



CANYONS & CAVES

A Newsletter from the Resources Stewardship & Science Division

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The canary in the delicate Canary Room off the Guadalupe Room. (NPS Photo by Tom Bemis)

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All issues can be downloaded as a PDF file from the park website
<http://www.nps.gov/cave/planyourvisit/brochures.htm>
Address: 3225 National Parks Highway, Carlsbad, New Mexico 88220

RESOURCE NEWS

WELCOME to Jake Martin, new biologist in the Biology Branch. Jake comes to us from the U.S. Fish and Wildlife Service in Ventura, California, where he has been working primarily on endangered species consultations, listings, habitat conservation planning, and recovery implementation. He has worked in the field with a variety of species, including amphibians, black bears, shorebirds, and cutthroat trout, primarily in central coastal California, the Sierra Nevada mountains, and the Great Basin. Three seasons at Sequoia and Kings Canyon were early career highlights and he is happy about returning to the National Park Service. He looks

forward to exploring CAVE and getting to know his new co-workers.

WELCOME to Shelly J. Tucker, the new Lead Biology Technician for the Revegetation Project. She replaces Meredith Gosejohan, who left us for California. Meredith did an excellent job laying the ground work for the next Biology Technician. Shelly will have a large set of shoes to fill. Before coming to the CAVE, Shelly worked as an Environmental Consultant in the petroleum industry in southeast New Mexico and West Texas. She handled construction activities, reclamations/restorations, and remediations of areas that had been impacted by oil exploration, production, or contamination caused by spills, leaks, blowouts, etc. Shelly originally comes to us from the Hobbs, New Mexico area, but has lived in Carlsbad now 8 years. She loves the outdoors, horses, and caves. Her husband, native to Carlsbad and grandson of Tom Tucker, was recently hired by the BLM in Roswell, New Mexico as a Petroleum Engineering Technician. They have three boys who keep them hopping; Brady age 7, Garret age 6, and Chance age 4. Shelly hopes to get a permanent position with the NPS or the BLM.

WELCOME to Jake Hemingway, Brigid Shaw, & Elle Harmon, a seasonal archeological technician and two archeological interns brought on this summer to document park archeological sites and help out with the park's museum program. Expect a report on their findings in the next issue of Canyons & Caves.

LECHUGUILLA CAVE – Currently 126.83 miles (204.1 kilometers) long and 1,604.2 feet (489.0 meters) deep.

CARLSBAD CAVERN RESURVEY – Currently 28.28 miles (45.5 kilometers) and 1,031 feet (314.2 meters) deep.

2009 INTERNATIONAL CONGRESS OF SPELEOLOGY – The 15th International Congress of Speleology (ICS) was held in Kerrville, Texas July 19 – 26. Held every 4 years somewhere in the world, this event was a great success with over 1,600 cave and karst scientists and enthusiasts from at least 49 countries in attendance. As an agency that manages over 4,000 caves including 4 of the 5 longest caves in the world and significant portions of karst regions throughout the United States, the National Park Service was a major sponsor for this event. Several cave parks including Mammoth Cave, Carlsbad Caverns, Wind Cave and Sequoia/Kings Canyon provided free access for ICS participants to general cave tours and also hosted pre- and post-Congress field trips. The NPS maintained a booth where the national cave and karst program was highlighted as well as were individual cave parks. Various NPS employees were also active at the ICS by presenting talks on cave geology, cave management, and other related topics as well as chairing several of the sessions.



Kurt Helf from Mammoth Cave NP mans the NPS booth at the ICS. (Photo © Gosia Allison-Kosior)

BATS AND WIND ENERGY

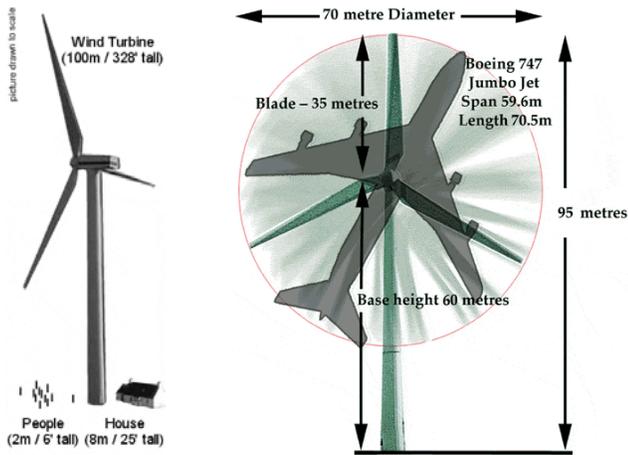
Renée West

Years ago when wind energy ‘farms’ started growing into big operations and turning up all around the world, the dangers to birds became apparent early on. Birds were being killed in substantial numbers. Researchers were able to pinpoint why and how birds were being killed, and the industry has largely mitigated many of the problems (although not completely) by changing tower design and placement.

But no one had an idea that bats were in any danger. That is, until one day in August of 2003. That day, hundreds of dead bats were found at a wind farm in Mountaineer, WV. It is now estimated that 2,000 to 4,000 bats per year are dying at wind farms in North America, and the wind industry is just starting to gear up. Of bat vs. bird deaths now in the continent, more than three quarters are bats (85% if you don’t count California; 89% in Canada).

So bat researchers got together with the wind industry around North America and started working to find out what causes bat deaths. The Bats and Wind Energy Cooperative (BWEC) was formed in 2003 by Bat Conservation International (BCI), the U.S. Fish and Wildlife Service, the American Wind Energy Association (AWEA), and the National Renewable Energy Laboratory of the U.S. Department of Energy (NREL).

“As concerns about climate change and increasing costs and long-term environmental impacts from the use of fossil fuels have heightened, wind has become an increasingly important sector of the energy industry,” according to the BWEC website, <http://www.batsandwind.org/>. “Wind-generated electricity is renewable and generally considered environmentally clean. However, the direct and indirect local impacts of wind facilities on wildlife continue to be an issue and widespread instances of fatality of birds and bats have been reported.



(Drawings courtesy of: <http://www.aweo.org>)

“Unexpectedly high numbers of bat fatalities reported at wind energy sites, especially those on ridge tops in the eastern United States, have heightened the urgency to understand problems and find solutions.”

As wind energy goes into exponential growth, the environmental concerns are also growing. For the National Park Service, potential impacts are numerous and as varied as the parks and their environments. For many parks there are major concerns about impacts to their viewsheds as huge farms of wind turbines are planned along their boundaries or within easy viewing distance of their scenic overlooks. For others, concerns center on habitat destruction and wildlife deaths. These are more difficult, because when wildlife travels into and out of a park, we don't always know what happens to them. And we can't protect them.



Human beings are dwarfed by the huge wind towers and turbines now in use by the wind energy industry at huge 'farms.' And future towers will be even taller. (Photo courtesy of: <http://www.aweo.org>)

In light of these concerns and the rapid growth of this industry, national parks and regional offices have started educating themselves and sharing information. A wealth of information has been (and continues to be) collected at a website put together by the NPS Southern Plains Inventory

and Monitoring Network, which includes parts of eastern New Mexico. The website -- <http://imnetsharepoint/SOPN/wind/default.aspx> -- is accessible through government computers and contains numerous links to other sites on the topic.

The Western Bat Working Group hosted a symposium on Bats and Wind Energy in April, and the information in this article came mostly from those presentations.

There is little regulatory protection for bats in this country (unlike Europe). Only a few species are listed as threatened or endangered, and the species that are being killed by wind turbines now have no legal protection. They are mostly prime breeding-age adults, which leads to what's called additive mortality – not only their deaths but those of all the offspring they would have had but can't. The cumulative impacts are mounting.

So far, not many studies have been done on the problem, and those are of short duration. The studies are fraught with difficulties (dead bats are scattered, hard to see, often eaten by scavengers, etc.). Patterns found so far are that:

--Most species being killed in the East are migratory bats, especially hoary bats, red bats, and silver-haired bats. Concerns are that with heavy wind energy development coming to Texas and New Mexico, the Brazilian (Mexican) free-tailed bats may be in trouble too;

--Most fatalities are occurring in mid-summer and late fall (July-September is fall migration from north to south across the continent). Spring migration flight is usually at a higher altitude, which may explain differences in reported mortalities (fall) – but the turbines are now being built higher too;

--Fatalities are not concentrated at individual turbines, but are spread out across facilities, making them harder to mitigate;

--Most fatalities are observed on nights with low wind, less than 6 mph. Tests reveal that a 60% reduction in fatalities results when they turn off the turbines at low wind speeds. This is a possible mitigation that would cost the industry very little and gives hope for reducing deaths;

--Some bats are being killed, not by collisions with the equipment, but by a newly discovered condition called 'barotrauma' in which flying through the extremely low pressure created by the vortex of the turbine's rotor tip causes hemorrhaging in bats' lungs.

Wind farms and the individual turbines are huge – gigantic – at a scale that's difficult to imagine without direct experience (see photos). The farms are huge installations with roads, caliche pads, buildings, lines, and substations, as well as cranes and tracked vehicles for installation. One speaker described the turbine blades as, “three times the size of a semi truck and moving at twice the speed.” Not only are they moving rapidly, but the blades bounce around while turning, creating atmosphere disturbances like wind shear and turbulence from the complex wake or vortices of air flow.

The challenges surrounding wind energy and bats are numerous, with new issues constantly turning up, such as development of offshore wind farms. About 80 percent of the world's people live on coasts, and offshore wind energy is a growing field. Bats do migrate over oceans, but very little is known about these migrations.

For now, some people's efforts are focused on understanding the issues and mechanics and finding a place in the process to comment and make improvements. Some are working for more regulation of wind energy at various governmental levels. In New Mexico, the legislature has passed a joint memorial for a task force to study need for improved regulation of commercial wind facilities (SJM45).

Research is focusing on three main areas: pre-construction monitoring to assess bat activity levels and use at proposed wind turbine sites; post-construction searches to determine estimates of fatality, compare fatality estimates among facilities, and determine patterns of fatality in relation to weather and habitat variables; and finding operational mitigation and deterrents to reduce bat fatalities. Researchers are worried that between the white-nose syndrome killing hibernating bats and the wind facilities killing migratory bats, bats in North America could be in serious trouble.

TOM "BOOMER" BEMIS RETIRES AFTER 30 YEARS AT CAVE

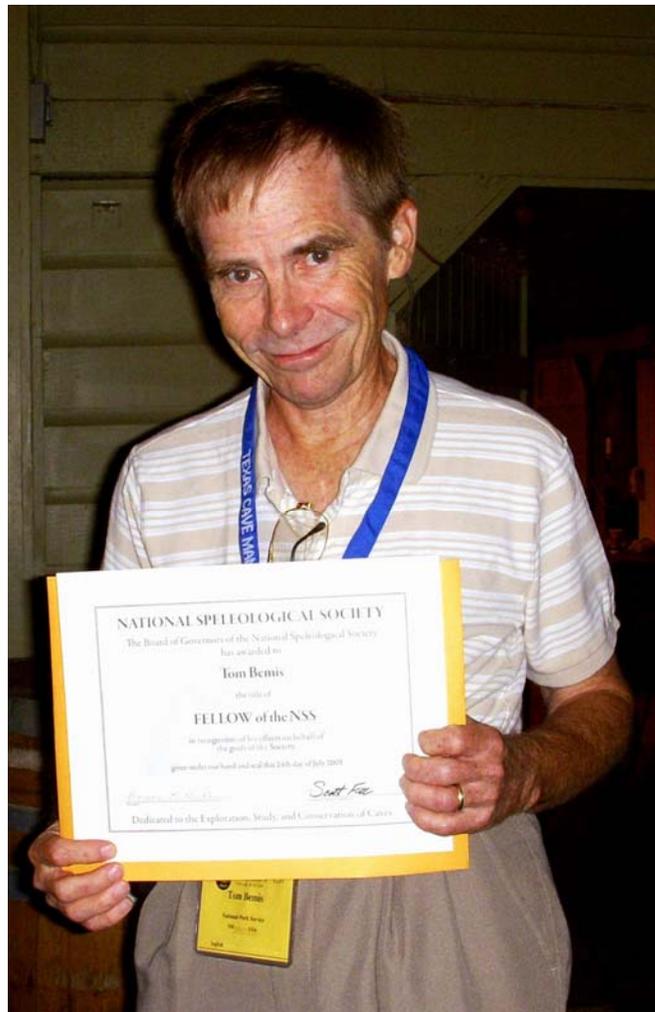
Paula Bauer

August 3, 2009, is Tom "Boomer" Bemis' last day working for the NPS at Carlsbad Caverns National Park. Boomer started in July 1979 working in Interpretation; then moved to Facility Management, and finally Resource Stewardship and Science as a Cave Resource Technician. Boomer has had a hand in many projects over the years, from maintaining the radio systems to replacing and testing various cave lights to participating in the annual winter bird counts. During his time at the park, Boomer has some had hair-raising experiences, such as witnessing park employees, visitors, and the underground lunchroom taken hostage by gunmen, and when he and a fellow employee did "white water rafting" down Walnut Canyon in a flood.

Still, Bemis is perhaps best known in the park and the state as a Search and Rescue Coordinator.

Boomer is a native of Carlsbad, New Mexico and has long been involved with vertical caving, which requires ready skills with rope rigging and climbing. Eventually, he began sharing his skills and knowledge by teaching others how to safely be on rope and became involved in search and rescue after "saving" a friend whose hair got caught in his rappel device. Boomer has taught scores of people everything about ropes from basic knots to methods of rigging multiple pulley systems for high-angle rescues. Without a day of rest, Boomer will start his new job as an adjunct instructor of search and rescue at the Permian Basin Regional Training Center in Carlsbad. Although he will be missed on a day to day basis, he assures us that he'll be back in the park to help with ongoing

cave restoration projects and sharing his expertise on cave lighting as the park plans to upgrade all the electrical in Carlsbad Cavern in the coming years.



Tom Bemis became a "Fellow of the National Speleological Society" in July 2009. This is a special designation for a limited number of NSS members who exemplify, over many years, their dedication to promoting caves and advancing cave research and protection. (NPS Photo by Paula Bauer)

Eds. note - Written in June 1967, the following article is on the discovery of the New Section and the Guadalupe Room beyond Matlock's Pinch. There has been no effort to correct punctuation or other grammatical errors.

A NEW MIRACLE MILE AT CARLSBAD CAVERNS *John Barnett, Park Naturalist*

To say that Carlsbad Caverns is completely explored is a fallacy. Each time a new passage or room is discovered we realize that there are many fractures and small openings within the caverns that may possibly be pushed into now unknown chambers. It is somewhat like education – the more we learn the more we realize there is yet to be learned.

In the Spring of 1966 this feeling was dramatically brought home by the discovery of what has become known as the Guadalupe room complex. Over a mile of new passage has been mapped thus far and a multitude of openings off of the mapped area have yet to be extensively examined. New and spectacular wonders are seen in several places in these newly discovered areas.

The story of the new chambers has to begin with the story of one of the park guides, a Mr. Ben Billings. Ben is an amateur speleologist. (To the uninitiated, one who explores caves.) It was his interest in caves that originally encouraged him to apply for a job as a park guide at Carlsbad Caverns. Needless to say, after the proper requirements were met, Ben joined the National Park Service staff.

After that initiation, Ben, like the other guides, conducted several trips a day through what has to rank as a great natural wonder of the world. Apparently for Ben, this only whet his appetite. It is National Park Service policy to occasionally allow specially approved trips into the unopened portions of the caverns for orientation of the staff and for educational purposes. Trips by NPS personnel into the smaller openings and passages are sometimes approved by the administration for the purpose of more complete mapping of the cave. Forearmed with such an approval, and in the evenings with other guides, Billings started poking behind, under, around, and over rocks, into crevices, down pits, and into places where his rather small frame could barely squeeze through.

Finally, on May 22, 1966, Ben, in company with Gary Matlock and Lloyd Jacklin, all park guides, made his way along a ledge covered with rubble. The ledge seemingly disappeared into a solid wall high above a paved trail in the part of the caverns known as Devil's Den. From the natural entrance down the trail to the underground lunchroom is a drop of 750 feet in elevation. The ledge on which the men found themselves is about 400 feet below the surface. As the trio made their way over the rather precipitous footing they found the wall not to be solid, but broken by a small fracture. Their carbide headlamps and battery flashlights didn't penetrate very far into the narrow opening, but going there was their purpose. So crawling through narrow holes, edging their way over deep fissures, and lifting themselves up unique chimneys they pushed their way into the narrow passage.

The lighting in a passageway is always eerie. With only headlamps and flashlights the holes look deeper, the passageways narrower, and the chimneys higher than they might actually be. Add this to the rough surfaces covered by sharp cave formations that rip at your clothes and cut any exposed hands or knees that take an unplanned move and you have an eerie feeling.

Their slow and deliberate movement continued for several hundred feet and suddenly it appeared that this passageway ended in a very small hole dissolved in the very solid limestone. The walls were too close to let shoulders through and the ceiling covered by cave popcorn was too low. Lights didn't show anything very far ahead so it was time to go back

– except for Ben. He was always ready to give it a try. Even though he isn't very large, he had to take the small items out of his pockets, push his hard hat ahead as well as his flashlight, and even then it was doubtful if he could clear himself through the pinch. Lying on his back with his shoulders at an angle and using his heels to move he pushed into the blackness ahead with his face narrowly clearing below the cave popcorn. After moving several feet in this manner the hole enlarged and he managed to get to his knees. The passage resumed its former size – but still wasn't overly large. Matlock and Jacklin were waiting to hear what was ahead before trying the "pinch" themselves. They didn't have long to wait. Soon an eruption of excited shouts came through the tiny opening and they knew that Ben had found something more. So they too copied the same methods in going into the "pinch". About 100 feet beyond they found Billings standing in a low ceilinged room about 50 feet across. This is now known as the Sand Room. On the floor was a layer of thin, crusty sand, capping about a foot of silt that broke at the lightest touch when they stepped. They carefully made a single path across the area until they got clear of the crust-like cover.

Excitement was high. This new room was the first discovered at Carlsbad Caverns in 5 years. If nothing else was seen the three men had gained a major accomplishment.

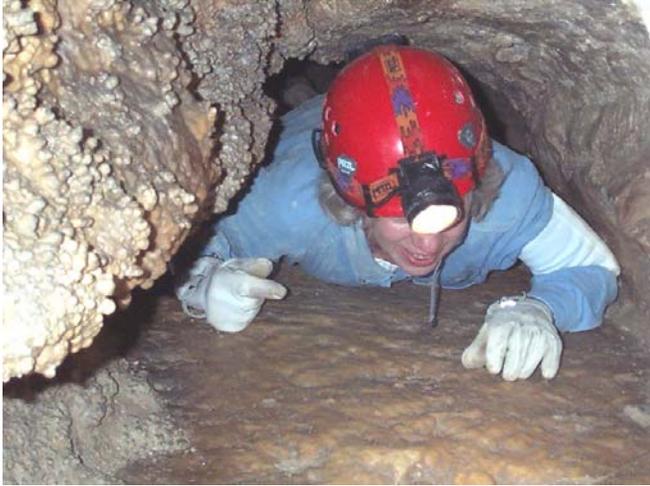
Across the Sand Room the fracture is larger than before. Walker was easier although irregular floors, ceiling, and walls made going treacherous and slow. It obviously continued farther. So the trio pushed on until they had covered some 1,000 feet from the original entry at Devil's Den. So far nothing of great scenic beauty had been noticed. Only the sandy crust and a few small stalactites added scenic delicacy to the new openings.

The men finally had to return to the main cave area and home. Their workday would start in just a few hours. But they knew they had a major discovery on their hands that had a possibility of continuing to who knows where. Back they went through the "pinch", and, if anything, it was more difficult clearing the tiny hole on the way out. Ben got part way through and his clothes got hung up on some popcorn. When he finally cleared to the other side he had skinned out of his pants that were still hanging inside of what has become known as "Matlock's Pinch". On they went through the narrow enclosing corridor to the main cave where paved trails and electric lights seemed like a Los Angeles freeway.

Back on the surface the men had a chance to reflect on their discovery and plan further exploration. Each day the men conducted the tours through the cave and on most nights put on their cave crawling clothes and returned to that unbelievably small opening into that new world that was now revealing its secrets.

On the next two trips into the new sand passages the explorers pushed quickly into the Sand Room and beyond. They soon found the first fracture that had pushed in a single direction was intersected by others where the passages turned at sharp angles or was joined by new opening. Each new spot was a mystery to be explored. First the men would pass over high

rock falls, or beside deep pits, or move into narrow slits in the walls or floors always looking for a passageway that “goes”.



Secretary of the Interior Gale Norton in Matlock's Pinch after a visit to the Hall of the White Giant in 2002. (NPS photo by Dale Pate)

Finally, after a sharp turn and again returning to a small solution opening, Billings, this time accompanied by James Cavin, came upon a large room almost 200 feet long. At either end is a low depression pit and in the center a large hill about 75 feet high made of and crusted in many places by flowstone and spotted with small white stalagmites. Capping it all at the crest of the hill was a very large and very active white stalagmite. The lack of scenic beauty in the new caverns had been remedied. The room now called Hall of the White Giant has walls covered in great part by flowstone resembling waterfalls and a ceiling spotted with dainty stalactites, but dominating it all from its lofty perch is the moist, active, massive stalagmite at the top of the large hill. Standing about 15 feet high and about 8 feet in diameter at the base, glistening in the low light of the spelunkers lamps this large formation rules over the scenery of the entire room and is truly a White Giant.

In the next few days, members of the National Speleological Society were advised of the new discovery and National Park Service officials asked them to help in a program of mapping the new passages. The NSS team, under Mr. Bob Willis, national vice president of the NSS, came from Dallas, Albuquerque, and other cities to help in this program.

Finally, on the weekends in June, 1966, groups of mappers accompanied Billings into his find and began the tedious job of mapping the new passages. As they progressed they also pushed the small openings and the area beyond the Hall of the White Giant. New holes opened and “went” – some a long way, others just a few feet. Most were just passages, but some were jagged and beautiful. One area contained some of the most delicate formations yet found in Carlsbad Caverns. Tiny aragonite helictites no larger than a piece of thread reaching to a height of several inches resembles “petrified grass”. It seems as though a gentle breath would collapse this delicate wonder. Other formations were massive and beautifully colored with a variety of hues not often seen in the main caverns.

On June 26, the mappers and Billings were pushing on into what were just more passages and pits already excited about the amount of new underground chambers they had seen. Many hours were consumed in running the surveys into the sand passages, making their notes, measuring distances, and checking various holes and pockets that might “go”. As they reached the apparent end of this hallway the men had decided to head back out – but there might just be time to look at a couple of more holes. Bob Willis entered one and Ben another. Soon Bob turned around – his didn't go, but Ben found his moved upward through a narrow slot. Laying face down he could make his way up the sandy slope. Now it leveled and he moved on in a standing crouch. Bob again heard some excited shouts. Following the sounds, Bob soon found himself standing with Billings at the lip of a sharp drop off into a large and unusual room. Though their lights couldn't penetrate it all they surely knew this was the largest room yet found in the new complex. Its dimensions are some 150 x 300 feet. It has a sloping ceiling and a boulder strewn floor spotted with an occasional white stalagmite giving contrast from decoration. The solitary darkness of the Guadalupe Room had been finally shattered by some of man's weak lights.

The opening into the new room is high toward the ceiling. To explore the room they had to pick a way down a sharp rock face onto the sloping boulder covered floor. Some mass of stalactites were visible ahead, but generally the first view is void of decoration. As they neared the low side of the room an area of ceiling took on the quality of sparkling diamonds. An area many feet square is covered by a fantastically thick concentration of soda straw stalactites, each carrying on its tip a drop of water that delightfully throws back some of the weak light of the lamps.

Soda straws are extremely thin stalactites not much larger in diameter than a drop of water. Over the countless years and countless drops of water, limestone is deposited from each drop on the tip of this narrow formation. Soda straws are hollow and each drop makes its way down through the central tube to place its minute load with the many that went before. Most of the soda straws are several feet long, but a few champion size ones extend well over 6 feet with a few going beyond 8 feet long. Below this unusual ceiling the falling drops of water keep the floor wet and cause several small pools to dot the area near the wall.

Farther into the room are almost orange stalactites resembling giant carrots as seen from a gopher's point of view. In the ceiling running almost the entire length of the room is a seam of rock that contains large and sparkling crystals of calcite. Still lower in the room are pits and alcoves where unusual and delicate formations hide away.

Today, the NSS mapping group works only at infrequent intervals. Still, however, they have recently located more holes and passages that “go”. No one is willing to say that all the major rooms of the Guadalupe Room complex have been discovered. To date, some 6,600 feet of passages have been put on the maps of the new caverns.

There hasn't been an over abundance of trips into the Guadalupe Room. National Park Service personnel have been

in occasionally to evaluate what is there. A few authorized trips have been made by small groups under the watchful eye of the NPS in order that the press and some official groups should know how difficult it is of access.

There is no plan to open the new cavern rooms to the public for several reasons. First, Carlsbad already had 3 miles of paved trails for the public and generally this is enough to satisfy anyone. Second, as a general rule the new passages do not approach the main caverns now opened for size and decoration. Third, extensive blasting would be required to clear a passable route into the new rooms and since much of the new chambers are in a sandy formation possibly much damage would be done to the cave itself. In its present condition not too many people are anxious to try the “pinch”.

Carlsbad Caverns have long been known as one of the more unusually and spectacular sights on earth. Still, as stated at the beginning, it is not completely explored and with each new chamber the wonders seem to multiply.

REVEGETATION RESIDENTS: LOOK WHO'S MOVING IN

Visitor Center and Sewer Line Restoration

Steve Ross (with Renee West)

All photos are NPS Photos by Steve Ross

One of the main goals of CAVE revegetation efforts is to return disturbed areas to their natural condition. We know that this is not entirely possible due to the complexity of natural plant communities and the great lengths of time that have passed during their evolution. While it is humbling to acknowledge this, it is also very empowering to witness the positive effects of even our smallest efforts and the resilience of nature that is at the heart of any revegetation success we realize.

So much for the revegetation perspective. What about the perspectives of our constituents? Are we transforming our disturbed areas into natural spaces that are hospitable to flora and fauna from adjacent intact natural areas? If early visitation is any indication of long-term residency, we can answer in the affirmative. Here are just a few of the many visitors we've documented recently:



We've also noticed the successful germination, growth and flowering of numerous native forbs and grasses facilitated by the ongoing restoration. This is a very welcome augmentation to the intentional plantings and is a further reminder of the capacity of native plants to re-colonize disturbed areas. We are particularly fortunate here at CAVE in that our natural plant communities are intact. From a revegetation perspective, we can literally rejoice in being surrounded by a natural seed source. In other words, these plants are somewhat self-seeding here at CAVE. This allows us to focus our efforts on the more acute needs of revegetation, plant salvage, exotic species control and monitoring in our few disturbed areas. Here's a sampling of floral residents that have recently arrived in our project areas:



Certainly there are many less conspicuous new residents who go entirely unnoticed (the “quiet, keep-to-themselves” types). Moths, bees, nocturnal mammals and reptiles come quickly to mind. We can feel free to let our imaginations wander far beyond that which we can readily see and gain a sense of

wonder and appreciation for the beauty and resilience of our Chihuahuan Desert surroundings!

TEEN LABOR AND LEARNING: YCC AT CARLSBAD CAVERNS NATIONAL PARK

Paula Bauer, CAVE YCC Program Coordinator



August 5 and 6, the crew worked with Steve Ross and Shelley Tucker on the plantings in front of the Visitor Center. They scarred the open ground, removed exotics, sprinkled grass seed, and laid mulch.

Not your usual summer job! Eight local teenagers, ages 15 to 18, participated in the park’s Youth Conservation Corps program this year. Work leader Dave Benton motivated the crew and kept them on track on their various projects. In the park, they cleaned the irrigation ditches at Rattlesnake Springs, trimmed vegetation along the Scenic Loop Road and the Archeology Site Pull Out, cleared fallen rocks from the edges of Walnut Canyon Drive, loaded onto a trailer pieces of fencing from the horse corral in Walnut Canyon, helped with the set up for Bat Flight Breakfast, and seeded and mulched part of the re-vegetation area in front of the Visitor Center. In addition to working in the park, the crew also worked with the Bureau of Land Management at Cottonwood Day Use area, US Forest Service on White Oaks trail, Brantley Lake State Park on salt cedar removal, Living Desert State Park on pulling weeds in and around various animal exhibits, and the City of Carlsbad Parks Department.



Paula Bauer, YCC Program Coordinator and crew leader, Dave Benton with YCC crew 2009: Gena Quintela, Omar Jurado, Josh Chavez, Ryan Gallegos, Michael Munoz, Joe Dowhower, and Ruby Ovalle; CJ Romero was not present for this photo.

The YCC program is a specially funded program aimed at employing young people, teaching them about team work, and involving them in land management. The nationwide program has existed since 1974 and crews have worked at CAVE in the past. Crew members earn minimum wage and are expected to work forty hours per week for eight weeks. Although others were close, only Ruby Ovalle had 100% attendance this summer. When comparing the number of projects and tasks completed and the amount the kids learned and earned, it's hard to say who benefitted more from this summer job – us or them!