

CANYONS & CAVES

A Newsletter from the Resource Management Offices
Carlsbad Caverns National Park



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Edited by Dale L. Pate

Special Thanks to Paula Bauer, Bill Bentley, Kelly Thomas

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Look for Issues of *Canyons & Caves* at the following websites: <http://www.caver.net/> Once there, go to the Caves & Canyons icon. Bill Bentley has placed all issues on his personal website. <http://www.nps.gov/cave/> Kelly Thomas is in the process of placing these newsletters on the park website.

Photo montage: *Spring comes to the Desert.* From left to right, flowers of the Prickly Pear Cactus, the Ocotillo, and the Strawberry Cactus.

All Photos © Dale L. Pate 1999

RESOURCE NEWS

Pre-design Plan for Carlsbad Cavern Area – The Denver Service Center is preparing a Pre-design Plan for the developed surface areas above Carlsbad Cavern. This plan will decide whether segments of the present infrastructure will be removed, mitigated or left in place. This extremely important document will be open for public review through the NEPA process. Changes being considered in the plan are the removal of the Mission 66 housing (the 3-bedroom apartments), the maintenance facility, the Bat Flight parking area, redesign of most parking and road areas to mitigate fluid leakage from vehicles and several other infrastructure

changes. In conjunction with the development of this plan, a separate plan is being developed that will lead to the remodeling of the entire Visitor Center. An open house will be held on June 29, 1999 from 3pm to 8pm at the Stevens Motel in the town of Carlsbad for anyone wanting to comment on either of these projects. A draft Environmental Assessment (EA) for the Pre-design Plan will be available for public review a few months after the open house. Anyone wanting to receive a copy of this draft EA should contact the Superintendent, Frank Deckert at the following address: Carlsbad Caverns National Park, 3225 National Parks Highway, Carlsbad, New Mexico 88220

Welcome to Paul Burger – Paul recently accepted a temporary position to produce the Environmental Assessment for the Pre-design Plan that is being prepared for the park by the Denver Service Center. The Pre-design Plan is a document that will decide the fate of a number of NPS structures that have been built directly over Carlsbad Cavern. As a karst hydrologist, Paul brings an excellent working knowledge of the karst of the area to this project.

Roads & Parking Lots Get Resurfaced



NPS Photo by Dale Pate

Angel Hair - Jason Richards has been monitoring the angel hair or cave cotton that grows seasonally along the Long Loop of Lower Cave in Carlsbad Cavern for awhile now (See *Canyons & Caves* No. 11, page 7 for a description of the project). No one was ever sure of the exact mineral that grew there because there are several possibilities. Recently, Victor Polyak was able to determine what the angel hair

consisted of. His analysis shows that it is **thenardite** (Na_2SO_4), a dehydration product of **mirabilite** ($\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$).

Fringed Myotis Bats in Carlsbad Cavern – On June 19, 1999 Stan Allison and Gosia Roemer counted an average of 270 Fringed Myotis bats leaving Left-hand Tunnel for their nightly feed outside. Based on a recommendation from Dr. Ken Geluso, we monitor the size of this maternity colony twice each summer by counting the individuals as they fly along Left-hand Tunnel. One count is done in June before the baby bats are born and once in August after the babies are flying. The counts are accomplished by two individuals using bat detectors with earphones where they sit in the dark of Left-hand Tunnel for approximately 3 hours making no noise and each count the number of bats that fly by their location. The two counts are then averaged for the number. For a brief description of the initial study that Drs. Geluso and Troy Best performed, see *Canyons & Caves* No. 2, page 5.

BELL'S VIREO UPDATE

by Rob Taylor and David Roemer

Each year about 30 Bell's vireos make their way from wintering grounds in the tropics to the riparian woodlands of Rattlesnake Springs to breed. Rattlesnake Springs is the northwestern-most outpost for this particular subspecies of Bell's vireo (*Vireo bellii medius*), a small insectivorous songbird. In southwestern Texas, where the bulk of the U.S. population of *V.b. medius* breeds, populations have been declining for the past 25 years. The small population here is therefore of considerable conservation interest. Though the vireos have returned to Rattlesnake Springs for many years, their future is uncertain due to the low reproductive success they experience here. Since 1996, resource managers at Carlsbad Caverns have been monitoring the vireo population in an attempt to understand why vireo nests produce so few young, and determine ways to manage for healthier populations.

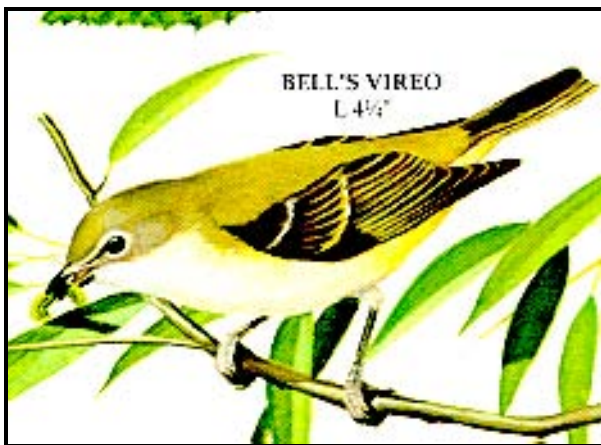


Illustration borrowed from the Golden Press – A Guide to Field Identification, Birds of North America by Robbins, Bruun, and Zim.

Resource managers have suspected – and our observations have borne out – that the main cause of nest failure in Bell's vireos is parasitism by brown-headed cowbirds. Cowbirds do not build nests of their own, but

instead lay their eggs in the nests of other “host” species. The host, not realizing that the egg is not its own, incubates the cowbird egg, feeds the nestling, and even cares for it after it leaves the nest. Since cowbird eggs hatch quickly, host eggs may not hatch at all. If they do, the larger and more aggressive cowbird chick gets the lion's share of the food brought by the parents, and the host nestlings may starve. The adult cowbird female frequently removes one or more host eggs to increase the chances that her own egg will hatch, further reducing the productivity of the host species.

Bell's vireos seem particularly susceptible to cowbirds. Nest parasitism rates of up to 69% have been reported in the literature, and higher rates (up to 80%) have been observed at Rattlesnake Springs. Vireos have presumably survived for millennia in the presence of some degree of cowbird parasitism. However, human modification of the landscape during the past century has altered the playing field for these relationships, reducing suitable habitat for some species (e.g., Bell's vireo), while creating favorable conditions for others, such as the brown-headed cowbird. The reduction of riparian habitat, and the introduction of cattle ranching and irrigated farming to the southwest, have created very favorable conditions for cowbirds, allowing them to significantly expand their range and numbers.

This year, there are approximately 15 pairs of Bell's vireo at Rattlesnake Springs. As of June 23, they have built 46 nests, 36 of which have failed, 7 that are still active, and only 3 that have succeeded in fledging young. Some nests fail because cowbirds have laid eggs in vireo nests before the vireos have finished building it. In other cases, cowbirds have destroyed one or more vireo eggs during incubation. Vireos tend to abandon their nests under such harassment by cowbirds, but in one instance we found a vireo that was continuing to incubate a nest containing three cowbird eggs and no vireo eggs. In addition to nest failure due to cowbirds, there are the usual risks of predation and inclement weather that cause nest failure at Rattlesnake Springs.

For the last three years, resource managers have attempted to reduce the impacts of cowbirds by removing the cowbird eggs from vireo nests. In 1998 we managed 10 vireo nests in this way, and 5 of them were successful (leading to vireo fledging success). Unfortunately, this method only works for nests that we can find and reach safely. There were 9 other vireo nests in 1998 that were found too late for management - the vireos had already abandoned them. Additionally, cowbirds often revisit nests and continue to destroy host eggs. Therefore, nest management is a somewhat unreliable method for reducing the impacts of cowbirds.

Beginning this year, we have been trapping and euthanizing cowbirds in an effort to reduce cowbird densities and the incidence of nest parasitism in Bell's vireo. The trapping program got off to a slow start due to the reluctance of cowbirds to enter the traps. It is possible that the abundance of other food resources in the area made it difficult to initially attract cowbirds to the traps (for example, over 100 cowbirds have been observed feeding at the BLM alfalfa field along the Black River). To solve that problem we had to import cowbirds from a trapping program on the Rio Grande to stock our traps. These birds attracted

cowbirds from Rattlesnake Springs and the Black River into the traps. To date we have removed about 40 cowbirds from the local population, and hope to see a positive effect on vireo nest success. Because the behavior of cowbirds and vireos change as the breeding season progresses, we will likely have to wait until the end of the year to know if the trapping program was effective.

To date, only three pairs of Bell's vireo have successfully fledged young at Rattlesnake Springs, and only one other pair was busy feeding a vireo nestling. We hope for improved success in the remainder of this season, and a much better year next summer. If our efforts are successful, people will continue to hear the sprightly, raspy (some have called it "unmusical") song of the Bell's vireo for many years to come.

LECHUGUILLA EXPLORATION AND SURVEY UPDATE

by Stan Allison

Exploration and survey work continues in Lechuguilla Cave with a total of 7 week long expeditions planned for 1999. Ordinarily six survey and exploration expeditions are allowed per year. In 1998, one of the expeditions was postponed until this year resulting in 7 for 1999.

An expedition led by Peter and Dave Jones in December of 1998 resulted in the known surveyed length of the cave passing the much-talked about 100-mile mark. Their group surveyed over 6,000 feet of cave mainly in the East and Southwest sections of the cave. Several interesting areas were found in the Far East. A 100-foot climb above Grand Guadalupe Junction led to a series of well decorated rooms containing beautiful gypsum fins, dogtooth spar and pristine corrosion residues (An interesting side note is that over the years Lechuguilla cavers' thoughts on corrosion residue have changed from thinking of it as a slick, gross nuisance to realizing that it is a beautiful feature full of microbial life which deserves protection). Names of the rooms in this area include "Elnido Del Lobo" (Lobo's Lair) and "Century Hall" named because the 100-mile mark was passed on this expedition. Fin-like stalagmite walls approximately one-foot tall were found in the La Morada Maze. The discoverers of this strange speleothem had never seen anything similar to it in Lechuguilla before. Surveyed mileage at the end of this expedition was 100.6 miles (160.7 kilometers).

Steve Reames led an expedition in March of 1999. New survey of 540 feet was accomplished along with 1,824 feet of resurvey. Survey work was done in the North Rift, Chandelier Graveyard and Southwest sections of the cave. Trail flagging was done in the High Hopes area to confine traffic to a defined path. The High Hopes team found an extremely tight squeeze off of the FLL survey that led to a 25-foot drop requiring rope. This lead still waits exploration as only one team member could negotiate the squeeze. Much of this expeditions' work centered on fixing survey loop errors and performing resketches of the Chandelier Graveyard area of the Western Borehole. Unfortunately some of the earlier sketches of Lechuguilla were poorly done probably due to the excitement of virgin cave overcoming the need to perform quality survey. In order for final maps

to be drawn of the area, some resketching was necessary. Fortunately, due to the acquisition of two laser range finders by the Cave Resource Office it is now possible to perform resketches and measure passage dimensions with minimal impact. In the past walls were measured using survey tapes that required the cavers to walk across the passage with a tape. This resulted in impacts to the floor. Now, using the range finder to measure wall and ceiling distances it was possible for a resketch of the Three Amigos Room to be accomplished with out ever leaving the flagged trail! At the end of this expedition the surveyed length of Lechuguilla Cave was 100.85 miles (161.1 kilometers).

Peter Bosted led an expedition in May 1999 in which 4,100 feet of new survey along with 800 feet of resurvey was performed. All of the work was done in the Western Borehole. Highlights of the expedition include the discovery of an area above "Hard Daze Night Hall" that contained beautiful aragonite and a pool 15 feet by 20 feet and of an unknown depth. This area was named "La Vida de Altibajos" (The Life of Up and Down) in reference to the many vertical fluctuations in the passage. Possible barite formations were noted as well as minerals tentatively identified as green endellite and fluorapatite. Most of the new survey was accomplished in the Mental Breakdown and Chandelier Graveyard areas. At the end of this expedition the surveyed length of Lechuguilla was 101.7 miles (162.4 kilometers).

Joel Despain, Vivian Loftin and Greg Stock led an expedition in June 1999. Their expedition netted about 2,500 feet of new survey bringing the survey length of Lechuguilla Cave to 102.23 miles (163.3 kilometers). Work focused on finishing leads and resketching in the Fubar survey, ABC's Room and Needle Park Maze areas of the Western Borehole. The expedition leaders will use the information gathered from this expedition to draw final maps of these areas. Highlights from the expedition include an area off of the Fubar area that contained large gypsum flowers and numerous crinoid, horn coral and brachiopod fossils. Several crinoid stems were found sticking out from the limestone bedrock walls approximately 8 inches! A new pool 40 feet long, 10 feet wide and two feet deep was discovered in the Dead Sea area. Although the passage continued across the pool, exploration was stopped in an effort to keep the pool pristine for potential microbe research in the future.

Four more expeditions are planned for 1999. Mark Rosbrook will lead an expedition July 24-31. The Lechuguilla Exploration and Research Network (LEARN) has a permits for expeditions August 7-14, September 11-18 and October 23-30.

NEW MEXICO HAS LOST 22 VERTEBRATES

According to the Spring 1999 issue of *Share with Wildlife Update*, twenty-two species and subspecies of vertebrates have been extirpated from New Mexico (which means that they are no longer found in New Mexico, but are found in other areas). Five of these twenty-two are now extinct (which means that they are gone forever). These vertebrates are as follows:

Extinct Vertebrates

Rio Grande Bluntnose Shiner
Phantom Shiner
New Mexico Sharp-tailed Grouse
Merriam's Elk
Hot Springs Cotton Rat

Extirpated Vertebrates

Shovelnose Sturgeon
Spotted Gar
Colorado River Cutthroat Trout
American Eel
Bonytail Chub
Beautiful Shiner
Polomas Pupfish
Freshwater Drum
Sage Grouse
Gray Wolf
Grizzly Bear
Black-footed Ferret
Mink
Southwestern River Otter
American Bison
Western Boreal Toad
Lowland Leopard Frog

SQUIRRELS OF THE PARK

by Ken Geluso

Five species of squirrels occur in Carlsbad Caverns National Park (CCNP) –**rock squirrel** (*Spermophilus variegatus*), **Mexican ground squirrel** (*Spermophilus mexicanus*), **the spotted ground squirrel** (*Spermophilus pilosoma*), **the gray-footed chipmunk** (*Tamias canipes*), and the **Texas antelope squirrel** (*Ammospermophilus interpres*).

Rock Squirrel – The rock squirrel is by far the most commonly observed rodent in the park, and as its name implies, it is almost always associated with rocks. In the park, this species occurs in all habitats of the reef but is most common on canyon slopes containing rock outcrops and cliffs. I have seen numerous animals, for example, in these rock formations while driving along Walnut Canyon. On one spring afternoon, I counted over a dozen squirrels on rocks as I walked up Yucca Canyon. A rock squirrel was trapped on a rock ledge near Yucca cabin at an elevation of 5,800 feet. The trap site was in a ravine containing a dense stand of evergreens and deciduous trees. At 5,790 feet, another rock squirrel was spotted on a grassy knoll containing many patches of gray oak. Here vegetation grew among rocks, stones, and areas of exposed soil.

Although I have never seen a rock squirrel in open, flat areas of the seabed along the base of the escarpment, I have observed them in the deep arroyos that cut through the flatlands. Here they live on rocky ledges of the steep walls of the arroyo. Rock squirrels also occur in seabed habitats at Rattlesnake Springs where the only exposed “rocks” are cement aqueducts, the rock-lined storage pond, and a small man-made pile of rocks near the horse barn. At least one family of squirrels lived near the ranger station where they burrowed under a metal shed and next to the aqueduct. A

rock squirrel also lived next to the rock pile near the horse barn. The lowest elevation that I observed a rock squirrel in the park was 3,625 feet at Rattlesnake Springs.



Rock Squirrel

(Photo by Ken Geluso)

Rock squirrels are basically ground dwelling animals but occasionally climb trees to feed and sometimes may even den in them. At Rattlesnake Springs, I saw one in a hollow trunk of a large weeping willow behind the ranger station. On three occasions, I have observed them sitting in the branches of trees near Carlsbad Cavern.

Although their activity may be curtailed on exceptionally cold days, rock squirrels apparently do not hibernate at CCNP. In fact, individuals can be seen most days throughout the year sitting on rocks at the entrance to Carlsbad Cavern. On 27 January, I watched two individuals sunning themselves at this location when the air temperature was 23.3°C. On 4 February, another one was eating the seeds of a juniper when the ambient temperature was 20.0°C. Near Flagstaff, Arizona, active rock squirrels have been observed basking at air temperatures of 10.0°C.

Ordinarily rock squirrels are too large to catch in the size of sherman live-traps used in my study, but a small female managed to squeeze into one on 24 July. This subadult weighed 275 grams and showed no signs of reproductive activity. On 21 May, I caught one of several young rock squirrels living in a wood pile next to the ranger station at Rattlesnake Springs. This young female weighed 165 grams.

Mexican Ground Squirrel – At CCNP, Mexican ground squirrels are found in the flat lowlands of the seabed where desert scrub predominates. In the flats along the base of the escarpment, a young female was collected on a rocky substrate containing numerous patches of lechuguilla, while another young female was trapped in an area of exposed soil with small stones and no lechuguilla. In both situations, sparse grass grew among widely spaced shrubs. At Rattlesnake Springs, Mexican ground squirrels were found in similar habitats. An adult male and female were trapped under an acacia in the small area of desert scrub by the shooting range. The area contained silty soil and little grass, but some spots had stones and rocks. Near the horse barn, I observed an adult female picking the flowers of the Mexican vervain. I later trapped this individual under a littleleaf sumac. This shrubby area is heavily grazed by horses and contains very little grass growing on the fine, dusty soil.



Mexican Spotted Squirrel

(Photo by Ken Geluso)

Although Mexican ground squirrels in the park were caught only in habitats containing sparse grass, this species does inhabit grassy areas. On seven occasions I spotted these squirrels in grassy situations along paved roads just outside the park. Habitats beyond the roadsides were either desert scrubland or areas disturbed by man. I later trapped one of these squirrels, a large male, leaving its burrow on 30 April. It's burrow dropped straight down for 130 mm before bending and had an entrance opening of 55 by 60 mm in diameter. The dozen Mexican ground squirrels mentioned above were taken or seen at elevations ranging from 3,610 to 3,680 feet.

In the town of Carlsbad, Mexican ground squirrels are common on golf courses and in other similar situations. I observed as many as five at a time on the front lawn of the Civic Center on the south side of town. The Civic Center is 3,165 feet above sea level.

It is not clear whether or not Mexican ground squirrels hibernate. In the Trans-Pecos region of Texas, this squirrel is seldom seen during the winter months. Late winter was the first time I noticed Mexican ground squirrels in the present study; four individuals were active on the lawn of the Civic Center on 17 March 1991. Two days later at this spot, I watched these squirrels chase one another and, in one instance, mate. On this day, I trapped a female from this location.

Adult females collected on 19 March, 7 May, and 15 May showed no obvious signs of reproductive activity. Two young females were collected, one each on 20 July and 11 August, and were not reproductively active.

Spotted Ground Squirrel – Spotted ground squirrels are found in arid grasslands and deserts throughout New Mexico. I obtained only one specimen from CCNP. This individual was trapped in desert scrubland along the base of the escarpment on 27 July. The surrounding area was flat with soil containing small stones. Shrubs included tarbush, creosote bush, mesquite, viscid acacia, javelina bush, mariola, and Christmas cholla. Grass was sparse and lechuguilla was not present. The burrow of this female was located under a creosote bush. It went straight down for 100 mm before bending, and its entrance opening was 45 by 55 mm.

I collected two other spotted ground squirrels outside the boundary of the park. A male was captured on top of a mound constructed by a banner-tailed kangaroo rat on the morning of 15 March. Surrounding vegetation included creosote bush, viscid acacia, javelina bush, mariola,

prickly pear, and skeletonleaf goldeneye. Bare soil mixed with small stones and some rocks covered the ground between the shrubs, and no lechuguilla and almost no grass was present. The trapsite was located one mile from the park's southern boundary near the vicinity of New Cave. On



Spotted Ground Squirrel

(Photo by Ken Geluso)

7 May, a female was captured only 0.2 miles from the east entrance to Rattlesnake Springs. The trap was set under an allthorn next to a paved road. Nearby vegetation included creosote bush, tarbush, mesquite, fourwing saltbush, catclaw acacia, and clumps of grass. Vegetation grew on a silty soil. Beyond the roadside was a desert-scrub habitat. The three spotted ground squirrels mentioned above were taken at elevations of 3,700, 3,980, and 3,630 feet, respectively.

Spotted ground squirrels are known to hibernate in New Mexico. In short-grass prairies of central New Mexico, most squirrels emerged from hibernation between mid-March and early April. The first spotted ground squirrel I saw during the present study was on 15 March.

Gray-footed Chipmunk – See *Canyons & Caves* No. 7, page 6 for a write-up on this chipmunk.



(Photo by Ken Geluso)

Texas Antelope Squirrel – See *Canyons & Caves* No. 9, page 5 for a write-up on this squirrel.



(Photo by Ken Geluso)

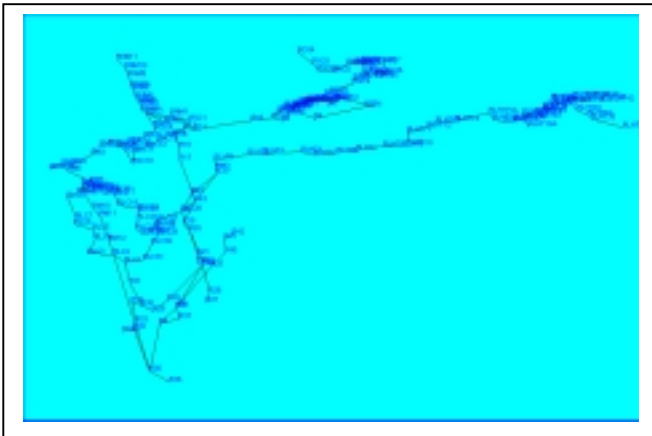
This article was taken from a 1992 report by Ken Geluso titled "Rodents of Carlsbad Caverns National Park."

CARLSBAD CAVERN EXPLORATION UPDATE

by Jason M. Richards

Though the official length of Carlsbad Cavern still remains at 30.85 miles (49.3 kilometers), over 27 miles of resurvey has been accomplished by numerous groups over the last few years. The resurvey is expected to surpass the known length of the cave in the next year or so.

In the 1960's and again in the 1970's, Tom Rohrer did a precision theodolite survey of Carlsbad Cavern. Today, Tom's survey is used as the backbone for the map of the cave. When surveys in different areas of the cave are started, they are tied into a "Rohrer point", and given a survey designation letter or letters. The line plot below is the Rohrer point backbone for the resurvey project of Carlsbad Cavern.



During the first part of 1999 there have been two Cave Research Foundation, and four private survey expeditions, totaling 1.72 miles of added passage to the current map. Joe Sumbera, Steve Keselik and team Troglebrau from San Marcos, Texas are continuing their Central Boneyard survey in Lower Cave. Barry and Rita Loucks, and Ann Scavarda from Phoenix, Arizona, returned to continue their survey of Left Hand Tunnel. Recently, Kathy and Dale Lankford from Denver, Colorado, and Dennis Worthington from Ruidoso, New Mexico, started the Middle Earth and Netherworld survey out of the Big Room.

Expeditions planned for the rest of the year include the continued survey of Middle Earth, F-fissure, Central Boneyard, Remarkable Crack, and Lake of the Clouds (after the bats leave). With the enthusiasm and quality of the present survey teams, perhaps we will officially break the 30-mile mark by the millennium.

TURKEY VULTURES, A SIGN OF SUMMER

by Gary Vequist

Beginning around the first of May, turkey vultures are a common sight in the park as they migrate north from Mexico. You can see them gracefully soaring with their characteristic wing tips curved upward. Their six-foot wing span form a dihedral angle that stabilizes the bird during the frequent desert wind storms. From the Visitor Center they can be seen pointing into the wind, staying aloft with minor feather adjustments. Even on days with little wind, they seem to find updrafts off the escarpment. If only my sailboat could utilize wind as efficiently as this large bird.



A Turkey Vulture rides the wind.

Photo © Dale L. Pate 1998

Like the bats of Carlsbad, the turkey vulture is a misunderstood creature. Few understand its ecological role as a carrion feeder. The turkey vultures use their sense of sight and smell to find food, unlike other vultures, which use sight only. The turkey vultures will see the carcass, but won't eat it until they have smelled it. Research has shown that they can locate food hidden from sight if it is odoriferous enough for their fancy. Their red featherless head makes them different from their close relative the black vulture.

These vultures do well in this habitat because they feed on different kinds of animals. They devour carcasses of cattle, deer, rodents, snakes and miscellaneous road kill. Then like other birds, they return to the nest to feed their young. Feeding involves regurgitating the rotten morsels, creating a stench that is only pleasing to vultures. Cave Specialist Stan Alison recently said that, "he had observed a turkey vulture regurgitating its food as a defense mechanism to scare him away and it wasn't a pleasant experience."

Vultures normally nest in hollow stumps or on the ground in thickets, but also have been known to nest in the entrances to caves. Every evening at Rattlesnake Springs over 100 vultures roost in cottonwood trees for the night. On one of those rare foggy, windless days, I once observed over 30 vultures perched on the fence around the tennis court near the housing area of the park. Now that was an eerie sight.

Turkey vultures migrate south in late autumn heading for warmer climes. Since they are soaring birds, they seldom travel far in a straight line. They must circle frequently to gain altitude before resuming their gliding path. On your next trip through Walnut Canyon, stop at a pullout and look up for these black gliders.

THE ESA AT TWENTY-FIVE

by Gerry Jackson

"Nothing is more priceless and more worthy of preservation than the rich array of animal life with which our country has been blessed." With these words, on December 28, 1973, President Richard Nixon signed the **Endangered Species Act (ESA)**, a law that has proven to be one of the strongest and most foresighted efforts ever made to protect the delicate web of life.

Backed by a groundswell of public support, Congress, in enacting the ESA, committed the Nation to reversing the alarming trend of extinctions that threatened the biological integrity of our country's natural resources.

Fervor for the law was spurred by the knowledge that over 500 species of native plants and animals had become extinct since Colonial days. Furthermore, half of these extinctions had occurred during the previous 50 years, from 1922 to 1972. Projections were that, within 25 years, an additional 40 mammals and birds and 25 fish species would become extinct if the trend were not halted.

Congresswoman Leonore K. Sullivan, who at that time chaired the House Committee on Merchant Marine and Fisheries, summarized the need felt by many for an ecological safety net. "*Man's presence on the Earth is relatively recent and his dominion over the world's life-support systems has taken place within a few short generations. Our ability to destroy, or almost destroy, all intelligent life on the planet became apparent only in this generation. A certain humility, and a sense of urgency, seem indicated.*"

While earlier endangered species laws passed in 1966 and 1969 raised public awareness about the plight of rare animals, it was the 1973 act that provided the real tools to help wildlife and plants facing extinction.

Under this law, endangered species conservation has built an impressive track record. In 25 years, the ESA has proven remarkably effective at preventing extinctions and slowing the decline of imperiled species. Nearly half of all species for a decade or more are now either stable or improving in status. Only seven, or less than 1 percent, have been found to be extinct. Preventing extinction of the remaining 99 percent of listed species is one of the ESA's greatest successes.

Futhermore, since 1973, 11 species have been removed from the list due to recovery. Another 18 species (all but 3 of which are native to the United States) have been reclassified from endangered to the less critical category of threatened, including the American peregrine falcon (*Falco peregrinus anatum*), bald eagle (*Haliaeetus leucocephalus*), and gray wolf (*Canis lupus*). Last June, Secretary Babbitt announced that these three species, and nearly 20 others, are

now being considered for delisting or downlisting due at least in part to recovery progress.

Certainly, the ESA's first 25 years have not been without controversy - at times, intense controversy. Although protection of most species has gone without much public attention, a few, such as the snail darter (*Percina tanasi*) and northern spotted owl (*Strix occidentalis caurine*), have been lightning rods for contention.

But in examining the facts, we find that economic development can be compatible with the goals of the ESA. Of more than 145,000 Federal actions reviewed formally and informally between 1979 and 1992, only 69 - or less than one-tenth of one percent - resulted in a jeopardy decision where there was no reasonable and prudent alternative for protecting the species. This is an average of 2 of 11,000 projects reviewed annually.

Despite some controversy, the incremental knowledge gained through a quarter century of experience with the ESA has enabled the Fish and Wildlife Service to review, validate, fine-tune, and implement creative reforms designed to improve the ESA's effectiveness, while easing regulatory burdens on landowners and businesses, and encouraging the development of partnerships to conserve species. As we look back over the last 25 years of endangered species protection, we can see that implementation of the ESA has evolved in a very positive way. The approaches of the early days of the ESA - single species management, confrontation, and rigidity - have given way to a multi-species/ecosystem focus, landscape approaches to management, increased regulatory flexibility, and a new sense of partnership.

As we approach the Year 2000, citizens all over the globe are taking the time to reflect on the significance of the new millennium to each of us as individuals and to society as a whole.