

Ennedi Massif: Natural and Cultural Landscape

2020 Conservation Outlook Assessment

SITE INFORMATION

Country: Chad
Inscribed in: 2016
Criteria: (iii) (vii) (ix)



In the northeast of the country, the sandstone Ennedi Massif has been sculpted over time by water and wind erosion into a plateau featuring canyons and valleys that present a spectacular landscape marked by cliffs, natural arches and pitons. In the largest canyons, the permanent presence of water plays an essential role in the Massif's ecosystem, sustaining flora and fauna as well as human life. Thousands of images have been painted and carved into the rock surface of caves, canyons and shelters, presenting one of the largest ensembles of rock art in the Sahara. © UNESCO

SUMMARY

2020 Conservation Outlook

Finalised on 02 Dec 2020

SIGNIFICANT CONCERN

Overall, the outstanding landscape values of the site (criterion vii) remain in good condition. A number of pressures (tourism, livestock grazing) are expected to increase and may result in negative impacts on the aesthetic value of the site. However, several concerns remain regarding criterion (ix) values. Whilst the site represents an outstanding example of a very specific relict ecosystem, the revised boundaries of the site do not include the full range of these features, noting that the original boundaries proposed at the time of inscription were revised during the evaluation process, specifically, a reduction of approximately 20% excluded areas in the northern part where an oil concession was granted. Following a history of traditional management, in 2018 Ennedi formally came under the long-term management of the African Parks Network (APN) which has allowed for professional management to complement traditional methods, including through new financial investment; some legislative changes; construction of management infrastructure; biological surveys; community engagement; as well as plans to address tourism management and strengthen management, monitoring and surveillance capacity. Issues of concern raised by the World Heritage Committee regarding important fundamental management matters including an update of the management plan for the site considered inadequate at the time of inscription to protect the values under criterion (ix), as well as concerns over the boundary configuration of the site, remain to be addressed and clarified. Long term sustainable funding will also need to be secured for the site into the future. It is

projected that the continued strengthening of new management arrangements under APN, full implementation of all World Heritage Committee requests by the State Party, and securing long term sustainable funding for the site, will facilitate a continued positive trajectory and improved conservation outlook for the site in the medium to longer term.

FULL ASSESSMENT

Description of values

Values

World Heritage values

► **Desert landscape of outstanding aesthetic value**

Criterion:(vii)

The Ennedi Massif is one of the six major mountain ranges of the Sahara, the largest desert in the world. The morphological and colour contrasts between this relief and the surrounding desert plains confer an outstanding aesthetic value. The verdant wetlands of the gueltas contrast with the ochre and red rocks of the relief. Sheltering the last crocodiles of the region, the Guelta d'Archei is an exceptional site encased in imposing walls of red sandstone (World Heritage Committee, 2017).

► **Conditions enabling survival of relict species far from their current distribution**

Criterion:(ix)

The relief of the Ennedi Massif allows the local coexistence of hyper-arid to semi-arid zones and generates wetter conditions than in the surrounding desert plains which enabled the animal and plant species to survive in the massif after the installation of the current arid Saharan climate 4,300 years ago. These relict species are far removed from their current distribution ranges in the subtropical and tropical zone. An estimated population of 10 crocodiles is also present in the Guelta d'Archei, where water is present all year round (de Smet, 1999; Brito et al., 2011). This relict species found itself isolated a few thousand years ago with the draining of the hydrographic network linking the Ennedi to the neighbouring regions. The massif shelters Saharan, Sahelian, subtropical and relict species and constitutes an island of exceptional biodiversity in a desert (World Heritage Committee, 2017; Gillet, 1968; Brundu & Camarda, 2013).

Assessment information

Threats

Current Threats

Low Threat

While many current threats remain at a low level due to the remoteness of the site, some are expected to increase with the growing local population, particularly grazing pressure, as well as tourism which could increase pressures such as littering and off-road driving. Poaching decimated populations of many animal species in the past and while viable populations of some key species exist in the site, they continue to be threatened.

► **Livestock Farming / Grazing**

Low Threat

(Livestock grazing)

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

Pastoralism is the basis of the local economy. Livestock grazing is concentrated in areas with permanent water access and therefore may result in significant, though localized impacts. However, overall pressure from grazing has not yet reached a critical stage and desertification has been observed during the evaluation mission even in the most heavily used areas (IUCN, 2016). Recently, it was reported that grazing pressure is increasing in some parts of the site and, if left unchecked, could quickly escalate (UNESCO, 2018).

► **Logging/ Wood Harvesting** **Low Threat**
(*Firewood collection*) Inside site, localised(<5%)
Outside site

Firewood collection by local communities does not represent a high threat currently, but could become an issue as a result of growing population and visitor numbers (IUCN, 2016). In 2020, the State Party reported the implementation of a ban on cutting of green wood (State Party of Chad, 2020).

► **Hunting and trapping** **Data Deficient**
(*Poaching*) Inside site, widespread(15-50%)
Outside site

Poaching has decimated populations of some species in the site and is reported to have led to local extinctions of several key species, such as Oryx, Addax, Dama Gazelle, Ostrich and Lion. There are still viable populations of some species, but these continue to be threatened (IUCN, 2016).

No poaching data are currently available, however law enforcement is being strengthened since the site came under the management of the African Parks Network in 2018 (African Parks, 2019 and 2020), which should help to address poaching issues going forward. In 2020, the State Party also reported the implementation of a ban on hunting (State Party, 2020).

► **Solid Waste** **Low Threat**
(*Waste*) Inside site, scattered(5-15%)
Outside site

Decomposition of waste is very slow in a desert environment and waste management is therefore an important issue. However, the problem of littering currently is still limited (IUCN, 2016), but it might become an issue with the expected increase in visitors numbers.

► **Roads/ Railroads** **High Threat**
(*Off-road driving*) Inside site, scattered(5-15%)
Outside site

Off-road driving is common in the property and it impacts on vegetation and intactness of the landscape are visible. There is a need to establish a more rigorous system to control these activities (IUCN, 2016).

► **Other** **Data Deficient**
(*Threat to viability of crocodile population*) Inside site, localised(<5%)

Inbreeding represents a severe threat to the crocodile population, possibly also human disturbance and the lack of sufficient food (IUCN Consultation, 2020).

Potential Threats **High Threat**

Various threats are expected to increase in the future, particularly grazing pressure, potentially agriculture development and tourism. Noting that the boundaries of the original nomination were modified by the State Party during the nomination process, and the reduction was triggered by the fact that an oil concession was granted in the area which was removed from the boundaries, the potential threat of oil operations in the vicinity of the site also remains high. In fact, it can be argued that oil concessions have already resulted in a significant impact on the site through the reduction of the area originally nominated by the State Party. This area also contains significant attributes important for supporting the Outstanding Universal Value of the site.

► **Crops, Livestock Farming / Grazing** **High Threat**
(*Increasing pastoralism and agriculture development*) Inside site, scattered(5-15%)
Outside site

Increasing pastoralism pressure represents a high potential threat to the values of the property (IUCN, 2016). While the potential to develop agriculture is currently limited by the lack of water, it could be developed in the future in some areas by accessing underground water resources. The proposed budget in the management plan for the site at the time of inscription included development of drip irrigation

(IUCN, 2016).

► **Oil/ Gas exploration/development**

High Threat

(Oil exploration and exploitation)

Outside site

The boundaries of the original nomination were modified by the State Party when the nomination was already being evaluated. The reduction in the area proposed for inscription was triggered by the fact that an oil concession was granted in the area which was removed from the boundaries. While this means that no oil concessions overlap with the boundaries of the site as inscribed, the area excised from the original nomination contains significant attributes important for supporting the Outstanding Universal Value of the site. Future oil operations in the vicinity of the site may have impacts on the site's integrity and values (IUCN, 2016).

► **Tourism/ visitors/ recreation**

Low Threat

(Increasing tourism)

Inside site, scattered(5-15%)

Outside site

The area is very remote and tourism remains limited. However, it is expected that tourism activities will increase in the future and this will require careful management (IUCN, 2016). In 2019, APN described the Ennedi Massif as renowned for being a prime destination for Saharan tourism and identifies the tourism potential as being "immense", to provide valuable income to the reserve and help support local communities (African Parks, 2019), and any increased tourism will require careful management. However, the impacts of the 2020 COVID-19 pandemic on visitation numbers are yet to be evaluated.

► **Other**

Data Deficient

(Threat to rock art)

Inside site, extent of threat not known

Possibly threat through human intrusion (tourism) and "natural" decay.

Overall assessment of threats

High Threat

Overall, the current threats to the site remain relatively low due to its remoteness, however some threats are expected to increase with the growing local population, particularly grazing pressure, as well as tourism which could increase pressures such as littering and off-road driving. Poaching decimated populations of many animal species in the past and while viable populations of some key species exist in the property, they continue to be threatened. Oil operations in the vicinity of the site also represent a high potential threat. In fact, oil concessions have already resulted in a significant impact on the site through the reduction of the area originally nominated by the State Party. The reduction in the area proposed for inscription was triggered by the fact that an oil concession was granted in the area which was removed from the proposed boundaries. However, this area contains significant attributes important for supporting the Outstanding Universal Value of the site. With the management of the property under the African Parks Network (APN) since 2018, there is a positive opportunity to ensure proactive and effective management of current and potential future threats going forward.

Protection and management

Assessing Protection and Management

► **Management system**

Some Concern

At the time of inscription, the nomination dossier stated that the traditional management by the indigenous people has until now safeguarded the integrity of the proposed property (State Party of Chad, 2015), however such traditional management should be complemented by additional professional management to be able to respond to the challenges facing the site. The State Party proposed for this

additional management system to include Local Organization and Implementation Committees, a site manager and a deputy who would have direct responsibility for the management of the site. While this proposed system was considered sufficient for safeguarding the property's outstanding landscape values, it was considered insufficient to protect its values under criterion (ix) due to the lack of field staff and resources (IUCN, 2016).

In February 2018, Ennedi formally came under the long-term management of the African Parks Network (APN) in partnership with the State Party, and supported by funding from the European Union and the Dutch Postcode Lottery. The shared long-term vision is to restore natural and cultural assets, reintroducing species that lived there before, and to recreate a representation of the Sindian-Saharan and Sahelian biomes in Africa, which are no longer found anywhere else in the entire Sahel region (African Parks, 2020).

► **Effectiveness of management system**

Some Concern

Although management is anticipated to improve over the medium to longer term through the 2018 APN management agreement, the effectiveness of current management remains of concern, since the management structure proposed in the nomination dossier was considered to be insufficient to efficiently protect the site's biodiversity and ecological values due to the lack of professional field staff and resources (IUCN, 2016), and no confirmation has been provided that the existing management plan has been updated as requested (State Party of Chad, 2020). An update of this plan should be completed to allow for effective management of the site. Funding constraints had also prevented the effective implementation of the existing Management Plan (2014-2024) and impeded the requested revision of the Plan (State Party of Chad, 2018).

As of 2020, various issues remain to be addressed, including a comprehensive review of the legislative arrangements and update of the management plan (State Party of Chad, 2020), however it is anticipated that the new management arrangement will continue to improve the protection and management of the property going forward.

► **Boundaries**

Serious Concern

The original boundaries of the area nominated by the State Party were revised during the course of the evaluation process. Specifically, a reduction of approximately 20% was introduced which excluded areas in the Northern part of the original nomination where an oil concession was granted. The excluded area contains significant attributes important for supporting the OUV of the site and therefore this excision is of concern (IUCN, 2016).

Subsequently, it has been proposed to create a Natural and Cultural Reserve of Ennedi (RNCE), which would include the entire mountain chain of Ennedi (UNESCO, 2018). It will be important to ensure that all important areas are included in the envisaged boundaries of the reserve and that an appropriate buffer zone is foreseen (World Heritage Committee, 2018).

In 2019, APN reported that the newly published Decree for the creation of the RNCE provides the official legal framework for the Reserve, but also noted that due to boundaries being incorrectly cited, an amended Decree was resubmitted and validated by the Committee of Ministers and its publication awaits the signature of the President (African Parks, 2019). However, no information on boundary modifications was provided in 2020 (State Party of Chad, 2020) and no boundary modification request was submitted, so it is of concern that the clarification of boundaries remains to be confirmed.

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

Data Deficient

Data deficient

► **Relationships with local people**

Mostly Effective

About 40,000 nomadic or semi-nomadic pastoralist people live in the region of the property (including its buffer zone), following traditional lifestyles (IUCN, 2016). Local community representatives expressed their support to the nomination during the evaluation mission and the management plan for the property foresees that local communities will remain actively involved in the management of the site

through the proposed local committees (IUCN, 2016).

In 2019, APN highlighted the utmost importance of its work with nomadic and settled communities that legally live or move through Ennedi every year. A field study done in collaboration with the NGO APIDEL (Association pour la Promotion des Initiatives de Développement Local) and the European Union's PASTOR programme (Programme d'Appui Structurant de Développement Pastoral), documented how these communities use the reserve's landscape and natural resources, and results will guide the implementation of future community development projects. The Park Management Unit conducted exploratory work for the community development strategy for Fada, the capital of Ennedi West Province. At the end of 2019 a full-time Deputy Manager was appointed to work with the Community Manager on Community Development Projects, such as possibly supporting date-palm plantations and small-scale vegetable farming for female farmers. The ongoing presence of the Park Management Unit which collected baseline socio-economic data offered opportunities to foster relationships with local communities, and enabled the identification of key individuals to join the APN team as Community Liaison Officers (African Parks, 2019).

► **Legal framework**

Some Concern

The property is protected by a special Decree on its protection (Decree 260/PR/ PM/MCDT/2016) of 5 March 2016. The protection regime established by this decree foresees the exclusion of mining prospecting or exploitation, hunting and logging. Traditional uses are permitted. Other relevant legal instruments include Law No.14/PR/2008 concerning forest, wildlife and fisheries resources, Law No. 14/PR/98 concerning the environment, and Law No.14/PR/60 concerning the protection of monuments and natural sites and prehistoric and archaeological monuments and objects. However, the legal framework needs to be further strengthened to guarantee the adequate level of protection for the property's Outstanding Universal Value (World Heritage Committee, 2017). In February 2019, the Decree for the creation of Ennedi Natural and Cultural Reserve was published, providing Ennedi with the official legal framework. However, due to boundaries being incorrectly cited, an amended Decree was resubmitted and validated by the Committee of Ministers and its publication awaits the signature of the President (African Parks, 2019).

The World Heritage Committee's recommendation that the long-envisioned strengthening of the legal protected area status be accompanied by a review of the best possible configuration for the site, ensuring full harmonization between the national legal status, management approach, World Heritage status and buffer zone boundaries (UNESCO, 2018), remains to be implemented.

► **Law enforcement**

Some Concern

At the time of inscription in 2016, poaching was identified as a serious problem (IUCN, 2016), which indicated that law enforcement was inefficient. Since the management of the site was taken over by APN in 2018, law enforcement efforts are being strengthened. In 2019, APN reported that after a preliminary field-based assessment, baseline information was provided to adequately setup the reserve's Law Enforcement Department. Three Law Enforcement instructors, two internationals and one national from Zakouma, worked with a representative from the Forestry and Wildlife Brigade department of the Ministry of Environment, Water and Fisheries (MEEP), to lead a five-day selection event for new eco-guards in Fada, where 40 out of a total of 650 candidates were selected to attend full Basic Field Ranger training. However, on request from MEEP, equal recruitment between Ennedi East and Ennedi West will need to occur before the training can resume in early 2020. A mobile unit was set up in 2019, consisting of five people patrolling five days a week, to help raise awareness among the local communities about local wildlife laws, the impact of poaching on local species, as well as the ramifications for breaching the law. The teams also increased advocacy efforts among priority communities, to inform them of APN's conservation strategies, management actions and overall impacts for the reserve and the communities living in and around the area (African Parks, 2019).

► **Implementation of Committee decisions and recommendations**

Some Concern

Following inscription of the site on the World Heritage List in 2016, the World Heritage Committee has

expressed various requests and recommendations (World Heritage Committee, 2016 and 2018). Several recommendations, for example establishing a legal framework and improving management measures are in the process of being addressed by the State Party, however others remain to be implemented, such as ensuring full harmonization of the national legal status, management approach, World Heritage status and buffer zone boundaries, as well as finalization of the proposal for the boundaries of the RNCE to guarantee that all important areas are included and an appropriate buffer zone is foreseen (UNESCO, 2018; State Party of Chad, 2018 and 2020).

► **Sustainable use**

Some Concern

Traditional uses are permitted in the site (World Heritage Committee, 2017). Livestock grazing is the main local activity and while its current levels within the site haven't reached a critical stage, it might become an issue in the future with increasing grazing pressure (IUCN, 2016).

► **Sustainable finance**

Some Concern

In February 2018, Ennedi formally came under the long-term management of the APN in partnership with the Government of the Republic of Chad. This management is supported by funding from the European Union (EU), which committed €10 million under the 11th European Development Fund towards the Greater Zakouma area from 2017-2021, as well as from the Dutch Postcode Lottery, supporting the first three year of African Parks' management of Ennedi through a €2.9 million 'Extra Project' (2018-2020) (African Parks, 2020). This international support is providing important funding to the site. In the medium to longer term, the funding requirements for the effective protection and management of the property will need to be determined and sustainable funding will need to be secured beyond the 2021 timeframe.

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

Some Concern

Initiatives to strengthen staff capacity are starting to be implemented in recent years. In 2019, APN reported as part of its 2020 objectives to select, train and deploy 40 eco-guards with an adequate surveillance strategy; develop community intelligence network and establish a functional control room (African Parks, 2019). After a preliminary field-based assessment, baseline information was provided to adequately set up the reserve's Law Enforcement Department. Three Law Enforcement instructors, two internationals and one national from Zakouma, worked with a representative from the Forestry and Wildlife Brigade department of the Ministry of Environment, Water and Fisheries (MEEP), to lead a five-day selection event for new eco-guards in Fada, where 40 out of a total of 650 candidates were selected to attend full Basic Field Ranger training. However, on request from MEEP, equal recruitment between Ennedi East and Ennedi West will need to occur before the training can resume in early 2020. A mobile unit was set up in 2019, consisting of five people patrolling five days a week. Their purpose was to help raise awareness among the local communities about local wildlife laws, the impact of poaching on local species, as well as the ramifications for breaching the law (African Parks, 2019). Further strengthening of staffing to effectively manage the site will be required.

► **Education and interpretation programs**

Some Concern

In its original nomination dossier for the site, the State Party outlined planned activities, including an exhibition and installation of information shields (State Party of Chad, 2015). In 2019, APN reported tourism development as a strong focus (see "Tourism and visitation management" section below), which will provide the opportunity to strengthen education and interpretation programs. As one of its objectives for 2020, APN intends to kick-start community development projects focusing on environmental education, vegetable gardening benefitting women, and waste management in Fada (African Parks, 2019).

► **Tourism and visitation management**

Some Concern

At the time of inscription, visitation levels remained very low due to the remoteness of the site, however tourism was expected to increase and require careful management (IUCN, 2016). In 2019, APN described the Ennedi Massif as renowned for being a prime destination for Saharan tourism and identifies the tourism potential as being "immense", to provide valuable income to the reserve and help

support local communities. APN states that, while Ennedi does not yet have its own tourism infrastructure, a 'Tourism Task Force' composed of all local tourism stakeholders was created in 2018 to develop a sustainable Tourism Development Plan. After a series of meetings, fieldtrips and workshops, the project was postponed to better coordinate among all stakeholders, but will be reinstated in 2020. Engagement continues with the Ministry of Environment, Water and Fisheries and the Ministry of Tourism, Arts and Culture on viable solutions that ensure a joint vision to develop sustainable tourism in the reserve (African Parks, 2019). Since tourism is anticipated to grow in future, it remains very important for an effective, collaborative tourism strategy to be developed and implemented through a holistic approach focused on the conservation of the Outstanding Universal Value of the site.

► **Monitoring**

Some Concern

An integrated monitoring system will be implemented by APN in order to achieve better site management for the site (State Party of Chad, 2020).

Since 2018, various biodiversity surveys have been carried out. Initiated in 2018, a camera trap survey revealed the presence of 20 medium to large mammal species including aardvark, honey badger and slender mongoose (African Parks, 2019). The same year, APN staff discovered the last population of North African, or red-necked, ostrich residing in the north of Chad. For two decades, scientists considered the subspecies to be locally extinct in the Ennedi Massif, but the discovery of around six individuals (male and female) in the northeast of the reserve offers renewed hope for the world's largest living bird (African Parks, 2018). In September 2019, Ennedi's first ornithological survey was conducted over 10 days and covering 1,150 km, which resulted in 185 species observations and provided the first-ever Ennedi bird species list (African Parks, 2019 and 2020). In December 2019, a 12-day aerial survey covered 4,888 km of transect lines, recording 219 dorcas gazelle and 53 barbary sheep. The ecological study on the relict population of West African crocodiles continued throughout the year, confirming the presence of four individuals (three females). DNA samples will confirm whether Zakouma's crocodiles are a suitable source for a possible translocation to help revive the population. A five-year action plan for the conservation of Ennedi's recently discovered remaining population of red-necked ostriches, thought to be locally extinct, was presented at the National Workshop for Ostrich Conservation. Upon delivering this plan, six near-adult ostriches kept in an enclosure in Fada were donated to the reserve (African Parks, 2019).

These surveys provide a useful contribution to documenting the values of the site under criterion (ix), and the establishment of the reported integrated monitoring system by APN will allow for the ongoing monitoring and management.

► **Research**

Mostly Effective

See "monitoring" section above. A number of universities and research institutions, for example the University of Köln, have been involved in research activities in the property for a long period of time (State Party of Chad, 2015).

Overall assessment of protection and management

Some Concern

At the time of inscription in 2016, traditional management had been in place to safeguard the integrity of the site. However, it was noted that additional professional management should be implemented to complement traditional management, and the management system proposed at the time of inscription was considered insufficient to provide efficient protection for the site's values under criterion (ix) due to the absence of field personnel and resources, and the system remained to be implemented. In 2018, Ennedi formally came under the long-term management of the African Parks Network (APN) in partnership with the State Party of the Government of Chad, and supported by funding from the European Union. This has allowed for various management improvements to be initiated including through financial investment; some legislative changes; construction of management infrastructure; biological surveys; community engagement; as well as plans to address tourism management and strengthen management, monitoring and surveillance capacity. Notwithstanding the positive progress underway, there are issues of concern regarding important fundamental management matters that remain to be implemented or clarified including an update of

the management plan for the site, as well as concerns over the boundary configuration of the site, i.e. the reduction by approximately 20% to exclude areas in the Northern part of the original nomination where an oil concession was granted and which contain significant attributes important for supporting the OUV of the site. Long term sustainable funding will also need to be secured for the site into the future.

The ongoing strengthening of new management arrangements, full implementation of all World Heritage Committee requests, and securing long term sustainable funding for the site will facilitate a continued positive trajectory for the site in the medium to longer term.

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

Some Concern

Notwithstanding the positive progress underway with the management of the site (see below), many issues remain to be addressed, including those originating from outside the site's boundaries. Potential of future oil operations in the vicinity of the site remain of high concern, both due to potential significant impacts on the site, but also due to the fact that the area excised from the original nomination, because an oil concession was granted overlapping with it, contains significant attributes important for supporting the Outstanding Universal Value of the site (IUCN, 2016).

State and trend of values

Assessing the current state and trend of values

World Heritage values

► **Desert landscape of outstanding aesthetic value**

**Good
Trend:Stable**

At the time of inscription, the outstanding landscape values of the property were considered to be in good condition (IUCN, 2016). However, a number of pressures (tourism, livestock grazing) are expected to increase and might result in negative impacts on the aesthetic value of the property. The 2018 formal long-term management of the property by APN with the financial support of partners (African Parks, 2020), and planned actions to update an integrated management plan, and establishment of a tourism development plan, will provide the opportunity to facilitate effective management of such pressures going forward.

► **Conditions enabling survival of relict species far from their current distribution**

**High Concern
Trend:Improving**

Ennedi has long been a refuge for Saharan wildlife, with species such as addax, oryx, cheetah, Dama and Leptocere gazelles among others present in large numbers until the mid-20th century. While poaching and conflict almost eradicated these species, some exceptional wildlife spectacles remain (African Parks, 2020).

While the site represents an outstanding example of a very specific relict ecosystem, concerns were expressed with regard to the revised boundaries of the site which do not include the full range of these features (IUCN, 2016). Also, a significant loss of populations of many key species was documented in the site in the past (IUCN, 2016) and, while viable populations of many other species still exist in the site, it raises concerns regarding the impacts on the ecosystem integrity and functioning.

Recent 2018-2019 surveys by APN, show the presence of Barbary sheep, Dorcas gazelle, striped hyaena, baboon, patas monkey, caracal, and honey badger, desert hedgehog, common genet, Rüppell's fox. Also, a small relict population of crocodiles (*Crocodylus suchus*) persists in the Guelta d'Archei, the last known representatives of this species throughout the Sahara (African Parks, 2020). In 2018, APN staff discovered the last population of North African, or red-necked, ostrich residing in the north of Chad.

For two decades, scientists considered the subspecies to be locally extinct in the Ennedi Massif, but the discovery of around six individuals (male and female) in the northeast of the reserve offers renewed hope for the world's largest living bird (African Parks, 2018). Although these data show that various species are present, their conservation status or recovery status currently remains unclear. A project is currently underway to introduce additional red-necked ostriches to bolster the existing population and a study is underway to explore the possibility of introducing more desert crocodiles. Chad is home to the only viable populations of both of these species and their in-situ conservation is essential to their survival (African Parks, 2020).

Summary of the Values

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

High Concern
Trend: Improving

The outstanding landscape values of the site under criterion (vii) remain in good condition and stable. A number of pressures (tourism, livestock grazing) are expected to increase and may result in negative impacts on the aesthetic value of the site, which will require effective management. For criterion (ix) values, high concerns remain since the site represents an outstanding example of a very specific relict ecosystem, however the revised boundaries of the site do not include the full range of these features. Also, a significant loss of populations of many key species was documented in the site in the past and, while viable populations of many other species still exist in the site, this raises concerns regarding the impacts on the ecosystem integrity and functioning. The new management priorities planned under the 2018-established formal long-term management of the site by African Parks (APN), for the restoration and conservation of Ennedi's wildlife populations including regular ecological data collection, long-term monitoring of key species, and reintroduction of locally extinct emblematic species, are a positive step towards significantly improving the conditions to, firstly, determine the current status of biodiversity values of the site, and secondly, to facilitate the ongoing monitoring, protection and management of relict species into the future. As these management plans are implemented, a positive trend is expected in the future.

Additional information

Benefits

Understanding Benefits

► Outdoor recreation and tourism

Tourism is currently limited due to remoteness of the area, but might increase in the future. While this could provide new opportunities for local communities, it will also need to be carefully managed in order to avoid any impacts on the property's values.

► Importance for research

A number of universities and research institutions, for example the University of Köln, have been involved in research activities in the property (State Party of Chad, 2015).

► History and tradition, Sacred natural sites or landscapes, Cultural identity and sense of belonging

The Ennedi hosts a large number of prehistoric sites; among them are numerous sites with rock art of great variety (cf. Simonis et al. 2017).

One could think about conservation measures; the free access of tourists to sites could affect them.

► **Direct employment,
Tourism-related income**

Due to its wide grasslands, the Ennedi offers important pastures for the livestock of nomads and thus a basis for the economic survival of numerous families. Pastoral nomadism, if the number of animals is appropriate to the existing grazing areas, represents a millennia-old and sustainable use of the ecosystem by man. Tourism can be an additional source of income for the local populations.

Factors negatively affecting provision of this benefit :

- Climate change : Impact level - Moderate, Trend - Continuing
- Overexploitation : Impact level - Low, Trend - Continuing

Summary of benefits

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