Carlsbad Caverns Audio Guide Script

Natural Entrance and Big Room

Natural Entrance Route

#1 Bottom of Stairs

EMILY Hi, welcome to Carlsbad Caverns National Park. I'm Emily Baker.

BRAD And I am Brad Kinkaid. We'll be joining you on your journey through the crown jewel of the world's caves.

EMILY Carlsbad Caverns is beautiful, but easily damaged. We'd like our grandchildren to see this cave in the same condition that you'll see it today. You can help us with that.

BRAD Remember, no food, drinks, candy, tobacco products or chewing gum are allowed in the cave. And please don't touch the formations; they're easily broken, and the oil from your skin will damage them. Don't throw coins or other objects into the pools. For everyone's safety and peace of mind, children and adults need to stay together all the time.

EMILY This is a physically demanding hike. The natural entrance trail is a steep, downhill mile long path. If you have any problems with your heart, lungs, knees or back, this isn't the tour for you. You might want to consider using the elevator and touring The Big Room.

BRAD These rules help us protect you and the Cave. Carlsbad Caverns doesn't belong to any single person or group; it's so special, so beautiful, and so distinct from any other cave that it belongs to all the citizens of the world.

#2 Along path to Natural Entrance

EMILY Look around. Believe it or not you're walking along a reef that was formed in an ocean. But that was millions of years ago, during the Permian age. Today, after many changes in climate, what you see all around you is the Chihuahuan desert. Let's listen to Park Ranger Michael Connelly:

MICHAEL Think about when you got out of your car today and looked down to the south and you saw this empty space out there; you're looking out towards Texas to the south. Picture yourself looking onto the ocean onto the sea, except rather than us standing on top of a mountain. That we're basically in a boat right above a reef of sea creatures and that your boat would be floating amongst a lot of algae and a lot of photosynthetic organisms that live right along the edge of a beach which is not to far from here and so we're going to be diving into this reef of sea creatures as we go down the Natural Entrance.

BRAD Imagine waves of an ancient ocean lapping at your feet! Of course the Chihuahuan Desert is the wettest desert in North America. But it gets only 10 to 12 in. of rain a year. We may even get some snow. Diane Dobos Budno Biologist elaborates:

DIANE I think people equate Deserts with deserted or barren lands and I think that's one of the most amazing things about the Chihuahuan Desert is, it's not. In fact it's the most diverse desert in North America. Carlsbad Caverns National Park has over 120 species of grasses, just in the park and it has a thousand plant species. If you compare that to like Rocky Mountain National Park, which has a little bit over 200 species of plants, that's five times as many, just in the park itself and Carlsbad Caverns National Park is 47,000 acres.

EMILY Those stucco buildings across the canyon were built in the early 1940's by the Civilian Conservation Corps. That was a Depression-era government program that taught young man job skills, all for $30 a month. The stone buildings were built by employees of the National Park Service in the 1920's and 1930's. Most of the buildings are used as offices.

BRAD Carlsbad Caverns was designated by President Calvin Coolidge as Carlsbad Cave National Monument in 1923; just 11 years after New Mexico became a state. Congress changed the sites designation in 1930 to Carlsbad Caverns National Park.

EMILY Before the federal government came along, ranchers, guano miners and others knew about the cave. But it wasn't until 1923, the year it was designated a National Monument that people began to really pay attention to the Cavern.

BRAD Even back then people realized just how special this place is, and that the National Park Service could give it the protection that it deserves, while letting people like us enjoy it.

EMILY Up ahead a Park Ranger is going to remind us about the rules before going into the cave.

#3 Ring Midden

EMILY Those large stones in the circular depression are part of an ancient cooking pit; called a 'midden ring'. Native Americans would dig out a hole, place the hearts of the agave plant into it and then cook them by covering them with hot rocks, and coals. The size of this 'midden ring' suggests that several generations may have used this pit again and again. Native Americans were here perhaps thousands of years ago. Many Native American tribes, some from as far away as Oklahoma, claim an ancestral connection to the park. So the Cave is an important part of their heritage, too.

BRAD While it's obvious that Native American's knew about the Cave, we don't know if they actually ventured inside. Before this trail existed, there was a dangerous drop into the entrance, and to go any distance into the Cave they would have needed torches. Since we haven't found evidence of torches', or any other cultural material, it's probably safe to assume that Native Americans never went any further than the entrance.

EMILY A big, dark hole in the ground may have held religious significance, whether or not they ever actually went inside. Up ahead, we'll see evidence of other, smaller, groups that do enter the cave.

#4 Swallow Sign

EMILY If you see something flying around the cave entrance. Most likely, it's birds, not Carlsbad Caverns famous bats.

BRAD This colony of cave swallows was established in 1966. With several thousand birds. It's the largest known colony of cave swallows in the US. Let's listen to Park Ranger Michael Connelly:

MICHAEL Something I noticed about those birds that fly around, they arrive back here in Spring, probably early March or late February, when we get down in the depths of the Cave you'll see hundreds of nests up on the ceiling and they just leave the nest there and they come back probably to the same nest or something very

similar. I love watching the birds circle around the Natural Entrance, that's all they do all day, is circle around and around and around.

EMILY. Each November the birds fly south. But by mid-February, they return. We call the cave swallows the 'day shift' because they eat insects throughout the day. After dark, the bats fly out and take over the 'night shift'.

BRAD During the bat flight programs each summer evening, you can sit in this amphitheater and watch as hundreds of thousands of bats leave the cave in a giant cloud. Check out the program time in the Visitor Center. Please remember, no flash photography during the bat flight program.

EMILY Bats eat tons of insects each night, and produce great fertilizer, and they led early explorers to the cave. In the late 1800's, Jim White noticed a huge cloud of bats on the horizon. They led him to begin what became a lifetime of exploring the cave. We'll talk more about Jim White and his adventures later.

#5 Drip Line

BRAD In 1898, Jim White was a 16 year-old cowboy, working on one of the local ranches. The story goes, that one day he noticed what he thought was smoke off in the distance. So, he went to check it out. As he got closer to the smoke he noticed that it broke apart into little pieces. Of course, it wasn't smoke Jim was seeing, it was bats.

EMILY He looked at the huge cloud of bats and the large gaping entrance and thought, "If there's that many bats coming out a hole that big, that must be one huge hole." He made up his mind that some way, somehow, he was going to explore that hole.

BRAD He built a ladder out of sticks and old wire and with only a homemade lantern for light, he made the first of what would be hundreds of trips into the Cave.

EMILY That must have been quit an adventure! None of those early explorers had the paved trails, electric lights, handrails, elevators or Rangers to help them along like we do. Imagine taking a tour here 75 years ago; walking among magnificent formations but only being able to see them by the dim glow of your lantern.

BRAD Try to imagine walking all the way in and then, four or five hours later, walking all the way back up!

EMILY I'm glad we won't have to do that today.

BRAD Me too!

#6 Cave Development Sign

EMILY 250 million years ago The Delaware Sea covered the land here. That ancient ocean eventually dried up and the reef was covered by silt and wind-blown sediment. The reef, now limestone, cracked and split under its own weight. The water table was within the reef.
Hydrogen sulfide generated by oil and gas deposits was carried by water into the limestone. And when the hydrogen sulfide mixed with the oxygen-rich water, acid was created - sulfuric acid.

BRAD That's the acid in your car battery, and it's pretty strong stuff. Strong enough to eat away the limestone and leave large cavities; and, that's how this cave was formed. The evidence of that is all around us. The chemical reaction produced a by-product called gypsum - the material in the sheetrock in your house.

EMILY There is huge deposits of gypsum all through the cave; we'll see lots of it as we go along the trail.

BRAD While this was happening, the reef was still covered with silt and sediment. As the continental plates shifted, they created the Guadalupe Mountains, lifting the limestone out of the acid filled water. So, the acid went to work on a new, lower section of the limestone until uplift occurred. We'll be walking down through those dissolved sections to a depth of 750 ft.

EMILY Look up at the Natural Entrance. Hundreds of thousands of years ago the rocks there collapsed, allowing fresh, dry air to come into the cave and letting some unwitting adventurers inside too.

#7 Bat Cave Sign

BRAD Look into the blackness in front of you, into the general area of the Bat Cave. That's where the bats roost in summer. The bats are Brazilian free-tailed bats and they've been here for thousands of years.

EMILY The Brazilian free-tailed bats are small, weighing about half an ounce. They winter in Mexico, show up here in the cave sometime around late spring and leave in October. The colony generally numbers in the hundreds of thousands, but as you might imagine, it's pretty tough to count small swirling dark creatures at dusk.

BRAD The bats are one of the main reasons people visit Carlsbad Caverns. We're lucky to have this colony and we're always glad to see them return each spring.

EMILY Bats are some of the most misunderstood, but beneficial animals in the world. You may be worried that the bats will fly into your hair or suck your blood. You may have even heard that bats are blind.

BRAD But, those are myths; they just aren't true. While there are vampire bats that do drink blood, they don't live around here. They live way down in Central America, and they much prefer the blood of cattle, and deer.

EMILY And bats aren't blind. They use their eyes when there's enough light just like you do. But, they use echolocation to get around in the dark. That's important, because they feed at night.

BRAD Bat's are an important part of the eco-system because they help control insect populations, and in a slightly less pleasant way, they produce guano.

EMILY Guano is the waste product of bats; essentially recycled insects. Guano is used as a fertilizer, and it was mined from the Bat Cave in the early part of the 20th-century. It was also mined from other caves in the park, but all guano mining ended in 1957.

BRAD The bats are still here and plenty of guano still accumulates in Bat Cave. While bats have lived here for thousands of years they aren't the only animals to find their way into the cave. In a minute or two, we'll tell you about creatures in the Twilight Zone.

#8 Twilight Zone

BRAD We call this the Twilight Zone because it's the boundary between daylight and darkness,

EMILY The opening can be a natural trap for unwary animals. Long ago, very different animals roamed the surface above the cave. Occasionally, when one approached too near the mouth of the cave, it fell into the entrance and died. Let's listen to Park Ranger Jeff Axle:

JEFF As much as this cave is a scenic wonder, it's also a natural museum. This cave has been watching the world go by for about a million years, and in that time it's seen a lot change here in this corner of southeast New Mexico. Paleo-botinists are scientists that study the plants of the past, and they were very surprised to find, digging around in the dirt, pinecones, pine needles, even the pollen grains of raspberry plants, those plants are not found on the surface today.

BRAD The natural trap effect is still a concern, but today it's more of a 'people' problem. Food carried into the cave creates odors that attract animals. Once they get in, they have a tough time getting out, and they often die. That's why we don't allow food, or gum, into the cave.

EMILY It may take a few minutes for your eyes to adjust to the light. We keep the lights dim in the Twilight Zone to discourage animals that might follow the spell of food, and to prevent the cave swallows from flying farther into the cave. Before long your eyes will adjust and you'll see some amazing things.

#9 Devil's Spring

EMILY Here you can see drops of water hitting the pools surface. This is a drip pool, created by rain and snow soaking into the ground and falling into the cave. The rock here stops the water and holds it, so, drip after drip after drip, it grows into a drip pool.

BRAD The last time this pool was full to the brim was probably around the time of the last Ice Age. Since drip pools are trapped bodies of water, any contamination has lasting effects. Coins corrode, and leave ugly green marks on the bottom of the pool. So, please don't throw coins or trash into the pools.

EMILY Water in the cave starts out as rainfall in the desert. It takes about two months for a drop of water to get from the surface to this level of the cave. But if there had been a hard rain on the surface two months ago, you wouldn't see much of an increase in drips down here. Where a drop of water goes, and when it will make it into the cave, all depends on where the rain falls on the surface.

BRAD This cave, in climates past, was probably so active that the sounds of dripping would have resembles a nice spring rain. When you hear dripping, you know the cave isn't dead; it's still active. It's just <u>less</u> active than in the past. The amount of moisture changes in here as a natural part of the 'life cycle' of the cave.

EMILY Caves are ancient; they outlast seasons, centuries, and millennia. You might say they easily weather, the weather! If you were to come back in 20,000 years, you would almost certainly encounter a very different cave then you see today. So, the cave isn't dead, but you can think of it as sort of napping.

BRAD And, it's breathing too! In the few moments you'll feel it.

#10 Taffy Hill

EMILY Stop here a moment and you might feel air blowing past you. The National Park Service doesn't have to pump air into the cave; the air circulation is natural. Changes in temperature and barometric pressure outside create the airflow.

BRAD So, you can 'breathe easy'. The exchange of fresh air in the cave is constant. During parts of the year you can see a light cloud of condensation in this area. That happens when wet air from the cave mixes with dry air from outside. Let's listen to Paul Burger, Park Hydrologist:

PAUL You got that really large entrance, which is at the bottom of a valley and the entrance itself is in a depression, so it's essentially a cold air trap. So you have this river of cold air, it comes in the natural entrance, goes all the way down to the Big Room and, although you can't feel it, there's a similar warm river of air running up, out of the cave along the ceiling. It's one giant heat pump or air exchange pump, that runs naturally because we have such a large entrance. There's never any danger of there being so many people in here that the CO2 levels get too high and it's a constant exchange because it doesn't matter how warm it is on the surface there's still relatively cooler air available that flows down into the cave.

EMILY The movement of air in caves may indicate an undiscovered opening. Cave explorers say, 'where it blows it goes'. That's what led cavers' to discover another spectacular cave here in the park back in 1986. From a small, unimpressive opening, Lechuguilla Cave has been explored and surveyed to a distance of over 130 miles, making it one of the longest and most beautiful caves in the country.

BRAD We'll tell you more about Lechuguilla Cave later. But next we'll find out more about early explorers and visitors in Carlsbad Caverns. The trail is steep in this area so be extra careful and use the handrail.

#11 Devils Den

EMILY Early visitors came into to Carlsbad Caverns for the same reason as you; to see this fabulous underground world. Back then the trip was a lot more difficult. There wasn't much of a trail; visitors had to climb up, over and around the rocks. It wasn't until 1929 that the National Park Service blasted a tunnel under the Devil's Hump where we walk today.

BRAD Jim White named a lot of sites in the cave, 'Devil', after all it was a big dark hole in the ground and it was probably pretty scary. Guano-miners and tourists had their suspicions about what might be lurking down here. They were probably a little worried about getting lost, or that their lights would go out. The tourists knew that Jim White was the only one who knew the way in and out of the cave. If something happened to him there was nobody who would be able to come in and find them! A cave tour in those days was a real adventure!

EMILY And, awe-inspiring. Just wait till you see what's up ahead!

#12 Just Past Stairs

EMILY This cave is huge. But, Carlsbad Caverns is not the largest cave in the world. The longest cave in the world is Mammoth Cave in Kentucky, more than 350 mi. long. The deepest cave is in the nation of Georgia.

Over a mile deep! And the largest cave room ever found is in Borneo. But it lacks any decoration. Most park visitors tell us that Carlsbad Cavern is one of the most beautiful places on earth.

BRAD Or, in the earth. There are very few places in this cave that are not highly decorated. Although the cave is mostly one color, white from the calcite, the other colors are more surprising and rewarding because they're so rare. The orange you see comes from iron. And manganese leaves a black or dark gray residue.

#13 Balloon Ballroom

EMILY Dripping water is the sound of the cave formations growing! Water in the cave starts out as rainfall so, speleothems start out as rainfall too, in a way. Rain water trickles down through vegetation and soil on the surface and picks up carbon dioxide gas which mixes with water, and creates carbonic acid.

BRAD Carbonic acid makes the little bubbles in soda pop and it easily dissolves limestone. As the drop of water moves through the limestone, it etches out a tiny little piece of calcite. When it enters the cave, it has a few options. If it hangs from the ceiling for a long time it will leave the calcite up there. Forming a stalactite on the ceiling,

EMILY Stalagmites are generally made by faster dripping water. The water splashes down, leaving the calcite on the ground in a big pile. One way to remember which is which is that stalactites cling tight to the ceiling and that stalagmites stand up tall and mighty.

BRAD So, when they grow together, that would be a *'mighty tight"*?

EMILY Not quite. When a stalactite and stalagmite meet in the middle, it's called a column. Also, sometimes the water drop slowly slides down an arched ceiling and leaves a snail's trail of calcite behind it. These thin lines of calcite are deposited on top of one another, over and over again, making a thin, graceful, curving drapery.

BRAD There are draperies all over the cave. They're my favorite decoration because they look so delicate and fragile even though they're made out of rock.

EMILY Coming up next, we'll answer the question, 'do things fall in here'?

#14 Iceberg Rock

EMILY You don't need to worry about things falling in here. Today things practically never fall. Thousands of years ago they did, but rarely. The boulder in front of you is called, Iceberg Rock, and it was once attached to the ceiling. Continued erosion by dripping water finally loosened Iceberg Rock's grip on the ceiling

BRAD All over the cave there are rocks and boulders that were part of the ceiling, but now, through natural processes, are on the floor. The term for that is 'breakdown'.

EMILY But you don't need to feel nervous. Rock-falls of this magnitude probably haven't occurred for thousands of years. The cave is very stable. There is no rain or strong wind, the temperature remains the same

year-round, and the few earthquakes in this area weren't felt by people in the cave. That doesn't mean things don't fall now. But, when they do, it's almost always caused by people.

BRAD Like in June of 2000 when some desk-sized boulders slid down onto the trail. Since rocks don't just break free from where they've been sitting for tens of thousands of years, something must have disturbed them. The only explanation is people, and the rocks most likely shifted because someone left the paved path and kicked something loose.

EMILY So, in short, the answer to the question, 'do things fall in here'? Is both 'yes' and 'no'. No, not typically and yes, very, very rarely on a geologic time scale.

#15 Iceberg Rock Telephone

BRAD Imagine the effort, engineering, and maintenance that have gone into the creation of a safe cavern trail system? It's a huge job! Most of the work is done by hand, and all the materials have to be carried in. Over the years, trail routes, construction methods, and surface materials have changed. In fact, we're still experimenting with surface materials today. Take a look below you and to the left. You'll notice stairs and a trail passing under this trail.

EMILY That area is closed to visitors, so please resist the temptation to go down there. This underpass was added so that incoming and outgoing tours could pass each other more easily. With the addition of the larger elevators, visitors are no longer allowed to walk out of the Cavern.

BRAD Further down the trail we'll tell you about life in the cave and learn about the Park's connection to outer space.

#16 Green Lake Overlook

BRAD Look around here. We see nothing here but water and rock. The sun never shines in here; no plants grow. It would be easy to think that there's no food, and no life.

EMILY But, there is. Even this far down in the cave, life thrives. We have cave crickets, mites, and even little spiders. They live by eating each other and eating what comes in with visitors. Each of us leaves behind lint, skin cells, hair, and dirt from our shoes. We'd ask you not to feed the animals but I'm afraid you just can't help it.

BRAD There is also life that's invisible to the naked eye. Bacteria can be found throughout the cave. Some of these bacteria are pretty bizarre. There are even bacteria that survive here by eating rock. Here is Paul Burger, Park Hydrologist:

PAUL These pools are in complete darkness. There's no organic input, there are no streams washing in organic debris so any microbes that were in the cave had to live on just what was available. The water, the rock, you know, and each other. So, a microbiologist came in and just put some sterile slides, near a bunch of the pools and some of them partially in the pool just to see what was there. He found in a few of the pools in Lechuguilla cave, more bio-diversity in those pools then in the exact same square footage would be in the Amazon jungle.

EMILY But, the bacteria have to protect their food sources by eliminating competition. So they produce enzymes that prevent the growth of other organisms. Scientists studying these enzymes have discovered that some of them attack cancer cells while leaving healthy cells alone.

BRAD So, bacteria may lead to a cure for cancer. And that may not be their only benefit. NASA has conducted research in Lechuguilla Cave to learn about bacteria that live in extreme conditions. They want to know if similar organisms might be found living in other hostile environments - like Mars.

#17 King's Palace

EMILY You can sit down here to rest, or we can keep walking. Carlsbad Cavern has had more than its 15 minutes of fame. This cave has appeared in a number of movies.

BRAD If you remember the movie JOURNEY TO THE CENTER OF THE EARTH, starring Pat Boone? It was filmed in the King's Palace.

EMILY Other movies and TV shows filmed in the Park include THE MEDICINE MAN, GARGOYLES, JONATHAN LIVINGSTON SEAGULL, KING SOLOMON'S MINE, and a television episode of ROUTE 66. More recently, the Disney movie ATLANTIS included scenes which artists based on the caverns.

BRAD The King's Palace tour is a Ranger-guided tour that will take you into an especially beautiful-and fragile-part of the caverns. You can find out more in the Visitor Center.

#18 Wooden Stairs

EMILY Take a look at these wooden stairs. Before 1925 visitors began their tour by being lowered 17 stories in an old guano-mining bucket. In 1925, the, Carlsbad Chamber of Commerce provided money to build wooden stairs at the natural entrance to replace the guano bucket ride. Instead of the switchback trails that we use today, visitors walked down hundreds of wooden steps. Then, they walked back up!

BRAD Touring the cave in those days took all-day. Right about here visitors were nearing the Lunchroom so this hill was named Appetite Hill. The wooden stairs were hard to maintain in the high humidity and were always difficult and tiring to climb. By 1956 all of the stairs were replaced by this trail. This segment of stairs was left for us to see what a Cave tour was like in ‘the old days’. You might say that visiting the Cave today is ‘a walk in the park’.

EMILY After the long climb out, on those old stairs, just about everybody was ready for something better, and it finally happened when the elevators were installed.

BRAD And in case you’re wondering, we’re just a few minutes away from the rest area.

#19 Bone yard

BRAD Not all of Carlsbad Caverns is huge rooms and passageways. Cavers' often have to wiggle through tight, twisting crawl ways in order to find larger areas on the other side.

EMILY So far, the known passageways have been mapped at over 30 miles and to a depth of 1,037 ft. Exploring a cave involves surveying and mapping. When Jim White explored the cave he memorized his way. He didn't need a map because he came into the cave hundreds of times and knew the landmarks. Later, surveyors used paint to permanently mark stations and measured the distance between them by stride-length or with a measuring tape.

BRAD Today, volunteers do most of the mapping. Surveyors use flagging tape to make permanent stations without damaging the cave. They use electronic measuring devices to determine distance, depth, and height. In sensitive places, like Lechuguilla Cave, surveyors will stop mapping if they come across a spectacular area or a pristine pool of water to give scientists an opportunity to study the area.

EMILY Exploration and survey is an on-going process. You can never be sure that you have discovered all there is to find. Currently, a re-survey of Carlsbad Cavern is underway that has already revealed new passages. Through continuing exploration and research, we'll learn more about this remarkable natural treasure.

BRAD That way we'll be better able to preserve and protect this priceless jewel, so that your children and grandchildren can have an unforgettable Carlsbad Cavern experience.

EMILY We're almost to the end of the Natural Entrance trail. We hope you'll continue into the Big Room which, believe it or not, is even more spectacular. If not, we wish you pleasant days and safe travels. On behalf of your National Park Service, 'thank you', for visiting the world's most amazing cave. We hope you come back again soon.

BRAD Coming up is the Big Room Junction. Take a right to go to the Big Room, or go straight to get to the elevators and the Rest area.

Big Room Route

#20 King's Palace Corral

BRAD Welcome to Carlsbad Caverns National Park. I'm Brad Kinkaid. .

EMILY And, I am Emily Baker. We'll be joining you as you experience one of the most magnificent natural treasures in the world. You'll see things you'll remember for the rest of your life; sights unlike anything else in the world. But first we need to review some simple, but important rules that the Ranger talked to you about earlier.

BRAD Remember stay on the paved trail at all times. Food, candy, and gum are not allowed in the cave, and tobacco and alcohol use is prohibited. In some places you will be close enough to touch the formations - Please don't! They break easily, and even the gigantic ones will be damaged by the oils from your skin.

EMILY We'll pass pools of water; they aren't wishing wells. Please don't throw coins or garbage into the pools, or anywhere else in the Cave. And don't forget the silence of the cave is part of the experience. So, speak softly and avoid any loud noises. Also, please watch your treasures by keeping children under the age of 16 years within arm's reach at all times.

BRAD We tell you about these rules to emphasize that this cave is not only a national treasure, but a global treasure. It's everyone's job to protect the cave. Thanks for your help. Now, let's go!

#21 Grape Arbor

EMILY Early visitors to Carlsbad Caverns had a much tougher trip. They walked all the way in, and they walked all the way out on a guided tour that took 4 to 5 hours.

BRAD You know, I suddenly have a real appreciation for the elevators!

EMILY They are a nice touch.

BRAD Obviously, they haven't always been here. The shaft for the freight elevators was blasted in the 1930's and the passenger elevators were installed in the 1950's. It took about six months to finish the 750 ft. shaft; that's about 75 stories!

EMILY And if you think that's impressive, wait until you see what's coming up.

#22 Just Past the Duck-Under

BRAD You're right, I'm impressed!

EMILY I just love the surprise of popping out into this huge room. This is the just the beginning of the Big Room, and it gets bigger and bigger.

BRAD It's hard to imagine how a room like this was formed.

EMILY It's a complex process that took place over millions of years. Before any of this cave existed, everything for miles around was covered by an inland sea. Park Ranger Greg Litten, tells more:

GREG 250 million years ago, according to all the geologists and the scientists, this part of New Mexico was a coastline and a coastline very much what you can see today around Florida and the Bahamas. If you can imagine sandy beaches and maybe a warm lagoon, clear water, beautiful place to go on a honeymoon.

EMILY Imagine that, what's desert today was once covered in water. Over time, a reef formed at the edge of the sea.

BRAD But not like the reefs in the Caribbean or Australia.

EMILY No, it wasn't a coral reef. It was built of sponges, algae, and other animals like clams. As these creatures died, their skeletons formed the limestone of this mountain we're walking through.

BRAD Millions of years ago, hydrogen sulfide from oil and gas deposits mixed with rainwater in the limestone and made an acid we call sulfuric acid. Sulfuric acid is potent stuff that dissolves limestone. It turned cracks and fissures in the mountain into giant rooms like this.

EMILY The way we know that, is that when sulfuric acid and limestone mix, you get three things; water, carbon dioxide, and gypsum. The water and carbon dioxide are long gone now, but we'll see some big gypsum deposits along the trail.

#23 Big Room sign

BRAD This place is huge, but in order to say how big is it. You first have to know how to measure empty space. Of course, when scientists and cavers' talk about the size of caves, they could mean one of three things: the length, the depth, or the open space of a room. All three can be determined by surveying.

EMILY Here at Carlsbad Caverns, most of the mapping is done by volunteers with electronic surveying equipment. Some estimates measure the Big Room at about 14 football fields. Other measurements in the cave are more precise: it's 1,037 ft. deep, and, over 30 miles in total length.

BRAD Thirty miles is a lot of cave.

EMILY As we continue to explore, we expect the mileage to increase.

BRAD Another cave here in the park, Lechuguilla Cave, is over 100 miles long, and we keep finding more each year.

#24 Billing Dove

BRAD This is another beautiful area. Look at how delicate and fragile the decorations are. Those delicate decorations are made of calcite.

EMILY Stalactites are the ones that cling tight to the ceiling and stalagmites stand up tall and mighty from the ground. They're made when dripping water carries calcite into the cave and deposits it. Slow drips leave deposits on the ceiling; more frequent drips leave calcite on the floor. Draperies look like fabric and grow slowly as water rolls down a sloping wall or ceiling. Do you know how quickly they grow?

BRAD Nobody knows the answer to that question. For one thing, formation growth is based on the amount of rain or snow on the surface. Rainfall is a wildly unpredictable thing. Add to that all the forces that act on rainfall above the cave, for example gravity and evaporation, and you can see that it's pretty remarkable that any water gets into the cave at all.

EMILY Plus, surface climate changes bring about changes to the cave climate too. So, there's absolutely no way for any stalactite to grow at a constant rate throughout its existence. Let's listen to Jason Richards, Environmental Protection Specialist:

JASON We live in a desert, the Chihuahuan desert is above us and everything on the top influences what happens down in the cave. So if it's very dry on top, everything's going to be very dry in the cave. Should we start getting a lot of moisture, then a lot of those formations will become active again.

EMILY So how old are these decorations? It's safe to say they're older than any of us. So, please respect them, by not touching them.

#25 Lion's Tail

EMILY We can only pause here for a moment, but look up, over your head. This stalactite has grown in an odd kind of way. Some people think it looks like a lion's tail. That lumpy, bumpy growth is called cave popcorn, and it's formed in a variety of ways.

BRAD One way is when moisture in the air carrying calcite, condenses on a cave surface, and evaporates, leaving the calcite behind. Popcorn is a very complex cave decoration. You can read more about cave popcorn and other cave decorations in books available at the Cavern Books

#26 Fairyland

EMILY You know these formations look like dancing fairies.

BRAD Jim White thought so too. He was the first explorer to enter the cave in 1898 at the age of 16. He found his way in and out mostly with good skills, good memory…and good luck. To help him remember his way around he gave decorations imaginative names. He saw fairies here. So he named this place, the Fairyland.

BRAD Considering the names Jim gave to other areas of the cave, Devil's Den, Devil's Spring
It seems that he learned the cave was not as scary as he thought.

EMILY I like discovering shapes and characters in different formations. Let your imagination go and you might see formations shaped like goblins, animals, and people, even some of your relatives. Go ahead and try it, it's fun.

#27 Temple of the Sun

BRAD These trails sure are nice, but you can bet the first visitors didn't have it this easy. At first there was no path, just Jim White picking his way along a treacherous cave floor.

EMILY The only improvements were guano sacks used as a 'Golden Staircase' in the cave. The basic trail route as we know it today was in place by 1930.

BRAD Wooden stairs were built down through the Natural Entrance and used for almost 30 years and finally the walkway was paved, lighted and lined with stones and handrails.

EMILY But Carlsbad Caverns wasn't always a National Park. Carlsbad Cave National Monument was established in 1923 and then in 1930 Congress created Carlsbad Caverns National Park. It's one of the most incredible National Parks in the entire system.

#28 Caveman Junction

EMILY We've come to a place in the Cave, where you'll need to make a choice. For these directions to make sense, please face the sign for the Audio Guide number marker. If you want to go back to the elevators and restrooms and leave the Cave, turn left at this shortcut, that'll get you there in about 20 to 30 minutes.

BRAD But if you want to see Mirror Lake and the Bottomless Pit, just go right. You can expect another half mile walk and you'll get back to the elevators about an hour from now.

#29 Totem Pole

BRAD We sure wouldn't see much of this room without the electric lights. With the lanterns and torches the early visitors used most of the beautiful decorations that we can see today probably weren't even noticed. Now there are more than 1200 light bulbs in the Cave, some of them in very hard to reach places. It actually takes special training to change a light bulb around here.

EMILY Some of the Cave is well lit but other parts are left in shadows. Lighting placement was designed by a theatrical lighting specialist who worked on Broadway. The idea is to show off the most beautiful parts of the Cave, while keeping the Cave, well, cave like. The natural state of a cave is total complete darkness. You can get a peek at what that's like on one of our Ranger Guided Tours.

BRAD It's sure a lot easier to see in the Cave, now, than when the National Geographic Society first explored here. We'll talk about that in a minute.

#30 National Geographic Pit

EMILY Just before the Park was established in 1923, a geologist named Willis T. Lee, came here to investigate. Later he led a National Geographic scientific Expedition. They planned a six month expedition to map, survey and explore the Cave. It was harder than they thought it would be. Even with the help of Jim White, they completed only a one mile survey of the Main Corridor.

BRAD The pit to your left is the National Geographic Pit, the entrance used by the expedition to reach the Lower Cave. Elizabeth Lee, Willis T. Lee's daughter, was the first woman to explore the Cave. She went along on the expedition, even leading the way.

EMILY Next up we'll talk more about Jim White and his discoveries.

#31 Jumping Off Place

BRAD Have you noticed the passages all around us? They seem to be everywhere. This is the Jumping Off Place, below you can see the Lower Cave that we were just talking about.

EMILY Jim White discovered the Lower Cave along with most of the rest of what we're seeing.
But he didn't discover Carlsbad Cavern. Plenty of people knew about it in the late 1800's. They called it the Bat Cave. Jim White was the first person who had the guts, and determination to venture past the opening.

BRAD But, this isn't the only cave around here. The Guadalupe Mountains are like Swiss cheese, there are probably 300 caves. In a moment we'll tell you about a really special one,
Lechuguilla Cave.

#32 Lucifer's Lair

EMILY So what's so special about this Lechuguilla Cave?

BRAD At well over 100 miles in length, Lechuguilla Cave is one of the longest caves in the world, plus it's relatively undisturbed and pristine, mostly because it has no natural entrance.

EMILY For years cavers' knew Lechuguilla Cave as Misery Pit, a deep hole in the ground that didn't go anywhere. Over the years cavers' reported wind blowing up through the rubble on the floor. There's a saying in caving; 'if it blows, it goes'. Wind moving at 30 to 40 mph was a pretty sure tip that there was a cave waiting to be discovered.

BRAD With permission from the National Park Service, some cavers' began to dig through the rubble and sure enough they found a passageway. To keep the airflow in the Cave as natural as possible, the National Park Service installed an airlock door. Even though it's been extensively
explored, Lechuguilla is still one of the most undisturbed natural caves in the world, and the National Park Service is going to do everything it can to keep it that way.

EMILY Lechuguilla cave is restricted to exploration and research and then only by very experienced and ethical cavers'. Every caver has to carry everything they need to stay alive, and they have to carry out everything they take in.

BRAD That's important because Lechuguilla cave is like a cutting edge laboratory. The cave may show us how to preserve the most special gift of all, Life; we'll talk more about that in awhile. But next we'll tell you about a fascinating discovery here in this cave.

#33 Top of the Cross

EMILY Look closely, and you can see a rope that stretches all the way from the floor in front of you to the large hole above. This rope was used to climb into that opening in the ceiling, 225 feet over your head.

BRAD In 1985 cavers' raised the rope to the ceiling using helium filled balloons attached to a hoop. They snagged a stalagmite on the ceiling and rigged the rope from the floor, up and around the stalagmite and back down to the floor.

EMILY After pulling and tugging on the other end to make sure the knot would hold, one very nervous caver started climbing the rope to the ceiling. When he got to the top,
he found a beautiful room above the Big Room. Named the Spirit World, the passage extends about 750 feet before becoming too small to squeeze through.

BRAD We left the rope there just in case there needs to be more research in the Spirit World. Let's listen to Cave Technician Tom Bemis:

TOM We've got 3 rules of 3 for Caving. The first rule is: You never go into a cave with less than 3 people in your group. If somebody gets hurt, you're gonna want somebody to stay with them, somebody else to go out for help. The second of the rules of 3: is each person in that group carries at least 3 sources of light, and I've come out of a cave more than once on my last source of light. In fact I've had to fix my third source of light in a cave before too. Murphy lives underground and he eats lights. The third rule of three is: You tell at least 3 people where you're going and what time you plan to be back out.

BRAD Up ahead, there's a good spot to talk about the water in the cave.

#34 Mirror Lake

EMILY The water level of the pool in front of you is determined by the amount of surface water that can reach this point. Thousands of years ago the surface climate was much wetter and there were a lot more pools. It takes at least 8 months and often a lot longer for water from rainfall to reach this pool.

BRAD Later we'll tall you about how the answers to some of the mysteries of life may come from pools like Mirror Lake. Please don't contaminate the water by throwing coins or anything else in cave pools.

EMILY Coming up, you'll see one of the better known landmarks, the Bottomless Pit.

BRAD How long does it take a drop of water to fall down a pit with no bottom?

EMILY We can get to the bottom of that question, in a minute.

#35 Bottomless Pit

EMILY It's pretty common for the deepest hole in a cave to be named the Bottomless Pit. It's a throwback to the early days, when the mystery was greater and the lights weren't as bright. Let's listen to National Park Service National Cave Specialist Ron Kerbo:

RON A man named Tom Roar, came to the Park and climbed into the dome above the Bottomless Pit in the Big Room. This was during the countries Bi-centennial year. In fact, we did it in July and ended getting up there on July 4 of 1976, and he named that area The Liberty Dome.

BRAD If the rock layers look slanted to you, it's because they are. This rock was all formed as part of a reef and we're nearing the front edge of the reef, called the 'Fore Reef'. There the action of waves on the front of the reef, caused materials to break loose and slide down into the sea. The result was a reef with a sloping front. That's what accounts for the slope of the rock you see here.

EMILY We're actually fairly close to the ancient seabed here at the front of the reef. It's only about 80 feet from the top of the Bottomless Pit, to the outside world. I wonder what the weather's like up there.

#36 Bat Roost Sign

EMILY The earliest known successful occupants of the cave were bats. Several species of bats have been found here, but the most famous ones are the Mexican Free Tailed bats. They are the ones that roost in the Bat Cave section and fly out on summer evenings.

BRAD These small bats fly out of the cave in immense spiraling clouds and then head off to eat all kinds of night flying insects. They may fly in and out of the cave several times during the night, but they all try to get back before dawn.

EMILY The bats produce a lot of guano, or bat dung. Guano was mined from the bat cave from 1903 to 1923 and used as fertilizer in the citrus groves of California. Guano helped many families put food on the table. There was never any mining at this spot, but the reddish brown bat guano on top of the rocks tells us that bats have been here.

BRAD Bats can fly a long way into the cave, and the dark of the cave is no problem for them. They use sound waves or echolocation to find their way around and to detect insects they eat.

EMILY These guano piles are over 45,000 years old. It's hard to grasp long stretches of time like that, but that's just a minute or two in the life of a cave. These guano piles are probably the youngest features you've seen today.

#37 Gypsum Blocks

EMILY These large blocks are gypsum, left over from the chemical process of sulfuric acid dissolving limestone. Gypsum is the same material you find in the sheetrock in the walls of your house.

BRAD Do you see those long straight holes in the gypsum? Those holes were drilled through the gypsum by dripping water. Gypsum is easily dissolved by water, so there must have been a lot more gypsum in the cave at one time.

EMILY Again we can see the rock layers of the 'Fore Reef' slant downward towards the ancient seabed. The Permian reef grew so large that it cut off the supply of fresh water to itself which eventually killed the ocean and the reef.

BRAD Fossils found in the cave walls like trilobites, sponges and algae, tell us that the reef formed from living organisms.

EMILY When they died their bodies formed the reef. Let's listen to Park Ranger Greg Litten:

GREG One of the tricky things is looking for these fossils in the cave. First of all it's a dark cave and you're not going to be able to see all the fossils really well. Now, the second thing that makes it difficult to find the fossils is that you have to stay on the paved trail and how often is the paved trail next to the fossils? Well, not very common. But the final thing that makes it very difficult to find these fossils, is that the fossils are inside the native rock, I guess you could call it. If you remember that the limestone rock is full of fossils, billions and billions of different fossils. But inside that rock the caves have been formed and over the inside of the caves, drip by drip, crystal by crystal, flowstone, stalagmites, stalactites, draperies, curtains have grown. And what those formations have done for the most part is cover over the fossils.

EMILY When you leave the cave, you'll be leaving something behind too, and you're going to be surprised at what it is.

#38 Massive Gypsum Sign

BRAD Here are more examples of gypsum and drill holes, and there's also some stuff that you can't see.

EMILY When our clothes rustle and rub against each other it cause excess fabric to fall off, and we're constantly shedding skin cells and hair the same way. We call it lint and except for dust bunnies you might think it isn't much of a problem.

BRAD But have you ever noticed how much lint your clothes dryer's lint trap collects in just one load? Multiply that, by the half a million visitors that pass thorough Carlsbad Cavern each year and you've got one big pile of lint.

EMILY Lint coats and discolors formations and causes chemical reactions that eat away at them. If the lint isn't removed from the decorations, it may actually become encased under a new layer of calcite.

BRAD Nobody wants that to happen. So don't be surprised to see Rangers and volunteers picking lint from the decorations to protect them and restore their beauty. Let's listen to Paula Bauer, Park Ranger:

PAULA Lint, like in your house in areas, it's hard to reach or hard to dust like say under the couch or under the bed, where little balls of lint can pile up. The same kind of thing happens here. So, we have to go in with tweezers or little paint brushes that will lift out that lint and clean it up. Other impacts that occur in the cave are things like mud, either from muddy shoes or boots that walked across an area, could even be a hundred years ago. There's no rain here that will knock that or wash that mud away. so it'll just sit there. Sometimes it's a clear line, showing where an area has been restored and where it hasn't. Some volunteers and people that get into cave restoration think of it as almost like restoring an artistic masterpiece.

#39 Small Alcove on Right

BRAD It might be a good idea to stop here for a moment and think about all the things you've seen and learned today. The surprises and mysteries of the cave are kind of like this little alcove, it's obvious and well lit, but lots of people walk right by without ever really noticing it.

EMILY Look at the tiny, delicate details and smaller decorations. We talk a lot about what's biggest, longest, tallest, greatest, first and best. Some times we forget to notice the beauty, everywhere. Even in the smaller places.

#40 Caveman Junction

BRAD Time to make another choice. For these directions to make sense, please face the sign for the audio guide number marker. To get to the elevators, the lunchroom, the restrooms and the exit, turn right. To repeat your tour through the back side of the Big Room, take a left.

#41 Crystal Spring Dome

EMILY Look at how wet and shiny the Crystal Spring Dome is. It's one of the most active formations in the cave. In fact from this point on you'll find a lot more moisture in the cave.
Water may not be dripping everywhere, but the cave is definitely still active

BRAD Moisture levels have naturally fluctuated over the past several thousand years and today the arid climate of the Chihuahuan desert means that very little water enters the cave.

EMILY But we've learned that most change in the cave comes from the actions of people. The National Park Service has built parking lots and buildings over the cave, which have changed the natural flow of water into the cave. In the future some of the paved surfaces will be removed.
And others will be replaced with materials that will let water pass through in a more natural way.

BRAD Something like that happened when the Visitor Center was constructed. The staff decided that it would be easy to cool the building with cave air by simply propping open the elevator doors. Before long though, they noticed that cave pool water levels were dropping and the problem was simple evaporation. So the doors were closed and revolving doors were installed. Which took care of most of the problem.

EMILY Things like that are called unintended consequences. No one intended to change the water levels. It just happened. Today the National Park Service takes a hard look at every action to make sure that they won't cause unintended changes in the cave or to other Park resources.

BRAD Of course, sometimes changes in the cave occur naturally. We'll talk about that just ahead.

#42 Pool of Sticks

EMILY Lots of visitors wonder if things fall in here. The sticks you see in the pool are stalactites that fell from the ceiling. We know that happened a long time ago, because years and years of calcite deposits have cemented the stalactites to the floor of the pool

BRAD So we know that stalactites fall, but what causes them to fall, well we don't know for sure, but a good guess would be an earthquake. That isn't much of a concern today. This part of the country is stable and the few earthquakes we do have are minor. Of course the greatest potential for change in the cave comes from, people.

EMILY That's right, today people are the most likely cause of things falling in the cave. For instance, in June of 2000, some rocks slipped out of place along the Natural Entrance route and completely covered the trail. There wasn't an earthquake, but the day before hundreds of people had passed by, so most likely someone wandered off the trail and kicked something loose and that caused the slide. That's one reason we insist that everyone stay on the paved trail.

BRAD Our next stop will be at The Rock of Ages. Once the highlight of every tour.

#43 Rock of Ages, Wheelchair Turnaround

EMILY The large column in front of you is called the Rock of Ages. From it's size you can tell that it's very, very old.

BRAD For a long time tours through the Cavern included a stop here. Then all the lights in the Big Room were turned off. As the visitors stood in total darkness Rangers led them in singing the old hymn, 'Rock of Ages'.

EMILY As tours grew larger, it became impossible to safely turn out all the lights, so the Rock of Ages experience was discontinued. But, you can still experience a black-out today on one of the Ranger Guided tours. It's probably the only opportunity most of us will ever have to experience absolute darkness.

BRAD Up ahead, we have a view from the overlook that might get your pulse going and if the view doesn't do it, the climb up the hill might.

#44 Rock of Ages, Overlook

EMILY Look at the size of this room. If you measured the distance between the furthest walls that you can see, you'd find that you were looking at an amazingly beautiful quarter mile of cave.

BRAD This is the very heart of the Big Room. From here it's easy to see where Jim White came up with that name. But the Big Room isn't the biggest cave room in the world.

EMILY That honor goes to the Sarawak Chamber, discovered in Good Luck Cave, in Borneo.
Caves seem to demand comparisons like, biggest, deepest, longest. Carlsbad Cavern is none of these. But most of our visitors say that Carlsbad Cavern is the most beautiful cave in the world, and we're happy to settle for that.

#45 Just Before Longfellow's Bathtub

EMILY I love this area, especially the way the decorations are growing right on top of each other. I also like the way the pool is shaped, like a long bathtub.

BRAD The pool is a good place for us to learn more about research in Park Caves. Earlier we talked about how we might learn to preserve life, through research in Lechuguilla cave. Scientists had assumed that nothing lived in that environment. But today we know that bacteria live in the cave. Especially near pools of water, like this one.

EMILY How bacteria can survive without food or sun is another exciting discovery. Most of the bacteria in Lechuguilla cave survive by eating rocks, even more exciting scientists have discovered that many of these bacteria produce enzymes that restrict the growth of other bacteria.

BRAD Cancer doctors and NASA scientists are the ones who are most interested in these extreme bacteria. Those enzymes are being studied for their ability to attack cancer cells, while leaving healthy cells alone, perhaps leading to a cure for cancer. NASA scientists are studying the bacteria because the way life exists in extreme environments, may teach us a thing or two about the possibility of life on Mars.

EMILY So, inner space of caves, may teach us about outer space. How about that?

#46 Painted Grotto

BRAD Look at these colors, this is definitely one of my favorites spots. The colors come from minerals. Mostly there's calcite, the bright white rock you see. But you can see that many of the soda straws are sort of orange, that's because they've been stained by iron oxide.

EMILY Another color you've seen is black, which comes from manganese. This cave may not have a lot of color, but the colors are beautifully displayed. Sometimes you may see the color, green. That's another unintended consequence. The lights in the cave happen to be the right wave length, to encourage green algae to grow. Another source of green might be coins corroding in the cave pools.

BRAD Have you seen any formations that resemble something else? Just around the corner is a section of the cave called 'the Zoo', with a few minutes and a little imagination, you'll see how it got it's name.

#47 The Zoo

BRAD This is called 'the Zoo' because with a little imagination, you can see all sorts of animals in the formations.

EMILY That's one of the best things about this cave. You can be a serious scientist, or if you prefer you can be a kid again.

BRAD But please, don't feed the animals.

#48 Chinese Theatre

BRAD This area is called the Chinese Theatre. As you can imagine this cave attracts global attention. Every year visitors come from all over the world. Everyone seems to walk through the cave with the same awe struck

expression. They seem to know that protection of the cave is important because of what their visit meant to them.

EMILY In 1995, Carlsbad Cavern was designated as a World Heritage Site. That means that Carlsbad Cavern belongs to all the citizens of planet Earth. It's a special place that ignites a spark of wonder and awe in each of us.

BRAD The National Park Service is proud of this honor and is committed to making sure that this treasure is here for the children and grandchildren of the world to experience just like you have today.

#49 Trap Door

EMILY Let's listen to Tom Bemis, Cave Technician:

TOM I consider caves to be one of the last frontiers on this planet. On the surface of the Earth, pretty much everything has been explored now, but you get down underground or the floor of the ocean, that's about all that's left.

EMILY We've seen some amazing sights and we've learned some amazing facts about Carlsbad Cavern. It's been fun showing you my favorite scenes and having the chance to help create your memories.

BRAD We're back in the small end of the Big Room where you started. You might have had great expectations and a desire to learn something new about a part of your heritage. Now you've come full circle, and we hope the tour has lived up to your expectations and maybe even exceeded a few.

EMILY Thanks for letting us share this time with you. We hope you come back again soon. When you do you'll find that the cavern hasn't revealed all of it's secrets. You'll see things that'll you swear weren't here today, but they were. That's the magic of Carlsbad Cavern.

#50 Elevator Lobby

BRAD The elevators will take you back to the Visitor Center, where you started. They cover the 750 feet to the surface in just under a minute. As you ride you can watch the distance go by on the red illuminated panel over the door. Enjoy your trip up and out of the Cave.

EMILY If you'd like to learn more about Carlsbad Caverns or many of your other National Park Service areas, visit the Cavern Bookstore, just across the lobby from the elevators. They have lots of publications, videos, music and DVD's for all ages. You can even adopt your very own bat. The proceeds go to research and education here at the Park.

BRAD Rangers offer lots of other educational tours and programs, so check at the Information Desk for details. They can also tell you how you can become a Junior Ranger.

EMILY Thank you for allowing us to share your day, and come back soon.

BRAD For Carlsbad Caverns National Park, I'm Brad Kincaid.

EMILY And I'm Emily Baker.

BRAD Bye now!

EMILY See you soon.