

STATE OF CONSERVATION REPORT OF THE WORLD

HERITAGE PROPERTY

“EL PINACATE AND GRAN DESIERTO DE ALTAR

BIOSPHERE RESERVE”

(MEXICO-1410)



SEPTEMBER 2020



For evaluation of the World Heritage Committee UNESCO

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Executive Summary

The composition of the ecosystems in the U.S.-Mexico border portion is the result of thousands of years of northward or southward movement of flora and fauna. As an example, we have that along the coastal plains, Neotropical elements have moved to the northern parts, and with the glaciations, Nearctic elements established and remain in the Eastern and Western Sierras Madre. This was possible because of the absence of barriers that prevented them from moving in both directions for long time.

In 1993, El Pinacate and Gran Desierto de Altar Biosphere Reserve was decreed as natural protected area. It includes a surface of 714,566 hectares. This region of the Sonoran Desert was recognized for its geological values, diversity of habitat and species, extraordinary natural landscapes and great natural integrity and in 2013 was inscribed as a Natural Property on the World Heritage List.

The Government of Mexico, through CONANP, has allocated human, financial and material resources for the management, protection and conservation of the Property in such a way that its Outstanding Universal Value (OUV) is maintained. In addition, permanent actions are implemented, aimed at evaluating, monitoring and establishing the necessary measures for protection against possible impacts.

The World Heritage Center requested to the Government of Mexico this report on the State of Conservation (SOC) of the Property and the studies on the possible impacts on its attributes on April 10 and July 13, 2020. This, in order to have a diagnosis of the potential effects that the construction of physical structures in USA territory that run and would run along the USA-Mexico border area (hereinafter referred to as *physical structures in the border area*¹) will have on the Outstanding Universal Value of the Property.

¹These physical structures, which can be made of different materials and comprise different objects, have been and would continue to be built by the United States Government, unilaterally and entirely within its territory, but within the area defined as the "border zone" between the United Mexican States and the United States of America, and along the land and maritime dividing lines established by both States through international treaties. It is necessary to emphasize that the Government of the United Mexican States has not consented the construction of such physical structures, and that they are not built on the land and maritime dividing lines between both countries. Such physical structures in the border area have been and continue to be colloquially referred to by the Government of the United States of America as the "border wall."

The SOC is based on studies and field observations conducted at the Property and surrounding areas, since no prior and timely information on the “physical structures in the border area” construction and operation project was available from USA authorities.

The construction of the barrier, carried out by the United States in its territory, includes a solid metal wall, another parallel wall of mesh, barbed wire and service and surveillance roads, works that will inevitably have effects on regional biodiversity due to loss, degradation and fragmentation of habitat, reduced access to vital resources and habitat, isolation and fragmentation of populations, aversion of certain species to roads, increased human activity and disruption of the social structure of populations, among other aspects.

The best knowledge available, as result of different research works in the border between Mexico and the United States and specifically the border of the El Pinacate and Gran Desierto de Altar Biosphere Reserve, may allow the following conclusion: the construction of a barrier that avoids free wildlife dispersal is a threat to it. This, in addition to important impacts to the physical environment.

The World Heritage Committee stressed that the most important long-term management issue is to address potential problems arising from tourism-related water consumption. However, construction activities on the U.S. side could affect water use and conservation in both countries.

The Committee also noted that the long-term protection and management of the Property also includes the need to minimize and/or mitigate the impacts of existing or planned roads. This, to ensure effective implementation of measures to prevent further depletion of scarce water resources, to maintain and improve ecological connectivity to buffer the impacts of climate change, and to

Therefore, for the purposes of this report, “border zone” should be understood as: “[...] *the area located up to 100 kilometers on both sides of the land and maritime dividing lines between [the United Mexican States and the United States of America.]* ”, In terms of the provisions of the Agreement between the United States of America and the United Mexican States on cooperation for the protection and improvement of the environment in the border area, signed on August 14, 1983, and in force for Mexico since March 22, 1984; and by “physical structures in the border area” should be understood the physical structures made of various materials and that may comprise different objects, which have been and would continue to be built by the United States Government, unilaterally and entirely in its territory, but within the area defined as the “border zone” between the United Mexican States and the United States of America, and along the land and maritime dividing lines established by both States through international treaties. A different meaning or interpretation cannot be attributed to any of both terms.

effectively control and eradicate invasive alien species. These measures are now valid for implementation.

The Government of Mexico presents the following information in compliance with the principles established by the Convention concerning the Protection of the World Cultural and Natural Heritage and its Operational Guidelines. So, as reiterating that we are convinced of the scope of international cooperation to achieve the common interest of the States Parties to the Convention and guaranteeing the protection of cultural and natural heritage for present and future generations.

1. Outstanding Universal Value Attributes of the World Heritage Natural Property

Brief synthesis

El Pinacate and Gran Desierto de Altar Biosphere Reserve is located in the Sonoran Desert. The Sonoran Desert is one of four great North American deserts along with the Chihuahuan Desert, the Great Basin Desert and the Mojave Desert.

The Biosphere Reserve has a surface of 714,566 hectares with 354,871 hectares of buffer zone. It is a large and relatively undisturbed protected area, which comprises two very distinct broad landscape types. To the East, there is a dormant volcanic area of around 200,000 ha, comprised of the Pinacate Shield with extensive black and red lava flows and desert pavement. The volcanic shield boasts a wide array of volcanic phenomena and geological formations, including a small shield-type volcano. The most visually striking feature is the concentration of 10 enormous, deep and almost perfectly circular Maar (steam blast) craters.

In the West towards the Colorado River Delta and South towards the Gulf of California, is the Gran Altar Desert, North America's largest field of active sand dunes and only active Erg dunes. The dunes can reach 200 meters in height and contain a variety of dunes types. The dunes originate from sediments from the nearby Colorado Delta and local sources. In addition, there are several arid granite massifs emerging like islands from the sandy desert flats, ranging between 300 and 650 meters above sea level, which represent another remarkable landscape feature harboring distinct plant and wildlife communities.

The variety of landscapes results in extraordinary habitat diversity. The diversity of life forms across many different taxa is notable with many species endemic to the Sonoran Desert or more locally restricted to parts of the property. All feature sophisticated physiological and behavioral adaptations to the extreme environmental conditions. The subtropical desert ecosystem reportedly hosts more than 540 species of vascular plants, 44 mammals, more than 200 birds, over 40 reptiles, as well as several amphibians and even 2 endemic species of freshwater fish.

Inscription Criteria

Criterion (vii): The property presents a dramatic combination of desert landforms, comprising both volcanic and dune systems as dominant features. The volcanic shield in the property boasts a wide

array of volcanic phenomena and geological formations, including a small shield-type volcano. The most visually striking feature is the concentration of 10 enormous, deep and almost perfectly circular Maar (steam blast) craters, believed to originate from a combination of eruptions and collapses. The property is visually outstanding through the stark contrast of a dark-colored area comprised of a volcanic shield and spectacular craters and lava flows within an immense sea of dunes. The dunes can reach 200 meters in height and contain linear dunes, star dunes and dome dunes, displaying enormous and constantly changing contrasts in terms of form and color. In addition to these predominant features there are several arid granite massifs emerging like islands from the sandy desert flats, ranging between 300 and 650m high. The combination of all these features results in a highly diverse and visually stunning desert landscape.

Criterion (viii): The property's desert and volcanic landforms provide an exceptional combination of features of great scientific interest. The vast sea of sand dunes that surrounds the volcanic shield is the largest and most active dune system in North America. It includes a diverse range of dunes that are nearly undisturbed, and include spectacular and very large star-shaped dunes that occur both singly and in long ridges up to 48km in length. The volcanic exposures provide important complementary geological values, and the desert environment assures a dramatic display of a series of impressive large craters and more than 400 cinder cones, lava flows, and lava tubes. Taken together the combination of earth science features is an impressive laboratory for geological and geomorphological studies.

Criterion (x): The highly diverse mosaic of habitats is home to complex communities and surprisingly high species diversity across many taxonomic groups of flora and fauna. More than 540 species of vascular plants, 44 mammals, more than 200 birds and over 40 reptiles inhabit the seemingly inhospitable desert. Insect diversity is high, despite it is yet under research. Several endemic species of plants and animals exist, including two freshwater fish species. One local endemic plant is restricted to a small part of the volcanic shield within the area. Large maternity caves of the migratory Lesser Long-Nosed Bat, which is an important pollinator and seed dispersal vector, are found within the property. Noteworthy species include the Sonoran Pronghorn, an endemic subspecies restricted to the Southwestern Arizona and Northwestern Sonora and threatened by extinction.

Integrity

El Pinacate and Gran Desierto de Altar Biosphere Reserve is relatively undisturbed and has an outstandingly high level of physical integrity largely related to its harsh environment. The entire property is under the authority of the Federal Agency the National Commission of Natural Protected Areas (CONANP).

2. Protection and Management of the Property.

The Property has an adequate legal framework. It has been effectively implemented since 1993. On those days, there was decreed the natural protected area (NPA) El Pinacate and Gran Desierto de Altar. It was categorized as Biosphere Reserve. The Property is under the administration of the National Commission of Natural Protected Areas (CONANP).

The management of the area is supported in terms of human and financial resources according to the fiscal budget assigned annually. As of 2020, the CONANP staff at the Biosphere Reserve is composed of a Director, an Assistant Director, three Chiefs Department, and an Analyst. There are also staff members hired for specific projects, composed of an Administrator for the Museum and Center of Culture for Conservation and two Field Technicians.

Its Management Program regulates the property. It was developed with the participation of local governments and different sectors of society involved in the area and published in 1996. This policy instrument is under update process frequently. From the management program is derived the Annual Operational Program and its implementation is supported by local governments, non-governmental organizations and indigenous populations.

The Biosphere Reserve (BR), has an Advisory Council composed of representatives from federal and local governments, academic and research institutions, NGOs, and communities and *ejidos* located within or near the NPA as well as members of the Tohono O'odham indigenous peoples. This Council functions as a forum for public and social participation.

CONANP has subsidy programs that apply with the communities, which allow an approach and direct contact with the beneficiaries of these programs, which are inhabitants of the towns settled in the protected area and its zones of influence, detonating actions of surveillance, joint monitoring, capacity building and the generation of small productive projects. Likewise, they have allowed the generation of synergies and alliances with legal entities, academic and/or research institutions or civil society organizations to carry out actions or research or conservation studies of the ecosystems and their biodiversity, which are fundamental for the management of the site.

Surveillance trips to the border

The team from El Pinacate and Gran Desierto de Altar Biosphere Reserve makes weekly trips to document the progress of construction of "physical structures in the border area" and identify critical passage points for wildlife that have been blocked, which they intend to monitor in order to learn about the effects of the barrier on wildlife populations.

Biological corridors for large and small mammals, as well as important surface runoff sites (streams) in the area were identified as priority areas. There, the surveillance activities are stronger.

The actions and modifications that are carried out due to its construction are strictly within the limits of the United States. In this report, reference is made to the supervision tours carried out on May 30 and August 12, 2020, by personnel from the Deputy Attorney for Natural Resources and the Delegation of the Federal Attorney's Office for Environmental Protection (PROFEPA) in the State of Sonora, with the support of personnel from CONANP and the National Guard, without any alterations being observed in Mexican territory in the Biosphere Reserve.

It is important to point out that CONANP collaborates with the Federal Attorney's Office for Environmental Protection (PROFEPA), in the surveillance actions.

International Designations and Bilateral Agreements

The Reserve has three International Designations, which show the relevance of the area and the decision of the Mexican Government to assume the commitments and obligations through the integral management of the area, to guarantee the conservation and protection of its biodiversity and associated values, the sustainable use of its resources, and to promote knowledge and its diffusion.

Since 1993 El Pinacate and Gran Desierto de Altar Biosphere Reserve has been part of the World Network of Biosphere Reserves of the UNESCO MaB Program. It was expanded in 1995 and designated as the Alto Golfo de California y El Pinacate and Gran Desierto de Altar Biosphere Reserve. Mainly for fulfilling the functions of conservation of geological volcanic formations with craters, dunes, oases and beaches, and the diversity of plant associations determine its special landscape and biodiversity. For its role in the sustainable development of the population in the buffer zone that mainly carries out economic activities such as livestock, agriculture, fishing and tourism. In the central areas of the BR, very few activities are allowed and should be monitored, including research and low-impact tourism. In the transition areas, agriculture is the main activity.

Measures have been taken to mitigate its impact on the environment, such as keeping livestock stable and controlling exotic plants.

MaB UNESCO website: <https://en.unesco.org/biosphere/lac/alto-golfo-california>

In 2008, the Agua Dulce Ramsar Site was designated as a Wetland of International Importance, especially as a Waterfowl Habitat, located in a small portion of the Sonoyta River, for being the habitat of the desert pupfish (pupo) (*Cyprinodon eremus*), an endemic and endangered species in Mexico (Official Mexican Standard NOM-059-SEMARNAT-2010). In the United States the species was listed as endangered since 1986. The permanent water outcrop "Agua Dulce" of the Sonoyta River is a critical site of great binational importance, for endemic fish species and resident and migratory Neotropical bird species.

Ramsar website: <http://www.conanp.gob.mx/conanp/dominios/ramsar/lsr.php>
http://www.conanp.gob.mx/conanp/dominios/ramsar/docs/sitios/FIR_RAMSAR/Sonora/Agua%20Dulce/Mexico%20Agua%20Dulce%20RIS%20S%202008.pdf

In 2013, the natural property El Pinacate and Gran Desierto de Altar Biosphere Reserve was inscribed on the World Heritage List under criteria (vii), (viii) and (x) of the Convention concerning the Protection of the World Cultural and Natural Heritage (1972).

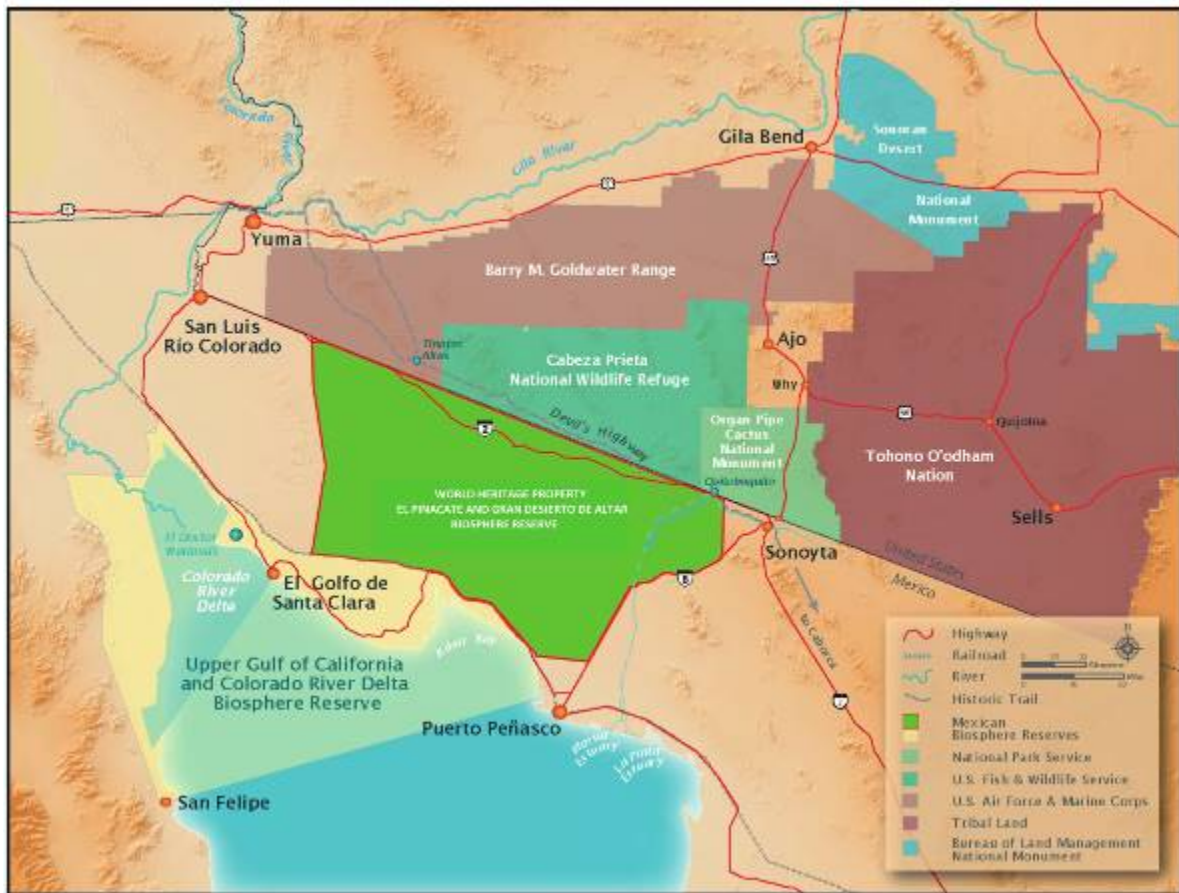
Official website of the property: <https://whc.unesco.org/en/list/1410>

Cooperation Agreement between SEMARNAT and the U.S. Department of the Interior

Agreement between the Secretariat of the Environment and Natural Resources of the United Mexican States and the National Park Service of the Department of the Interior of the United States of America on Cooperation for the Management and Conservation of National Parks and Natural Protected Areas (2012)

At the bilateral level, starting in 1998, Organ Pipe Cactus National Monument, from the USA and El Pinacate and Gran Desierto de Altar Biosphere Reserve began with monitoring activities of diverse species of the Sonoran Desert, as well as field visits. They also began to exchange information for their respective visitor centers and El Pinacate biological station. Subsequently, numerous projects were carried out, such as joint climate monitoring, training of park rangers and impact monitoring, among others. Until 2012, the Mexican government, through CONANP,

formalized actions with the protected areas near the property, specifically with the U.S. National Park Service.



This Collaboration Agreement is implemented through twinning protected areas with similar characteristics and conditions in both countries. The document establishes general actions, such as specialized projects related to the understanding, conservation and restoration of populations of shared migratory species and other trans boundary wildlife resources and technical cooperation to protect, conserve and maintain the flora and fauna protected by one or both countries.

Within this cooperation scheme, actions carried out specifically between the Property in Mexico and the protected areas of the United States stand out: Organ Pipe Cactus National Monument, Cabeza Prieta Wildlife Refuge, Arizona Game and Fish and Arizona-Sonora Desert Museum, all of them in the heart of the Sonoran Desert, constituting a protected ecological unit.

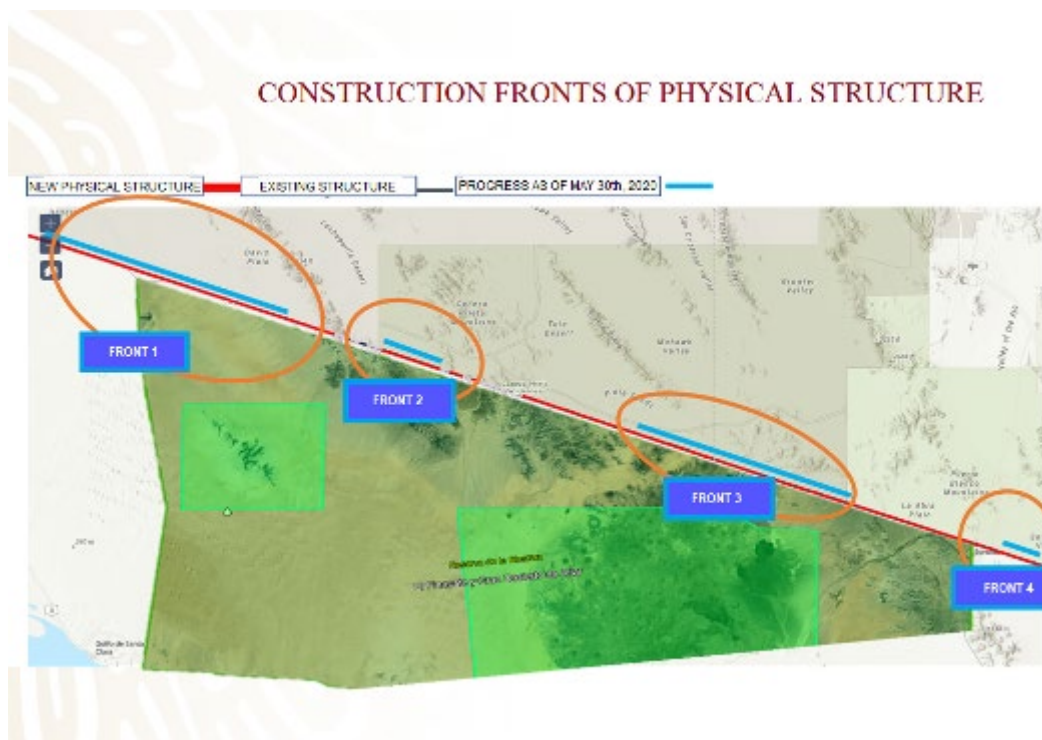
The collaboration currently focuses on the following taxonomic groups, birds, rodents, reptiles, fish, mammals, and priority species such as the Sonoran pronghorn, chameleon (*Phrynosoma mcalli*), Sonoyta river puppy fish and long-finned charal, broken-breasted turtle, bats, and climate monitoring issues with the Automated Weather Station Network.

This collaboration between protected areas on both sides of the border is essential to reinforce the protection and conservation of habitats and species and to guarantee the ecological integrity of the Sonoran Desert. This was a recommendation of the World Heritage Committee, with the inscription of the Property, urging the Government of Mexico to continue trans boundary cooperation with adjacent protected areas in the United States to maintain and improve the management of the Property as an essential factor.

3. Current situation of the construction of physical structures in the USA territory, along the border.

Since January 2020, a surveillance route was established by the personnel of El Pinacate and Gran Desierto de Altar Biosphere Reserve in order to identify critical elements or elements of interest in the construction of “physical structures in the bordered area”. Initially, the routes were carried out on a monthly basis; however, as of May 30, the routes were intensified to be carried out on a weekly basis, due to the increase in activity and the speed of the construction of the physical structures.

During these trips, it was observed, that the construction companies, established four construction fronts, which correspond to areas of 2 to 4 hectares, where they have installed material collection centers, equipment to manufacture concrete, park heavy machinery such as backhoes, dump trucks and concrete, cranes, and vehicles for transporting personnel.



These work fronts are distributed from west to east in terrains with different characteristics.

Front 1

It is located in the section where the Property borders the Barry Goldwater Range training camp, in a semi-fixed dune ecosystem. On this front, the previous “physical structures in the border area” a 4-meter-high wire mesh was not removed, leaving a separation of approximately 20 meters for transit and patrol. The new “physical structures in the border area” is between 9 and 15 meters high, with holes/wells identified for water extraction every 5 km.



During the August 12, 2020 trip², federal officials were able to confirm that work on the "physical structures in the border area" is 100% complete.

² Once the surveillance route was completed, a georeferenced map of the route was drawn up using the Arcgis 9.2 Geographic Information System, using the INEGI Land Use and Vegetation Chart.

No partial or total removal of vegetation was observed, nor was the presence of wild fauna or apparent affectation in national territory.

This section is adjacent to El Pinacate and Gran Desierto de Altar Biosphere Reserve World Heritage Site and Natural Protected Area

Front 2

Located in the section known as *Tinajas Altas*, this group of granite mountains are shared between Mexico and the United States, forming the biological corridor of the bighorn sheep. At this point, heavy machinery was identified demolishing the saw rock to install new “physical structures in the border area”. It is important to point out that the previous “physical structures in the border area” only reached the sides of the mountain range and did not exist in the higher areas, now we can see building machinery in higher parts. This machinery is installing the new “physical structures in the border area”, since we do not know the project, we do not know if it will reach half of the mountain range or if it will be installed over the whole of it, which would totally prevent the movement of the bighorn sheep. A relevant fact is that the largest number of sheep in the Biosphere Reserve live here and the only access to water for these animals is just across the border in the United States, in the high tinaja, so blocking total access would completely condemn the sheep population in Mexico.

On the route of August 12, 2020, the progress of the work on the "physical structures in the border zone" is 100%.

No partial or total removal of vegetation was observed, nor was the presence of wild fauna in national territory or any apparent affectation.

This section is adjacent to El Pinacate and Gran Desierto de Altar Biosphere Reserve.



Front 3

It is located in the section where the Biosphere Reserve borders Cabeza Prieta Wildlife Refuge, a site recognized as Wilderness and which is the most important crossing point for the Sonoran pronghorn. Here the barrier is 12 meters high and is practically finished, it has totally blocked access from south to north and vice versa, for any individual larger than a mouse.

On the August 12, 2020 route, the progress of construction of the "physical structures in the border area", is 99.9%

No partial or total removal of vegetation was observed, nor was the presence of wild fauna or any apparent effect on national territory.

This section is adjacent to El Pinacate and Gran Desierto de Altar Biosphere Reserve Natural Protected Area.



Front 4

It is located on the border with the Organ Pipe Cactus National Monument, this section is the one that is slowest in construction, although in recent days there has been a greater flow of vehicles from the Border Patrol, United States National Guard and construction companies, which is expected to accelerate. In this area, it has been recorded that heavy machinery has destroyed hundreds of plants such as the saguaro, damaged archaeological and historical sites such as the oasis of Quitovaquito, as well as opening roads, some parallel to the “physical structures in the border area” and others for service. Soil removal has had an immediate effect, creating large dust hopper, which can be seen permanently along the “physical structures in the border area”, this situation is worrisome. This, because it is well known that by modifying soils of this type it promotes the

colonization of invasive exotic species such as the Saharan mustard (*Brassica tournefortii*). This mustard species establishes in these areas causing displacement of native plants and in the case of El Pinacate and Gran Desierto de Altar Biosphere Reserve, currently there are no serious problems with Saharan mustard in the northern part of the Reserve, condition that is expected to change.

This front is located in the vicinity of the Morelia *ejido* at km 8 of Federal Highway 2 Sonoyta - San Luis Rio Colorado, General Plutarco Elias Calles Municipality, State of Sonora, geographical coordinates 31.909623° N, - 112.914454° W.

In the trip of August 12, 2020, an area without native vegetation was found where construction material of the previous "physical structures in the border area" are being collected; also, construction activities of the new "physical structures" were visualized.

A person was interviewed who stated that he is dedicated to recycling, selling and buying old iron and that this material, according to this person, are the poles, "physical structures" that previously delimited "the border zone" and that USA personnel who are carrying out the work, give them the bent, broken or in poor condition posts, which are sold to be used to delimit ranches or neighboring properties in the Municipality General Plutarco Elias Calles, Sonora.

At first glance, no activities of partial or total removal of vegetation were observed within the national territory, nor were stumps or apparent affectation of native vegetation observed; nor was there any presence or apparent affectation of wildlife.



The great variety of landscapes in El Pinacate and Gran Desierto de Altar Biosphere Reserve reflects the "extraordinary diversity of habitats", and with the species that stand out the most, are the Sonoran pronghorn, bighorn sheep, ferruginous pygmy owl, Sonoyta pupfish, mule deer, gray fox, several species of bats, cactus and other species.

It is of particular importance the habitat of the Sonoran Pronghorn, as it is limited only to the El Pinacate region and around the site including the USA protected areas north of the border at *Cabeza Prieta* Wildlife Refuge and Organ Pipe Cactus National Monument.

In the 1990s, the United States built several types of “physical structures in the border area” to physically separate its border with Mexico. Regarding the section adjacent to the Property, these “physical structures in the border area” were constructed along 140 kilometers, with the exception of the high parts of the mountains known as Tinajas Altas and Choclo Duro, two types of “physical structures in the border area” were designed to limit the flow of land vehicles, however, they were permeable for fauna and were installed in the section of the border adjacent to Organ Pipe Cactus National Monument and Cabeza Prieta Wildlife Refuge.



Physical structures for vehicles in Organ Pipe Cactus NM. Credits: National Park Service

The third design corresponds to the section bordering the Barry M. Goldwater Air Force Range, which consists of a 4-meter high steel barrier that does not allow the passage of vehicles or wildlife. This section is located in the most arid zone of the Reserve and is not a natural passage for most species. The current project of “physical structures in the border area” replaces the existing “physical structures in the border area”.



The new physical structure in the border area

4. Possible effects in some attributes of the Property

Effects on hydrology and water resources

The effects that the construction itself of “physical structures in the border area” will have on water resources are not yet known, and alterations to the flow and disposal of surface water have already been detected. The cement plants, camps and facilities for the preparation of the site and construction, have put strong pressure on the groundwater resource, which has not yet been quantified.

The upper Sonoyta River basin is located in the United States, which contributes to the flow of water southward. However, the current base flow of the river's main channel, when it crosses the border into Sonoyta, Mexico, is already greatly reduced. The “physical structures in the border area” will likely function as a dam for many waterways that cross border areas, including the Sonoyta River, and will alter their hydrology within the site that have a constant flow, as well as intermittent drainage. If water is clogged or water availability changes due to the “physical structures in the border area”, species endemic to these riparian habitats and streams will be affected, such as the Sonoyta River Desert Puppy.

It has also been observed that where "physical structures in the border area" cross trans boundary streams, they trap the debris that is normally carried by surface runoffs, causing backwater or ponds on the upstream side, whose pressure on the "physical structures in the border area" has sometimes caused them to collapse, generating sudden high runoffs and floods on the downstream side, affecting whatever is in their path.

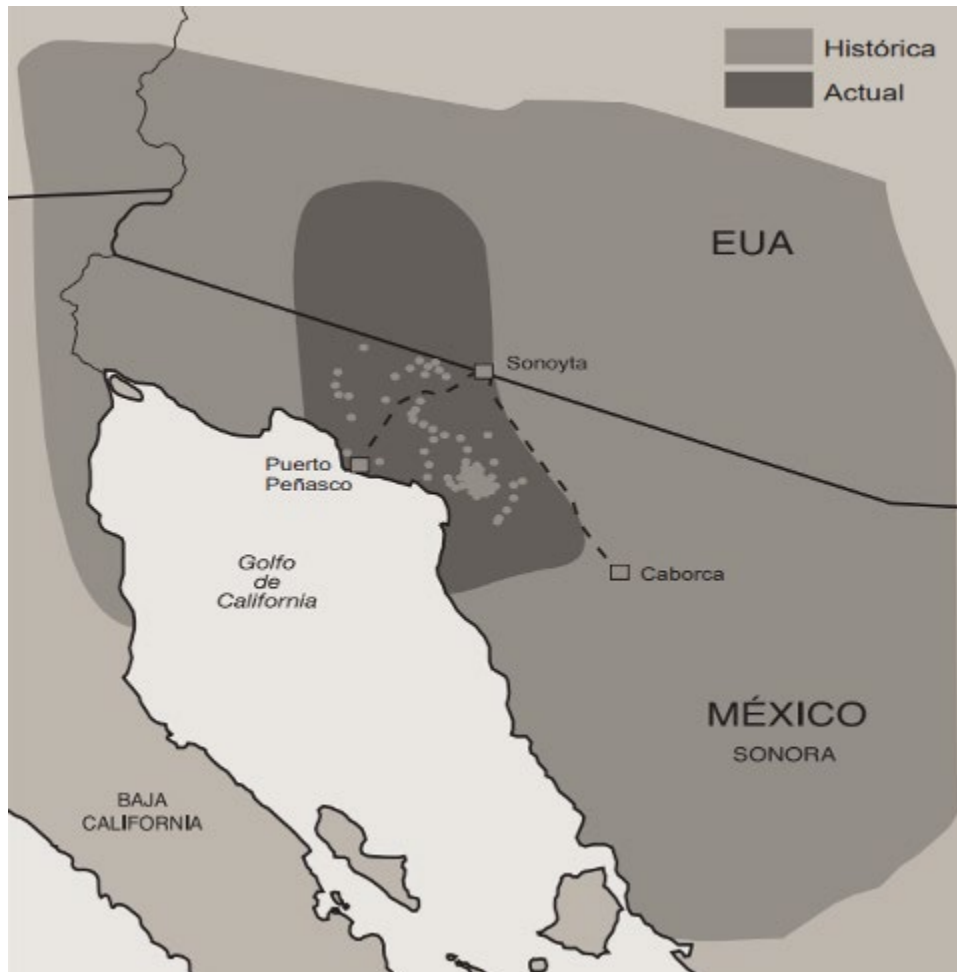
Effects on wildlife

As detailed above, the Sonoran Desert ecosystem extends well beyond the international border, approximately 250 kilometers north to the United States. The free movement of wildlife across the border has allowed the continuity of ecological and evolutionary processes for all border species for millions of years, so the “physical structures in the border area” along the northern strip of El Pinacate would prevent these historic migrations.

In general, fences, and in particular impermeable ones, can cause decreases and even local disappearance of species. These barriers prevent mobility that is essential for dispersal, the seasonal

migration of many species, the search for food and water, and the escape of predators; fragmentation of habitat and populations; and can even cause direct mortality.

Limiting the dispersal of species can cause population-level effects by reducing gene flow between populations, which can lead to genetic divergence between populations and a rapid loss of genetic diversity in small populations. In fact, even a slight decrease in dispersal can have large consequences for populations of species, and smaller isolated populations may be subject to a higher risk of extinction. Human disturbance, removal of vegetation and additional barriers, roads, and lighting that accompany fences are likely to further reduce the permeability of the border to wildlife.



Historical and current distribution of the Sonoran pronghorn.
The clear points represent observations of groups of pronghorns in Sonora.

The importance of habitat connectivity to preserve and increase the wealth of species is of great importance in all ecosystems. However, its relevance increases when it comes to deserts, since rainfall is regularly low and isolated which causes some of the species have to migrate continuously in search of sites more favored with the moisture and availability of food. This is the case of species such as bighorn sheep and Sonoran pronghorn that are under constant pressure by the fragmentation and loss of habitat.

There are analyses by experts who agree that the effects of the construction and operation of the “physical structures in the border area” will have a greater impact, mainly on species that are under some category of risk according to the Mexican Regulation NOM-059-SEMARNAT-2010, such as the pronghorn (*Antilocapra americana*), the bighorn sheep (*Ovis canadensis*), the badger (*Taxidea taxus*), the desert fox (*Vulpes velox*), as well as various species of fish that live in rivers and border streams and other medium and small species that are distributed in valleys and other specific sites along the border.

The groups of wild flora and fauna with the greatest potential risk are

- Migratory waterfowl.
- Large and medium-sized land mammals: Pronghorn, bighorn sheep, mule deer, puma, badger, desert fox, wild boar, among others.
- Endemic species to the border strip of amphibians and reptiles, small rodents, freshwater fish, invertebrates.
- Plant species that are distributed on both sides of the border and have very reduced populations.
- Relictual animal and plant communities of the so-called "Sky Islands".

Technical information on wildlife species at risk

Sonoran pronghorn (*Antilocapra americana sonoriensis*)

It exists in only one place, in the Sonoran Desert, in southwestern Arizona and northwestern Mexico. Unfortunately, the Sonoran pronghorn is among the most endangered mammals, having suffered sharp declines in population. The latest Sonoran pronghorn census shows that only about 850 individuals remain in approximately 12% of the historic habitat. The decline of this species was caused by historical hunting, cattle grazing, drought and habitat fragmentation. Their populations

depend on the genetic renovation between the only three existing groups of Sonoran pronghorns which are located in the zone known as "Quitovac" (east of the Natural Protected Area) with around 650 individuals, the second group is located within El Pinacate and Gran Desierto de Altar Biosphere Reserve with a little more than 100 individuals and finally a third group that is located between Organ Pipe Cactus National Monument and Cabeza Prieta Wildlife Refuge, where there are about 250 individuals, it is important to point out that these 250 individuals were reproduced in a semi-captive system with a breeding stock obtained from the groups in Mexico in 2002, since the population in Arizona had practically disappeared by that date.

In Mexico, the Sonoran pronghorn is in the category of "endangered" in the Mexican Official Regulation NOM-059-SEMARNAT-2010. In the United States in 1967, it was classified as "endangered".



Connectivity between the three populations of Sonoran pronghorn.

The pronghorn requires "vast areas of open field without threat" that allow the pronghorn to travel freely long distances between sporadic and seasonal localized rainfall" in search of food. Habitat fragmentation remains a key threat to the species, including fragmentation caused by "physical barriers". "Such as border infrastructure, wall/fences and roads". Fences are of particular concern because the pronghorn rarely jumps over fences, although they may try to crawl under them. Consequently, unless a fence rises 16 inches off the ground, it is impassable to pronghorn.

According to Meléndez, et al. (2006), 80% of the population of the Sonoran pronghorn is located southeast of Highway 8 (Puerto Peñasco-Sonoyta). However, as already mentioned, the Biosphere Reserve area is of great importance as a biological corridor for maintaining the seasonal mobility of pronghorn groups within the range east of the highway.

Until recently, the international border fence in the pronghorn habitat was a vehicular barrier fence that did not pose an obstacle to the animals. However, the “physical structures in the border area” will undoubtedly be impassable for the Sonoran pronghorn, permanently cutting off the northern and southern populations of the species, avoiding dispersion and the much needed genetic exchange, which could lead to the loss of the existing population in the Biosphere Reserve. In addition to being an extremely sensitive species to disturbances, the “physical structures in the border area” are expected to have a significant negative effect as an impassable barrier to the crossing of pronghorns, producing populations that will be isolated and will therefore need to be managed to avoid local extinction.

Desert bighorn sheep (*Ovis canadensis*)

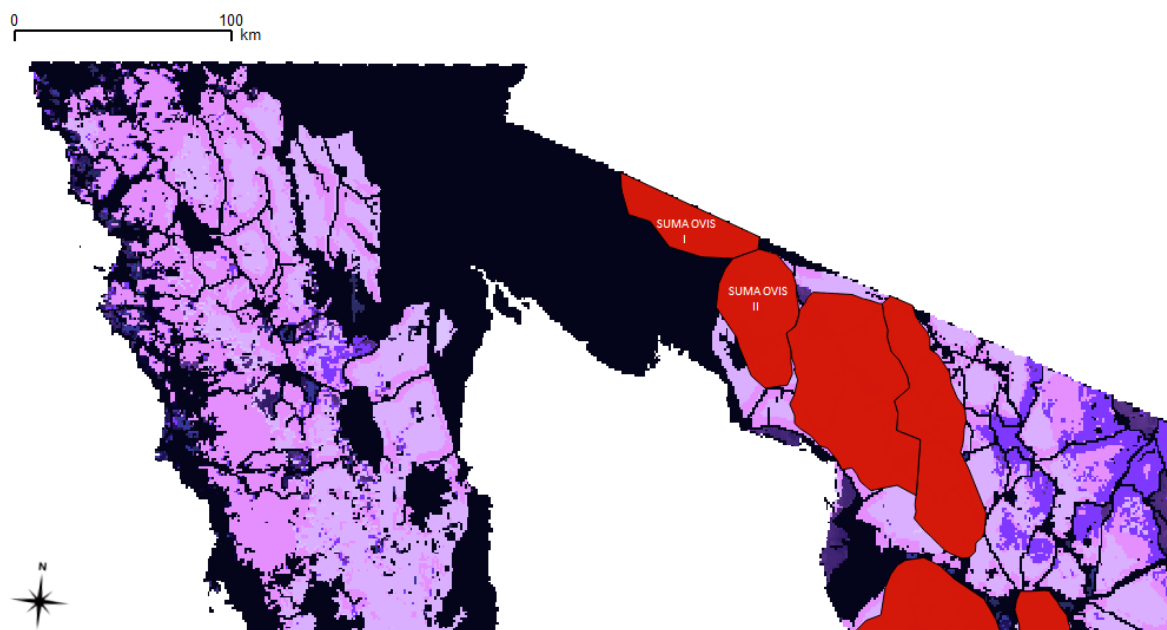
Desert bighorn sheep are "subject to special protection" in Mexico, and Cabeza Prieta National Wildlife Refuge was established, in part, to protect the species and have always shared populations on both sides of the border. It has not been possible to identify probable effects on the population because the executive project is not known and whether the construction of the “physical structures in the border area” will be done on the mountain ranges, to establish the impacts on the habitat of this species.

However, desert regions are characterized by very low rainfall and prolonged droughts so bighorn sheep suffer high food insecurity, which in drier years or in situations of disturbance forces them to move more than normal to meet their requirements. Habitat modifications in some bighorn areas, due to infrastructure works that are being developed as part of the project, have caused the bighorn to move much further than the species has traditionally done, in search of other areas with less disturbance, leaving the bighorn exposed to predators and possible diseases.

It is worth mentioning that only bighorn sheep populations in Mexico are included in CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) under Appendix II. Due to the very particular controls that CITES requires, along with the population management that the State of Sonora has been carrying out for decades, the species has recovered in

the northern and western region of the state. The Biosphere Reserve has played a very important role in maintaining the populations, and although since 2006 it has remained relatively stable (around 200 to 250 individuals in the SUMA-OVIS I and II bighorn sheep areas (defined as regional distribution and management areas for Bighorn Sheep in Sonora; see map). It is a hunting-free area, where they reproduce and later migrate to the mountain ranges of southwestern Sonora, in addition to presenting large seasonal movements from the United States to the center of the state of Sonora.

The Sierra Tinajas Altas (Alacranes) is home to most of the sheep that live in this area, this is validated by the data recorded in the four aerial monitoring conducted in recent years (2006, 2009, 2012 and 2016), then follows the Choclo Duro and Sierra El Águila (State Government of Sonora, 2012; unpublished information from the Secretariat of Agriculture, Livestock, Water Resources, Fisheries and Aquaculture (SAGARHPA) - Sonora).



Map. Delimitation of SUMA-OVIS (bighorn sheep management areas) in the State of Sonora³.

³ The polygons delimited by the red line correspond to the different SUMA-OVIS recognized for the management of bighorn sheep in the state; SUMA-OVIS I and II are highlighted, where sheep populations will be affected by limiting their seasonal movements. A reduction in their population is expected.

Source: Government of the State of Sonora (2012). Bighorn sheep (*Ovis canadensis mexicana*): Results of aerial monitoring in the State of Sonora, Mexico, November, 2012. General Directorate of Forestry and Wildlife of Hunting Interest of the Ministry of Agriculture, Livestock, Water Resources, Fisheries and Aquaculture (SAGARHPA) - Sonora.

Adverse conditions equivalent to those of the Sonoran pronghorn are expected, mainly due to lack of food and water, in addition to conditions of vulnerability to predators, and there is a very significant risk of limiting population growth and recovery in the north of the state, undermining decades of effort.

The ferruginous pygmy owl (*Glaucidium brasilianum*)

The ferruginous pygmy owl is another species that will be threatened by the “physical structures in the border area”. It is a small owl that could fit in the palm of a human hand. The habitat of this species and other owl species is of great importance within El Pinacate and Gran Desierto de Altar Biosphere Reserve.

Recent studies show that vegetation gaps can slow or limit movements, especially in non-migratory birds such as pygmy owls, whose flights involve steep descents from low perches followed by direct flights near the ground. Flesch et al. (2009) evaluated the effects of a “border wall/fence” on pygmy owls and found that their flights averaged only 1.4 meters above the ground, and only 23% of flights exceeded 4 meters, (They concluded that vegetation gaps along high fences, such as the “border wall”, can limit cross-border movements of pygmy owls, reducing dispersal. Because their populations in Arizona are low, compared to those in Sonora, maintaining cross-border connectivity is vital to the recovery of owl populations.

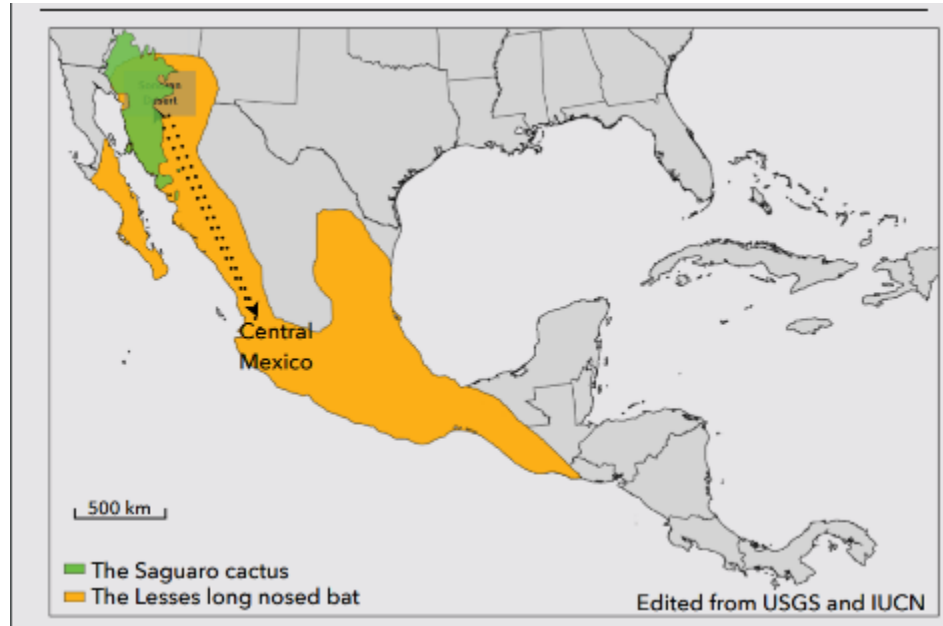
The Lesser Long-nosed Bat (*Leptonycteris yerbabuenae*)

The maguay bat is an important pollinator of cacti and agave plants, which help maintain the desert ecosystems of northwestern Mexico and the southwestern United States.

They are one of three species of bats in North America that feed on nectar, and it's not just the plants that benefit: bat pollination is essential for the blue agave plants from which tequila is made in central Mexico, a fact that can save this endangered species.

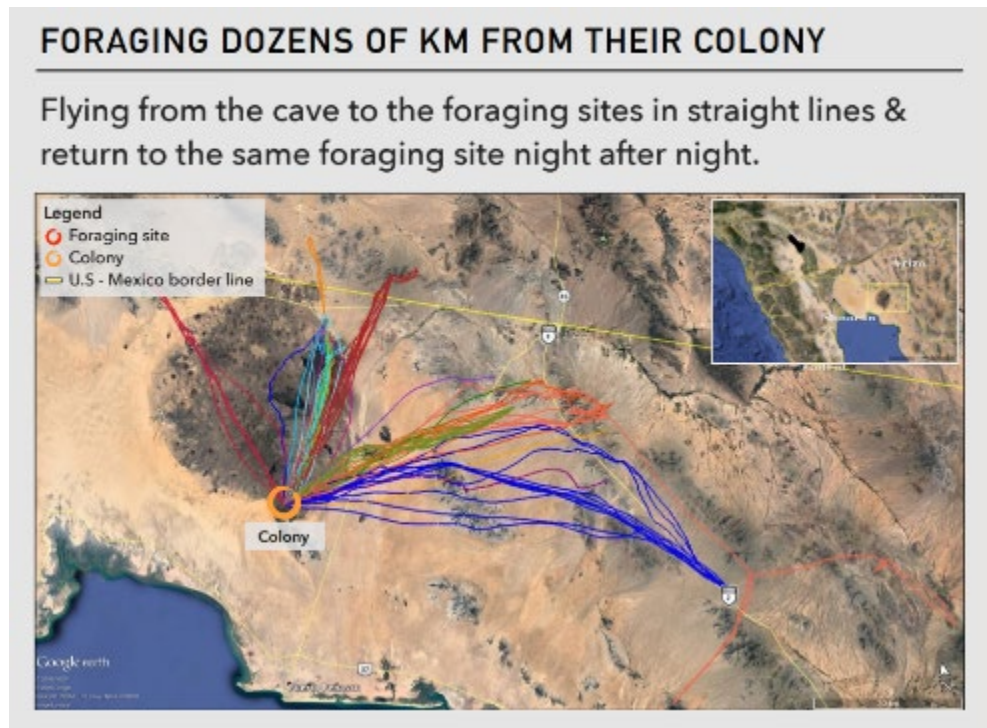
Maguay bats are migratory animals, spending the winter in Central Mexico and moving as far north as southern Arizona and New Mexico. Also, they live in the Sonoran Desert and throughout Mexico.

As they travel, these bats gather by the thousands on perches on the walls of caves where they rest and give birth to their young. After a night of searching for nectar, the mother bats return to the cave to feed their babies whom they identify using a multi-sensory process.



In El Pinacate and Gran Desierto de Altar Biosphere Reserve and in the Organ Pipe Cactus National Monument, there are some of the main maternity caves. These caves are used every year by these species to have their offspring, and the reason is the co-evolution that exists between the bat and the Sahuaro (*Carnegiea gigantea*), this species that is distributed only in the Sonoran desert and that is the fundamental food for the Maguey bat, which depends directly on the pollination of the bat for its survival.

In a study conducted in 2018, with small GPS equipment installed in a certain number of bats inside the Maternity Cave in El Pinacate and Gran Desierto de Altar Biosphere Reserve, it was confirmed that the species flies daily to feed on the nectar of the Sahuaro flower in El Pinacate region but also in the Organ Pipe Cactus National Monument region, beyond the border.



It appears that the current “physical structures in the border area” project will have a lighting system along its length, with a considerably high intensity, which could directly affect migration of populations that turn out to be so fragile.

Other Sonoran Species

Other species such as the mule deer, white-tailed deer, collared boar, wild cat, badger, puma, desert fox and various reptiles among others, are part of the Outstanding Universal Value of this site and will definitely be affected by the construction of these “physical structures in the border area”, by interrupting the natural connectivity of the habitat and these populations and completely and irreversibly isolating the populations of the United States from those of Mexico.

Desert Fish and Turtles

The Sonoyta pupfish or pupo (*Cyprinodon eremus*) is an endemic and endangered species, and its habitat is limited to a small runoff in the northern part of the Sonoyta River of no more than 2 km and a depth of 30 cm, as well as in the small Quitovac lagoon on the USA side of the border.

The upper Sonoyta River basin is located in the United States, which contributes to the flow of water southward. However, the current base flow of the river's main channel when it crosses the

border into Sonoyta, Mexico, is already greatly reduced. The “physical structures in the border area” has already shown in other sections that it can function as a dam for many streams and waterways that cross the border, including the Sonoyta River, because of its influence on the Biosphere Reserve and the endemic species that live there, such as the cachorrito or pupo.

It is very important to emphasize that the "*Agua Dulce*" Wetland of International Importance as a Ramsar Site, and its ecological character, as described above, would be at serious risk of being affected as a whole. So it is proposed as a site to which joint attention should be given and to be able to foresee as soon as possible an adequate management of groundwater and surface water at the basin level.

It is also habitat for the longfin dace charal (*Agosia chrysogaster*), another important species protected by Mexican Laws with the status of threatened species and both are of biological importance as locally distributed species. In addition, it is important to point out that Agua Dulce as a water body is a unique place for the biological cycle of the pupo (*C. eremus*) and the longfin dace charal (*A. chrysogaster*), due to its so far permanent characteristics as far as the aquifer is concerned.

The Property also host other species of high importance to the NPA because of the state of their populations and their critical habitats such as: the Sonoyta mud turtle (*Kinosternon sonoriense longifemorale*). It is the only species of water turtle in the region, endemic to the place and with restricted distribution of this arid part of North America and which has a population very sensitive to disturbances in the area.

This Ramsar Site is a critical wetland because of the importance of its habitat for species, its high sensitivity to changes in the disposition of groundwater and surface water for various anthropogenic uses, and the extraction of water through wells on the border for the construction of “physical structures in the border area”, put greater pressure and threat on the resource.

Landscape and Natural Beauty

One of the main attributes that the Property and the areas around it have is the immense surface of natural landscapes practically unaltered by the hand of man. Although a vehicular barrier has existed since the 90's, it is not comparable to the visual impact of a practically closed “physical

structure” of 9 meters high along the entire “border area”. One of the main attributes of the Property is the extraordinary natural landscapes. While the visual impact is concentrated north of the Property in an irregular strip along the “border area”, it does break with the natural landscape and can become “physical structure” that are not visible to some wildlife species.

Potential Environmental Impacts from the preparation, construction and operation of “physical structures in the border area”

Currently, researchers with different works in the border between Mexico and the United States and specifically the section that corresponds to El Pinacate and Gran Desierto de Altar Biosphere Reserve, agree that the construction of “physical structures in the border area” represents a threat to wildlife that is distributed on both sides of the border, pointing out direct and indirect impacts in the short and medium term. This leads to urgently pose a series of joint binational strategies to identify the real risks for each taxonomic group and identify the effects on various physical aspects (water, soil and air).

In 2007, the Ministry of the Environment and Natural Resources, the National Institute of Ecology and the Colegio de la Frontera Norte organized and held a technical-scientific workshop named *“Taller técnico-científico sobre los impactos ambientales potenciales del muro fronterizo entre Estados Unidos y México”* (INE-COLEF, 2007), with the participation of experts from the governmental, academic and non-governmental sectors of both countries, who sought to identify and analyze the possible environmental impacts of the construction of the “physical structures in the border area”, identifying the following as the main effects on fauna:

- Edge effect by fragmentation

In fragmented habitats, the edge effect has negative impacts on the distribution and abundance of animals.

- Contraction of the area of activity of individuals

The establishment of a physical structure would fragment territories, reduce the area of activity and modify the home environments of many species.

- Barrier to dispersion and migratory movements

The “physical structures in the border area” would prevent the free transit of fauna between both countries and this would affect the natural processes of dispersion and migration.

- Interruption of the genetic exchange

The “physical structures in the border area”, in addition to isolating populations, prevent genetic exchange between individuals.

- Proliferation of harmful and/or exotic fauna

Areas subject to anthropogenic disturbances favor the proliferation of exotic and harmful fauna, such as rats and some birds. This fauna could affect directly or indirectly wild populations.

- Electric Lighting Contamination

Electric lighting in the surrounding areas could affect several species of nocturnal animals such as some predators, dispersers and pollinators. It would also affect the movement of nocturnal migratory birds that transit the border areas.

- Noise pollution

The effect of noise on wildlife can cause stress and generate metabolic, hormonal, and behavioral effects. (Moya 2007).

5. Considerations on the construction of “physical structures in the border area”

Ecological

- A fence of any kind, is intended to divide a territory in two. This division will affect wildlife differently due to the natural breakdown of the landscape setting (Hernández et al. 2018).
- The landscape of El Pinacate and Gran Desierto del Altar Biosphere Reserve is the territory to be fragmented by the new “physical structures in the border area”. This Reserve was declared a World Heritage Site by UNESCO for its geological and physiographic importance.
- While insects and arachnids, birds and some reptiles, amphibians and small mammals can cross more or less freely from one side to the other, larger specimens will have difficulty doing so.
- There are fences that cannot be seen or felt by some animals, so that when they run or fly they can crash with them and get trapped, hit and even die from the impact; such is the case of ungulates and some birds when they fly at ground level to hunt. There are fences that stop the flow of seeds, spores or pieces of plant material moved by the wind for the establishment of new seedlings; likewise, much seed dispersal occurs due to the movement of animals. Although the direct impact of fencing on wildlife mortality is relatively low, in the long term, fencing can pose a serious threat to wildlife through its barrier effect, resulting in habitat fragmentation and the disconnection of biological populations and isolation of metapopulations (Pokorny et al. 2017).
- Prior to the construction of “physical structures in the border area”, systematic studies are required to determine the implications of the fence on the spatial behavior, movements and gene flow of key species in the border zone.
- There are emblematic fauna that are protected by Mexican laws and that due to the construction of “physical structures in the border area” will increase their threats, diminishing their evolutionary and survival capacity. For example, the Sonoran pronghorn (*Antilocapra americana sonoriensis*), which is in danger of extinction, the bighorn sheep (*Ovis canadensis mexicana*) subject to special protection, endemic bats such as the magueyero (*Leptonycteris curasoae yerbabuenae*) and the fisherman (*Myotis vivesi*). Also, the golden eagle (*Aquila chrysaetos*) – the national flag bird, the Mexican falcon (*Falco mexicanus*) are under risk. Some fishes stand out, from epicontinental water such as the

desert duck (*Cyprinodon macularis*), in danger of extinction, and the long-finned charal (*Agosia chrysogaster*), which is threatened. There are also reptiles of great importance for Mexican and international conservation such as the chameleon (*Phrynosoma mcallii*) endemic to the Sonoran Desert; the gila monster (*Heloderma suspectum*) and the mountain or desert tortoise (*Gopherus agassizii*), both of which are threatened (CONANP, 2020).

- Within the vegetation, the halophiles stand out. This vegetation is very rare in the world since it grows in the sand dunes, which are mobile by the action of the wind but at some point can be fixed and fossilized by the presence of this vegetation. The most representative plants are the genera *Larrea* and *Atriplex*.

Sociocultural

In addition to the threats to the Outstanding Universal Value of the Property, the “physical structures in the border area”, will also severely harm the Tohono O'odham indigenous peoples, and will damage their ancient religious and cultural practices in both the Biosphere Reserve and Arizona. In the nomination file for the property, the International Union for Conservation of Nature (IUCN) recognized the historical and current cultural importance of the site to the Tohono O'odham Nation, whose traditional lands are divided by the U.S.-Mexico border.

Currently the area of El Pinacate and Gran Desierto de Altar Biosphere Reserve is recognized as a sacred site and is regularly used for ceremonial purposes by the Tohono O'odham Nation.

Concerns expressed by the Tohono O'odham Nation

The ancestral lands of the Tohono O'odham encompass the South of Hermosillo, Mexico, the North of the City of Phoenix, the West of the Sea of Cortez and the East of the Rio de San Pedro. The Tohono O'odham Nation shares a 120 km international border, which divides their lands and peoples in half.

Approximately 1,400 O'odham were born and continue to reside in the communities of Mexico. There are nine communities traditionally recognized as O'odham in Mexico, such as Ce: dagi Wahia / Pozo Verde, Wo'osan, Cu:wi Gersh/ San Francisquito, and Quitovac, which are sanctuaries for their sacred sites and ceremonies.

There are three areas along the US-Mexico border where the O'odhams used to pass through before the US Government established official entrances, all of which have been closed for O'odham use.

The entries are being held by the United States Border Patrol, and the last one, San Miguel Gatem was sealed from the Mexico side.

Many O'odham residents in Mexico cannot cross the border for fear of deportation. There are two brothers who have been continually deported from one side of the O'odham lands to the other, simply because they did not speak Spanish or English, but only O'odham. On the US side, O'odhams who traveled and worked the land have been questioned many times by the Border Patrol and have been detained on "probable cause" and "reasonable suspicion."

They do not only face the imminent threat of the construction of “physical structures in the border area” on both sides of the Tohono O'odham Nation, but have witnessed the construction of the Integrated Settlement Towers, permanent watchtowers with powerful electromagnetic transmissions that will affect their precious desert with pollutants, as bees, bats and butterflies. This will affect food and medicines for people and wildlife uses for their welfare, ceremonies and, above all, their way of life to which the O'odham call Himdag.

They argue that “the damage that the Trump administration wall has done to their landscape continues”. To the west of the Tohono O'odham Nation lie the grasslands of A'al Waippa or Quitovaquito, a natural oasis in Organ Pipe National Monument Park. A'al Waippa dates back 12,000 years and is home to rare and endangered species such as the Sonoran kinosternon and the Sonoran carp, species that can be found only in their sacred places.

Since January 2020, the waters of A'al Waippa have been drastically drained from nearby wells for the construction of “physical structures in the border area” directed towards Yuma. This is a devastating impact on their land, wildlife, and life throughout desert landscapes, especially climate change. They are afraid that unless it rains on the prairie, it will cease to exist.

As Indigenous Peoples and Nations affected by forced migration due to climate, hunger and violence, they will continue to fight against migration control systems in the future.

Their will to survive and their resilience are their culture and traditions: “Our culture is our strength! The ways of life that our mother earth has taught us will continue to help us survive and strive to maintain relationships between our families, subsistence and cultural practices as Peoples and Nations, and defend our shared obligations as defenders of the rights of all

humanity. We must continue to support and fight together for our collective and our inherent rights”.

6. Mexican Government Position

Biocultural landscapes of North America are connected, both ecologically and culturally, so achieving the objectives and results of their protection requires coordinated actions not decisions taken unilaterally.

Mexico recognizes and assumes that, among the fundamental obligations provided for by the Convention concerning the Protection of the World Cultural and Natural Heritage, are those set forth in Article 6, numbers 1 and 3, which read, respectively, to the letter:

- *“Whilst fully respecting the sovereignty of the States on whose territory the cultural and natural heritage mentioned in Articles 1 and 2 is situated, and without prejudice to property right provided by national legislation, the States Parties to this Convention recognize that such heritage constitutes a world heritage for whose protection it is the duty of the international community as a whole to co-operate”.* (emphasis added); and
- *“Each State Party to this Convention undertakes **not to take any deliberate measures which might damage directly or indirectly the cultural and natural heritage referred to in Articles 1 and 2 situated in the territory of other States Parties to this Convention**”.*(emphasis added).

Additionally, Mexico recognizes the existence of multiple principles and norms of customary international law that prohibit the commission of acts by a State in its territory that may have adverse effects on the territory of other States.

In that sense, Mexico will continue to honor its international obligations regardless of what a third State decides to build in its territory, expecting reciprocity in this action. Nevertheless, it will maintain special attention in the areas where there are elevated parts and constitute the shared mountain ranges between the two nations, very important sites for some species such as the bighorn sheep, for being part of their range of occupation, where they satisfy their habitat requirements, among those that make daily or seasonal migrations.

Unilateral actions by a State Party, on a Property located in the territory of another State Party, would be a cause of non-compliance with these obligations.

In addition to the environmental impacts that could be caused, there are also the social and cultural impacts on the Tohono O'odham Nation, which has traditionally occupied these territories in accordance with its customs and traditions. In this sense, the Government of Mexico will continue to guarantee their passage through national territory and human rights.

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8. Annexes

- A. Contributions of the Federal Attorney's Office for Environmental Protection (PROFEPA)
- B. Contributions of the National Institute of Indigenous Peoples (INPI)
- C. Report of the International Boundary and Water Commission between Mexico and the United States (CILA), Ministry of Foreign Affairs
- D. Dron Video
- E. Complementary references. Contributions of the National Commission for the Knowledge and Use of Biodiversity (CONABIO) and the National Commission of Natural Protected Areas (CONANP).
- F. Contributions of the National Commission for the Knowledge and Use of Biodiversity (CONABIO) and the National Commission of Natural Protected Areas (CONANP).