IUCN Conservation Outlook Assessment 2017 **(archived)**
Finalised on 08 November 2017

Please note: this is an archived Conservation Outlook Assessment for Doñana National Park. To access the most up-to-date Conservation Outlook Assessment for this site, please visit https://www.worldheritageoutlook.iucn.org.

Doñana National Park

SITE INFORMATION

Country:
Spain
Inscribed in: 1994
Criteria:
(vii) (ix) (x)

Site description:
Doñana National Park in Andalusia occupies the right bank of the Guadalquivir river at its estuary on the Atlantic Ocean. It is notable for the great diversity of its biotopes, especially lagoons, marshlands, fixed and mobile dunes, scrub woodland and maquis. It is home to five threatened bird species. It is one of the largest heronries in the Mediterranean region and is the wintering site for more than 500,000 water fowl each year. © UNESCO

SUMMARY

2017 Conservation Outlook

Significant concern

Doñana National Park is threatened by a significant number of issues, the most serious being the long-term and continuing reduction in water quantity and quality within the property. Although the park managers are doing a good job of managing the property itself with excellent public awareness and management activities, plus the decision not to dredge the Guadalquivir River and to develop and implement the “Special Management Plan of the Irrigation Zones located to the North of the Forest Crown of Doñana” has been very positive, there are still other decisions pending that may have an impact on the property. Until external threats such as water management (which also has an effect on alien invasive species and wildfires) can be resolved, and given the demonstrated deterioration in some of the property’s OUV, the Conservation Outlook for the property is of Significant Concern.

Current state and trend of VALUES

High Concern
Trend: Deteriorating

The deterioration of the hydrological regime of the property (both in water quantity and quality) affects all the other values of the property. Although some species have been shown to be stable or are even increasing, others are decreasing, particularly those associated with water. Therefore, the overall conservation status of the property is assessed as of high concern, and deteriorating.

Overall THREATS

Very High Threat

The current threats to the property, in particular the long-term and continuing reduction in water quantity and quality in aquifers and rivers, plus the high threat

of wildfire and potentially high threats of pollution, invasive species and climate change, means that the property has a very high level of threat.

Overall PROTECTION and MANAGEMENT

Some Concern

In general protection and management of the property is effective or even highly effective, apart from the problem of how the management authority can address threats originating from outside the property, including conflict over water use with the agricultural sector.

FULL ASSESSMENT

Description of values

Values

World Heritage values

► **Exceptional coastal and marshland ecosystems**
Criterion:(ix)

Because of its unique composition of sedimentary deposits and ongoing coastal and fluvial processes, the property comprises an exceptionally wide range of well-preserved coastal and freshwater marsh ecosystems (Ramsar, 2007). Marsh ecosystems which support the greatest bird diversity are highly seasonal and typically fall dry in summer. They are characterized by steep salinity gradients with associated shifts in flora and vegetation. Coastal ecosystems are dominated by beach and dunes, the latter partly mobile and sparsely vegetated, and partly immobile and covered in Rhamno-Juniperetum Sophora communities with a notable degree of endemism (UNEP-WCMC, 2011). Doñana holds both permanent and temporary ponds. The system of temporary ponds of Doñana is one of the most important in Europe, due to the abundance and diversity of ponds, and their natural origin. In rainy years, around 3,000 ponds can be flooded in Doñana, with different sizes and hydroperiods, allowing for the conservation of a great number of species of zooplankton, macro-invertebrates, amphibians and aquatic macrophytes (Serrano et al., 2006; Díaz Paniagua et al., 2014; Díaz Paniagua & Aragonés, 2015).

► **Extraordinary terrestrial ecosystems**
Criterion:(ix)

The terrestrial inland part of the property is characterized by extended

heathland and open forest ecosystems which are a major habitat of the Iberian Lynx Lynx pardinus. The area belongs to the WWF Global 200 priority ecoregion “Mediterranean Forests, Woodland and Scrub” (WWF, 2012). Since the inclusion of the property in the World Heritage list, the systematic removal of eucalyptus and the naturalisation activities and reforestation of degraded areas or areas occupied by exotic species has lead to a notable improvement and local regeneration of habitats and communities of interest (State Party of Spain, 2016).

► Globally significant bird migration hotspot

Criterion:(x)

Doñana, and particularly its marshes, is of international importance for numerous species of breeding, staging and wintering waterbirds, and is a bottleneck along the Western Europe – West African migratory flyway, with 400,000 wintering and up to 6 million migratory birds during peak migration periods (UNEP-WCMC, 2011). Migratory and wintering groups of particular importance include ducks and geese, storks and raptors, as well as gulls and shorebirds. 20,000 storks and raptors regularly pass over the area. The area overlaps with the Important Bird Area of global importance “Guadalquivir Marshes” (BirdLife International, 2017a), recently identified as IBA in Danger by BirdLife International and SEO/BirdLife (BirdLife International, 2017).

► Diversity of flora

Criterion:(x)

Over 750 species of higher plants have been recorded in the property, including a number of threatened species growing in four main vegetation types: marshlands/aquatic, salt-tolerant, open forest and heath, with healthy populations of species typical to these vegetation types. Noteworthy protected and nationally endemic species include Micropyrosis tuberosa, Linaria tursica, Gaudinia hispanica, and Vulpia fontquerana (UNEP-WCMC, 2011).

► Exceptional diversity of fauna

Criterion:(x)

Doñana has a rich fauna diversity, with 37 species of mammals, 12 of amphibians, 23 of reptiles, and 72 of fishes, plus a large number of

invertebrate species (UNEP-WCMC, 2011). More recently, 1,957 species of animals have been recorded in the property (State Party of Spain, 2016). The most notable element of the property's fauna is its avifauna, with more than 419 species having been recorded (UNEP-WCMC, 2011), including several globally threatened breeding species such as the Marbled Teal Marmaronetta angustirostris (VU), the White-headed Duck Oxyura leucocephala (EN) and the Spanish Imperial Eagle Aquila adalberti (VU). In addition its huge heronries, with at least eight breeding species of heron and egret, are remarkable. The area overlaps with the Important Bird Area "Guadalquivir Marshes" (BirdLife International, 2017a), but not with any Endemic Bird Area (BirdLife International, 2017b). Another emblematic element of the property's fauna is the Iberian Lynx Lynx pardinus (EN) with an effective population size around Doñana of about 24 breeding females (Iberlince, 2016). Among the reptiles, particularly notable are the Spur-thighed Tortoise Testudo graeca (VU), and Lataste's Viper Vipera latastei (VU). Among the fish, the Spanish Toothcarp Aphanius iberus (EN) is noteworthy (UNEP-WCMC, 2011; Crivelli, 2006).

► **Extraordinary natural beauty**
Criterion:(vii)

At the time of nomination, the property was noted for its exceptional beauty, solitude and unspoilt nature, particularly its vast flat expanses of wilderness containing diverse habitats (marshes, forests, beaches, dunes, lagoons). Its 38 km long beach is completely pristine, and it possesses spectacular colonies of nesting birds, as well as a unique spectacle of bird migration (IUCN, 1994).

Assessment information

Threats

Current Threats

Very High Threat

There are a number of high threats and a very high threat, which have already significantly degraded the hydrological and functional basis of ecosystems which support the integrity of the site, both over the course of the 20th century and more importantly, during the past 20 years. A number of ambitious management initiatives to contain these threats have not been sufficiently effective in reversing this trend, thus the property is considered under very high threat.

► Hyper-Abundant Species

Low Threat
Inside site, extent of threat not known
Outside site

Wild boar population has increased greatly within the National Park in recent years. Wild boars pose one of the key threats to the bird species within the National Park (EBD, 2016).

► Tourism/ visitors/ recreation

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

Some tourism infrastructure developments near the property such as at Mazagón were documented in 2008, and the general disturbance from high level of weekend tourism has been highlighted (WWF, 2008). These are considered a low threat. However, increased tourism has further reduced the groundwater reserves, which is included in the very high threat of reduced water supply (see above). The beach resort of Matalascañas also remains a problem due to the high pressure of water abstraction for drinking water on the nearby ponds in the dune area. The POTAD land use plan (Junta de Andalucía, 2004) already recognized this problem and proposed the relocation of the public boreholes, but nothing has been done to date.

► Fishing / Harvesting Aquatic Resources, Poaching

Low Threat

Inside site, extent of threat not known
Outside site

Illegal egg collection and bird and large herbivore poaching have been documented from the property, as well as illegal fishing and persecution (poisoning) of wild animals (WWF, 2008). There reportedly is also illegal fishing of European eel (Anguilla anguilla) which returns to breed in the lower Guadalquivir. The status of the population is so bad that glass eel fishing has been banned since 2011, although illegal fishing remains a problem. However, due to the relatively effective management of the property, in comparison to other threats this threat is significant but low.

► Roads/ Railroads

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

A number of fenced roads both within and around the property are contributing to habitat fragmentation. Despite the fences, there is also a high amount of roadkill including the Iberian Lynx. For example, 2,298 vertebrates were killed on roads inside the property in nine months in 2007 (WWF, 2008). A "Special Plan" implementing the Regulations of the Doñana Region Land Plan is meant to "establish a balance between the development of agricultural activity in the vicinity of Doñana and the environmental impact of this activity", noting the decision that the "functional structure of the agricultural area needs to be compatible with the road system and rural routes providing access to the holdings, and the services and equipment linked to agricultural activity and their users" (State Party of Spain, 2016). It was added that "Measures need to be taken to permeate the agricultural area to allow for the movement of wildlife through the creation of an ecological connectivity, and precautionary measures need to be taken to ensure compatibility with the road system and all the rural routes". Once this is put into place so that fragmentation and roadkill is reduced, this threat will also be reduced, but at this point in time it remains high.

► Water Pollution, Household Sewage/ Urban Waste Water, Industrial/ Military Effluents

High Threat
Inside site, throughout(>50%)

Outside site

The 1998 Aznacóllar mine accident led to the poisoning of the Guadiamar River with heavy metals and other toxic materials, which affected the property (UNEP-WCMC, 2011). In 2013 the regional government issued a public bid for reopening the mine, and in 2015 one international bid was received for its exploitation. In 2016 the State Party reported in its state of conservation report that the project has not proceeded to implementation but a research project has been authorized. In addition, several municipalities on tributaries of the wetlands of the property such as Almonte, Rociana de Condado and Matalascañas, reportedly have insufficient waste water treatment systems in place. There is also contamination from agricultural runoff and industrial water pollution, including on the Guadalquivir River (CSIC et al., 2011). The combined pollution from various sources of water entering the property constitutes a high threat, contributing to the entrance of nutrients and eutrophication. The Spanish government was fined by the European Union in 2016 for the lack of adequate water treatment in Matalascañas (La Nueva España, 2016).

► Fire/ Fire Suppression

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

A large fire, which occurred outside of the property in June 2017, threatened the property and caused problems with the Iberian Lynx captive breeding facility (El País, 2017). The fire has affected about 40 species of flora, including the endemic Linaria tursica¸38 species of mammals and 75 species of birds. In addition, 13 habitats of community interest and 3 of primary community interest have been affected (SEO/BirdLife, 2017a).
Reports on fires in 2008 and 2009 indicate a large number of fires inside and in the vicinity of the property, with more than 84,000 ha of the property and its surroundings affected. Fires affect forest areas in particular and appear to be largely caused by humans, with more than 40% started intentionally (WWF, 2010).

► Invasive Non-Native/ Alien Species

Low Threat
Inside site, widespread(15-50%)

Outside site

Both alien plant (e.g. Eucalyptus, Acacia spp., giant cane Arundo donax, burdock Xantium strumarium, Nicotiana glauca and alien floating fern Azolla filiculoides) and alien animal species (e.g. American Crayfish Procamburus clarkii in the wetlands, Chinese Mitten Crab Eriocheir sinensis in the Guadalquivir estuary) have been detected inside the property (UNEP-WCMC, 2011; State Party of Spain, 2016; Green et al., 2017). 96% of the fish biomass inside the marshland of the National Park are invasive alien species (Moreno et al., 2013). These alien invasive species are currently classed as low threat although they may in effect be a higher threat to the OUV of the property, particularly with climate change and eutrophication of the water. Three species of fish have disappeared from the property, caused in part by invasive species (WWF, 2017).

► Crops, Dams/ Water Management or Use

Very High Threat
Inside site, throughout(>50%)
Outside site

Hydrological changes have reduced the marsh area at the property from 150,000 ha to 30,000 ha during the second half of the 20th century. As a result of partial hydrological disconnection from its main tributaries (mainly the Guadalquivir River, Guadiamar River, La Rocina Stream and El Partido Stream) and groundwater abstraction in areas surrounding the property, water input has been reduced to 20% of natural values (UNESCO/IUCN/Ramsar, 2011). Water distribution systems inside the property have also been affected. This has led to dramatic changes in marsh vegetation and ecosystems, as well as the timing and extent of migratory and resident bird populations (WWF, 2009). This trend reportedly continues, with reportedly continued illegal wells and illegally irrigated strawberry plantations (WWF, 2016). A “Special Management Plan of the Irrigation Zones located to the North of the Forest Crown of Doñana” was concluded in December 2014, but there is concern that it was not achieved in a participatory manner and that the farmers would push back (IUCN, 2015). The State Party report (2016) notes that "Within the framework of current hydrological planning, decisions need to be made on the setting of limits on the extraction of groundwater resources for irrigation and the associated irrigated area, without adversely affecting the ecosystems related to such

resources in the Doñana Natural Area". A number of specific measures have been implemented, and the Guadalquivir Basin Hydrological Plan 2016-2021 includes another set of measures at the basin level which are also applicable to the groundwater bodies affecting the Doñana National Park and its environment (State Party of Spain, 2016). Whilst dredging of the Guadalquivir River appears in the 2016-2021 Guadalquivir Basin Hydrological Plan, the State Party of Spain has confirmed that dredging will not be allowed to proceed due to the Superior Court ruling. The issue of ground water extraction and irrigation nonetheless, remains a very high threat for the property.

► Livestock Farming / Grazing

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

The vegetation cover of the marshland of the marsh area of the National Park shows evident signs of a strong overgrazing.
According to the analysis, the summed area of the two most extreme categories (surface with intense and extreme overgrazing) represents a total of 10,508 ha, that is, 39.6% of the total cover of the marshland of the Doñana National Park , Discounted the funds of spouts and pikes that naturally do not develop emergent cover (Urdiales, 2009).
There is a positive correlation between the breeding success of waterfowl colonies and their location in areas with perimeter fencing of livestock exclusion in certain areas of the marsh, areas where these structures have kept the marsh vegetation in good condition, indicating the negative effects of overgrazing on the conservation of these birds. Overgrazing compromises the state of conservation of aquatic birds in Doñana in the Plan of Recovery and Conservation of Birds of Wetlands of Andalusia (SEO/BirdLIfe, 2015).

► Tourism/ visitors/ recreation

High Threat
Inside site, extent of threat not known
Outside site

No impact studies have been carried out since the admission of the 'rocieros'. The pilgrimage of El Rocío attracts more than 40,000 people, who corss areas of high ecological value during the breeding season of birds, which

undoubtedly generates important and significant impacts on biodiversity that have never been quantified (SEO/BirdLife, 2017a).

Potential Threats

High Threat

Potential threats from refinery/shipping accidents and climate change interacting with other threats such as fire and invasive species may well present significant threats in the future.

▶ Water Pollution

High Threat
Inside site, extent of threat not known
Outside site

The site is highly exposed to potential impacts of refinery/port or tanker traffic accidents and pollution in the access of the extended La Rábida oil refinery at Huelva, and there have been minor oil spills already, such as in 2009 (UNESCO/IUCN/Ramsar, 2011). Because of the proximity (ca. 35 km) and size of the facility, this is a high potential threat. Navigation in the Guadalquivir also poses a threat, with boats being stranded almost every year.

▶ Shipping Lanes

Very Low Threat
Inside site, extent of threat not known
Outside site

A project to dredge the Guadalquivir river to a depth of 8m to improve access to the Port of Seville would have wide-ranging consequences for the dynamic, morphology and biodiversity of the river and the property. The government has confirmed that regarding the deepening dredging, "the project has been neither authorised nor implemented and that, in view of the conclusions of the Scientific Committee, the grounds of the judgment of the Supreme Court, the stance of the World Heritage Committee and the assessment of the Property's management and participation bodies, the project will not be
allowed to go ahead" (State Party of Spain, 2016). This potential threat can therefore be viewed as very low, although if the decision were to be changed

the threat would be very high.

► Habitat Shifting/ Alteration, Droughts

Data Deficient
Inside site, extent of threat not known
Outside site

Climate change at medium level is likely to reduce groundwater inflow into the property through the Almonte-marismas aquifer in the long term, aggravating existing hydrological threats to the property (Guardiola-Albert & Jackson, 2011). Climate change will also influence the number and intensity of wildfires as well as affect a wide range of additional potential threats including an increase in alien floating plants and cyanobacterial blooms (Green et al., 2017) which need to be studied in more detail. A study (Scheffer et al., 2015) alerts a number actions carried out in Doñana, leaving it vulnerable to climate change.

► Dams/ Water Management or Use

High Threat
Inside site, extent of threat not known
Outside site

A new project to increase water use of rice paddies upstream of the property and reported dam construction on the Guadiamar River was reported (IUCN, 2015), which would likely have a negative impact on the property. The State Party reported that a detailed study/draft plan analysing the possibilities of the enlargement of the Agrio reservoir and the environmental feasibility of the works will be undertaken (State Party of Spain, 2016).

► Oil/ Gas exploration/development

Data Deficient
Outside site

The impact of several mining and gas exploitation and storage projects in the vicinity of the property could have a potentially cumulative effect of the OUV of the property. Thorough EIAs for all these projects taken together need to be undertaken for these projects (IUCN, 2015).

Protection and management

Assessing Protection and Management

► Relationships with local people

Mostly Effective

The Participation Council of Doñana, a consultative body including representatives of 60 bodies, institutions or social agents linked to the Doñana Natural Area, meets annually to approve reports on activities and outcomes of the protected area, as well as the annual Work and Investment Plan (State Party of Spain, 2016). However, some concerns have been expressed that this council is composed of too many institutional stakeholders without a direct relevance to the site's management, and that conservation NGOs and technical experts are not sufficiently represented. There is still a lot of room for improvement, creating real multi-sectoral working groups (that include people not represented in the Council), where consensus is reached on the best solutions for the challenges of Doñana.

► Legal framework

Mostly Effective

The property's legal framework consists of the Law 91/1978 of 28 December 1978 which established the National Park; the Special Plan of 1986, the Plan Director Territorial de Coordinacion 204/1984 of 17 July 1984 as well as the Plan de Ordenacion del Territorio del Ambito de Doñana 341/2003 of 3 December 2003, which protects and enhances spaces of environmental value and contributes to economic values (UNESCO/IUCN/Ramsar, 2011). It is further supported by a number of general national laws, such as on coastal protection, biodiversity and nature protection. In 2016 protection has been reinforced: by Royal Decree 389/2016 the State has adopted a new and more demanding Master Plan for the National Park Network in accordance with the new Law on National Parks of 2014. By Decree 142/2016, the Junta de Andalucía has approved new planning documents for the Natural Site (National Park and Natural Park) and the expansion by almost 14,500-hectare of the Natural Park (State Party of Spain, 2016). The framework is effective

overall, although concerns persist regarding implementation, particularly regarding illegal wells and irrigated horticulture in the Corona Forestal (WWF, 2009; WWF, 2016).

► Enforcement

Some Concern

WWF (2016) notes that there are 1,000 illegal wells and 3,000 hectares of illegal farming fields in the area surrounding the property which have great impact on water flows and quality within the property. The State Party has noted the closure of 246 wells (State Party of Spain, 2016). Enforcement of park regulations within the park seems to be adequate, whereas enforcement of water use outside of the park still seems to need improvement.

► Integration into regional and national planning systems

Serious Concern

A regional and national planning system, including the Doñana Territorial Management Plan (2003), a Plan for the Sustainable Development of Doñana, and a Special Management Plan of the Irrigation Zones Located to the North of the Forest Crown of Doñana (2014) is in place. However, these and other planning documents have repeatedly not resulted in reversing the trend towards reduced water quantity and quality in the property to date, and have not halted illegal water abstraction (Carmona et al., 2012; WWF, 2016). In 2015 a new River Basin Management Plan was approved for the Guadalquivir River basin (including Doñana) that does not properly address water issues in Doñana, and splits the aquifer in 5 units, declaring 2 of them in good status. Therefore while there is integration with the property into regional planning systems, the results have not been positive in terms of increasing water quantity and quality in the property.

► Management system

Mostly Effective

Management of the property (both the National Park and the Nature Park) is under the authority of the Autonomous Community of Andalucía, with a single management authority. The national Ministry of the Environment fulfills a supervisory function. The National Park’s management plan was

approved in 2016 and sets a clear structure and procedures for its management, including cooperation with key external institutions and organizations relevant to the management of the property (UNESCO/IUCN/Ramsar, 2011). However, the management system is not effective in addressing threats originating from outside the property, which are of high importance.

► Management effectiveness

Mostly Effective

Doñana National Park holds the European Diploma of Protected Areas since 1985 that was renewed for 2010-2020, with an annual progress report requested (CoE 2010; CoE 2017: State Party of Spain, 2016). This diploma indicates good overall management effectiveness. The park was added to the pilot phase of the “IUCN Green List" (IUCN, 2015), which requires reassessment in 2017. Overall management effectiveness is good, apart from the inability to manage and control key external threats.

► Implementation of Committee decisions and recommendations

Some Concern

The State Party has addressed some of the recent Committee decisions and recommendations. It is positive that the State Party has been stated that the “Special Management Plan of the Irrigation Zones located to the North of the Forest Crown of Doñana” is starting to be implemented, and that the Guadalquivir will not be dredged, although the Port Authority has reported the activities to be suspended. It is less clear on how some of the other recommendations (World Heritage Committee, 2015; IUCN, 2015) are being implemented, although they appear to require further studies.

► Boundaries

Mostly Effective

The boundaries were generally considered adequate upon inscription (IUCN, 1994), and improved after extension in 2005 so that the property and the National Park had the same boundaries (World Heritage Committee, 2005). There is no buffer zone but the surrounding Natural Park largely fulfills this function. It has been suggested to add a marine coastal area to the property to increase the biodiversity values conserved within it (Oceania, 2010;

UNESCO/IUCN/Ramsar, 2011).

▶ Sustainable finance

Mostly Effective

The periodic report (State Party of Spain, 2014) notes that 80% and 20% of funding for the property comes from the regional and national governments respectively, and that existing sources of funding are secure in the medium-term and planning is underway to secure funding in the long-term. No annual budget information is provided, although it is noted that the available budget is inadequate for basic management needs and presents a serious constraint to the capacity to manage. A number of projects are funded from EU funds or other sources (State Party of Spain, 2016).

▶ Staff training and development

Highly Effective

In 2016 a total of 251 park staff were reported: 138 including administrators, guards, technicians, educators plus 113 staff funded through projects (State Party of Spain, 2016). This compares with 178 staff reported in 1995 (World Heritage Committee, 2006). A capacity development plan or programme is in place and partially implemented; some technical skills are being transferred to those managing the property locally but most of the technical work is carried out by external staff (World Heritage Committee, 2014).

▶ Sustainable use

Mostly Effective

There is only limited natural resource use but significant tourism use (UNEP-WCMC, 2011). Natural resource use consists of planned sustainable use of shellfish, bees, pine cones and forestry around and also inside the property (UNESCO/IUCN/Ramsar, 2011). These do not appear to influence the values of the site, and their management is considered mostly effective. However, agricultural water use outside the property is clearly unsustainable (Carmona et al., 2012). The Sustainable Agriculture Initiative has made a "Doñana Strawberry and Sustainable Water Management Group Position statement" (SAI, 2016). Although no scientific data have been collected, there appears to some pressure inside the property from overgrazing, indicated by soil compaction, nest destruction, phosphorous mobilization that

could be contributing to eutrophication, tuberculosis propagation etc. (Confidential consultation, 2017).

► Education and interpretation programs

Highly Effective

There is a planned and effective education and awareness programme that contributes to the protection of the World Heritage property (WHC, 2014).

► Tourism and visitation management

Mostly Effective

The property and the surrounding natural space receive about 400,000 visitors annually. The overall Doñana Natural Space which includes the property and beyond has 8 excellent visitor centres with walking and bicycle trails, observatories and recreational areas among other infrastructure. Guided visits are restricted to specific areas of the park and outsourced to a company with special vehicles, and numbers of visitors and timing are strictly regulated. However, weekend tourism is intense and increasing tourism has an effect on water supplies. The pressure from increased number of tourists associated with the pilgrimage is significant and needs to be managed.

► Monitoring

Mostly Effective

There are many monitoring projects on biodiversity undertaken by the Doñana Biological Station on a wide range of flora and fauna as well as on climate change impact (State Party of Spain, 2016; CSIC, 2017). WWF has conducted a regular forest fire monitoring during the early 2000s (WWF, 2009). Increased monitoring on water flows and quality is required (WWF, 2016). The Doñana Biological Station (EBD) is working on a new set of indicators, which could be further improved to become real meaningful tools to improve and adjust management.

► Research

Highly Effective

Research at the property is led by the Doñana Biological Station, under the

authority of the Spanish Council for Scientific Research (CSIC). There is high-level research into species ecology and evolution, ecosystem conservation, invasive species, global change impacts and other areas (CSIC, 2017).

Overall assessment of protection and management

Some Concern

In general protection and management of the property is effective or even highly effective, apart from the problem of how the management authority can address threats originating from outside the property, including conflict over water use with the agricultural sector.

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

Serious Concern

The big issue for the park is how to manage water use and quality outside of the park, which has tremendous impact on the OUV of the property, and to date this has not been effective. However, other aspects of park management including replanting of previously degraded areas, tourist management, education and research, are highly effective.

► Best practice examples

The tourism and interpretation programme of the property and the collaboration of nature based tourism operators under a relatively strict access regime is a best practice example that could be replicated in other comparable properties.

State and trend of values

Assessing the current state and trend of values

World Heritage values

► Exceptional coastal and marshland ecosystems

High Concern
Trend:Deteriorating

Given the dramatic reduction of the extent of coastal and particularly marshland ecosystems from 150,000 ha to 30,000 ha since the middle of the 20th century (WWF, 2009), as well as the limited impact of marsh restoration efforts under the Doñana 2005 Programme and the continuing threats from groundwater abstraction and hydrological connection, the long-term state and trend of these values of the property is deteriorating (UNESCO/IUCN/Ramsar, 2011). The situation of coastal ponds in the dune area can almost be considered critical, as the studies of the Doñana Biological Station show (CSIC, 2011).

► Extraordinary terrestrial ecosystems

Low Concern
Trend:Stable

Although the property is affected by fire and other anthropogenic threats (WWF, 2008; 2010), it appears that the conservation status of the terrestrial ecosystems of the site is stable as long as fire control and other management activities are maintained.

► Globally significant bird migration hotspot

High Concern
Trend:Deteriorating

The site continues to be a bird migration hotspot (e.g. BirdLife International, 2012a), but this function clearly depends on the hydrological integrity of the area and is therefore of high concern. Populations of some species such as egrets have remained positive but ducks and coots are declining.

► Diversity of flora

High Concern
Trend:Deteriorating

The hydrological shifts within the property have had a clear effects on the integrity of its vegetation and flora. For example, some plant species requiring more water have had their surface area reduced by more than

60%, and in some cases have been reduced to 80% between 1990 and 2004 (WWF, 2009).

► Exceptional diversity of fauna

High Concern
Trend:Deteriorating

The last census of the Iberian lynx shows decreasing population and Imperial eagle stable. Some other species have been very rare, for example 7 out of 10 species of dragon- and damsel flies have disappeared from the property, as well as 3 species of fish. In addition the Marbled Teal, once a common breeding duck in Doñana, is now rarely seen (WWF, 2016). Other bird species that used to breed in Doñana are also deteriorating. Rabbit population has crashed in recent years, dropping 90% since 2012.

► Extraordinary natural beauty

Low Concern
Trend:Deteriorating

The property continues to possess extraordinary natural beauty, and has not changed significantly visually, since inscription, though the coastal ponds in the dune area can almost be considered critical. This value could rapidly deteriorate if the hydrological state of the marshes and their associated biodiversity deteriorates.

Summary of the Values

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

High Concern

Trend: Deteriorating

The deterioration of the hydrological regime of the property (both in water quantity and quality) affects all the other values of the property. Although some species have been shown to be stable or are even increasing, others are decreasing, particularly those associated with water. Therefore, the overall conservation status of the property is assessed as of high concern, and deteriorating.

Additional information

Benefits

Understanding Benefits

► Outdoor recreation and tourism

400,000 people visit the Doñana Natural Space annually (UNESCO/IUCN/Ramsar, 2011). If managed sustainably, the site will continue to offer a unique opportunity to experience an extraordinary coastal and marshland landscape with its associated biodiversity. This contributes significantly to income generation and the socio-economic development in the property’s vicinity.

If the marshes dry up, or the water becomes increasingly polluted with aquatic vegetation or toxic cyanobacterial blooms clogging up the water, or if the temperature gets hotter, tourism will decline with a reduction in benefit to the local and regional population.

► Importance for research

Research in and around the property has significantly contributed to scientific understanding of many topics, including bird migration, conservation biology, climate change and hydrology, and knowledge continues to be generated through extensive scientific research and publications (CSIC, 2017).

► Contribution to education

Based on the site’s significant importance for knowledge generation and its excellent visitor and educational programmes and facilities, the Doñana Natural Space also functions as a living museum, giving people a direct experience of the natural coastal Atlantic landscape as well as memorable encounters with large numbers of birds and other wildlife (UNEP-WCMC,

2011).

- **Collection of wild plants and mushrooms, Fishing areas and conservation of fish stocks**

  The property also supports livelihoods based on the sustainable harvest of natural resources such as fish, molluscs, honey and wild plants collected in the areas surrounding the property as well as apparently to a certain extent within the National Park (Rössler et al., 2011).

- **Direct employment, Tourism-related income, Provision of jobs**

  The park employs over 200 people plus concessions to companies managing tourist visits.

Summary of benefits

The greatest benefit of the property is its iconic wilderness qualities and extraordinary biodiversity and ecological values, which attracts increasing nature tourism and contributes to the local and regional economy. The park also employs a significant number of people. Sustainable natural resource use is also dependent on the park that provides an important breeding area for fish populations, and the property has and continues to make a large contribution to knowledge generation and education.

Projects

Compilation of active conservation projects

№	Organization/ individuals	Project duration	Brief description of Active Projects
1	Doñana Biological Station (CSIC)		Research and monitoring of biota and ecosystems inside the property and beyond, including genetics, evolution, ecology and ecosystem ecology.
2	OCEANA		Several research projects and campaigns in relation to threats to the marine/coastal part of the property (particularly refineries and tanker traffic) and its extension to include high value coastal marine areas.

№	Organization/ individuals	Project duration	Brief description of Active Projects
3	WWF Spain		Several projects on hydrological and fire monitoring and research as well as campaigning, policy advice and support, and campaigns in relation to illegal groundwater abstraction around the park.
4	Nature Tourism Association “Puerta Doñana”		Several projects in support of sustainable nature based tourism in and around the property.

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