



CANYONS & CAVES

A Newsletter from the Resources Stewardship & Science Division

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Elizabeth and Dr. Willis T. Lee in the King's Palace during the 1924 National Geographic Expedition to Carlsbad Cavern. See Bob Hoff's article on Elizabeth Lee starting on page 3. (NPS Photo from the Dana Lee Collection)

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Look for Issues of *Canyons & Caves* at the following websites:
<http://www.nps.gov/cave/pub-pdf.htm> Thanks to Kelly Thomas and Bridget Eisfeldt all issues can be downloaded as a PDF file from the park website.
<http://www.caver.net/> Once there, go to the Canyons & Caves icon. Bill Bentley has placed all issues on his personal website and can also be downloaded as PDF files.
Address: 3225 National Parks Highway, Carlsbad, New Mexico 88220

RESOURCE NEWS

THANKS AND GOODBYE – Congratulations to Superintendent Mary Gibson Scott. She has been selected to be the new Superintendent at Grand Teton National Park beginning in early May. We have appreciated the Superintendent's ability to make a number of critical projects take major steps forward while still protecting park resources. We will miss her energy and drive and know that Grand Teton National Park will be in good hands.

NEW DEPTH FOR LECHUGUILLA CAVE – A more reliable depth for Lechuguilla Cave has been determined to be 1,604 feet (489.0 meters). No new deeper passage has been found, but several significant survey loop closure errors have been fixed over the last few years. By fixing these errors, we have a better idea of the actual depth of the known cave. As

the survey data becomes more reliable, particularly in relationship to the depth of the cave, we may have to adjust our depth figures once again. For now, the known depth of the cave is 1,604 feet (489 meters) deep.

UPCOMING CONSTRUCTION PROJECTS – To help serve visitors to the park and to better protect resources, there are several significant changes scheduled for the park in the next few years. The first will be the **Visitor Center Rehabilitation Project** that will completely rehab the current Visitor Center (a Mission 66 building from the late 1950s). This rehab will not change the overall footprint other than place new restrooms outside the front of the building and the kennel is to be moved to the west side of the building. This project is slated to cost \$7.2 million with construction to begin within a year or so. Closely following this project will be the repair and rehab of **Walnut Canyon Drive** and the three parking lots associated with the Visitor Center for \$2.45 million. This 7-mile long paved road was first built in 1930 and several problems will be fixed during this project. Additionally, problems associated with the parking lots will be fixed along with the addition of oil and gas separators being installed. Also under this project, the bat flight parking area will be reconfigured with a bus drop-off and handicapped parking put in place on the west end and with pavement from much of the current parking area to be removed. As part of the Caverns Historic District, the rock walls will be left in place for most of this area. The third project, **the replacement and realigning of the outfall sewer line** will be completed after the others at a cost of \$2.57 million. Scheduled for replacement will be the line from the Bat Flight restrooms to the front of the Visitor Center, the outfall system from the Visitor Center down to the present sewage lagoons, and the rehab of the present sewage lagoons.



In preparation for replacing the sewer lines, Keith Pruitt, Bill Willis, Ken Frank, Bernie Rodriguez, Robert Smith, and Jimmy Sillas discuss sewer line alignment for sewage being pumped from the Bat Flight restrooms up to the front of the Visitor Center. (NPS Photo by Dale L. Pate)

CIVIL DEFENSE BARRELS REMOVED – At the height of the Cold War, the Underground Concessions area of Carlsbad Cavern was declared a Fall Out Shelter. In early 1963, food, water, and medical supplies were received and stored in an area off of Pickle Alley. While most of the items were removed from the cave a number of years ago, seven steel water barrels had been left in an alcove off of Left-hand Tunnel only a short distance from the paved concessions area. For long-term protection of the barrels as well as for resource protection (the barrels had been rusting), the barrels were removed from the cave and temporarily stored at the Cultural Resources office.



Civil Defense water barrels were removed from Left-Hand Tunnel.

BIOLOGY BRANCH NEWS – The two-year Barbary sheep monitoring project got up and running in early March. The enthusiastic biotech crew, which will be here until mid-May or mid-June, depending on the budget, consists of **Anthony Novack** and **Kristin Dorman-Johnson**, with **Gary Lenhart** as a volunteer for four weeks. They are being supervised by Kelly Fuhrmann. Lots of background information and equipment was put together over the winter by **Donna Laing** and Fuhrmann. This is the long-awaited start of a project first planned in 2000. Many thanks to everyone who has helped get this show on the road, including: volunteer Laing for helping plan equipment and logistics and gathering research literature; to NMSU (Las Cruces) librarian Susan Beck for sending us so much literature on Barbary sheep; our protection rangers for long backcountry safety briefings; and to VIP Lenhart for contributing his expertise. Welcome!

Anita Swanson is scheduled to return April 4 for a second season of bird nesting monitoring at Rattlesnake Springs. Welcome, Anita!

David Roemer has received a special recognition award from Intermountain Region for his work in GIS (geographical information system). He received a certificate and an award. Many of us know what a valuable service he performs for all divisions in the park with GIS. It's nice to see him being recognized for his achievements.

Kelly Fuhrmann has designed a great new pocket-sized notebook called Resource Observations. It contains handy little pages for staff to use to report biological and other resource observations while out in the park. Call Kelly at extension 3100 if you would like to get one.

Renée West attended the fourth Southwestern Rare and Endangered Plant Conference March 22-25 at New Mexico State University. Many of the botanists who have something to do with the history or the future of our park's federally listed cacti were scheduled to be there, including: [Ken Heil](#), who co-wrote the recovery plan; [Marc Baker](#), who studied the characteristics of the cacti recently; [Phil Tonne](#) and [Tim Meehan](#) from New Mexico Natural Heritage Program, who have done several years of rare plant surveys in the park; [Charlie McDonald](#), formerly with U.S. Fish and Wildlife Service, who worked with the park in the 1990s on consultation; [Nancy Baczek](#), currently working with the park

on its EIS and biological assessment for fire management; Patricia Barlow-Irick, a botanist who has helped with rare plant surveys in the park; and Bruce Rittenhouse, an endangered plants specialist with the NPS Biological Resources Management Division, who is working with us on a technical assistance request to organize monitoring data.

ONE MORE CAVE – A new cave was recently documented bringing the total known in the park to 107.



Walter Fiester with a full wheel barrel of rubble. (NPS Photo by Dale Pate)

PBSS RUBBLE HAUL – Saturday, March 13 saw a small crew from the Permian Basin Speleological Society out of the Midland-Odessa area continuing their long-standing tradition of helping the park remove rubble from the Old Underground Lunchroom. Walter Fiester, Tom Kaler, Rebecca Lee, and Ruel Metcalf spent all day removing an entire dump truck load of rubble. Thanks to Tom Bemis for overseeing their work (and hauling buckets of rubble) and Jimmy Sillas and other maintenance folks for providing the wheel barrels and the park dump truck.



Rebecca Lee packs rubble into the back of the dump truck. (NPS Photo by Dale Pate)

ELIZABETH LEE EARLY WOMAN EXPLORER

by Bob Hoff

All photos are NPS photos from the Dana Lee Collection taken during the 1924 National Geographic Expedition.



Elizabeth Lee – one of the first women explorer's of Carlsbad Cavern.

If any person's name is synonymous with Carlsbad Caverns National Park, that person would be James Larkin White, the 16-yr. old cowboy turned cavern explorer around 1898. He explored the cavern, built trails, and guided others along them, becoming the foremost advocate of the cavern known as *Bat Cave* then, and Carlsbad Cavern now.

Appointed in 1925 as the first National Park Service Chief Guide at the caverns, his four year formal tenure with the federal government was, by bureaucratic time spans, swift, but his association with the caverns was long-lasting and continues today. His story is pivotal for understanding the early history of the caverns.

But the young Jim White was not the only young person to be bitten by the cave exploration "bug" at an early age. While Jim White's association with the caverns was decades long, for 22-yr-old Elizabeth Louise Lee the association was, by comparison, brief. Elizabeth Lee served on the 1924 six-month (day-trips only) *National Geographic Society*-sponsored caverns expedition led by her father, the noted geologist Willis T. Lee. Dr. Lee took leave from his regular job with the *United States Geological Survey*, not only to direct the expedition, but also to act as the *Carlsbad Cave National Monument's* first custodian in charge. Besides hiring White as the expedition's guide, and local writer/expert Carl Livingston as his personal helper (and several others), Dr. Lee hired both his children, Elizabeth and Dana, to serve on the expedition.

In his unpublished memoirs written after the expedition (Lee died in 1926 at 61) Lee said, "*My daughter, Miss Elizabeth L. Lee, began work as secretary to the expedition but soon proved that she could be useful as a 'cave woman.'*" She

assisted me in the cavern much of the time, especially in the photographic work. Her figure may be recognized in many of the photographs here used for illustration.”

Fortunately for caverns’ history enthusiasts, Elizabeth’s younger brother Dana, besides helping with cave survey work and other general assignments, kept a diary during the 1924 expedition, preserving many first hand observations of his sister Elizabeth and other expedition members. For her part, if Elizabeth kept a diary, she kept it private. We do know, courtesy of Dana’s diary, that his sister graduated from Syracuse University in 1923 with a bachelor’s degree in painting and that during the expedition she sometimes painted local scenes.



Heading down the National Geographic Pit into Lower Cave during the 1924 expedition, Jim White descends on the right, Willis T. Lee begins his descent at the top, and Elizabeth Lee walks backward down the slope to the ladder.

Today we know, by using cavern photographs of that 1924 expedition and Dana’s diary entries, that Elizabeth was an adventurous, seemingly tireless, cavern explorer. Numerous historic photographs shows her in several different areas of Carlsbad Cavern including in the Dome Room and the New Mexico Room. Other photos show Elizabeth following Dana and Jim White up a cavern trail made of dirt or guano-filled bags and, yet another catches her and Dana climbing out of the difficult and dreaded “valley” of *Devil’s Den*; a third documents Elizabeth climbing up the ladder from the *Lower Cave* nine stories below.



Elizabeth Lee in the Dome Room.

Dana records that his sister was the first women to descend into Lower Cave and that she was the first woman guide at the caverns (her first tour was made up of college geology students). Supplying the Department of Agriculture scientist Vernon Bailey with bats that he could dissect required netting and shooting a number of the winged mammals and Elizabeth joined Jim White and her brother in collecting the needed bat samples.

Her sense of adventure operated out of the cavern as well. Once when two army fliers landed their plane with a broken shock absorber here, she accepted an invitation to go on a 20-minute flight with one of them.

Elizabeth loved the caverns and returned as a married woman in 1936 and in 1954 to visit them; her Brother Dana returned in 1966, donating dozens of historical pictures. What eventually became of the ‘cave woman?’ Former National Park Service employee, Rebecca R. Lee, as a source for her research paper on women at Carlsbad Caverns, interviewed a nephew of Elizabeth’s in September 1998, finding out that Elizabeth passed away from abdominal cancer in Green Valley, Arizona, on July 12, 1978.

No relation to Elizabeth, Dana, or Willis, Rebecca Lee argues persuasively in her well-written and researched paper, *Women of Carlsbad Caverns*, that,

A strong explorer and significant to the history of Carlsbad Caverns National Park, Elizabeth Lee can indeed be called the female equivalent to Jim White. The first woman to seriously explore the cave, the first woman to enter Lower Cave, and the first woman to be a guide at the cave, Elizabeth’s notoriety has unfortunately been lost within the pages of history. But, history can be changed. The more that is learned about the women of Carlsbad Caverns the more they will be included in the making of the park and in the history of the park as (contributors) more than wives, daughters, mothers and sisters. Elizabeth Lee probably knew that she was making history every time she entered Carlsbad Cave but was more interested in the cave itself. With the help of her father’s ordinary plate camera, Elizabeth Lee and Carlsbad Caverns will forever be timeless and beautiful.



Willis T. Lee, Elizabeth Lee, and Jim White climbing guano bags on their way out of the cave.

On the occasion of Women's History Month 2004 and every month thereafter, it is well that we remind ourselves that until we National Park Service interpreters include the stories of female participants like Elizabeth Lee in our interpretation of the caverns history, we only tell part of the story and partial stories can't help but be slanted, unfair, and less significant



Elizabeth Lee in Left-Hand Tunnel.

Certainly the Jim White story mustn't be forgotten or not told to others. But neither must the stories of Elizabeth Lee and other women participants in cavern history be excluded. At Carlsbad Caverns, there is more than just the Jim White story. At Carlsbad Caverns, we must interpret the whole story, females included, to experience the fullness, richness, and significance of Carlsbad Caverns history.

TROLL TOWN BRIDGE PROJECT

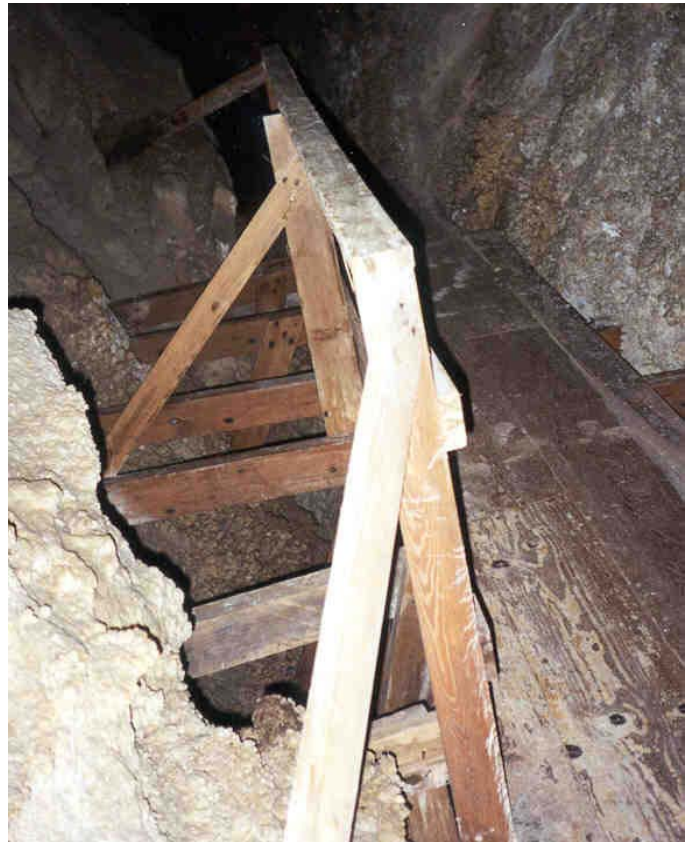
by Stan Allison

All photos are NPS Photos.

Troll Town Bridge is located in Left Hand Tunnel of Carlsbad Cavern just beyond where the visitor tours of Left Hand Tunnel ends. This wooden structure is a 25-foot long, 3-foot wide bridge with a 14-foot handrail that spans a 70-foot deep pit. The pit leads to an area called Troll Town. Park Historian Bob Hoff estimates that this bridge was installed around 1958-1960. The actual placement date of the bridge is unknown. Warm, moist air rising from the pit has caused the bridge to be severely compromised by the mold and decay of the wood and from the corrosion of its nails. In December 2003, Park Carpenter, Donn Allen examined the bridge and found the damage to be so severe as to recommend closure of the bridge. Superintendent Mary Gibson Scott made the decision to close the bridge to prevent an accident.

The Cave Resources Branch of the Resource Stewardship and Science Division developed a proposal to allow for safe access beyond the Troll Town Bridge and to safely remove the wooden bridge. Two main options were considered:

1. Replace the wooden bridge with a new bridge made of moisture resistant materials.
2. Replace the wooden bridge with a traverse line utilizing expansion bolt anchors which would require Single Rope Techniques (SRT) to negotiate.



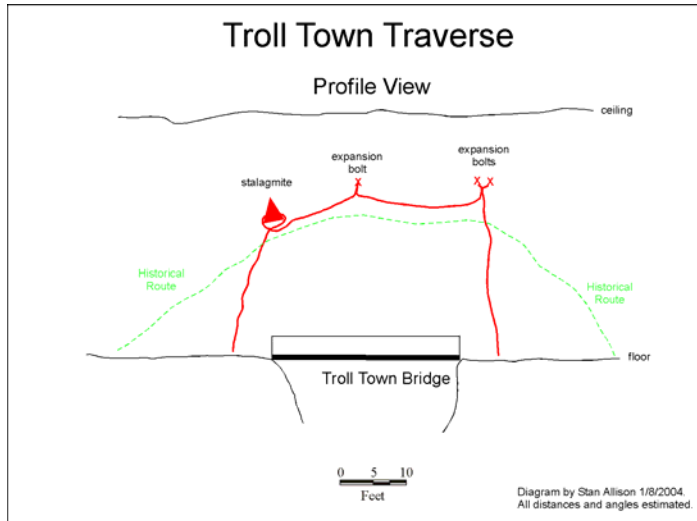
The Troll Town Bridge viewed from the west side. Note the white mold and damp appearance.



The bridge is held in place by large 4" x 6" and secondary 2" x 6" braces jammed into the walls of the pit.

Option 2 was selected as there is no current or planned need to provide access to persons unskilled in SRT beyond the Troll Town Bridge. Option 2 was also selected because it is less expensive and would result in less impact to the cave than building a new structure. The project proposal was submitted to the Inter-Disciplinary Team (IDT) which reviewed and approved the project.

On March 13th, a traverse line was installed that will safely allow employees, volunteers, or researchers to cross the pit. The traverse was rigged completing the first stage of the project. Two volunteers visiting from Wind Cave National Park, Martha Jakobek and Bob Kobza assisted Cave Technician Stan Allison with rigging the traverse to bypass the bridge. A total of three stainless steel expansion bolts were placed. Two stalagmites on one end of the traverse were used as natural anchors. A static 11 millimeter diameter rope was anchored to the expansion bolts using stainless steel screw links and hangers. All permanent SRT rigging hardware in park caves is required to be stainless steel. Steel and aluminum hardware corrode and lose strength when left in the corrosive cave environment.



Profile map showing the new traverse in red. Dashed green line indicates location of the route that was used by explorers before the bridge was installed.

In order to negotiate the bypass it is necessary to have a caving harness with a double cows-tail, ascender, descender and locking carabiners. Negotiating the traverse requires a twenty-foot, low-angle roped ascent using a safety ascender, a twenty foot traverse using the double-cows tails to stay attached to the traverse line when passing bolts and a twenty foot low-angle roped descent. Orientation trip leaders to areas beyond the traverse will need to go through a safety session on how to properly use the traverse before being allowed to lead trips beyond it. To obtain this safety briefing, approved leaders should contact Stan Allison.

Now that the traverse is rigged the second stage of the project, the removal of the bridge is planned to take place in the next few months. Removal of the bridge will be done using the traverse line as a safety line to prevent falling into the 70-foot pit below the bridge. The bridge will be disassembled starting

at the far side and working to the near side. Wood from the bridge will be wrapped in tarps to avoid spreading wood pieces and mold through the cave and then carried out.



Stan Allison and Bob Kobza placing a stainless steel expansion bolt for the traverse line.



Stan Allison on the Troll Town Traverse.

SEARCH AND RESCUE TRAINING 2004

by Tom Bemis

All photos are NPS Photos by Tom Bemis

Fourteen people from Carlsbad Caverns National Park, Roswell Bureau of Land Management (BLM), and Carlsbad Fire Department attended a five day vertical rescue training at Carlsbad Caverns during the last week of February. A week of mixed weather made the course especially challenging, but the training continued with only minor modifications. This 40 hour course included one and a half days of classroom study, a half day of litter transport and haul system rigging practice, a

day of personal vertical skills refresher, a day of cliff practice, and one day of in-cave rescue practice. The mock cave rescue consisted of raising and lowering an injured patient in the entrance of Helen's Cave.



Participants get lines ready for use at Helen's Cave

This was the first time park SAR practice had been conducted at Helen's Cave. The narrow entrance provided an especially difficult challenge for the class and the lessons learned will be used to develop a rescue pre-plan for use in any future accidents in that cave.



Kelly Mathis rigs a multiple point anchor during the mock rescue



Nate Skelton maneuvers the litter out of Helen's Cave.

This training was the first held in recent years that included employees of the Carlsbad Fire Department and the Roswell BLM and will help to build up a larger trained reserve of people to call in the event of a major rescue. The more diverse group helped in providing a broader base of experience to draw upon during this class. The final day of training was concluded with a critique of the rescue and the training exercise. Comments from this critique will be used to fine tune the future training events.

Thanks are extended to the Carlsbad Fire Department for allowing Nate Skelton to take time out of his busy schedule to attend and to teach the section on patient assessment and a special thanks to all supervisors and other employees who covered for those attending.

This year's attendees included:

Ken Allison	CAVE
Stan Allison	CAVE
Tom Bemis	CAVE
Ted Firkins	CAVE
Kelly Fuhrman	CAVE
A. J. Johnson	CAVE
Tom Kaler	CAVE
Kelly Mathis	CAVE
Barry Oost	CAVE
Chad Poston	Roswell BLM
Heidi Reick	CAVE
Nate Skelton	Carlsbad Fire Department
Mike Vanian	CAVE
David Wyrick	CAVE

INTERNATIONAL MIGRATORY BIRD DAY HONORS CAVE SWALLOWS AMONG COLONIAL BIRDS

by Renée West

Soon it'll be time again to celebrate the spring return of neotropical migratory birds. The annual celebration of International Migratory Bird Day (IMBD) this year is Saturday, May 8. This year's theme is *Birds of a feather...nesting together: Conservation of Colonial Birds*. One in eight species of birds in the world uses the strategy of colonial nesting. Many colonial-nesting species are aquatic

birds, such as herons, egrets, gulls, terns, and puffins, but several landbirds such as swallows and blackbirds are also colonial. The park's colony of cave swallows in Carlsbad Cavern is included in this group. It is also the northernmost nesting colony of cave swallows in the world.

Colony sites are made of many different materials and in a variety of locations: mud nests plastered on vertical surfaces and ceilings, like the cave swallows; burrows covering a seaside cliff; a stretch of depressions in a sandy beach, or bulky stick nests forming a woodland rookery. No matter which strategy they use, all the colonies are defined by the close proximity of nests and the social behavior of the colony members.

According to the IMBD website¹, it is believed that coloniality evolved in response to shortages in suitable safe nesting sites within range of food sources. Birds nesting in colonies may enjoy "safety in numbers," for example, when colony members cooperate to chase off predators. Also, colonial nesters may learn about spotty and scattered food supplies from observing their neighbors. Congregatory nesting behavior does have disadvantages: colonies may actually attract predators, foster higher rates of disease or parasitism, and members may experience increased competition for nest materials and food.



The spectacular colony of cave swallows has nested inside the Natural Entrance to Carlsbad Cavern every year for almost the last four decades. (Photo by Rick Wiedenmann)

According to *The Birds of North America* series on cave swallows, written by local biologist Steve West, cave swallows are very gregarious and almost always found together. "Throughout the nesting season, birds constantly interact with each other in flocking for prey, defending nest sites against predators, and bathing or drinking water in large groups."²

One incident of group protectiveness among our cave swallows was observed a few years ago by a biologist in the park housing area. Many swallows were flying in circles close to one spot on the ground. It turned out that they were trying to help a cave swallow that had gotten severely tangled in some landscaping netting. Luckily, some careful cutting with scissors freed the bird and they all flew off together.

Coloniality also increases population risks by concentrating birds in a limited area. In other words, a single event or incident can affect the nesting success of a large number of birds. There have always been natural threats to colonies such as storms and predators, but human activities have brought many new threats to colonies. The introduction of exotic species to breeding areas, disturbance of colonies, and outright loss of breeding habitat threaten many species of colonial birds.

Fortunately, colonial birds and their colonies are often highly visible and impressive, and thus can garner positive public attention and support. Join other IMBD celebrants in 2004 as we help the public get to know colonial-nesting birds and the ways people can help them survive! The National Park Service is one of many co-sponsors of the International Migratory Bird Day.

IMBD began in 1993 to honor the enormous distances that many birds cover during their twice-a-year migrations -- tens of thousands of miles for many species.

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¹International Migratory Bird Day website: www.BirdDay.org

²West, Steve. 1995. Cave Swallow (*Hirundo fulva*). In: *The Birds of North America*, No. 141 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, and the American Ornithologists' Union, Washington, D.C.

OTHER BIRDING NEWS

Researchers continue to monitor cave swallows in the Natural Entrance to Carlsbad Cavern. The cave swallow monitoring project was begun by biologist Steve West more than a quarter century ago. Again this summer he and New Mexico State University-Carlsbad biology professor Rick Wiedenmann plan to monitor the cave swallows. Volunteers are often needed in the Natural Entrance around 5 p.m. on swallow banding days. Call the Biology Office (505-785-3099) to ask about volunteering.

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The Spring Bird Count is one of the activities open to any willing participants—you don't have to be an expert. If you're interested in finding out about the count here in Eddy County,

contact our count compiler, Bob Nieman, in Carlsbad at 628-3977. It can be lots of fun! (Stay tuned for announcements for other possible events in CCNP.)

SAVE OUR CAVE DAY 2004

by Paul Burger

All photos are NPS Photos by Bridget Eisfeldt or Paul Burger.

Designed as a day for employees to work on restoration projects in Carlsbad Cavern, February 5 was designated as Save Our Cave Day 2004. A total of around 30 people participated in this event, spanning every division in the park. We started with a short organizational meeting before breaking into smaller groups. Team leaders conducted tailgate safety sessions with their teams and discussed job hazard analyses where appropriate. While most projects were in Carlsbad Cavern, the Visitor Center received needed attention as well. The Caverns Activity Association (CAA) sponsored an excellent catered lunch with barbecue meats and side dishes were provided potluck style by park staff.

In the Visitor Center, the public restrooms were thoroughly cleaned and scrubbed and the displays were cleaned and dusted. The large cave diorama was also vacuumed and cleaned. Several other cleanup projects, including dusting the ceiling fans and general cleaning throughout the Visitor Center were also accomplished.



Dave Wyrick cleans gum and debris from under a table

IN THE CAVE

Several hundred feet of wire and two old microphones were removed from Bat Cave. This system had been used at one time to monitor the amount of noise that the bats made as a way to estimate population. Electrical problems caused by lighting knocked the system out repeatedly and it had been out of service for several years.

Using tweezers and fine paint brushes, crews removed between five and ten pounds of lint, dust, and trash from the area around Billing Dove Tunnel in the Big Room. Crews also collected lint and trash along the trail down Main Corridor.



The Bat Cave crew from left to right: Ken Allison, Carolyn Richard, Mike Fitz, Tom Bemis, Kelly Fuhrmann, and Marjorie Head.



Superintendent Mary Gibson Scott's lint collection.

Twelve buckets of mud and silt were removed from the Red Pool near Caveman Junction in the Big Room. This silt had been dumped or washed into a pool basin most likely during construction or maintenance of the old dirt trails through the Big Room.



Red Pool before beginning the clean-up.



Red Pool half-way through the cleaning process.



Red Pool after the day of cleaning.

More than 16 tons of rubble were removed from the Old Underground Lunchroom area in the cave, a probable one-day record for that restoration area.



Tom Kaler and Mike Contreas working hard.

Save Our Cave Day 2004 was a great success with lots of projects worked on and completed and with lots of Interdivisional cooperation and support. Thanks to all who helped on these projects, the CAA for supplying the food and getting it to the park, and all the supervisors and chiefs who encouraged their staffs to participate. Special thanks are also

extended to all the employees who kept the park running and were not able to participate.

2003 LECHUGUILLA CAVE SURVEY, EXPLORATION AND INVENTORY SUMMARY

by Stan Allison

2003 exploration and survey in Lechuguilla Cave focused on fixing bad loops and resurveying surveys that had sketches not up to Carlsbad Caverns Survey Standards. Along with the fixing of past surveys, much new survey was accomplished with the discovery of a half-mile of new passages on the western edge of the cave called The Promised Land. New discoveries were also made in other areas of the cave. As of January 2003 Lechuguilla survey was 109.23 miles long. By December the survey had grown to 111.92 miles in length. Over 2.8 miles of resurvey was performed and 2.7 miles of new survey was done. The number of loop closures that exceeded 2 standard deviations was reduced from 312 or 17.2% to 267 or 14.2%. The overall standard deviation of the cave improved from 1.376 to 1.264. All survey and resurveys done in Lechuguilla Cave are required to have an inventory done in conjunction with survey and resurvey. A total of nine survey and exploration permits were granted for 2003.

The first trip into Lechuguilla Cave for 2003 was a survey, exploration and inventory expedition to the Far East section. Peter Jones and Dan Legnini were the leaders of this January 11-17 expedition. Trip participants were: Dave Jones, Rich Sundquist, Kent Taylor and Charley Savvas. Most of their time was spent in resurveying to fix survey loops with bad closures. A few climbs were done that led to small sections of passage. A return was made to the optimistically named "Other Side" passage discovered in October, 2002. Unfortunately it proved not to be the other side and led to only a couple hundred feet of unexplored cave.

January 22-24 was a trip to sample for total coliform and fecal coliform at Deep Secrets, Lake Louise and Red Lake. While waiting for the samples to incubate, some survey was done in the King Solomon's Mine area of The Chandelier Graveyard. 433.5 feet was surveyed in some breezy passages that became too tight to follow. A few hundred feet of resurvey was done and several small but breezy leads were noted. Park Hydrologist Paul Burger, Cave Technician Stan Allison, Jewel Cave National Monument (JECA) Cave Specialist Mike Wiles and JECA Assistant Cave Specialist Rene Ohms all participated in the trip.

Hazel Barton led Amy Bern, Paul Burger, John Cassidy, Tama Cassidy, Lee Florea, Jennifer Foote, Peter Haberland and Pat Seiser on a trip to the Western Borehole from May 25-30. Work focused on resurvey and survey in the Chandelier Graveyard which Hazel put to good use by updating her very detailed map of this area. A total of 1,748 feet of new cave was surveyed and 3,082 feet of resurvey was accomplished.

Art Fortini led Cathy Borer, Ron Miller and Daniel Chailoux on a survey trip to the Nativity Chamber area from June 28

through July 6. This trip was made to an area that was originally discovered in 1999. At the time of discovery, Art Fortini, Cathy Borer and Daniel Chailoux made the decision that the Nativity Chamber was too delicate to explore without first consulting with the Cave Resource Office. Just before arriving in the Nativity Chamber is a room called Christmas in August which has grimy corrosion residue necessitating a full change of clothing before entering the pristine flowstone area of the Nativity Chamber. Beyond the Nativity Chamber it is necessary to perform two more clothing changes to get to the current end of exploration as one transitions from "clean" to "dirty" areas. A total of 2,616 feet was surveyed in several passages. One passage, named the Congo pushes the known edge of Lechuguilla Cave 850 feet further west. The area beyond the Nativity Chamber is called The Promised Land. On the second to last day Cathy Borer fell and injured her elbow in the Western Borehole. Suspecting a possible broken bone, an EMT on the trip splinted her elbow and a self-rescue was affected. Since the group had been expecting to make another return trip to the Promised Land, some photographic equipment was left in the cave when the accident occurred. Stan Allison, Ron Miller and Daniel Chailloux returned to the Promised Land to retrieve the photographic equipment and surveyed ~400 feet of cave in a 26 hour caving trip. For more information on the Nativity Chamber and Promised Land see Canyons & Caves NO. 30, Fall 2003.

The first of two Lechuguilla Exploration And Research Network (LEARN) trips was August 16-24. Ron Miller led Bob Biddix, Chuck Cummings, Paul Fowler, Steve Maynard, Patrick Roberson, Rich Sundquist, Peter Tschannen, Doug Warner, Bruce White, Dean Wiseman and Mike Zawada. Two teams performed climbs and did resurvey in the Southern Branch. One team performed survey and resurvey in the Western Branch. ~400 feet of new cave was surveyed in the Paris Texas area which had been discovered in 2002. One team worked in the Far East performing survey and resurvey. This team attempted to locate some rusticles that were discovered in 1991 near Lake of the White Roses, but never surveyed. Although they did not find the rusticles, they did survey ~ 500 feet of new cave in an area above Lake of the White Roses. A total of 2,537 feet of new survey was accomplished with 4,413 feet of resurvey.

Joe Sumbera led a trip to resketch the Underground Atlanta area from September 15-19. Terry Burgan, Jon Credit and Jack Johnson participated in the trip which produced a very detailed sketch of Underground Atlanta.

The October 25-November 1st LEARN expedition was plagued by last minute cancellations. Fortunately, Vivian Loftin managed to lead a successful expedition in spite of these problems. Participants were Jean Krejca, Carl Reuter, Simeon Warner, Peter Bosted, Ron Bourret, Bill Frantz and Randy Brown. One team worked in the South and another in the Far East. The South team spent quite a bit of time doing resurvey, but also surveyed ~400 feet of virgin cave in the Lechy's Lair area. The East team spent most of their time

working in the La Morada area which is very complex and has elusive airflow. A total of 1,207.6 feet was surveyed with an additional 2,537 feet of resurvey.

John Lyles and Peter Bosted co-lead an expedition to the Western Borehole from November 8-15. Mark Andrich, Andy Armstrong, Jenny and Garry Whitby Robin Barber, Daniel Chailloux, Paul Fowler, Brian Kendrick and John Stephenson participated. Work focused on the Paris, Texas area located underneath the Western Borehole near Huapache Highway. One particular passage had numerous deposits of Tyuyamunite which is a yellow crystalline deposit that is slightly radioactive prompting the name Transuranic Highway. This passage led to a room 40 feet wide, 100 feet long and 10-15 feet high filled with raft cones. Continuing the naming theme, the group dubbed this room Nuculer Winter, poking fun at the grammar of a certain well-known Texan. A trip was made to the Zanzibar area so that Robin Barber could field proof the excellent map she produced of this area. A total of 4,218 feet of new survey was accomplished on this expedition along with 2,711 feet of resurvey.

Garry Petrie led a trip to the Southwest Branch December 12-17. Work focused on resurvey in the Voids to assist Gary in drawing a quad map of the area. Group participants were: Edd Keudell, Mark Lassiter, Kris Green, Bill Putnam, Paul Fowler and Steve Maynard.

Steve Reames coordinated six day trips to work in the North Rift area to continue work on the quad map Steve is drawing for this area. Participants were: Robin Barber, Paul Burger, Amy Bern, Carl Bern, Tom Dotter, Jeff Goben, Stuart Marlett, Bruce Albright, Barbara Smith and Skip Withrow. A total of 880 feet of mainly resurvey was accomplished in these trips.

The following survey, inventory and exploration trips were approved for Lechuguilla Cave in 2004:

Hazel Barton 6-person trip to continue work on the Chandelier Graveyard quad.

Art Fortini/Ron Miller 8-person trip to explore beyond the Nativity Chamber and other tasks in the West.

John Lyles/Peter Bosted 12-person trip to do quad work in Far West.

Simeon Warner 4-person trip to work on the La Morada quad in the Far East.

LEARN 6-person trip to work on blunders and quad tasks in the South.

LEARN 4-person trip to pursue climbing leads.

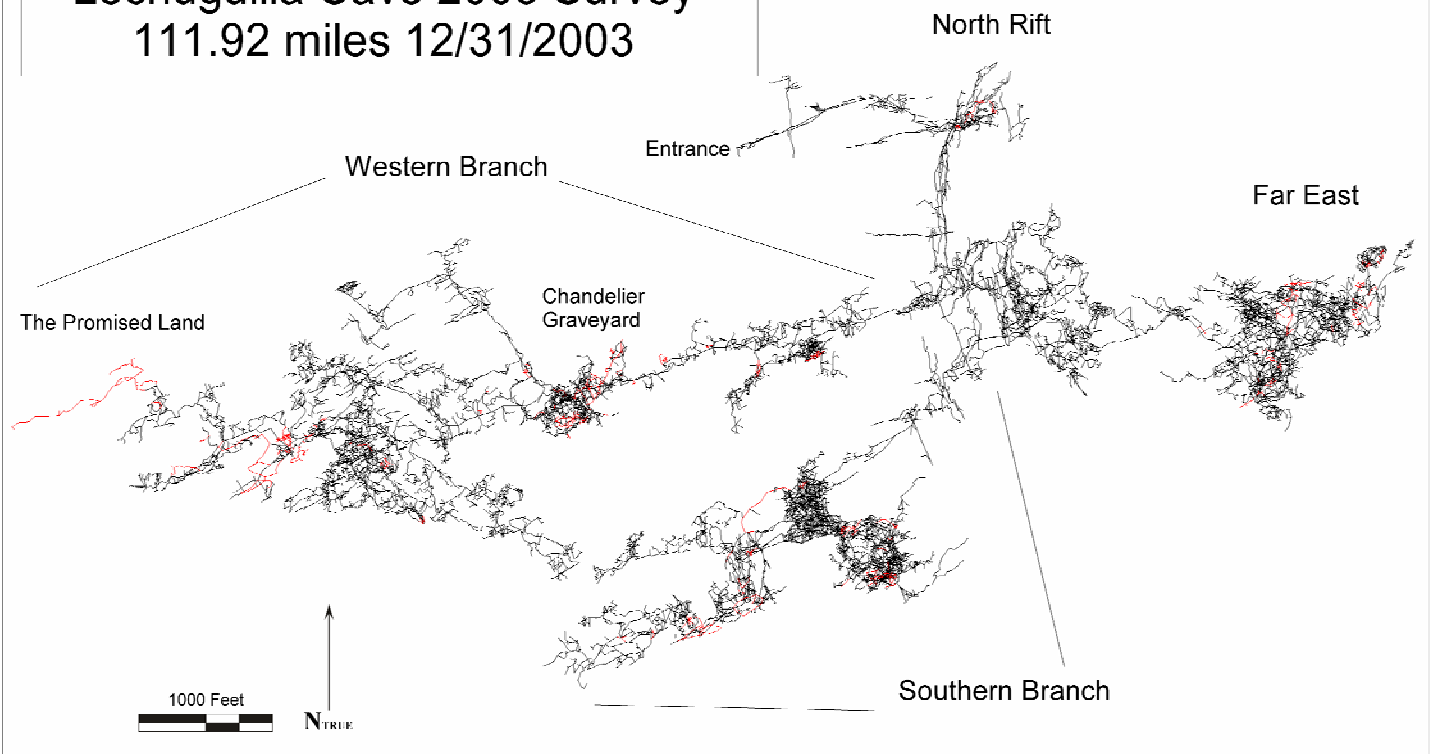
Aaron Addison/Peter Jones 6 day trips to perform quad map work in the Rift.

Steve Reames 6 day trips to perform quad map work in the North Rift.

Exploration and survey expedition proposals for 2005 are due by December 31, 2004. Permitted expeditions will be announced February 1st, 2005.

Lechuguilla Cave 2003 Survey

111.92 miles 12/31/2003



Surveys done in 2003 are shown in red. Map produced by Stan Allison using COMPASS and CANVAS software.