IUCN Conservation Outlook Assessment 2014 **(archived)**
Finalised on 29 September 2014

Please note: this is an archived Conservation Outlook Assessment for El Pinacate and Gran Desierto de Altar Biosphere Reserve. To access the most up-to-date Conservation Outlook Assessment for this site, please visit https://www.worldheritageoutlook.iucn.org.

El Pinacate and Gran Desierto de Altar Biosphere Reserve

SITE INFORMATION

Country:
Mexico
Inscribed in: 2013
Criteria:
(vii) (viii) (x)

Site description:

The 714,566 hectare site comprises two distinct parts: the dormant volcanic Pinacate Shield of black and red lava flows and desert pavements to the east, and, in the west, the Gran Altar Desert with its ever changing and varied sand dunes that can reach a height of 200 metres. This landscape of dramatic contrast notably features linear, star and dome dunes as well as several arid granite massifs, some as high as 650 metres. The dunes emerge like islands from the sea of sand and harbour distinct and highly diverse plant and wildlife communities, including endemic freshwater fish species and the endemic Sonoran Pronghorn, which is only to be found in northwestern Sonora and in southwestern Arizona (USA). Ten enormous, deep and almost perfectly circular craters, believed to have been formed by a combination of eruptions and collapses, also contribute to the dramatic beauty of the site whose exceptional combination of features are of great scientific interest. The site is also a UNESCO Biosphere Reserve.
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SUMMARY

2014 Conservation Outlook

Good with some concerns

EPGDABR is in a privileged position as the harsh environmental conditions and inhospitable terrain provide a high degree of natural protection. The dedication of scientific and political champions and staff have paid off and led to a situation without acute threats to the overall integrity of the property as far as they can be influenced by site-level management. In the longer term, there are important conservations concerns for the entire Sonoran Desert which appear best addressed by a coordinated large scale approach beyond the international border. While the relatively large size and contiguity with other large-scale conservation is exceptional, more coordination and cooperation is needed beyond the site and the international border. Efforts to maintain or, where needed, enhance the connectivity of the land and the prevention of new physical barriers are needed. Water stress, alien invasive species and anticipated climate change will likewise put new pressure on the limited resources available for management.

Current state and trend of VALUES

Low Concern
Trend: Stable

The visual integrity remains intact despite inevitable impacts of expanding road and energy transmission infrastructure. There are no factors which are likely to alter or impact on the geological values of the site. Despite multiple threats, flora and fauna do not appear to be under acute threat. However, the Sonoran Pronghorn continues to face an uncertain future. Overall, despite ongoing threats and management challenges, important improvements make EPGDABR a conservation success story.

Overall THREATS

Low Threat

While the acute threats appear understood and manageable, there are more serious concerns about Alien Invasive Species (AIS) and anticipated climate change. Both could lead to dramatic changes to the desert ecosystem. As regards IAS, such change is already observable elsewhere in the Sonoran Desert where non-native grasses and associated increase in fire frequency and intensity have fundamentally altered the entire desert ecosystem.

Overall PROTECTION and MANAGEMENT

Mostly Effective

The history of El Pinacate and Gran Desierto de Altar Biosphere Reserve is a remarkable success story in Mexican and global nature conservation. Formal conservation efforts have put an end to longstanding unregulated and destructive resource use. The current management efforts constitute a vast and continuous improvement compared to the early days when a first and much smaller protected area was designated. Some uncertainty remains about future funding, which raises questions about the longer term capacity.

FULL ASSESSMENT

Description of values

Values

World Heritage values

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

The El Pinacate and Gran Desierto de Altar Biosphere Reserve (hereafter EPGDABR) is visually stunning through the stark contrast of the dark-colored volcanic shield with its spectacular craters and lava flows next to vast dune fields. At a finer scale, there is an impressive diversity of landscape features, colors, shapes and forms. The elevated areas permit magnificent views, all the way to the adjacent Gulf of California and even the Baja California Peninsula (SoOUV, 2013).

► **Extraordinary volcanic and geological features**
Criterion:(viii)

A wide variety of volcanic and other geological features make the property geologically extremely complex. The Pinacate Volcanic Field boasts an exceptional aggregation, quality and conservation status of giant Maar craters and an unusual shield volcano, Volcán Clara. The dynamic geomorphology of the dunes and the volcanic shield is highly diverse, intact and of large scale. The vast sea of sand dunes that surrounds the volcanic shield is considered the largest and most active dune system in North America (SoOUV, 2013).

► **Scientific importance of volcanic and geological features**
Criterion:(viii)

Scientists have described EPGDABR as a "living textbook" due to the combination of the wide array of features, their excellent condition and the clear display of volcanic behaviour patterns and of different stages in Earth history. The combination of earth science features is an impressive laboratory for geological and geomorphological studies (SoOUV, 2013).

▶ **Rare, endangered and endemic species of flora and fauna**
Criterion:(x)

The seemingly inhospitable habitat mosaic is home to more than 540 species of vascular plants, 44 mammals, more than 200 birds and over 40 reptiles. Insect diversity is high and not even fully documented. Endemics include two freshwater fish species, Sonoyta Pup Fish and Longfin Dace and a local endemic plant restricted to a small part of the volcanic shield. The many other noteworthy species include the Sonoran Pronghorn, an endemic subspecies of the Pronghorn restricted to Southwestern Arizona and Northwestern Sonora and threatened with extinction. The flagship species is featured on the logo of EPGDABR (SoOUV, 2013).

▶ **Scientific importance (desert ecology and biology)**
Criterion:(x)

Among the North American deserts and even within the transboundary Sonoran Desert EPGDABR stands out as a rare large-scale area with limited past and current anthropogenic modifications, thereby constituting a rare and valuable baseline reference.

Assessment information

Threats

Current Threats

Low Threat

The large scale of the property, its contiguity with an even larger set of protected areas, the high degree of natural protection and the dedicated conservation efforts combine to make the property comparatively resilient.

► Roads/ Railroads

High Threat
Inside site
Outside site

The relatively recent construction of the coastal route has facilitated unprecedented access and could lead to new roads being created. The ongoing expansion of Route 2 near the border is accompanied by extraction of construction material and water, construction of temporary deviation and access tracks, noise, dust and pollution risks. The widespread, and apparently legally required, fencing of roads is likely to reduce connectivity (IUCN, 2013, Castillo – Sánchez, 1999).
While earlier plans for transmission lines along the coast were abandoned to conserve the visual integrity of the area, a major transmission infrastructure project is proceeding in parallel to Route 2 and the international border. It will connect the two Mexican States on the Baja California Peninsula with the Mexican power grid (IUCN, 2013).

► Other

Low Threat
Inside site
Outside site

Direct impacts from vehicles are reported on the other side of the international border. The disturbance from surveillance and physical barriers limits the connectivity and thus affects both sides of the border (personal communication during IUCN evaluation; see also Cohn, 2007, Cordova et al., 2007, Lieberman Goodwin, 2000; Southwestern Association of Naturalists,. 2008).

► Other Ecosystem Modifications, Dams/ Water Management or Use

High Threat

Inside site
Outside site

Increasing consumption from households and commercial agriculture in the wider ecosystem on both sides of the border threatens the long-term integrity of the property (Ganster, 1996; Hume, 2000; Mumme, 2000; Moya et al., 2011).
Surface water (in particular the Sonoyta River) and groundwater are scarce and of utmost ecological importance in and around EPGDABR. The increasing pressure from pollution and overuse on both sides of the border in the broader region is likely to have long-term impacts on the entire Sonoran Desert (IUCN, 201).
The Colorado River Delta is located just west of the Altar Desert. The huge Colorado River system has been massively transformed and overused to the point that hardly any of its water reaches the Gulf of California. This clearly constitutes a major ecosystem modification of an area that has intricate geological and ecological linkages to the property and the adjacent Gulf (Chester, 2006; Hume, 2000; IUCN, 2011.
The Sonoyta River is known to suffer from pollution, mostly from industrial agriculture in the United States of America and sewage from the border town of Sonoyta (Mumme, 2002; Sistema de Areas Naturales Protegidas del Estado de Sonora (SANPES), 1994).

► Tourism/ visitors/ recreation

Low Threat
Inside site
Outside site

While harsh conditions set natural limits to tourism numbers, there are a number of concerns. Tourists for example may engage in illegal extraction of plants and animals and there are indirect concerns related to water consumption in the nearby coastal tourism resort (World Heritage nomination dossier of the property).
Extreme environmental conditions set natural limits to tourism. Mainstream tourism takes place around a visitor centre and is restricted to the surroundings of that centre. Possible risks associated with tourists and scientists entering the property include unintended introductions of alien invasive species. Official and unofficial off-road rallies through the dunes of the Altar Desert are a concern. This sort of threat is growing and race

organizers are looking more and more seriously on organized off road races, mainly along the western and southern edge of the reserve. They take place in areas that are very difficult to control conventionally. Indirect impacts of tourism are related to water consumption in the arid area and disturbance from increased traffic, in particular on the axis connecting the coast to neighboring Arizona in the United States of America (IUCN, 2013; Burquez y Martinez-Yrizar, 2006).

► Mining/ Quarrying

Low Threat
Inside site
Outside site

Largely brought under control but still reported to occur (World Heritage nomination dossier of the property and IUCN, 2013).
The localized impacts of past extraction of volcanic ash (Morusa) and cinder mining of volcanic rock and pyroclastic material will be visible for a long time. Gold mining further east in the state of Sonora deserves to be mentioned. Despite the distance from the property the mining area belongs to the range of the last Sonoran Pronghorns like the property itself. Mining may therefore negatively affect the flagship species of El Pinacate (Burquez y Martinez-Yrizar, 2006; Burquez y Castillo, 1994; Castillo-Sánchez, 1999).

► Invasive Non-Native/ Alien Species

Low Threat
Inside site
Outside site

Considered a low threat at current levels but bearing high future risks considering the experience elsewhere in the Sonoran Desert (Avila-Jiménez, 2005; Hayden, 1998).
Major concern in the entire Sonoran Desert, including in the rare freshwater systems. The introduction of non-native grasses, such as buffelgrass (Pennisetum ciliare) has been transforming large parts of the Sonoran Desert (Búrquez and Martínez, 2006). In terms of fauna, known impacts mostly stem from feral livestock, competing with native species, disseminating non-native plants and raising concerns about wildlife diseases spread at waterholes (IUCN, 2013, Avila-Jiménez, 2005; Hayden, 1998).

Potential Threats

High Threat

While there is no current indication of dramatic impacts of Alien Invasive Species, the experience from other parts of the Sonoran Desert is alarming. Likewise, climate change may affect the delicate and highly particular microclimate with potentially major effects on water availability and thus most forms of life.

► Invasive Non-Native/ Alien Species

High Threat
Inside site
Outside site

Complex risks both from various plants and from feral livestock could lead to major ecosystem transformation as observable in other parts of the Sonoran Desert (see above).

► Desertification

High Threat
Inside site
Outside site

Water quantity and distribution patterns are critical factor for the biodiversity of the Sonoran Desert. Anticipated climate change may affect some of the ecological particularities of the property (IUCN, 2013; Villers-Ruiz et al., 1998).

► Fire/ Fire Suppression

High Threat
Inside site
Outside site

Wildfire is a well-documented key challenge elsewhere in the Sonoran Desert. The deliberate introduction of non-native grasses has increased fuel loads, triggering a process of gradual conversion of huge tracts of the Sonoran Desert into grasslands, as native systems lack major adaptations to fire. Effects on native flora are disastrous. So far EPGDABR has no major areas of introduced grasses. However, non-native grasses continue to be promoted in Mexico so the increase of infestation and a related increase in

fire events is a potential future scenario for the property (Avila-Jiménez, 2005).

► Volcanoes

Very Low Threat
Inside site
Outside site

Although volcanic activity is dormant, the mean recurrence interval of eruptions is becoming better known and suggests that this interval is significantly shorter than the time that has elapsed since the last known eruption (Gutman et al. 2000; Gutman 2011)

Protection and management

Assessing Protection and Management

► Relationships with local people

Some Concern

The property seems locally widely accepted. Some tensions are reported between authorities and owners of land within the property (ejidos). While there is respectful communication between park management and indigenous representatives, there is room for more consideration of the spiritual and sacred importance of EPGDABR (Nomination dossier for the property and IUCN, 2013; see also Otegui-Acha, 2007).

► Legal framework and enforcement

Some Concern

The legislation appears adequate and mostly enforced. However, there are concerns about non-compliance with mitigation requirements related to the expansion of Route 2 (IUCN, 2013).

► Integration into regional and national planning systems

Some Concern

Overall satisfactory with opportunities to coordinate even more closely with

adjacent coastal areas and protected areas. The regional level also has a transboundary dimension in this case. Despite longstanding and functional relationships at the working level, there is room for in the bi-national ecosystem of the Sonoran Desert (IUCN, 2013; Castillo – Sánchez, C. 1999; Chester, 2006; Ganster, 1996; Morehouse et al., 2008; Salazar, n.d.).

► Management system

Mostly Effective

The relatively small team has the capacity to deliver the key management tasks (IUCN, 2013).

► Management effectiveness

Mostly Effective

At the current level of threats, management efforts prove mostly effective (IUCN, 2013).

► Implementation of Committee decisions and recommendations

Highly Effective

Given the recent inscription (2013) it would be immature to suggest any non-compliance. It is also important to note that the one and only Committee decision referring to EPGDABR at the time of preparing this assessment contains only one request whereas all other points are recommendations. The former is a request to ensure full compliance with Environmental Impact Assessment requirements as regards the ongoing expansion of Route 2. The latter include encouragement to (i) expand the property to include the adjacent Ramsar site of Bahia de Adair; (ii) strengthen cooperation with the United States of America in the Greater Sonoran Desert Ecosystem; (iii) further cooperate on the saving of the Sonoran Pronghorn from possible extinction; (iv) consider environmental concerns in security efforts along the international border. In all cases, follow-up seems highly desirable (whc.unesco.org).

► Boundaries

Some Concern

As recommended by the Committee, it is conspicuous that the property does

not extend to the nearby Adair Bay, a formally protected area which is also a Ramsar site. This would add complementary and highly valuable areas, thereby covering the full mosaic and altitudinal gradient of the area. The buffer zones are, in accordance with Mexican legislation, formally protected and plausible in their design (IUCN, 2013). Greater protection of the area could be afforded by the inclusion of the extensive dune fields west of the western boundaries of the reserve, as far as to limit with the neighbouring Reserva de la Biosfera del Alto Golfo de California y delta del rio Colorado.

► Sustainable finance

Some Concern

While recent increases and diversification of funding sources are encouraging, there are concerns about long term funding security (IUCN, 2013).

► Staff training and development

Some Concern

Staff are well-qualified and frequent cooperation with academic and civil society partners exposes staff to scientific information and management ideas. Future staff development prospects will depend on continuing and ideally increasing funding levels (IUCN, 2013).

► Sustainable use

Mostly Effective

Sustainable use is restricted to tourism (Nomination dossier for the property).

► Education and interpretation programs

Mostly Effective

There is an exemplary visitor centre named Shuk Toak attracting increasing numbers of domestic and international visitors. Original interpretive pullouts along the coast roads require better maintenance.

► Tourism and interpretation

Mostly Effective

Further investment could be used to consolidate interpretation opportunities

in the various field stations along main roads.

▶ Monitoring

Some Concern

At the time of the IUCN field evaluation, not all field stations, located at strategic entry points along main roads, were operational. The vast area with limited road infrastructure presents important logistical challenges. The understandable focus on monitoring of the expansion of Route 2 comes at the expense of limited monitoring of other areas (IUCN, 2013).

▶ Research

Mostly Effective

There is a long history of research from various disciplines carried out mostly by Mexican and American scientists. Despite good personal relationships, not all of the research products are made available to park management. Results are available in English language and Spanish.

Overall assessment of protection and management

Mostly Effective

The history of El Pinacate and Gran Desierto de Altar Biosphere Reserve is a remarkable success story in Mexican and global nature conservation. Formal conservation efforts have put an end to longstanding unregulated and destructive resource use. The current management efforts constitute a vast and continuous improvement compared to the early days when a first and much smaller protected area was designated. Some uncertainty remains about future funding, which raises questions about the longer term capacity.

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

Some Concern

While the property is well-managed, park management is struggling to have a strong voice in other public sectors, namely road construction. The compliance with requirements defined in Environmental Impact Assessments is not always secured despite frequent complaints on the part of park

management, indicating a relatively weak position. Working relationships with neighboring Mexican protected areas appear to be functional. The transboundary conservation dimension in the shared ecosystem appears to have been compromised by border security issues (IUCN. 2013; Nomination dossier).

▶ **Best practice examples**

The visitor centre named Schuk Toak (the local indigenous name of the Pinacate Range) is a best practice example of an attractive and well-designed visitor centre enabling visitors to learn about the fragile and inhospitable desert environment and its original inhabitants.

State and trend of values

Assessing the current state and trend of values

World Heritage values

▶ **Extraordinary landscape beauty**
Low Concern
Trend:Stable

Overall, the visual integrity remains intact despite inevitable impacts of expanding road and energy transmission infrastructure (IUCN, 2013).

▶ **Extraordinary volcanic and geological features**
Low Concern
Trend:Improving

There are important past improvements and no factors which are likely to alter or impact on these values. A small part of the volcanic field extends into the neighboring state of Arizona in the United States of America. While also formally protected there, there are concerns about the impacts of recent increases in border security efforts (Castillo – Sánchez, C. 1999; Chester, 2006; Ganster, 1996; Morehouse et al., 2008; Salazar, n.d.).

► Scientific importance of volcanic and geological features

Good
Trend:Stable

Diverse research is ongoing, permanently adding to the wealth of available information and knowledge (e.g. Hayden, 1998; Gutmann 2008, 2011).

► Rare, endangered and endemic species of flora and fauna

Low Concern
Trend:Stable

Despite multiple threats, flora and fauna do not appear to be under acute threat. However, the Sonoran Pronghorn continues to face an uncertain future. The site plays a role in that future but on its own cannot secure it (e.g. Castillo – Sánchez, C. 1999; Moya, 2011).

► Scientific importance (desert ecology and biology)

Low Concern
Trend:Stable

The extraordinary value as a rare baseline reference of a large-scale intact area within the Sonoran Desert is only partially taken advantage of (Goudie et al., 2011).

Summary of the Values

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

Low Concern

Trend: Stable

The visual integrity remains intact despite inevitable impacts of expanding road and energy transmission infrastructure. There are no factors which are likely to alter or impact on the geological values of the site. Despite multiple threats, flora and fauna do not appear to be under acute threat. However, the Sonoran Pronghorn continues to face an uncertain future. Overall, despite ongoing threats and management challenges, important improvements make EPGDABR a conservation success story.

Additional information

Key conservation issues

▶ Road and energy transmission infrastructure

Local

The infrastructure need is plausible, as Route 2 is the main link between the Mexican mainland and two Mexican States on the Baja California Peninsula. The energy transmission lines will be the only link between these two areas of Mexico, the project is therefore classified as being of national security importance. Therefore, there is no fundamental opposition to these large-scale federal projects. At the same time, both projects require EIA in accordance with Mexican legislation and control of compliance.

▶ Border security activities

Local

While only indirectly affecting the Mexican parts of the Sonoran Desert, there are strong concerns about the impacts of disturbance from road traffic in wilderness areas and physical barriers to wildlife movement.

▶ Alien Invasive Species

Local

While so far no dramatic impacts have been reported, the experience elsewhere in the Sonoran Desert is alarming.

▶ Water management

Local

The scarce water resources are of fundamental ecological importance, yet threatened by a number of factors beyond the international border and beyond the control of park management.

Benefits

Understanding Benefits

► Outdoor recreation and tourism

The local economy is largely dependent on fisheries and tourism. The diversification of the touristic offer beyond beach tourism and sports fishing seems most promising.

► Sacred natural sites or landscapes

The property is widely recognized as the "heart of the Sonoran Desert" on both sides of the border.

► Wilderness and iconic features

What is today the World Heritage property continues to be a key sacred site of major spiritual importance to indigenous peoples on both sides of the border. Numerous ancient trails, sleeping circles and artifacts illustrate that the area was used and inhabited for centuries and possibly millennia. The Tohono O' odham regard the Sierra El Pinacate not only as part of their native homeland but their place of origin and a spiritual center.

► Importance for research

Outstanding record of and opportunities for research on a broad range of geological and volcanic features and phenomena and baseline reference for the understanding of the ecology of the Sonoran Desert.

Summary of benefits

The property is an important source of inspiration for traditional communities and visitors alike. A rare scientific reference area for many disciplines, the property also has a strong potential to further promote forms of tourism that are adapted to the fragile desert environment.

Projects

Compilation of active conservation projects

№	Organization/ individuals	Project duration	Brief description of Active Projects
1	United States National Park Service (USNPS)		Cooperation between EPGDABR and adjacent protected areas in the United States of America, in particular provision of equipment for field monitoring.
2	International Cooperation		Exchange with Los Cardones National Park, Argentina.
3	Various academic and NGO partners		Various research projects, such as monitoring of various species. Scientific research is carried out within the reserve.

Compilation of potential site needs

№	Site need title	Brief description of potential site needs	Support needed for following years
1	Involvement of indigenous representatives in sensitive areas	Mapping of sacred sites and displaying sites in publicly accessible maps and documents can be highly sensitive. There are current efforts to better understand native toponomy, considering sensitive locations. Touristic and scientific access to archaeological sites should be determined in consultation with indigenous peoples.	
2	Private land within the property	The remaining ejidos, a Mexican form of communal land tenure, within the property are the legacy of a questionable land reform which distributed land to establish agriculture and ranching. The expectations were met with little success when irrigation attempts proved costly and resulted in soil salinization. Governmental purchasing of the land could bring the longstanding and sometimes conflictive discussion to a conclusion. Such action is unlikely to result in major conflicts due to the low value of the land and given the use restrictions in a federal protected area. Such purchasing would reverse what can only be described as a historic error.	

№	Site need title	Brief description of potential site needs	Support needed for following years
3	Increased transboundary cooperation and coordination	Transboundary cooperation has conservation benefits in any shared ecosystem divided by an international border. It can be argued that the need for better cooperation is ever more important given the impacts of recent investments in surveillance and physical barriers on the United States of America side of the border, including within contiguous protected areas.	
4	Sonoran Pronghorn conservation	The conservation efforts for the Sonoran Pronghorn appear to require even better coordination. The role of EPGDABR could be consolidated within such a broader and coordinated approach.	

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