

Mana Pools National Park, Sapi and Chewore Safari Areas

2020 Conservation Outlook Assessment

SITE INFORMATION

Country: Zimbabwe

Inscribed in: 1984

Criteria: (vii) (ix) (x)



On the banks of the Zambezi, great cliffs overhang the river and the floodplains. The area is home to a remarkable concentration of wild animals, including elephants, buffalo, leopards and cheetahs. An important concentration of Nile crocodiles is also be found in the area. © UNESCO

SUMMARY

2020 Conservation Outlook

Finalised on 01 Dec 2020

SIGNIFICANT CONCERN

This vast wilderness in the middle Zambezi Valley has maintained most of its inherent values through its remote location and the low level of competing land uses. It is nevertheless undergoing significant long-term change as a result of the upstream construction of the Kariba Dam, affecting the flooding regime and annual cycle of alluvial deposition. Although this occurred half a century ago (before the site's world heritage listing) the resulting ecological change is likely to persist for decades, or perhaps centuries, to come. Changes on the alluvium and sandbanks are being seen that may reflect more localised conditions than the effect brought about by the Kariba Dam. Meanwhile, the potential for a third major hydroelectric facility on the Zambezi at Mupata Gorge, which would flood the core of the site and reduce its wildlife carrying capacity by half, remains a very real long-term threat. More immediate, but less significant in scale, are the threats arising from oil and mineral exploitation in the upstream catchment and poorly managed tourism development on both banks of the river. While protection and management appears to be generally adequate for such a large remote area with few immediate threats, it is not possible to fully assess its effectiveness. This is because the site lacks effective monitoring and therefore there is little information available on the state of the site's values. There is a need for increased vigilance to ensure greater trans-boundary cooperation in the design and site location of tourism infrastructure on both banks of the river, and monitor, evaluate and mitigate the effects of possible future mining activities within the Zambezi catchment. Aerial survey data indicate a decline in key species and this needs to be addressed.

FULL ASSESSMENT

Description of values

Values

World Heritage values

► **Diverse bird fauna**

Criterion:(x)

More than 450 species of birds have been recorded at the site (UNEP-WCMC), with 90 species of waterbirds and 52 raptors recorded in the wider Middle Zambezi Valley Important Bird Area (Birdlife, 2012)

► **Important populations of a diversity of large mammals and other fauna and threatened species**

Criterion:(x)

Because of its size and the diversity of its habitats, the site supports large and sustainable populations of a diverse mammalian fauna, an important population of Nile crocodile, and diverse assemblages of other fauna (many of which remain undocumented). The site supports important populations of threatened large mammals including an estimated 12,500 elephants, 3,000 hippopotamus, more than 260 lion, cheetah and wild dog. Near-threatened species include leopard, brown hyaena, and several species of birds, including more than 1% of the world's Lilian's Lovebirds (*Agapornis lilianae*) and an important population of African skimmers (*Rynchops flavirostris*) on the river sandbanks

► **Black rhino refuge**

Criterion:(x)

At the time of inscription, there were 500 black rhino, one of Africa's largest populations of this endangered species (World Heritage Committee, 2011). There are currently no rhino but the area remains a key rhino habitat for possible future reintroduction under suitable conditions.

► **Seasonal movements of large mammals**

Criterion:(ix)

More than 10,000 elephants (Dunham et al., 2015) and a similar number of buffalo move seasonally between the river and the surrounding deciduous woodlands, up to the top of the escarpment some 50 km away, all within the World Heritage property

► **Riverine sandbank ecosystems**

Criterion:(ix)

The 60 km² of alluvium within Mana Pools – sandbanks, islands, floodplains and old river channels - provide an exceptional substrate for ecological succession, driven by the changing course of the river and natural climatic and ecological factors (World Heritage Committee, 2011)

► **Spectacular animal congregations**

Criterion:(vii)

Spectacular dry season congregations of around 20,000 large mammals, notably elephants, buffalo, waterbuck, zebra and sable antelope, in the evergreen gallery forests and riverside communities along the banks of the Zambezi represent an exceptional natural phenomenon dependent on the maintenance of dispersal areas throughout the 6,766 km² of the World Heritage property and beyond (World Heritage Committee, 2011).

Assessment information

Threats

Current Threats

Low Threat

Long-term ecological change in the core riverine habitats resulting from a change in the seasonal flooding regime following construction of the Kariba Dam is probably the main driver of ecological change affecting the site. Poaching led to the eradication of black rhino in the early years following inscription, and remains a real threat preventing re-introduction of this key endangered species. Elephant face continued poaching and illegal trade. Other threats include inappropriate and multiplying tourism developments, the occurrence of alien invasive species, illegal fishing and artisanal gold mining/panning. The decline in numbers of many large mammal species, as evidenced by aerial surveys, is a threat. The causes of these declines are not known and should be researched, together with appropriate monitoring.

► Invasive Non-Native/ Alien Species

Low Threat

(Invasive alien species)

Inside site, widespread(15-50%)
Outside site

The alien floating plant, water hyacinth (*Eichhornia crassipes*) is present in the Zambezi and the old channels that make up the four 'Mana Pools'. Several other species have also been recorded and these include starburrs, senna, paperthorns, asters, blackjacks and mexican poppy. Local outbreaks on disturbed ground are common. Hay was brought in as animal feed in 2019 and it is unknown if there will be any new grass species "invasions" from this. Mistletoe (*Erianthemum dregii*) which parasitises the fruiting *Cordyla africana* is a recent cause for concern for key tree species in the WHS. The widespread death of *Cordyla* may impact of large mammal congregations. *Faidherbia albida* can also be affected by *Tapinanthus quequensis*.

► Hunting and trapping

High Threat

(Poaching)

Inside site, throughout(>50%)
Outside site

Well-organised commercial poaching of black rhino drove the species to local extinction between 1984 and 1994, and is considered to be a continuing threat preventing efforts to re-introduce the species at present. Elephant poaching is a major threat, but poaching of other species for bushmeat whilst not a major threat at present is of growing concern. The decline of several key species, notably buffalo and elephant (as evidenced by aerial surveys) may be an indication of an unknown poaching threat. Other factors, possibly ecological and yet to be assessed may be contributing to the decline of species such as sable, zebra and eland. Elephant and hippopotamus dominate the large herbivore guild in terms of biomass and inter-specific competition may be at play (IUCN Consultation, 2020).

► Fishing / Harvesting Aquatic Resources

High Threat

(Illegal fishing)

Inside site, widespread(15-50%)
Outside site

Recreational rod and line sport fishing is carried out on both sides of the Zambezi river with catch and release of Tiger fish (*Hydrocynus vittatus*) on the Zimbabwe side. However commercial artisanal fishing, both legal and illegal using extensive netting including monofilament net, is carried out from the Zambian side of the river from Chiawa and Rufunsa Game Management Areas and by Mozambicans boating upstream from Zumbo. There are concerns of the effects of long-term commercial fishing that spills over into the Zimbabwean side of the river. Monofilament net is a problem of great concern to artisanal fisheries across the Zambezi system as it is plastic, non-destructible and ensnares in particular, crocodiles leading to their death in many instances (IUCN Consultation, 2020).

► Tourism/ visitors/ recreation

Low Threat

(Impact of tourism activities)

Inside site, widespread(15-50%)
Outside site

Escorted and unescorted walking and canoeing trips through prime wildlife habitat are a major draw for tourism. Increased vehicular traffic and operator game drives are a threat to the site's wilderness values. There are also reports of disturbance by tourists at African wild dog dens leading to their abandonment (30 plus people recorded at one time). Other disturbance factors from tourism may become evident over time but crowding of iconic elephants and predator kills is already occurring. The recent collapse of tourism owing to Covid-19 will have ramifications for the WHS. The immediate one is

loss of income to support park management but others could include a reduction in disturbance of wildlife at the site, which would be a positive outcome. How long this will last and how the recovery of tourism will look are all unknown at this stage. Most operators will have already paid a deposit to ZPWMA authorities and the income drop may only become evident later in the year.

► **Dams/ Water Management or Use**

Data Deficient

(Regulation of flooding and water flow)

Inside site, extent of threat not known
Outside site

The construction of Kariba Dam in 1958 brought to an end the seasonal flooding and associated silt deposition in the wide, relatively slow-flowing section of the middle Zambezi between Kariba and Mupata Gorge (Attwell, 1970). This is inevitably having major long-term implications for the ecology of the riverbanks, islands and floodplains and associated communities of plants and animals (Guy, 1981), the nature and extent of which will never be known as there are no comparable data for periods before and after construction of the dam (Ncube, Beevers and Edwin, 2012).

Notwithstanding the effects of Kariba Dam there are other threats to the alluvium and sandbanks and vegetation changes are being noted (more details in "Assessing Values" section). It should also be noted that long-term geomorphological processes are such that the Zambezi river is gradually cutting (or eroding) into its south bank and depositing material on its north bank.

► **Hunting and trapping**

Low Threat

(Commercial sport hunting)

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

Commercial sport hunting has been suspended and discontinued in Sapi and Chewore North Safari Areas in long term lease agreements between ZPWMA and the current concessionaires in favour of non-consumptive photographic tourism and sport fishing. In Chewore South, the current concessionaire has reduced hunting offtakes to below the allocated quota. The Chewore South southern boundary is adjacent to a hunting concession in the Mukwichi Communal Land. Adherence to quotas and hunting regulations is good and overseen by ZPWMA. Present quotas however, may be at biologically unsustainable levels. Whilst causality is uncertain, these hunting areas (as well as Mana Pools NP) have seen declines in wildlife numbers, notably buffalo. There is concern about the hunting of iconic animals that stray into hunting areas from the non-hunting area and there are moves for regulations regarding their protection.

ZPWMA maintains a training quota (mostly elephant and buffalo) in all of its protected areas, including those in the WHS, which includes Mana Pools NP. Additionally a ration quota has been introduced to offset ranger hardship in a difficult macro-economic environment, now compounded by the COVID-19 pandemic. However, the biological sustainability of the combined safari hunting, training and ration quotas needs careful re-assessment and considered as a whole (IUCN Consultation, 2020).

► **Tourism/ Recreation Areas**

High Threat

(Development of tourism facilities)

Inside site, scattered(5-15%)

To date, tourism developments at the site have focused on low density, high quality tourism with small-scale tented camps and eco-lodge facilities. However, pressure for tourism sites in Mana Pools NP continues to grow in the absence of an approved plan and non-adherence to existing plans. Since 2017, a further six sites have been allocated, the majority within a few km of the alluvial floodplains.

Environmental assessments of these sites are often perfunctory and have been challenged in the past. In addition, two of these sites have been allocated in what was previously demarcated as a Wilderness Area in Mana Pools NP (ZPWMA Park Plan, 2009). This has effectively removed the Wilderness zone from the park.

Vine Camp is consistently mentioned as being an issue in previous reports and, although it is still a concern, management should be more concerned about the cumulative impact and the effect of 10 or more camps fielding over 200 beds in close proximity to the floodplain core area, each with its own exclusion area leading to a declining aesthetic quality of the site for the general public. In addition, the public campsite has undergone a significant expansion of sites and when full would represent a huge pool of tourists utilising the floodplain.

New camps away from the main river are often allocated at pans and this has the potential for disturbance of wildlife. In addition, exclusion zones around the pans remove them from the general tourism circuit. As these pans are typically seasonal, there is then the desire of the tour operator to provide permanent water through drilling into groundwater supplies. This not only affects large mammal behaviour, but also hydrological and ecological processes.

► **Other Ecosystem Modifications**

High Threat

(Deforestation for tobacco curing systems)

Outside site

Tobacco farming in surrounding communities has resulted in increased demand for fuelwood for tobacco curing. This has contributed to the undocumented deforestation in the southern boundary of the WHS (IUCN Consultation, 2020).

► **Mining/ Quarrying**

Data Deficient

(Artisanal gold mining and panning in rivers)

Inside site, localised (<5%)

Outside site

Over 500,000 Zimbabweans are directly involved as artisanal and small scale miners (ASM) with over three million dependents. ASM contribute significantly to national gold production and revenue generation for the country. However, both legal and illegal ASMs face a number of constraints which include policy shortcomings, and in particular adoption of poor mining methods which are leading to severe environmental degradation. Much illegal gold mining and panning is now taking place in and alongside major rivers and their catchments which flow into and through protected areas. The southern boundaries of Mana Pools and Chewore in particular are now being severely affected not only by mining and panning but by growing numbers of miners dependent on wildlife resources to sustain themselves while mining.

Potential Threats

High Threat

When the Zimbabwean economy and political climate becomes progressively more conducive to foreign investment and tourism begins to recover, there are a number of potentially major threats to the site. The most serious of these would be development of a hydroelectric facility in the Mupata Gorge with the associated loss of wildlife habitat. Oil and mineral exploration and development are real threats, with the associated pollution of the Zambezi. Growth in tourism will bring pressures to allow more, larger and intrusive tourism facilities which may ultimately exceed an acceptable tourism "carrying capacity" threshold for the site (especially the alluvial floodplains), impacting its core values as a unique and aesthetic wilderness. Conversely, lack of tourism and associated loss of revenue and funding for ZWPMA through Covid-19 could open the door for increased poaching and/or other more income generating activities which may impact the values of the site.

► **Crops**

Very Low Threat

(Development of irrigated agriculture)

Outside site

There are reports of a large-scale irrigated agricultural development project (the Chirundu Project) proposed in 2005 along the south bank of the Zambezi between the World Heritage site and the border town of Chirundu (UNEP-WCMC, 2012). However, no development has occurred since then. Other irrigation projects are currently being developed (land clearance) at Kanyemba adjacent to Chewore in Mbire Communal Land.

► **Dams/ Water Management or Use**

Low Threat

(Dam construction)

Inside site, localised (<5%)

Outside site

The ecological heart of the site, the rich floodplain, has been threatened by a hydroelectric scheme proposed for Mupata Gorge which would flood 850 km² of the Zambezi Valley and halve the wildlife carrying capacity of the world heritage site (UNEP-WCMC, 2012). Until now only feasibility studies have been carried out and while there is currently no intention to develop the project it remains a potential

threat because of severe electricity shortages in the region. The construction of the Batoka dam upstream of Kariba may satisfy local power demands for the foreseeable future.

► **Hunting and trapping**

Low Threat

(Commercial bushmeat poaching)

Inside site, throughout(>50%)
Outside site

Given the ease of access afforded to the site by the main Harare-Lusaka road, and the potential size of the market, it must be considered a possibility that commercial hunting of wildlife for bushmeat could occur (as it has in Kafue National Park, Zambia). Illegal commercial hunting and/or bushmeat harvesting is occurring increasingly within communities situated on the southern boundaries of the site. With current levels of poverty and the increased presence of gold miners and panners, bushmeat poaching may extend into the WHS, if not already happening.

► **Oil/ Gas exploration/development**

High Threat

(Oil and other mineral prospection)

Outside site

Oil prospecting within the world heritage area was proposed in 1989 (UNEP-WCMC, 2012), but never carried out. On the Zambian side of the river, opposite the World Heritage site, prospecting in the Lower Zambezi NP and the adjacent Chiawa Game Management Area have been undertaken in the past (2006-8) with significant discoveries of exploitable gold and copper. However further prospecting and exploitation in these two areas has not happened in recent years. Permits have been issued for Uranium mining developments 100-200 km upstream from Mana Pools, which could result in pollution of the property (IUCN and UNESCO, 2011).

► **Other**

High Threat

(Financial Stability)

Inside site, throughout(>50%)
Outside site

The continuing collapse of tourism through Covid 19 since the pandemic first emerged in early 2020 is already significantly reducing revenues to the ZPWMA. The authority is not part of central government revenue streams that could act as cushion during these times. How long and perverse this decline will be is unknown, but the situation is currently critical, as officially announced by ZPWMA. A management authority with few funds could open the door to increased poaching for elephants, other wildlife and bushmeat, or more perversely, redefine uses to which these protected areas could be put.

► **Habitat Shifting/ Alteration, Droughts**

Data Deficient

(Increased drought frequency)

Inside site, throughout(>50%)
Outside site

Climate change is expected to see higher temperatures and lower rainfall, with an increased frequency of drought and flood cycles. The recent drought prompted the provision of imported feed (hay) for elephants and other wildlife at Mana Pools, in the interests of their welfare. Such interventions need to be weighed up very carefully in respect of long term ecological processes and in situ conservation of populations of a species versus individual animal's welfare.

Overall assessment of threats

High Threat

The site currently faces few major direct threats but a number of lesser threats that will ultimately have a cumulative and potentially irreversible impact. Poaching led to the eradication of black rhino in the early years following inscription, and remains a real threat preventing re-introduction of this key endangered species. Alteration to the flooding regime caused by the Kariba Dam will continue to exert long-term influence on the area's ecology for many decades to come. Other lower-level threats include inappropriate tourism developments, the occurrence of alien invasive species and illegal fishing and mining. The potential for hydroelectric power generation from a downstream site in the Mupata Gorge presents the greatest long-term threat, as it would involve flooding much of the valley's key wildlife habitat and reducing its carrying capacity by half. Other potential threats include large scale mining and other development activities within the site itself and in adjacent areas that

would impinge on the values of the site itself and the unfolding impacts of Covid-19 on the funding and corresponding management activities in the site. A well defined robust and rigorous research agenda, together with monitoring of key indicators will help to identify quantitatively and qualitatively, the threats faced and the means to mitigate their impacts.

Protection and management

Assessing Protection and Management

► Management system

Some Concern

The Mana Pools National Park Management Plan articulates the biodiversity protection and management needs extremely well, and addresses all the key management needs including operational aspects of management, tourism management, zonation (including buffer zones), community outreach, awareness, other stakeholders, and Transfrontier Conservation Area formalisation. However the document is yet to be approved by the Minister, and consequently is not adhered to (IUCN Consultation, 2020). A new process was started in late 2017 for the WHS but stalled due to funding issues. Planning for the Zimbabwean side of Zambezi Valley as a whole is part of a GEF 6 project, this has not yet been initiated but expected during 2020/2021. With no guiding plan, tourism development is on an ad hoc basis which has already had negative effects such as the demise of the Nyamatusi as a Wilderness area.

► Effectiveness of management system

Some Concern

The WHS is managed from three stations - Nyamepi, Mkanga and Kapirinengu with oversight from Kariba, Marongora and Chinhoyi. Draft materials from the 2017 assessment for the planning process showed that facilities at all three stations in the WHS were unsatisfactory in terms of offices and housing. Communications and management office spaces have been improved at these stations through the Tashinga Initiative and other donors, but are still in need of improvement. The ZAVARU Rapid Reaction Ranger Force base is operational on the eastern boundary of the WHS at Nyakasanga and training and activities are supported by a number of NGOs. In addition, a coalition of stakeholders assist the Authority with fuel and deployments for anti-poaching.

Joint protection activities between Zambia and Zimbabwe are becoming more common and this includes sharing of patrol work and intelligence. This cooperation bodes well for the future. However, the current area by area management system could be perceived to be inefficient and not cost-effective (IUCN Consultation, 2020). Ecosystem based management that includes the WHS could be a way forward for the entire Zimbabwean Zambezi Valley, of which the WHS is a part. Communications between park management and the Authority HQ could be improved as could communications between stakeholders and the Authority, both on the ground and at the HQ (IUCN Consultation, 2020).

The last assessment of management effectiveness under the GEF 6 Project established the following METT scores: Mana Pools NP - 57; Sapi SA - 41; Chewore SA - 48.

► Boundaries

Some Concern

Boundaries of the three individual protected areas are defined in the Parks and Wildlife Act, using map grid references (to within 100 metres) and physical features such as rivers. Road boundaries are minimal and much of the boundary is not physically demarcated on the ground.

► Integration into regional and national planning systems

Mostly Effective

The Lower Zambezi-Mana Trans-Frontier Area (TFCA) is in its conceptual phase (Peaceparks Foundation, 2020), although there has been significant movement on this over the last few years with MoU consultation in Zambia being completed and underway in Zimbabwe. Expansion of the Zimbabwean WHS to the west could be considered. An opportunity exists to establish a major trans-frontier World Heritage property incorporating protected areas in Zambia and this is being pursued with joint technical

meetings held in 2017 and 2019. The Covid 19 pandemic has halted proposed further meetings. In addition the WHS is also part of the ZIMOZA TFCA which provides linkages into Mozambique. This TFCA is also at the conceptual phase (<https://zimparcs.org/wp-content/uploads/2017/09/SADC-TFCA-BROCHURE.pdf>)

► **Relationships with local people**

Data Deficient

There is little information available, but much of the property adjoins other protected areas which are devoid of people and serve as a buffer zone. Community based conservation projects have been established to the south of Mana Pools (Akashinga in the Pfundundu area with the International Anti-Poaching Foundation) and Chewore (Mukwichi). The southern section of Chewore SA is used for CAMPFIRE hunting activities. A tree planting initiative south of the WHS has started (MyTrees) and literacy programmes and Conservation Club projects have also been initiated through the World Bicycle Relief Project in joint venture with local conservation partners. The ZPWMA has employed a community liaison officer to coordinate community conservation activities and maintain relation with local communities adjacent the site.

► **Legal framework**

Some Concern

The site is administered under the Zimbabwe Parks and Wildlife Act Chapter 20:14 and the SADC Protocol on Wildlife and Law Enforcement. As a WH site ZPWMA is also required to submit reporting to UNESCO, as and when called upon by the World Heritage Committee.

► **Law enforcement**

Some Concern

Wildlife law enforcement is currently ongoing but there are serious resource constraints and inadequate human resources for it to be effectively implemented (Lindsey et al. 2018). Joint patrols are being undertaken with the Zimbabwe Republic Police. The Anti-poaching Strategy (2015) is being implemented, as is the Zimbabwe Elephant Management Plan with assistance partnerships from a number of NGOs. The Elephant Management Plan is currently being updated. It is also expected that some law enforcement activities will benefit from the UNDP GEF 6 project which is currently in its implementation phase.

On the ground, several picket bases have been established, communications on stations have been updated and SMART (Spatial Monitoring and Reporting Tool) has been introduced. Chewore is a CITES MIKE site. Some new roads focussed on law enforcement have also been opened up in the last few years. Training on law enforcement has been carried out with weapons refresher courses. Vehicles, boats and patrol rations have been provided to complement ZPWMA efforts on anti-poaching. In addition, surveillance flights through an NGO (Flying for Wildlife) have been stepped up.

► **Implementation of Committee decisions and recommendations**

Some Concern

In response to the 2018 State Party of Zimbabwe's State of Conservation report, the World Heritage Committee commended the State Party for substantial efforts to enhance the property's conservation status and requested that these are continued (UNESCO, 2018; World Heritage Committee, 2018). In particular, the State Party was encouraged to implement the Anti-Poaching Strategy and Elephant Management Plan and to continue reporting on progress. Additionally to complete the General Management Plan and submit to this to WHS and report on outcomes of research projects and other data on conservation metrics. Furthermore, a number of requests were made that remain outstanding, these include those relating to 'the decision regarding the proposed Kangaluwi and Chisawa opencast mine in Lower Zambezi National Park which could have serious impact on the property's Outstanding Universal Value'; mapping and communication of 'the exact locations of the proposed tourism developments'. The state Party was also encouraged to work with the State Party of Zambia to 'finalize the Memorandum of Understanding for the Lower Zambezi-Mana Pools National Parks Trans-Frontier Conservation Area, and to request technical advice from the World Heritage Centre and IUCN as needed' (World Heritage Committee, 2018).

► **Sustainable use**

Some Concern

All sport hunting in Zimbabwe is undertaken through an adaptive quota setting process run by the Zimbabwe Parks and Wildlife Management Authority. Quotas are set in consultation with stakeholders, based on species information which includes information on the following: - population estimates, distribution patterns, trophy quality. Also assessed if necessary is information on natural mortality and those resulting from disease. Ground based assessments will be carried out if circumstances require. However, the declines of key species and especially buffalo in the safari areas could be an indication that quotas were not sustainable in the past.

► **Sustainable finance**

Data Deficient

Recent tourism data from Mana Pools NP indicates fluctuating tourism numbers between 5,000 and 10,000 visitors per annum. However, five new camps are still to come on stream. However, the recent collapse of world-wide tourism may reverberate through the system for many years. Sustainable financing of Mana Pools NP was thought to be possible if revenue was retained and used on site. High value sport hunting is carried out in Chewore Safari Area, but has been suspended in Sapi Safari Area by agreement between ZPWMA and the present concession holder in favour of photographic tourism options.

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

Mostly Effective

Various ranger training workshops have been conducted over the last few years, which include basic intermediate and advanced training. The rangers have also undergone training on SMART. Officers have additionally been undertaking various staff development programmes including the use of new technologies through the Zimbabwe Parks and Wildlife Authority. It is expected that these training programmes will continue, funds permitting. Practical use of SMART has had some problems which include direction and leadership as well as technological issues. These need to be addressed

► **Education and interpretation programs**

Some Concern

Limited visitation by schools does occur in Mana Pools and the previous management plan for the park recommended increasing this aspect. Some education programmes south of the area in community land have been initiated, including the "community mobility programme" that donated bicycles to selected community members

► **Tourism and visitation management**

Data Deficient

Although tourism numbers to Mana Pools National Parks was relatively stable at around 10,000 per annum in the late 1990s, numbers subsequently dropped due to political and economic instability and are currently fluctuating between 5,000 and 10,000 per annum. These figures reflect the situation prior to five new camps coming on stream. However, tourism records for Mana Pools have not been consistent and there have been issues with recording and storage of data. In addition, the cost of visiting Mana is increasing and this results in a drop in local tourism. Local tourism has sustained many parks in the past when high-paying foreign visitation declines.

The Covid-19 outbreak in early 2020 has stopped virtually all tourism and it is not clear how long this situation will continue. Even with some kind of normalisation (hopefully during 2020) it is not certain how long it will take to build visitor numbers up to pre-outbreak levels again.

Tourists in Mana Pools are managed through park regulations and several "codes of conduct". However, uptake of these codes of conduct has been disappointing. Safari hunters are expected to abide by regulations for conduct, ethical hunting and hunt management and administration. Although vehicle entry levels to Mana Pools were regulated in the 1980s these are no longer part of the tourism management system.

► **Monitoring**

Some Concern

Zimbabwe conducted a national aerial survey of elephants and other large mammals in 2014 (Dunham et al. 2015, IUCN AESR 2016). It is unclear when the next survey will be undertaken, and whether a continuous monitoring system is in place. Survey intensity has decreased since the 1980s, presumably

due to funding constraints. However, a local NGO (Flying for Wildlife) is investigating the possibility of more frequent monitoring flights to complement national surveys.

Basic monitoring systems that should be in place are hampered by funding and equipment constraints. For example there are no long-term ground estimates of wildlife apart from an annual floodplain count by civil society (Dunham and du Toit, 2012).

► Research

Some Concern

Currently there is ongoing monitoring in the protected area including setting up of vegetation exclusion zones as experimental sites, movement patterns of elephants, modelling of elephant mortality (both natural and from poaching), ranger culture in biodiversity monitoring, as well as research and monitoring of the African wild dog. Resource constraints however remain a challenge and further research is required.

The following have been identified as possible areas for future research programmes:

1. Vegetation cover changes:

1.1 Structural changes in woodland cover over time.

1.2 Drivers of mistletoe infection distribution on key woody species and effectiveness of current control measures.

1.3 Impacts of fire management in particular controlled block and early burning on the escarpment and vegetation changes and structure on the flood plain.

1.4 Encroachment of certain species, for example, *Croton megalobotrys*, on the Mana Pools flood plain.

2. Climate change:

2.1 Rainfall pattern changes and species distribution.

2.2 Impact of introduction of game water supplies to reduce large wildlife concentrations on the valley floor in the dry season (compare with experiments on the Chobe in Botswana).

3. Species specific studies:

3.1 Analysis of aerial survey results, migration hypothesis, analysis of various forms of elephant mortalities (Poaching, PAC, Natural, Hunting etc).

3.2: Elephant movements through collaring

3.3 Predator studies: Interactions between lion and hyena.

3.3 Studies on rare antelope distribution patterns (sable, eland, nyala).

3.4 Dynamics of possible re-introduction of black rhino.

3.5 Predator surveys using spoor and camera traps.

Overall assessment of protection and management

Some Concern

While protection and management appears to be generally adequate for such a large remote area with few immediate threats, there is no doubt that the area is understaffed and poorly equipped to counter any upsurge in poaching, particularly should the drop in tourism revenue following the Covid-19 outbreak further reduce staff capacity. Partnerships between NGOs and the ZPWMA are proving to be useful in combating poaching threats. However, it is not possible to fully assess the effectiveness of anti-poaching activities because the site lacks effective monitoring and therefore there is little information available on the state of the site's values. There is a need to ensure greater trans-boundary cooperation in the design and site location of tourism infrastructure on both banks of the river, and internally within the Mana Pools NP. There is also a need to monitor, evaluate and mitigate the effects of possible future mining activities within the Zambezi catchment, as well as to mitigate poaching and other illegal activities. Conservation of key attributes of biodiversity needs further research, for example, the declines of key species need to be investigated, better understood and where appropriate, mitigated. More attention needs to be paid to the southern boundary. Currently all responses to threats in this area emanate from the river based HQ stations, which is not cost-effective

and difficult.

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

Some Concern

The main potential threats from outside the site emanate from across the international border in Zambia, where inappropriate riverbank tourism developments, artisanal fishing and upstream mining could occur. At present there is no formal mechanism for cooperation over joint management decisions and operations between the two countries. Inside Zimbabwe, there is increasing settlement and land conversion for tobacco on the southern boundary. Poaching and illegal wildlife trade are major threats that may have led to serious decline in population estimates of elephants and other species. Legal and illegal mining both inside and outside of the property also pose real threats to the property. However, some recent successes with anti-poaching have been noted.

State and trend of values

Assessing the current state and trend of values

World Heritage values

► **Diverse bird fauna**

**Good
Trend:Stable**

Although comprehensive data is somewhat lacking, the rich bird fauna is considered to remain essentially intact and the diversity of habitats is being maintained.

► **Important populations of a diversity of large mammals and other fauna and threatened species**

**High Concern
Trend:Deteriorating**

The important populations of large mammals remain but some have shown significant declines in the last decade. Hippo numbers were estimated at between 4,000 and 5,000 between 1996 and 2002 (Monks, 2005) but had declined to an estimated at 3,000 animals in 2005 (Fergusson, 2006). However this could be from survey differences (fixed wing versus helicopter). The standard aerial survey estimated 2,500 in 2013 but this type of survey is notoriously inaccurate for a species such as hippo (Dunham et al, 2014).

Elephant populations, estimated from aerial surveys, have declined in the WHS from over 11,000 in 2001 and 2003 (Mackie, 2002; Dunham, 2004) to around 7,000 in 2014 (Dunham et al 2015). These estimates don't take movement through the system into account but are still a cause for considerable concern.

For other species three surveys were compared, 2001, 2003 and 2014 (Mackie, 2002; Dunham et al, 2004 and 2015), as these had data separated into individual protected areas and hence estimates could be compiled for the WHS. The 2001 survey methodology was more directly comparable with the 2014 survey.

The trend of buffalo numbers in the WHS show a decline from nearly 8,000 animals in 2001 to around 4,000 in 2014. The Chewore and Sapi areas showed a decline from over 4,500 animals in 2001 to less than 1,000 in 2014. Other species are also a cause for concern. In most cases the declines were more evident in Sapi and Chewore Safari Areas, than in Mana Pools. However, local information indicates, especially for Mana Pools, that wildlife numbers may be increasing again. Camera trap surveys indicate almost 90 lions and 55 leopards in Mana Pools NP (Seymour-Smith and Loveridge, 2015).

► **Black rhino refuge**

**Critical
Trend:Data Deficient**

Black rhino disappeared from the site within ten years of its inscription, the last 10 individuals being translocated to safer areas. Site security is still considered inadequate to attempt re-introduction,

although it remains a strong hope for the future.

► **Seasonal movements of large mammals**

Low Concern
Trend:Stable

The seasonal movements of large mammals are considered intact but detailed information on this remains patchy and anecdotal. It is known that the movements still occur but a reduced number of animals.

► **Riverine sandbank ecosystems**

Low Concern
Trend:Deteriorating

Vegetation succession and the ecological processes associated with alluvial deposition and flooding of the river were irreversibly altered in 1958 by the construction of the Kariba Dam approximately 110 km upstream of the site. It is difficult to speculate on the course of changes that would be taking place without the Dam, as upstream alluvium which might have been deposited in the middle Zambezi no longer reaches Mana Pools, and seasonal flooding is now severely limited. Nevertheless, within the context of the 'new' (man-made) situation (which prevailed at the time of inscription), the natural ecological processes and vegetation succession associated with the sandbanks, islands and floodplains is undisturbed. However, in recent years concerns are being expressed at the recruitment levels of the iconic *Faidherbia albida* trees as well as the paucity of grass.

► **Spectacular animal congregations**

Low Concern
Trend:Stable

Although the aerial survey record indicates significant declines of key species in the WHS there are anecdotal reports that the wildlife concentrations on the alluvial floodplains still occur and remain relatively stable (Dunham and du Toit, 2012). However, these concentrations may also be part of the cause of vegetational changes on the alluvium.

Summary of the Values

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

High Concern
Trend: Deteriorating

Many of the site's values have been maintained, although the decline of large mammal species of the last decade is concerning. A new survey is proposed and this needs to happen as soon as possible. The ecology of the riverbank and floodplain communities is undergoing gradual long-term change resulting from the (pre-inscription) construction of Kariba Dam 110km upstream which permanently altered the siltation and flooding regime. There is anecdotal evidence of vegetation changes on the alluvium during the last few decades (grass reduction, woody species compositional changes, fluctuation of exotics etc). Hardpan soils contributing to rainfall runoff have also been noted. However, there is no baseline monitoring to confirm this. One key element of critical concern is the loss of black rhino as the property used to be one of the species' few remaining strongholds until the late 1980s. Cumulatively the threats to these values result in change of the "Concern Status" to "High".

Additional information

Benefits

Understanding Benefits

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

The WHS is the core component of a much larger network of protected areas spanning both sides of the Zambezi River. As such its designation as a WHS improves the conservation value of the surrounding areas. The mid Zambezi valley protected system in Zimbabwe covers almost 13,000 km² and represents a significant biodiversity resource for the country and the region

Factors negatively affecting provision of this benefit :

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

Many of these are data deficient

Summary of benefits

The WHS is the core component of a much larger network of protected areas spanning both sides of the Zambezi River. As such its designation as a WHS improves the conservation value of the surrounding areas. The mid Zambezi valley protected system in Zimbabwe covers almost 13,000 km² and represents a significant biodiversity resource for the country and the region

Projects

Compilation of active conservation projects

Nº	Organization	Brief description of Active Projects	Website
1	Zim Parks	Management Authority. Monitoring, research, management and protection	www.zimparks.org
2	Zambezi Society	Assists with wildlife protection, research, lobbying, education, training and fuel	www.zamsoc.org
3	Tashinga Initiative	Anti-poaching and law enforcement infrastructure; training; VHF radio communications; food security; ranger community welfare.	www.tashingainitiative.org
4	BirdLife Zimbabwe	Important Bird Area under BirdLife International. Training and monitoring	www.birdlifezimbabwe.com
5	Zambezi Elephant Fund	Funding and resources allocation to NGO's in support of ZPWMA. A voice to the world for the landscape	www.zambezielephantfund.org
6	Flying for Wildlife	Ad hoc flying of ZPWMA staff for reconnaissance patrols. Developing system for cheaper annual aerial surveys for selected parts of the ecosystem	
7	Bushlife	Anti-poaching, Wild dog research, Monitoring and Tracking, Infrastructure Development, Community Outreach	https://bushlife-conservancy.org/
8	Painted Dog Research	Painted Dog Research, Anti-poaching, Community work	https://www.painteddog.org/
9	SinoZim Wildlife Foundation	Anti-poaching assistance	

No	Organization	Brief description of Active Projects	Website
10	Rhino Force	Anti-poaching. Long term view for black rhino introduction	https://rhino-force.org/projects.html?gclid=EAlaIQobChMIwI79286L6QIVSuvtCh0-SAW1EAAYASAAEgl3b_D_BwE
11	African Wildlife Foundation	Anti-poaching support	https://www.awf.org/
12	Wild Cru	Predator surveys	https://www.wildcru.org/
13	International Anti Poaching Foundation	Anti-poaching and community work on southern boundary - Akashinga	https://www.iapf.org/

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