest found on basalt and basalt-like substrates in, or adjacent to, the World Heritage property (Department of Sustainability, Environment, Water, Population and Communities, 2011).

Assessment information

Threats

Current Threats

High Threat

The Australian Government is working closely with the NSW State Government, land managers, scientific experts, other stakeholders and Aboriginal communities to better understand the impact of the 2019-20 bushfires on the Outstanding Universal Value (OUV) of the site. Further detailed investigations of the direct and indirect impacts of the bushfire events are underway. Assessment of biodiversity impacts associated with the 2019/20 fires are high priority and will continue over the next 6 to 12 months. The impacts of climate change are predicted to continue to escalate, with increasing temperatures, drought, extreme weather and fires. With regards to other threats, control of introduced predators (foxes, cats and wild dogs) is on-going. In addition to threats of drought and fire, upland peat swamps continue to be threatened by mining adjacent to the Greater Blue Mountains Area.

► **Fire/ Fire Suppression**

Very High Threat

(Extreme fires)

Inside site, throughout(>50%)

The extreme fires in the GBMA and across south-eastern Australia over several months in 2019/20 reflect climate changes that have affected fire regimes that have led to increasing dry fuel loads. The NSW government released an immediate response plan in January for recovery actions and wildlife protection (Department of Planning Industry and Environment, 2020). A wider conservation response to the fires across Australia was prepared by Dickman et al. (2020) to outline priority actions and a blueprint for responding to such large-scale ecological disaster. The GBMA has one of the world's most fire-prone ecosystems. Initial estimates in early 2020 showed that potentially up to 82% (853,977 hectares) of the site was affected by fires that burned at greatly varying intensities for more than 3 months from end October 2019 to early February 2020 (State Party of Australia, 2020). A more detailed analysis using the Fire Extent and Severity Mapping (FESM) method, has shown that it is about 71% (IUCN Consultation, 2020c). Some areas burnt with lower intensity and provided critical refugia for some species. Impacts on species will not be fully understood until further monitoring is done. The fires were followed in February by torrential rain which also significantly impacted the property, with flash flooding resulting in increased

sediment, debris and ash runoff and erosion of some watercourses and unsealed access routes across the site.

Of the 587 fires that have occurred within the Greater Blue Mountains Area over the last 15 years, 67% (393) were contained to less than 10 ha and only 25 fires (<5%) were larger than 1,000 ha. During the 2019-20 fire season there were 41 ignitions (primarily as a result of lightning) across the World Heritage site. 20 of those remote ignitions were successfully contained by NPWS Remote Aerial Response Teams (RART) to an average fire size of less than 1.2 ha. This action contributed significantly to reducing the impact of the larger fires (IUCN Consultation, 2020c).

Many species that are attributes of the Outstanding Universal Value of the site were impacted by the fires (State Party of Australia, 2020). An evaluation of species impacts will draw together information on the status of species prior to the fires, the degree to which their range is within the fire extent and past fire impacts and traits which provide insights into the vulnerability of each species to fire. These traits will also help to identify actions which are required to support the recovery of each priority species. Actions have commenced to reduce the impacts from introduced carnivores and herbivores and weeds on fire-affected native plants and animals. The NSW Government is developing and implementing targeted ongoing monitoring programs to assess impacts and monitor recovery of species. Main ongoing threats relate to the impact of altered or inappropriate fire regimes on the ecological, biological and evolutionary processes within the eucalypt-dominated ecosystems (e.g. Barker and Price 2018), and the impact of inappropriate fire regimes on the quality of habitats for in-situ conservation of the biological diversity of primitive species with Gondwanan affinities and of rare or threatened plants and animals. The Final Report of the NSW Bushfire Inquiry has been released (<https://www.nsw.gov.au/nsw-government/projects-and-initiatives/nsw-bushfire-inquiry>) with all 76 recommendations supported by the NSW Government. Outcomes from the state inquiry, will help inform the NSW Government response in terms of future fire management approaches. The Royal Commission into National Natural Disaster Arrangements report was released to the Australian Governor-General on 28 October 2020 (<https://naturaldisaster.royalcommission.gov.au/>).

► **Water Pollution**

High Threat

(Discharge of polluted water from collieries into rivers)

Inside site, scattered(5-15%)
Outside site

The Wollangambe, Wolgan and Colo Rivers are affected by polluted water from collieries. The Colo (and its major tributaries that include the Wolgan and Wollangambe, see DECCW, 2008) is a dedicated Wild River (Benson et al., 2012; Hansen, 2010). In July 2015, coal fines from the Clarence Colliery collapsed into the Wollangambe River, resulting in pollution within the World Heritage site. The mining company was prosecuted and required to pay an environmental compensation, in addition to covering clean-up works. The State Party investigated the incident and remediation works, and concluded that there have been no long-term impacts on the OUV of the site (State Party Report, 2019; UNESCO, 2019). More recent research (Wright et al., 2017) reports that pollution from the mine extends at least 22 km downstream in the Wollangambe from the outflow of coal mine wastes. The resulting water pollution is causing major impairment of the aquatic ecosystem, with reduced abundance, taxonomic richness and loss of pollution-sensitive macroinvertebrate groups. Water pollution from the mine includes thermal pollution, increased salinity, and increased concentrations of a wide range of heavy metals that appear to have been mobilised into riparian vegetation (Wright et al. 2017; Belmer and Wright, 2018). Further assessment of the implications of heavy metal mobilisation to the terrestrial environment from waterways is recommended because if heavy metal contaminants are leaving the water column of their receiving waterways and mobilising to the terrestrial environment, serious long-term legacy pollutant impacts may persist (Belmer and Wright, 2018). There has also been serious ongoing heavy metal pollution (zinc and nickel) from Canyon Colliery that flows into the Grose river in the WHA (see Wright, 2020).

► **Oil/ Gas exploration/development, Mining/ Quarrying**

High Threat

(Subsidence and dropping of water levels)

Inside site, scattered(5-15%)
Outside site

Subsidence from long wall coal mining close to the boundary of the GBMA threatens cliff collapse, water pollution, lowering of water tables, desiccation of peat swamps and the loss of surface water (Independent Expert Panel for Mining in the Catchment, 2019). The Temperate Highland Peat Swamps on Sandstone (THPSS) are a Threatened Ecological Community (TEC) (New South Wales Scientific

Committee 2007; New South Wales Government Office of the Environment and Heritage, 2014; Commonwealth of Australia, 2014) and their water retention and ecological function (including providing base flow to downstream catchments) is shown to be impacted by mining, along with impacts of climate change and extreme fire (Cowley et al. 2019). In the THPSS swamps studies by Cowley et al. (2019) 70% of the water in the 4 of 5 swamps came from the surrounding bedrock aquifer, indicating the major impact subsidence can cause by removing water. The high floristic diversity of the swamps has been previously underestimated (Tierney et al. 2018). The threats are greatest in the Gardens of Stone area on the Newnes Plateau (containing many upland swamps that are listed as threatened under the EPBC Act, with fauna including two threatened species, the Blue Mountains Water Skink and the Giant Dragonfly; flows in the Wolgan River that runs through the GBMA may also be affected) (Department of Sustainability, Environment, Water, Population and Communities, 2013; Goldrey et al., 2010). The 2020 Centennial Angus Place Extension Report (ERM 2020) notes that "development of fractures within the sandstone bedrock underling watercourses across the Study Area caused by mining subsidence could significantly increase local hydraulic conductivity. This can significantly reduce, or in some cases effectively eliminate baseflow. This loss of flow can lead to the progressive drying of downstream swamps which can result in a range of impacts including loss of wetland plant species, drying and desiccation of the swamp peat, increased potential for incision, and erosion of the swamp surface during high flow events".

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

High Threat

(Spread of pests)

Inside site, throughout(>50%)

Other invasive species names

Outside site

European red fox (*Vulpes vulpes*), feral cat (*Felis catus*)

Control measures for invasive species are outlined in national park management plans, which are implemented in cooperation with neighbours. Invasive fauna include foxes, cats, carp, deer, dogs, goats, horses, pigs, rabbits, and cattle. The greatest threat is from introduced predators (foxes and cats) (Pascoe, 2011; Pascoe et al., 2011). Fire-affected landscapes leave native animals more exposed to predation by feral cats, dogs and foxes. Native animals are competing for scarce food with feral deer, pigs and goats. After the 2019/20 fires, feral animal control is underway to protect native animals while their habitat recovers. Invasive plants are well adapted to colonise burnt areas and may become more prevalent and out-compete native species. Targeted post-fire weed control to support the recovery of native flora is being planned and implemented (IUCN Consultation, 2020c).

► **Tourism/ Recreation Areas**

Low Threat

(Tourism and visitor management)

Inside site, localised(<5%)

Outside site

Visitation is managed to minimise impact while supporting the visitor experience and appreciation of values. Tourism development due to increasing visitor pressure and infrastructure is discussed in the GBMA strategic plan. The development of the Emirates Resort inside the Wollemi National Park was negotiated as a land swap of previously disturbed farmland within the park for high conservation freehold land. The process has been stalled because the land swap is subject to negotiating an Indigenous Land Use Agreement and this has not been finalised. The section of the Resort on park is subject to a 21-year lease to allow the land swap to be resolved.

► **Housing/ Urban Areas**

High Threat

(Urban run-off impacting threatened upland peat swamps)

Inside site, localised(<5%)

Outside site

Temperate highland peat swamps on sandstone (THPSS) are unique state and federally protected ecological communities comprising multiple swamp communities (Blue Mountains Swamps and Newnes Plateau Shrub Swamps) (New South Wales Scientific Committee, 2007; Hensen, 2010; New South Wales Government Office of the Environment and Heritage, 2014; Commonwealth of Australia, 2014). These habitats provide the function of carbon sinks, refuge for unique, often endemically isolated biodiversity and act as safeguards for water quality and unremitting flow regimes (Keith et al., 2014). Urban runoff within THPSS catchments is affecting the condition of their aquatic ecosystems (Belmer et al., 2018). However, at the scale of the World Heritage site, this threat is rather localized.

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

Very High Threat

Inside site, throughout(>50%)
Outside site

(Climate change)

Habitat die-off and uncontrollable wildfire is predicted to continue, in response to climate change and associated drought and extreme weather (Blue Mountains World Heritage Institute, 2006; IUCN Consultation, 2017). Torrential flooding exacerbated the impacts of the recent fires had a significant impact on infrastructure of the GBMA. There is concern that climate change could result in increased incidences of flora and fauna disease outbreaks including zoonoses (Bender et al., 2018). Climate change is already impacting on Threatened Highland Peat Swamps on Sandstone (THPSS) placing them under greater stress (Hensen, 2010). Climate change and associated drought and fire may impact on rainforest and wet sclerophyll communities also (Hamill and Tasker, 2010). Canopy dieback has been observed in the Greater Blue Mountains Area in 2019 (IUCN Consultation, 2020b).

► **Diseases/pathogens**

High Threat

(Emergence of disease in vulnerable ecosystems)

Inside site, widespread(15-50%)

Other invasive species names

Phytophthora cinnamomi, Myrtle Rust (Puccinia psidii), Chytridiomycosis, Chlamydia

Degradation of habitat compromises the health of wildlife, and the recent bushfires and extreme weather patterns increase the risk of diseases in wildlife populations that have their habitats and natural movement patterns disrupted (Bender et al., 2018). A number of diseases have been recorded in several species in the World Heritage site. Chlamydia has been confirmed in Eastern Rosella and King Parrots from multiple submissions from the Blue Mountains area (Australian Registry of Wildlife Health). Other diseases present include chytridiomycosis in frogs (Scheele et al., 2019; NSW Threatened Species Scientific Committee). Increased incidence of plant pathogens, Phytophthora cinnamomi and myrtle rust (Austropuccinia psidii) are also likely. The root rot pathogen Phytophthora cinnamomi causes vegetation dieback and may become more widespread due to climate change and habitat that is less resilient. It is spread by human activities (including on boots, bikes and vehicles) and moves from ridge tops down slopes and water courses (Blue Mountains World Heritage Institute, 2012; National Parks and Wildlife Service, 2012; Newby, 2014). A general survey of Wollemi National Park for Phytophthora cinnamomi found the pathogen was present in samples collected over extensive areas (McDougall and Summerell, 2003; Daniel et al., 2006; DEC, 2006). The disease in its east coast manifestation has a selective impact removing susceptible species so altering the makeup of the ecosystem.

Potential Threats

High Threat

Potential threats arise from developments on adjacent lands to the west and east of the site. These include raising of the Warragamba dam wall (with consequent periodic flooding of up to 550ha of the GBMA), mining (impacting groundwater and ecosystems), and airport development (impacting aesthetic values of the GBMA).

► **Dams/ Water Management or Use**

High Threat

(Raising of Warragamba Dam causing flooding and siltation)

Inside site, scattered(5-15%)

The proposal to raise the Warragamba Dam wall by 17 meters is to mitigate flood impacts on the Hawkesbury/Nepean floodplain by increasing the capacity of the dam to temporarily hold water during flood events. Raising the dam wall will increase the frequency, duration, depth and extent of temporary inundation upstream of the dam wall including parts of the GBMA. It is likely to impact biodiversity, aesthetic, wilderness, geodiversity and Indigenous cultural values. Preliminary modelling indicates there would be a temporary increase in area inundated in the GBMA of 0.04 - 0.05% (State Party of Australia, 2019). This equates to an area of 400 - 550 hectares for a 1 in 100 year flood and the maximum flood respectively. More detailed analysis of the area likely to be subject to temporary inundation will be presented in the Environmental Impact Statement (EIS) currently being prepared by the dam's proponent. The proposal is being assessed for its potential impacts on the OUV of the World Heritage site under a bilateral agreement between the Australian and NSW Government based on the NSW Environmental Planning and Assessment Act 1974 and the Australian Government's Environment

Protection and Biodiversity Conservation Act 1999 (EPBC Act) (State Party of Australia, 2020). The proposal has been determined a controlled action under the Environment Protection and Biodiversity Conservation Act (Referral no. 2017/7940). Environmental field surveys have been carried over the past two years to inform the proposed project's EIS. However, aboriginal leaders from the Blue Mountains whose land would be impacted have consistently opposed the project, saying they have not been adequately consulted for the project to proceed (Guardian, 2019). A draft Aboriginal Cultural Assessment, which had been carried out, has been criticised by archaeologists as inadequate (Scarp, 2019). The World Heritage Committee has requested that the State Party ensure that all potential impacts on the OUV of the site are assessed in detail by the EIS, which will be submitted to the World Heritage Centre for review by IUCN, prior to taking any final decisions regarding the project (World Heritage Committee, 2019; UNESCO, 2019).

► **Housing/ Urban Areas**

(Urban spread)

High Threat

Inside site, scattered(5-15%)
Outside site

A new Growth Plan for the Sydney Metropolitan Area (Department of Planning and Infrastructure, 2013) could result in denser development in the urban corridor adjacent to the GBMA, increasing the impervious surfaces, stormwater run-off and water and air pollution. This has the potential to increase pressure for hazard reduction to manage fire risk to new developments.

► **Flight Paths**

(Proposed Western Sydney Airport)

High Threat

Inside site, scattered(5-15%)
Outside site

Since the Retrospective Statement of OUV was approved by the World Heritage Committee in 2013, which noted that plans for a second Sydney airport had been abandoned, the Australian Government has decided to proceed with construction of the Western Sydney Airport. The airport will be located about eight kilometres east of the Greater Blue Mountains Area. More than 40 strict environmental conditions have been placed on the development of the airport, addressing biodiversity, noise and heritage. These conditions are included in the Airport Plan (<https://www.westernsydneyairport.gov.au/about/airport-plan>). The UNESCO World Heritage Centre issued a statement on the GBMA on 7 June 2017 (<http://whc.unesco.org/en/news/1670/>). The Environmental Impact Statement (EIS) concluded that construction of the proposed airport was unlikely to have a significant impact on the listed values of the Greater Blue Mountains Area, but that there may be some noise impacts on amenity within the GBMA. The airspace and flight path design will be the subject of a separate referral under the EPBC Act, which is expected to be released for public comment in 2021 (State Party of Australia, 2019). Detailed assessment was undertaken of possible indirect impacts from aircraft overflights, including consideration of a number of tourism and wilderness areas within the GBMA. This assessment included noise, air quality, visual impacts and the potential for dumping of fuel (<https://www.westernsydneyairport.gov.au/media-resources/resources/environmental-assessment>). The State Party of Australia confirmed that it will submit to the World Heritage Centre a copy of the EIS for the anticipated airspace and flight path operations, once available, for review by IUCN (UNESCO, 2019).

► **Oil/ Gas exploration/development, Mining/ Quarrying**

(Coal mining adjacent to the site)

High Threat

Inside site, localised(<5%)
Outside site

The Commonwealth Scientific Industrial Research Organisation (CSIRO) has been engaged to work with the Department of Agriculture, Water and the Environment to undertake a cumulative assessment of the impact of mining in the vicinity of the Greater Blue Mountains Area. The results of this assessment will feed into the State of Conservation Report on the Greater Blue Mountains due to the World Heritage Centre in December 2020 (State of Conservation report, April 2020). The State Party of Australia report (2019) provided an update to the World Heritage Committee on the status of mining operations beside the GBMA. In response, the Committee requested the State Party to undertake an assessment of potential cumulative impacts of all existing and planned mining projects in the vicinity of the property through a Strategic Environmental Assessment (SEA) or a similar mechanism (UNESCO, 2019). Since the report was completed, the Bylong coal mine on the north-western boundary of the GBMA has been refused development consent on the basis of long-lasting environmental, agricultural and heritage

impacts (<https://www.ipcn.nsw.gov.au/projects/2018/10/bylong-coal-project>). Centennial Coal has placed on public exhibition (March 2020) a revised plan for a 33-year extension to the Angus Place mine on the western boundary of the Gardens of Stone National Park in the GBMA (see map 2, (Map 2, State Party Report, 2019). The underground mining proposal seeks to draw water from Newnes Plateau to the new Springvale Water Treatment Plant that will service the water needs of the Mt Piper Power Station (Angus Place Mine Extension Report, December 2019; <https://www.colongwilderness.org.au>) that is outside the catchment of Newnes plateau that feeds streams inside the World Heritage site. Potential impacts include cliff collapse, water pollution, lowering of water tables, desiccation of listed endangered swamps (under the EPBC Act) and loss of surface water and stream flow to the Wolgan and Wollangambe rivers (part of the Colo Wild River) that is likely to affect aquatic communities in the World Heritage site. It was reported by the Commonwealth (April 2019) that the project was still undergoing assessment under the EPBC Act. As noted in regard to current coal mines in existing threats, these have caused water pollution, including coal fines from a collapsed tailings dam at Clarence Colliery and heavy metal pollution long after the Canyon Colliery was closed that drains to the Grose river in the World Heritage site (Wright, 2020).

Protection and management

Assessing Protection and Management

► Management system

Mostly Effective

The World Heritage site consists of seven adjacent national parks and a single karst conservation reserve (World Heritage Committee, 2013). There are management plans for each of the eight protected areas in the Greater Blue Mountains Area (Blue Mountains National Park Plan of Management, 2001; Kanangra-Boyd National Park Plan of Management, 2001; Wollemi National Park Plan of Management, 2001; Nattai National Park Plan of Management 2001; Gardens of Stone National Park Plan of Management, 2009; Thirlmere Lakes National Park Plan of Management, 2019; Yengo National Park Plan of Management, 2009; and Jenolan Karst Conservation Reserve Plan of Management, 2019). Currently all management plans have been gazetted, and those for three component reserves (Wollemi, Blue Mountains, and Kanangra-Boyd National Parks, which constitute 80% of the property) are under revision for greater emphasis on the protection of identified values.

The Greater Blue Mountains World Heritage Area Strategic Plan (National Parks and Wildlife Service, New South Wales, 2009) directs the coordination of planning and management of an area of 1,032,649 hectares in eight protected areas. It is a good example of local (12 Local Government Areas), New South Wales and Australian government cooperation.

A revised Strategic Plan is in the early stages of development. When agreed to by both the Australian and New South Wales governments it will replace the Strategic Plan (State Party of Australia, 2019). This new integrated management instrument needs to ensure that potential threats to the property from activities outside its boundaries, particularly mining, are fully considered in the development of this management framework, with a specific section focusing on the potential impact of the project(s) on the site's Outstanding Universal Value (UNESCO, 2019). The new framework also needs to provide for an integrated adaptive management approach that is based on measurable management objectives so outcomes of management actions can be monitored and adapted as needed (Chapple et al., 2011).

► Effectiveness of management system

Mostly Effective

The Environment Protection and Biodiversity Conservation Act 1999, the National Parks and Wildlife Act 1974, the Wilderness Act 1987 and the GBMA Strategic Plan are the main planning tools but the relatively high boundary to area ratio is such that the GBMA is exposed to many threats from outside. This requires more effective planning and management of adjacent areas including enclaves and in particular the lands in the Warragamba Catchment (National Parks and Wildlife Service, New South Wales, 2009; Department of the Environment, World Heritage and The Arts, n.d.).

► Boundaries

Some Concern

The boundary of the GBMA is extensive and convoluted and includes some major enclaves. Boundary anomalies affecting integrity have been mentioned in the Statement of Outstanding Universal Value (World Heritage Committee, 2013). This site does not have a formal Buffer Zone, increasing its vulnerability to edge effects. Since World Heritage listing, over 38,500 hectares of adjacent lands and inholdings have been added to the GBMA, through change in land tenure and management responsibility of some public lands and the purchase of strategically located private lands. The area of gazetted wilderness has increased from over 500,000 hectares at the time of listing to 683,786 hectares. In addition the New South Wales Government has stated its intent to convert about 16,000 hectares of four areas of State Forest adjacent to the Greater Blue Mountains Area to flora reserves (State Party of Australia, 2019). The GBMA Advisory Committee has recommended modification of the World Heritage boundaries to include the additions to the reserves made since 2000 (over 38,500 hectares). The GBMA Advisory Committee also recommend extensive expansion of over 230,000 hectares of significant natural areas adjacent to the GBMA (Benson et al., 2012; Benson and Smith, 2015).

► **Integration into regional and national planning systems** **Mostly Effective**

The Strategic Plan for the Greater Blue Mountains World Heritage Area, 2009 (National Parks and Wildlife Service, New South Wales, 2009) provides for the integration of management. A revised strategic plan will be available for public consultation in 2020.

► **Relationships with local people** **Mostly Effective**

The nomination of the World Heritage area in 1998 was strongly supported by local communities and the Blue Mountains City Council (BMCC). There is an Advisory Committee which includes local representatives, scientists, Aboriginal Traditional Owners and other specialists. The locally-based Blue Mountains World Heritage Institute was formed in 2004 in partnership with National Parks and Wildlife Service (NPWS) and BMCC. A Strategic Plan (National Parks and Wildlife Service, New South Wales, 2009) was developed to help coordinate management of the eight protected areas which make up the GBMA, and is under review in 2020. The NPWS works with the local community to foster appreciation and understanding of their role as neighbours of the World Heritage property.

The Dharug, Gundungurra, Wanaruah, Wiradjuri, Darkinjung and Tharawal language groups are acknowledged as the Traditional Owners of the GBMA. An understanding of the cultural context of the GBMA is fundamental to the protection of its integrity. Aboriginal people from these six language groups, through ongoing practices that reflect both traditional and contemporary presence, continue to have a custodial relationship with the area. The NPWS has obligations under the Gundungurra Indigenous Land Use Agreement, which covers some of the World Heritage site, to protect culturally significant sites and places, and to work together with the Gundungurra community to identify and monitor the condition of those sites (IUCN Consultation, 2020c).

► **Legal framework** **Mostly Effective**

The site has an adequate legal framework which ensures effective coordination between the Australian, New South Wales and local governments and their agencies. The protected areas within the GBMA are protected by means of the Australian Government Environment Protection and Biodiversity Conservation Act 1999, the National Parks and Wildlife Act 1999, and the Wilderness Act 1987 (National Parks and Wildlife Service, New South Wales, 2009). There is no formal buffer zone surrounding the World Heritage site; however, the Environment Protection and Biodiversity Conservation Act 1999 provides legal protection for Outstanding Universal Value by regulating actions occurring within or outside the site that have, will have or are likely to have a significant impact on its Outstanding Universal Value.

► **Law enforcement** **Mostly Effective**

Law enforcement is carried out by NSW NPWS under the NSW National Parks and Wildlife Act 1974 and Wilderness Act 1987. Resources for enforcement are limited.

► **Implementation of Committee decisions and recommendations** **Mostly Effective**

A State Party Report on the State of Conservation of the Greater Blue Mountains was submitted in April 2019 and considered by the World Heritage Committee at its 43rd session in June-July 2019.

Another State Party Report was requested by the WHC in response to the extreme fires from October 2019 to February 2020, and the report was submitted in April 2020.

The State Party is due to respond to the World Heritage Committee's 2019 request (Decision 43 COM 7B.2) for a State Party Report on the state of conservation of the property by 1 December 2020.

► **Sustainable use**

Mostly Effective

The protection of the GBMA contributes to sustainable land use through protection of diverse biodiversity and geodiversity, protection of wilderness areas, catchment protection and water supply (National Parks and Wildlife Service, New South Wales, 2009).

► **Sustainable finance**

Mostly Effective

The management of the site is funded by the NSW National Parks and Wildlife Service. The Australian Government provides funds for an Executive Officer and an Advisory Committee (IUCN Consultation, 2020).

► **Staff capacity, training, and development**

Mostly Effective

Staff training is primarily conducted by the NSW National Parks and Wildlife Service (National Parks and Wildlife Service, New South Wales, 2009). Rangers and program specialist staff are qualified and highly skilled. Field officers are trained to carry out park management and maintenance. Staff are trained and competent in fire management. NPWS offers ongoing staff training and development.

► **Education and interpretation programs**

Mostly Effective

There are a large number of national and international visitors to the GBMWA and visitor information centres are located at the major attraction hubs (National Parks and Wildlife Service, New South Wales, 2009). Key visitor nodes and trail heads provide interpretive material that highlights the importance of the GBMA. The NPWS runs an education program that brings school aged children to the GBMA. Alongside interactive web based apps and the official NPWS website, these programs seek to foster the next generation of natural area custodians. The BMCC runs innovative programs in local schools to educate local residents on the importance of managing water quality and urban runoff to protect the values of the GBMA. The Blue Mountains World Heritage Institute conducts some education programs focusing on the World Heritage site, in partnership with universities. The 'Botanists Way' concept has been developed by the Blue Mountains Botanic Garden at Mt Tomah, beside the GBMA, to provide a basis for expanded visitor interpretation of science and conservation in and around the GBMA (Benson, 2019). The Australian and New South Wales Government are investing in a project over the next 18 months to provide improved educational and interpretative signage and facilities for visitors and education groups across the GBMA (IUCN Consultation, 2020c).

► **Tourism and visitation management**

Mostly Effective

Information centres are located at the major attraction hubs. The NSW Government is investing over \$40 Mil over the next 4 years in improving visitor experiences in the GBMA. This includes major upgrades to key visitor precincts to better manage the visitor volumes now and into the future and renewing the walking track network to make it more resilient to impacts from visitors and natural events (eg fire). Impacts from fires and floods closed many visitor sites within the GBMA. These closures had significant flow on financial impacts to the local communities that rely on tourism. These impacts were compounded by the Covid-19 pandemic (IUCN Consultation, 2020c).

► **Monitoring**

Mostly Effective

The NSW State of the Parks program assesses management effectiveness for the reserves that make up the GBMA.

Since the property was nominated in 1998, 2,500 vegetation monitoring plots have been established by NPWS and reviewed. The overall number of plant community types have increased from 87 to 193, the

dry and wet eucalypt forest types have increased from 56 to 154; heath and swamps from 13 to 23 and rainforest types have reduced from 18 to 16 (an artefact of classification rather than the actual loss of rainforests) (Connolly et al, in prep).

However, more comprehensive and ongoing monitoring is needed, within an adaptive management framework with measurable objectives and indicators clearly defined. The 2019/20 fires have promoted plans to increased investment of effort in this.

► Research

Mostly Effective

Research is carried out by the Australian and New South Wales government agencies (National Parks and Wildlife Service, New South Wales, 2009), community groups, universities and other organizations, such as the Blue Mountains Institute. Assessment is continuing into the additional national natural and cultural heritage values of the site and some adjacent lands, Relevant research is documented in the NSW State of the Parks Assessments (<https://www.environment.nsw.gov.au/sop/>). The NSW Government funds a broad ranging applied management and research program called “Saving Our Species” (SoS) program that is aimed at securing threatened plants and animals in NSW from extinction. Thirty SoS projects are being delivered across the Greater Blue Mountains Area including projects to secure the Wollemi pine, koala, brush-tailed rock-wallaby, spotted-tailed quoll, Blue Mountains water skink, giant dragonfly, Megalong bottlebrush, Blue Mountains swamps and shale/basalt cap forests. There is a need for a detailed ongoing inventory of research for the site. NPWS is working to finalise a research and monitoring prospectus to identify research priorities to support the management and protection of the property, including the conservation of World Heritage values. Research effort is increasing in the wake of the 2019/20 fire season.

Overall assessment of protection and management

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

Some Concern

There is some concern about the long boundary and major enclaves, with the high boundary to area ratio leaving the site exposed to threats from outside. Attention is needed to the additional values that would add to the OUV and the integrity of the GBMA. The revised Strategic Plan being developed needs to provide for an integrated adaptive approach that is based on measurable management objectives so outcomes of management actions can be monitored and adapted as needed.

► Best practice examples

NSW State of the Parks program

To date, the NSW State of the Parks program is a best practice system for assessing management effectiveness. The Greater Blue Mountains World Heritage Area Strategic Plan (National Parks and Wildlife Service, 2009) is an outstanding example of the coordination of planning and management of an area of 1,032,649 hectares in eight protected areas. It is also an example of local (NGOs and 12 Local Government Areas), New South Wales and Australian government cooperation.

Saving our Species

The NSW Government’s Saving our Species program is best practice approach to multi tenure threatened species management. <https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/saving-our-species-program>

NPWS Rapid Aerial Response Teams

The NPWS remote areas response team (RART) program is used to deliver specialist remote area firefighters rapidly by air to bushfire ignitions (normally lightning) with the aim of containing the fire’s spread, and minimising fire size and the potential for greater impacts. In the five-year period from 2014/15 – 2018/19, RART teams were able to respond quickly and effectively to contain a large number of fires. The effectiveness of RART is a key factor in ensuring that a high proportion of fires

that start on-park are contained on-park.

State and trend of values

Summary of the Values

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

Trend: Deteriorating

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

High Concern
Trend: Data Deficient

The threatened Temperate Highland Peat Swamps on Sandstone are identified by the Australian Government as a high priority for detailed impact assessment in the wake of the 2012/20 fires (State Party of Australia, 2020). >50% of the estimated distribution of these swamps is within fire-affected areas.

Additional information

Benefits

Understanding Benefits

► **Flood prevention, Water provision (importance for water quantity and quality), Pollination**

The site provides major ecosystem services to Sydney region by water flow and quality, cleaning air, providing pollinators, regulating floods and drought flow of water to rivers, stopping river sedimentation, etc.

Factors negatively affecting provision of this benefit :

- Climate change Impact level - High, Trend - Increasing
- Pollution Impact level - Low, Trend - Continuing
- Overexploitation Impact level - Low, Trend - Continuing
- Invasive species Impact level - Moderate, Trend - Continuing
- Habitat change Impact level - Moderate, Trend - Continuing

Coal mining on adjacent land continues to represent a moderate threat that could increase in future.

► **Carbon sequestration, Water provision (importance for water quantity and quality), Pollination**

The site protects the catchment for Australia's largest city, Sydney. Joint management arrangements are in place between the NPWS and catchment management authorities.

Factors negatively affecting provision of this benefit :

- Climate change Impact level - Moderate, Trend - Increasing
- Pollution Impact level - Low, Trend - Continuing

- Overexploitation Impact level - Low, Trend - Continuing
- Invasive species Impact level - Moderate, Trend - Continuing
- Habitat change Impact level - Low, Trend - Continuing

Drought is impacting the provision of water for habitats.

► **Outdoor recreation and tourism**

Highly attractive natural scenery and extensive wilderness areas - close proximity to Sydney (5 million people)

Factors negatively affecting provision of this benefit :

- Climate change Impact level - Low, Trend - Increasing
- Pollution Impact level - Low, Trend - Continuing
- Overexploitation Impact level - Low, Trend - Continuing
- Invasive species Impact level - Low, Trend - Continuing
- Habitat change Impact level - Moderate, Trend - Increasing

► **Importance for research**

Valuable for explanation of natural processes in evolution of landscapes

Factors negatively affecting provision of this benefit :

- Climate change Impact level - High, Trend - Increasing
- Pollution Impact level - Low, Trend - Continuing
- Overexploitation Impact level - Low, Trend - Continuing
- Invasive species Impact level - Low, Trend - Continuing
- Habitat change Impact level - Low, Trend - Continuing

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

Valuable for building knowledge. Close to several Universities - courses include field trips in the GBMA to learn about conservation.

Factors negatively affecting provision of this benefit :

- Climate change Impact level - Low, Trend - Increasing
- Pollution Impact level - Low, Trend - Continuing
- Overexploitation Impact level - Low, Trend - Continuing
- Invasive species Impact level - Low, Trend - Continuing
- Habitat change Impact level - Low, Trend - Continuing

► **History and tradition, Wilderness and iconic features, Sacred natural sites or landscapes, Sacred or symbolic plants or animals, Cultural identity and sense of belonging**

Importance for local Aboriginal communities. Spiritual value for people in general to connect with wild nature.

Factors negatively affecting provision of this benefit :

- Climate change Impact level - Very High, Trend - Increasing

Extreme fires with climate change are impacting the cultural values.

Summary of benefits

The GBMA contains over one million hectares with key benefits on a local, regional and global level of nature conservation with exceptional representation of Eucalyptus-dominated sclerophyll ecosystems and biodiversity; recreation for the highly attractive natural scenery and extensive wilderness areas and close proximity to Sydney (over 4.5 million people); education for the explanation of natural processes in

evolution of landscapes and scientific research for building knowledge.

On a regional level the site provides major ecosystem services to the Sydney region through water flow and quality, clean air, pollination, regulating floods and drought flow of water to rivers, stopping river sedimentation, etc; and watershed protection as the site protects the drinking water catchment for Australia's largest city, Sydney.

The site is not listed for cultural associations although does have strong cultural and spiritual connection for the six Aboriginal Language groups of the area. There is one formal Indigenous Land Use Agreement for part of site, with the Gundungurra. The site contains, or is closely associated with a number of declared (under NSW legislation) Aboriginal places: the Three Sisters, The Gully, Kings Tableland, Red Hands Cave, Euroka, Mt Yengo, Shaws Creek, Appletree, Blackfellows Hand Cave, Baiame Cave and Emu Cave.

Projects

Compilation of active conservation projects

Nº	Organization	Brief description of Active Projects	Website
1	GBMA Management Committee	Oversight of management and strategic plan	www.environment.nsw.gov.au
2	NSW Department of Planning, Industry and Environment	Development of appropriate planning and management standards for GBMA enclaves and buffer areas	www.planning.nsw.gov.au
3	GBMA Advisory Committee	Review of GBMA Strategic Plan and assessment of additional national heritage values	
4	Blue Mountains Conservation Society	Community outreach re OUV of GBMA; advocacy for protection of the values	https://www.bluemountains.org.au/
5	NSW National Parks and Wildlife Service	Extensive number of conservation projects across the eight reserves of the GBMA and in collaboration with neighbours across extensive buffer areas. Includes a number of NSW Government Saving Our Species projects.	www.environment.nsw.gov.au
6	Colong Foundation for Wilderness	Ongoing advocacy for the protection of the GBMA. Active campaign in 2019/20 to oppose the raising of the Warragamba Dam wall.	https://www.colongwilderness.org.au/ https://www.giveadam.org.au/
7	Blue Mountains City Council	Range of measures to control impacts on the GBMA (especially stormwater management) as well as community engagement in relation to the OUV.	https://www.bmcc.nsw.gov.au/
8	Blue Mountains World Heritage Institute	Research into ecosystems and threats, to inform policy and management. Research into historical and social aspects. Community engagement especially in relation to bushfire threat and place attachment (Ratnam et al, 2016; Chapple et al., 2017).	www.bmwhi.org
9	Blue Mountains Branch Regional Advisory Committee (NPWS)	Statutory role providing advice on park operations and GBMA plans of management	

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