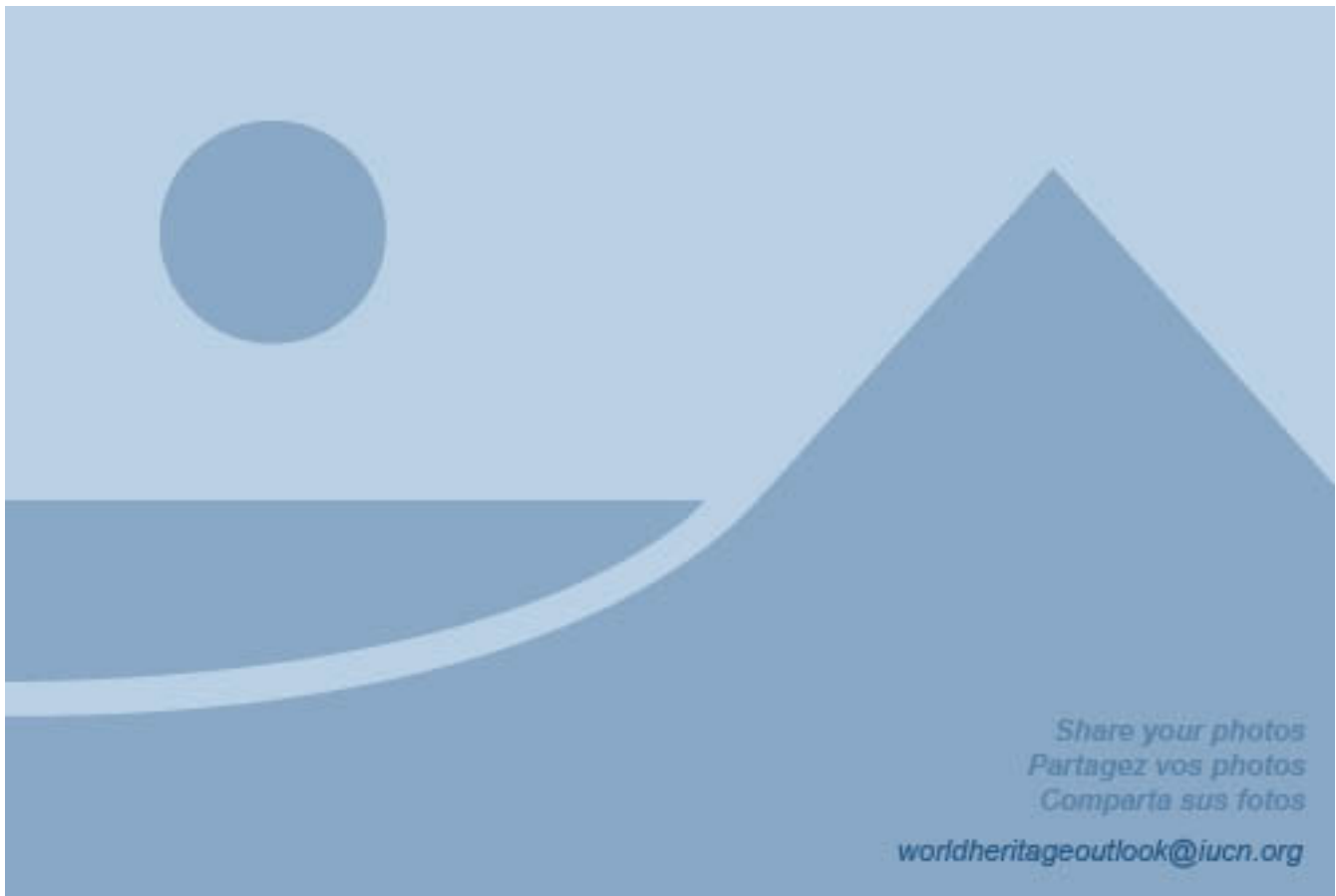


## Sitename:-Carlsbad Caverns National Park

Site Description:-This karst landscape in the state of New Mexico comprises over 80 recognized caves. They are outstanding not only for their size but also for the profusion, diversity and beauty of their mineral formations. Lechuguilla Cave stands out from the others, providing an underground laboratory where geological and biological processes can be studied in a pristine setting.



# Conservation Outlook

**Rating:**-Good with some concerns

**Justification:**-The cave resources of the site which form the basis of its Outstanding Universal Value are well protected yet additional staff could be used to monitor people passing through the cave, in particular as park visitation is increasing. However, the site will be able to maintain current biodiversity only with heightened diligence, funding and direction, particularly to address the threat of invasive species. There are no current threats to the geological values of the site for which it was inscribed. But increased oil and gas development can increase contamination of water resources and pollution (gas) could threaten all cave resources.

## Current state and Trend of values

**State:**-Good

**Trend:**-Stable

**Justification:**-The cave resources of the site which form the basis of its Outstanding Universal Value are well protected yet additional staff could be used to monitor people passing through the cave, in particular as park visitation is increasing.

## Overall Threats

**Overall Rating:**-Low Threat

**Summary:**-There are no current threats to the geological values of the site for which it was inscribed. However, exotic plants and animals threaten biological stability of native ecosystems. Increased oil and gas development can increase contamination of water resources and pollution (gas) could threaten all cave resources. Lowered water table as a result of drought, climate change and over use of water resources in nearby agricultural areas could decrease surface water imperiling riparian areas.

## Protection and Management

**State:**-Effective

**Justification:**-Overall, protection and management of the site are mostly effective. However, funding and human resources could be increased. Almost all available resources are used for cave protection and visitor services and increased resources could help better integrate other aspects biodiversity into management, such as for example the site's biodiversity values. Monitoring and research need to be more focused on management needs and understanding of the site's Outstanding Universal Value.

# Assessment Information

## Value

## **World Heritage Values**

*State:-*Good

*Trend:-*Stable

### **1: Rare and unique speleothems**

*State:-*Low Concern

*Trend:-*Stable

*Description:-*The park's primary caves, Carlsbad and Lechuguilla, are well known for the abundance, diversity, and beauty of their decorative rock formations. Lechuguilla Cave exhibits rare and unique speleothems, including a great abundance of large calcite and gypsum formations, including the largest accumulation of gypsum "chandeliers," some of which extend more than six meters (18 feet) in length. (Statement of Significance, 2006).

### **2: Geological features**

*State:-*Good

*Trend:-*Stable

*Description:-*Carlsbad Caverns National Park is one of the few places in the world where on-going geologic processes are most apparent and rare speleothems continue to form, enabling scientists to study geological processes in a virtually undisturbed environment (Statement of Significance, 2006). Capitan Reef is the largest exposed Permian Reef in the world, approximately 250 million years old. The Capitan Reef, in which Carlsbad Caverns and Lechuguilla Cave (and other caves) formed is one of the best preserved and most accessible complexes available for scientific study in the world. The more than 100 limestone caves within Carlsbad Caverns National Park are outstanding and notable world-wide because of their size, mode of origin (i.e. dissolution via sulfuric acid), exceptional geologic features, and unique rock formations.

## **Other Biodiversity values**

*State:-*High Concern

### **1: Biodiversity**

*Description:-*Park contains large number of species of birds, mammals and reptiles. Over 15 species of bats known from park, large colony of Brazilian Free-tailed Bats which sometimes exceeds 1,000,000 in number. Approximately 900 species of plants known from park, with many examples of species at the margins of their range. Recent studies have discovered several moth species new to science and some new to the United States, some new to New Mexico. Numerous single-celled organisms known from caves, especially Lechuguilla Cave and studies show the potential for cancer inhibiting properties in some of them. Exhibit adaptations to cave existence, feed on inorganic materials. Ten year study is expected to show high degree of biodiversity with several thousands of species present.

## **Threats**

## **Current Threats**

### **1: Invasive Non-Native/ Alien Species**

*Threat Rating:*-High Threat

*Justification:*-Exotic plants and animals threaten biological stability of native ecosystems.

### **2: Other Ecosystem Modifications**

*Threat Rating:*-High Threat

*Justification:*-Change in plant composition due to grazing, climate change, habitat fragmentation on boundaries of park.

### **3: Livestock Farming / Grazing**

*Threat Rating:*-Low Threat

*Justification:*-Occasional breach of park fences results in grazing impacts. There are insufficient personnel to monitor fence lines.

## **Potential Threats**

### **1: Oil/ Gas exploration/development**

*Threat Rating:*-High Threat

*Justification:*-Increased oil and gas development can increase contamination of water resources and pollution (gas) could threaten all cave resources

### **1: Crops**

*Threat Rating:*-Low Threat

*Justification:*-Lowered water table decreases surface water which could imperil riparian areas

## **Protection and management**

*Overall Rating:*-Effective

*Justification:*-Overall, protection and management of the site are mostly effective. However, funding and human resources could be increased. Almost all available resources are used for cave protection and visitor services and increased resources could help better integrate other aspects biodiversity into management, such as for example the site's biodiversity values. Monitoring and research need to be more focused on management needs and understanding of the site's Outstanding Universal Value.

## **Protection and management value**

### **1: Research**

**Protection Rating:-**Some Concern

**Justification :-**There is considerable research ongoing; however, it is not directed towards management needs (PR, 2013).

## **2: Monitoring**

**Protection Rating:-**Some Concern

**Justification :-**There is considerable monitoring, but it is not directed at management needs (PR, 2013).

## **3: Tourism and visitation management**

**Protection Rating:-**Highly Effective

**Justification :-**Tourism appears to be well-managed (PR, 2013).

## **4: Education and interpretation programs**

**Protection Rating:-**Some Concern

**Justification :-**There are some education and interpretation programmes in place, but this could be improved (PR, 2013).

## **5: Sustainable use**

**Protection Rating:-**Highly Effective

**Justification :-**Not a concern

## **6: Staff training and development**

**Protection Rating:-**Effective

**Justification :-**Current staffing is sufficient, but could be increased.

## **7: Sustainable finance**

**Protection Rating:-**Effective

**Justification :-**The available budget is sufficient; however further funding could help enhance the management of the site to international best practice standards (PR, 2013).

## **8: Boundaries**

**Protection Rating:-**Some Concern

**Justification :-**Boundaries of the site are adequate to protect the site's OUV; however, they could be improved (PR, 2013). The site has no buffer zone.

## **9: Implementation of Committee decisions and recommendations**

**Protection Rating:-**Highly Effective

**Justification :-**No decisions issued requiring implementation

## **10: Management effectiveness**

**Protection Rating:-**Highly Effective

**Justification :-**The management system in place appears adequate and is being fully implemented (PR, 2013).

**11: Management system (for transboundary/serial properties, integrated management system should also be described/evaluated)**

*Protection Rating*:-Effective

*Justification* :-The General Management Plan is from 1996 and therefore out of date, though draft management plans for karst and cave management, wastewater rehabilitation and fire management have been developed since 1996. (<http://www.nps.gov/cave/parkmgmt/planning.htm>)

**12: Integration into regional and national planning systems (including sea/landscape connectivity)**

*Protection Rating*:-Data Deficient

*Justification* :-Data deficient

**13: Legal framework**

*Protection Rating*:-Effective

*Justification* :-Carlsbad Caverns was designated as a national park in 1930. Two thirds of the area are also gazetted as wilderness. The Federal Government has full jurisdiction over all lands within the park boundary through the US Department of the Interior and National Park Service. A Land Protection Plan approved in 1984 is in place covering the private tract. The most recent Periodic Report notes some deficiencies in the implementation of the legal framework (PR, 2013).

**14: Relationships with local people (including stakeholder relationships, participatory management, rights, and access to benefits and equity)**

*Protection Rating*:-Effective

*Justification* :-Overall, relationship with local people is good, but closer partnerships with all local stakeholders would benefit protection and management of the site (R2, R3). Local communities provide some input, but do not have direct role in the management of the site (PR, 2013).

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

*Rating* :-Some Concern

*Justification* :-Oil and gas extraction on or near park boundaries is of particular concern and the site has limited capacity to deal with this threat.

**Best Practice Examples**

*Justification* :-no Jstification available

# Additional Information

## Key Conservation Issues

### 1: Preservation of biodiversity

*Scale* :-Local

*Description* :-Biodiversity values of the site are being impacted by invasive species and there is a need to develop an understanding of what occurs in the park and monitoring to protect these resources

### 2: Oil and gas development

*Scale* :-Local

*Description* :-Oil and gas development threatens park resources with use of water, nearby habitat fragmentation, pollution issues, potential gas escape into area caves, and elimination of dark skies

### 3: Degradation of area water resources

*Scale* :-Local

*Description* :-Water mining in recent times can result in lowered water table, this impacts water levels in area caves and surface water such as at Rattlesnake Springs which contains a very high number of threatened/endangered species.

### 4: Healthy bat populations

*Scale* :-Local

*Description* :-Bats are threatened by climate change, pesticide contamination from wintering areas, threat of white nose syndrome.

### 5: Control of exotic species

*Scale* :-Local

*Description* :-This park has a long list of exotic species, plant and animal, that threaten the biological stability of the park.

## Benefits

### 1: Nature conservation values

*Community within site* :-Minor

*Community outside site* :-Minor

*Wider Community* :-Minor

*Summary* :-By highlighting values at the park other than only caves, this helps to stress their importance and need for study and understanding

# Projects

Active Conservation Projects			
N.O	Organization/individuals	Brief description of Active Projects	Contact Details
1	Population dynamics and ecology of Ocotillo	Jim Cornett	
2	10 year study of moth species found in park	Dr Eric Metzler	
3	Ongoing 35 year study of birds in the park, especially banding Cave Swallows	Steve West	
4	Study of cave microbes	Dr. Diana Northup	
5	Oligotrophy in caves	Hazel Barton	



## Active Conservation Projects

Brief description of Active Projects			
N.O	Organization/individuals	Brief description of Active Projects	Contact Details
1	N.A.	Potential impacts of gas flow from area gas wells, gas pipelines, etc.	
2	N.A.	Biodiversity studies in park to evaluate number of species and distribution	
3	N.A.	Impacts of exotic species on park biodiversity	

## References

Rn0	References
1	Periodic Report (PR), 2013.
2	West, S. 1995. Cave Swallow ( <i>Hirundo fulva</i> ). In <i>The Birds of North America</i> , No. 141. (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, and The American Ornithologists' Union. Washington, D. C.
3	Metzler, E. H., E. C. Knudson, R. W. Poole, J. D. Lafontaine, and M G. Pogue. 2013. A review of the genus <i>Ogdoconta</i> Butler (Lepidoptera, Noctuidae, Condicinae, Condicini) from North America north of Mexico with descriptions of three new species. <i>ZooKeys</i> . 264: 165-191.
4	Metzler, E. H., and E. C. Knudson. 2011. A new species of <i>Elasmia</i> Moschler from New Mexico and Texas, and a new subspecies of <i>Elasmia</i> Mandela (Druce) from Texas and Oklahoma (Lepidoptera, Nothodontidae, Nystaleinae), <i>ZooKeys</i> . 149: 51-67.
5	Levine, D. and Pyne, N. 2010. <i>The Best of America Under Threat from Underfunding</i> . Environment America Research and Policy Center. Washington, D.C.
6	Geluso. 2004. <i>Mammals of Carlsbad Caverns National Park, New Mexico</i> . Bulletin of the University of Nebraska State Museum, Number 17. Lincoln, Nebraska
7	Degenhardt, W. G., C. W. Painter, and A. H. Price. 1996. <i>Amphibians and Reptiles of New Mexico</i> . University of New Mexico Press. Albuquerque, NM Geluso, K. N., and K.
8	Discussions with people who use park (i.e., researchers, hikers, members of area conservation groups, etc.)
9	Discussions with park staff
10	Bailey, V. 1928. <i>Animal life of the Carlsbad Cavern</i> . Monograph of the American Society of Mammalogists. 3: 1-195