

# **A Comprehensive Cave Management Program at Carlsbad Caverns National Park**

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## **Abstract**

Carlsbad Caverns National Park in southern New Mexico contains some of the world's most spectacular, yet fragile, cave resources. The cave management program that has evolved at the park strives to balance protection, preservation, and conservation of these non-renewable resources with access at varying levels for recreational and educational values, and scientific research and management needs. The tour routes in Carlsbad Cavern with a yearly average of 500,000 visitors and the management of Lechuguilla Cave with its current length of over 110 miles (177 kilometers) are examples of the different management challenges faced by the park. This paper will present a look at the current programs that help achieve the balance mentioned above.

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Carlsbad Caverns National Park is located in Eddy County, New Mexico, and contains 46,753 acres of rugged canyons and ridges. The park is found within the Guadalupe Mountains, an uplifted portion of the Permian-aged Capitan Reef Complex and lies within the northern Chihuahuan Desert. Comprising back-reef, reef, and fore-reef deposits of primarily limestone and dolomite, the Guadalupe Mountains are world-famous for its spectacular and very fragile cave resources. Within Carlsbad Caverns National Park there are 106 documented caves, of which Carlsbad Cavern, at 30.9 miles in length, and Lechuguilla Cave, at over 110 miles in length, are, by far, the longest and deepest. The cave management program that has evolved at the park strives to balance protection, preservation, and conservation of these non-renewable resources with access to these resources at varying levels for recreational and educational values and for scientific research and management needs. This paper will delve into current management strategies as well as discuss some of the challenges we face today and into the future.

### **A Quick Look at the Past**

Cave management is not a new idea. In fact it has been around ever since we started going into caves. The difference today is that we recognize the impact humans can have on

these fragile resources and work to minimize our impacts for the long-term protection of the caves. Almost any cave manager will be quick to tell you that we don't manage caves, they do fine by themselves. We manage people. It is how we manage people who go into caves that make all the difference. At Carlsbad Caverns National Park, cave management actually started the day that Jim White "discovered" and entered Carlsbad Cavern. Early "management" focused on the commercial aspects of the caves of the area, first by mining bat guano and then later by encouraging people to see the great wonders found deeper in the cave. While not deliberately wanting to destroy the cave and its features, the early entrepreneurs did things that we would not even conceive of today. A prime example was the sinking of two shafts directly into the top of the bat roost. This enhanced the efficiency of the guano mining operation, but in the process made the bat roost unsuitable for bats to live in. Fortunately, with the change in their roost area, the bats did not totally abandon the cave, but they could have. The shafts have since been sealed and the bats have returned to their original roosting area.

### **Management Today**

One way to look at management of the park is that we (the National Park Service) have to



take care of our customers. In this case though, some of our customers are not what the average person would think of. Some of the customers are people, whether they are visiting the park to enjoy the underground wonders, whether they are working or volunteering their time at the park, or whether they are scientists helping park management learn more about these amazing places. But the customers that are often overlooked are the resources themselves. The sky, the rocks, the plants, the animals, and the empty spaces in the rocks we call caves are all customers that depend on us for their survival. The resources are every bit as important as the people. They have to be.

Today's management must look to the past to see where we have come from and what we have done to get to where we are today. We must learn from the past and head to a future that insures the conservation and preservation of these resources while somehow allowing access to our other customers, the people. This is no easy task especially with the knowledge that cave resources in the Guadalupe Mountains tend to be very fragile and non-renewable. Once they are changed, they are changed forever. By not taking care of our customers, the resources, we will lose our other customers, the people.

In an effort to balance this seemingly impossible task (access versus conservation), a broad spectrum of cave experiences is available at the

park while still protecting caves and cave areas. A listing of these experiences is as follows.

### **Tours Along Paved, Lit Trails in Carlsbad Cavern**

Begun in the early 1970s, the self-guided tours in Carlsbad Cavern cover about two miles of paved, lit trails that the visitor, employee, or researcher can walk along at their leisure during the hours that the main trail is open for touring in both summer and winter. The areas covered by the self-guided tour are the Main Corridor and the Big Room.

Guided tours are offered in Carlsbad Cavern along a three-quarter-mile section of paved, lit trail into the Kings Palace area also known as the Scenic Rooms. Once part of the self-guided tour, increasing vandalism made the park return this area to a guided tour in 1995.

### **Off-Trail Guided Tours in Carlsbad Cavern**

Guided tours are offered into three "off-trail" areas in Carlsbad Cavern. The trails along these routes have few improvements to them and no electrical lights. A few improvements, such as providing flagged trails to help protect floor features, have been added for safety or resource protection reasons. These tours are designed to give visitors a range of experiences in off-trail areas.

In Carlsbad Cavern, the Left-Hand Tunnel Tour is through large, easy walking passages with candle or oil lanterns used for lighting. The Lower Cave Tour descends a series of stainless steel ladders to mostly large, easy walking passages also. Helmets and lights are provided to those on this tour. The Hall of the White Giant Tour offers visitors a more rugged caving trip and includes crawling and climbing as part of the experience. Helmets and lights are also provided for this tour.

### **Guided Tours in Three Other Park Caves**

Guided tours are also offered to three other park caves that provide a range of experiences for the visitor. The tour routes through these caves are similar to the “off-trail tours” in Carlsbad Cavern in that they have had few improvements and have no electric lights. The Slaughter Canyon Cave Tour is through large walking passages where everyone brings a flashlight to light his way. The Spider Cave Tour also includes areas of crawling and climbing. The park provides helmets and lights for those on this tour. Those taking the Ogle Cave Tour must be able to safely descend and ascend a 180-foot-deep entrance pit to reach the cave tour route which is a large, well-decorated walking passage. Because of the vertical entrance drop, this tour is only available to experienced cavers who have their own gear and have experience using it.

### **Caving On Your Own**

Eight caves on the park are available for cavers with proper equipment to visit on their own. These caves range from an easy walking cave with a large passage (Goat Cave) to a cave with a 300-foot-deep entrance drop (Deep Cave). These caves have few improvements that include flagged trails to help protect floor features and no electrical lights. Those visiting these caves must provide their own lights and equipment.

### **Research and Management-Related Trips**

All park caves, including Lechuguilla Cave, and all areas of Carlsbad Cavern, Spider Cave, and Slaughter Canyon Cave, including those areas not along the visitor tours routes, are available for approved research and management-related trips.

Research is essential for knowing what resources the park contains and understanding how to manage them in a way that will protect

and perpetuate the resources themselves and the processes that allow them to exist. Management related trips are important because they allow us to document passages and features, help keep assigned staff informed of resource conditions (an example would be assessing an area for the need to restore it to more natural conditions), and to provide infrastructure maintenance (an example would be monitoring or replacing ropes). This includes employee orientation trips along visitor tour routes and occasionally to some areas beyond the tour routes in Carlsbad Cavern, Slaughter Canyon Cave, and Spider Cave.

Much of the work to document passages and features cannot be done by park staff alone. Hundreds of experienced cavers have worked with our Cave Resources Office to volunteer thousands of hours to help the park explore, survey, and inventory numerous areas and caves. Included in these volunteer efforts have been restoration and conservation projects, particularly in Carlsbad Cavern where significant portions of the cave were impacted from early exploration and visitation trips and from building and maintaining an infrastructure in the cave.

### **Education and Special Use**

Mentioned last, but certainly not least, is education and special use. Education is essential for the long-term protection and survival of caves and their features. Education must reach everyone from the park managers and staff, the researchers and cavers, to the visiting public. Without education on all levels, the caves of the park stand to lose the essential ingredients that make them special, that give joy, astonishment, and beauty to the millions that have come to see them. The park has a good education program, including a developed curriculum for all school grades.

Special Use is a term the park uses for permitting uses on the surface or in caves that are not covered by other general guidelines. Commercial filming tends to be the one activity that is most often covered by Special Use provisions. Numerous films, mostly for television, have featured caves of the park and have been an excellent way to help educate the public about park caves and their fragile features. We work closely with film crews to help them get the film footage they need while assuring that the resources are not further impacted during the film shooting. Additionally, we encourage filmmakers to promote safety and to include preservation and conservation messages in their films.

## Impacts Versus Conservation and Protection

The fact that caves of the park and the features they contain are very fragile has been well documented. It has also been well documented that the more people that travel into a cave passage, the more that passage will be impacted. The impacts can be very visual such as crushed minerals covering the floor where once popcorn and other crystals grew intact. The impacts can also be more elusive and harder to detect. Virtually undetectable impacts to microbial ecosystems are made just from the amount of organic carbon breathed into a cave passage or room that has been entered for the first time. To go there, changes it. The more people who go there, the more it changes.

The cave management program at Carlsbad Caverns National Park tries to balance this dual-purpose mandate by providing access to vari-

ous caves and locations for various reasons. Some caves and areas are impacted more because of the large numbers of people allowed there while some caves and areas are impacted less so because of the fewer numbers of people allowed there and some caves or areas are impacted very little because of the even smaller numbers of people allowed there. By managing in this way, some caves and areas can evolve over time following natural processes with few disruptions while some caves and areas evolve over time with more disruptions effecting their evolution and some caves and areas receive many more disruptions and evolve over time with less ability for their natural processes to influence their evolution.

Is this a perfect system? Only time will tell. At the very least, this system does reflect the need to provide access to fragile, non-renewable resources while conserving them for future generations.

## Management Challenges and the Future

The ultimate challenge that management faces now and into the future is how to protect and conserve fragile, non-renewable resources while allowing access. Perhaps the more critical challenge is how to preserve these resources for far distances into the future. Providing access is relatively easy. Keeping too many people from visiting everywhere is the challenge. Every individual must know and understand that if they go there, they will impact it. If enough individuals go there over the next 20 years, the next 100 years, and even the next 10,000 years, they will have changed it and the natural processes that sustain the area forever.

As more and more people populate this earth, more and more people will want more and more access to more and more places. It is certainly not just a challenge we face with these cave resources. It is a challenge the entire world faces with what is left of its natural features.

### Carlsbad Cavern

Management of Carlsbad Cavern began before anyone knew what the cave really was and how fragile the cave really is. In many ways, Carlsbad Cavern was changed forever before any of us were born. The challenges that management faces over Carlsbad Cavern now are worth noting and worth fighting for. The first challenge is to understand the cave and our relationship to it. The second challenge is to identify past actions that were mistakes and to correct them. The third challenge is to look to

the future, the near and far future, and to initiate actions that will keep the cave out of harm's way as much as possible.

We are well on our way to understanding Carlsbad Cavern, the processes that created it, and our relationship to those processes and features. While much remains to be done in this regard, the park has taken major steps forward by not allowing any new structures to be built above the cave and by completing the Carlsbad Cavern Resource Protection Plan. This plan identifies the more serious problems associated with the infrastructure built on top of the cave and commits the National Park Service to removing, replacing, or providing mitigative measures concerning these structures for the cave's long-term protection.

The Carlsbad Cavern Resource Protection Plan has, in essence, identified some of the past mistakes that have been made and commits the National Park Service to correcting these actions. There will always be a need to continually look at everything we do in and above the cave and to make decisions and, ultimately, changes based on the long-term needs and protection of the cave. This is not to say that we should stop people from getting to see the cave in order to protect it. Rather, it means that in the long-term, the cave must survive as intact as possible. In order for this to happen, the cave, itself, must be given considerable weight in any decisions or actions that affect it.

While government agencies are only funded from year to year and the park's General Man-

agement Plan is a 15-year document, a challenge for management will be to look beyond these years to the far future and make rational decisions and actions that will allow the Carlsbad Cavern that we know today to be there for many generations to marvel at. One of the obvious challenges is to protect the cave from our own infrastructure and our own perceived need for conveniently placed buildings. The more numbers of buildings and infrastructure that are used and maintained directly above the cave for a longer period of time, the greater the potential will be for a catastrophe event to occur. The cave will remain somewhat at risk from possible catastrophe events and also from possible long-term chronic problems as long as much of the infrastructure remains over the cave. With the present infrastructure over the cave dating from the 1920's and 30's, we have had 70 to 80 years of relatively good luck. Hopefully, this will continue while much of the infrastructure remains.

### **Lechuguilla Cave**

Access to Lechuguilla Cave is through an approved research permit process that includes the physical exploration, survey, and inventory of the passages and rooms; applied and direct research; and for needed management related trips, such as replacing aging ropes in the cave. There are no recreational opportunities for entering the cave. Management at Lechuguilla Cave has evolved over the years since the breakthrough discovery that led to the main portion of the cave in 1986. In the last couple of years, the Cave Resources Office has taken a much more active role in directing exploration, survey, and inventory of the passages and rooms and in the development of maps for all areas of the cave. Experienced caver volunteers are the backbone of the program and are involved with fixing past survey problems as well as the exploration and survey of new passages. Survey and inventory teams work closely with cartographers to thoroughly check and document all areas in the cave. Survey errors have been significantly reduced and a high quality of documentation is obtained from all survey teams entering the cave. Additionally, an active educational program for those working in the cave has significantly reduced unwarranted impacts.

The present program for Lechuguilla Cave works well by balancing park needs and goals with the recognition and preservation of the fragile and pristine nature of the cave. The challenge now and into the future is how to allow limited access to the cave for the above-mentioned reasons or others that management in the future may deem important while still preserving its pristine nature. As in the other aspects of the cave management program, the present program means that some areas will be impacted more than others by human visitation.

Lechuguilla Cave belongs to the world and it has been and will continue to be a challenge to include foreign cavers and scientists in the limited numbers of people who are allowed to work in the cave. Scientists and cavers from many countries have been able to work in the cave and it is hoped that this can continue.

### **Summary**

Carlsbad Caverns National Park contains spectacular, world-class caves and associated features. There are numerous challenges that face the park in meeting its goals and mandate of conserving resources while allowing access. The present cave management program provides a broad range of experiences and opportunities for visitors, employees (including volunteers), and scientists and still allows some caves and cave areas to exist without much human contact or manipulation. By learning from the past and looking to the future, decisions and actions made today can and will influence how well caves and cave areas of the park survive for future generations.

### **About the Author**

Dale L. Pate began his caving career in 1970 as a student at Southwest Texas State University and became the Cave Specialist for Carlsbad Caverns National Park beginning in July 1991. He has continued in that position through the present. Duties for the position include direct involvement with park management concerning Carlsbad Cavern and supervision of all entry into Lechuguilla Cave. The direction of his paper is a summation of the cave management program that has evolved at the park.