The Black Range Naturalist

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What's Next for the Herps?

We plan a similar effort for the snakes of the Black Range in the October 2023 issue. If you have photographs, observations, or research which you would like to share in that issue, please send them to the editor. At this point, we pretty much have the rattlesnakes covered - except for the Black-tailed Rattlesnake split.

If you note any errors in the material included in this issue, please let us know. Sometime in 2024 we will issue one of our "book" publications on the reptiles of the Black Range, including material from this issue and the (anticipated) October issue. So if you have images, observations, or research which enhances material in this issue, please send it our way so it can be included in the 2024 book (sooner the better).

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Grizzly Bears in the Black Range

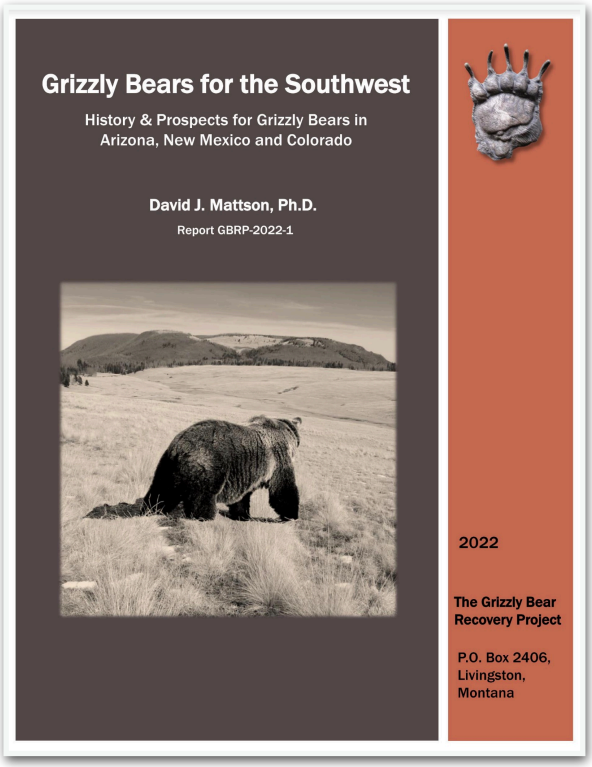
by Harley G. Shaw

For all the writing about grizzly bears in southwestern New Mexico, many questions remain regarding when, how many, and why. When, for example, did the big push start to eliminate the big bears from the region? Why did it start when it did? How many grizzlies lived in the area now called the Gila National Forest before Anglo settlement? What proportion of the Gila grizzlies resided in the Black Range? How many grizzlies were killed in the Black Range, as opposed to the area now defined by the Gila Wilderness? When was the last grizzly killed? When did the grizzly finally disappear from the region? Who were the hunters and trappers that pursued the big bears?

Many of these questions are addressed by a new, beautifully illustrated report by biologist David Mattson. Dave has the enviable lifestyle of summering in grizzly country in northern Montana - where grizzlies can still be seen - then wintering in SW New Mexico near country that once held grizzlies. He hopes that his report will foster thinking about putting the big bears back into the Gila Wilderness. He notes:

> *". . . my over-winter stays along the upper Gila and Mimbres Rivers in New Mexico have allowed me to make frequent forays into the Mogollon and Black Range Mountains where grizzlies managed to survive into the 1930s (Brown 1996). From all of this I have been left with vivid impressions of not only extensive wild country, but also severe human impacts.*
> *. . . I found myself taking note of potential grizzly bear foods and habitats, as well as more problematic features such as livestock husbandry practices, off-road vehicles, sport hunters, and the overall human footprint." (Mattson 2022)*

In the report, Mattson assesses historic grizzly habitats from multiple viewpoints: paleontology, archaeology, historical anthropology, the Spanish Entrada, and Anglo invasion. He provides the best assessment yet of verifiable historical records of grizzlies in the Southwest. He blends all of this with his own intimate knowledge of grizzly natural history: feeding habits, habitat needs, movements, reproduction rates, social behavior, and hibernation. Finally, he brings all of this to bear upon the current human social and political conditions, along with the potential effects of climate change, to assess the feasibility of restoring grizzlies to the Southwest.



If my reading is correct, Mattson considers adequate food availability within a climatic regime that grizzlies can tolerate to be the primary consideration in restoration efforts. Given our particular geographic area of interest, I want to bring his report, along with other historical material, to focus on the Black Range. Mattson notes:

> *"There is a remarkable concentration of diverse high-quality bear foods in highlands of the Southwest, notably in an arc from the San Francisco Peaks of Arizona southeast along the Coconino Plateau and Mogollon Rim to a terminus in the White, Mogollon, and Black Range Mountains in New Mexico . . ." (Ibid. p 23)*

And again:

> *"Metrics based on both NDVI and Wetness-Greenness closely agree in showing a concentration of productive grizzly bear habitat in an arc extending southeast from Arizona's San Francisco Peaks along the Mogollon Rim through the White, Mogollon, and Black Range Mountains–as well as in New Mexico's Sacramento, Sangre de Cristo, Jemez, and San Juan Mountains. These areas furthermore coincide with maximum diversity of oaks, piñon pines, and fruit-producing shrubs in the region." (p.50)*

Thus we have a current evaluation of historic grizzly range that rates our Black Range as among the best of remaining southwestern grizzly habitat, hence a potential restoration area. Yet when David Brown (1985), in assessing Grizzly records in the National Museum via Bailey (1931), tried to find verifiable records of grizzlies in the Black Range, he came up with only five.

Master story teller James A. McKenna (1936), in his *Black Range Tales*, mentions only three personal encounters with grizzlies, and these were all west of the Black Range, between Gila Hot Springs and Pinos Altos (pp. 21-27). He also tells, second hand, of two newcomers who encounter a "silvertip" somewhere north of Kingston, with one of them injured after shooting the bear with a small pocket pistol. The "pilgrim" survived, and the bear probably did. McKenna was known to embellish his stories, yet this single event seems to be the only grizzly he mentions in the Black Range proper. Whatever their credibility, McKenna's tales do not bespeak a high density of grizzlies.

Insofar as I can determine, master grizzly hunter Montague Stevens (1944) did not hunt in the Black Range. He acknowledges killing five grizzlies in ten years in the Gila country, then gets vague about how many he killed later, stating only "many."

Given a close reading of his own writings, famous bear hunter Ben Lilly (Carmony 1998) probably killed only one verifiable grizzly in the continental U. S., and that was in the Blue River country of Arizona, although he killed another big bear in Mexico that he had begun trailing in New Mexico. Lilly mentioned one foray into the Black Range near Chloride wherein he killed neither grizzly nor black bear (Carmony 1998). If he killed any grizzlies in the Black Range while employed by Federal Predator and Rodent Control, they were apparently lumped under the general category of bear.

Photographer and mining engineer Henry Schmidt documented the 1880s death of a grizzly near Chloride, New Mexico (Brown 1998 p. 52). His photo (see below) shows the bear packed on a burro, with a crowd of townspeople and children viewing it. No hounds are in the picture, so we might guess that the killing of the grizzly was an opportunistic event, or even that the bear was a trapped bear. If a story goes with the photo, I've yet to see it. It apparently was not one of the five bears tallied by Brown, above. The hunter was Christian Olsen. The 1910 U. S. Census shows a Christian Olsen, age 71, living in Chloride. His occupation was given as carpenter. He would have been in his 40s during the 1880s.

In 1930, the Evans brothers of Slash Ranch fame trailed a large grizzly from Diamond Creek, on the west side of the Black Range, and killed it in the headwaters of Las Animas Creek (Evans 1951). This animal is among the five counted in Brown's tally.

Brown (1983, p. 190) repeats a story told by J. E. Hawley about him and Albert Pickens finding an eccentric named Bear Moore torturing a bear to death in a pole trap. The species of the bear isn't given, but this story sounds similar to one told by Jack Stockbridge about Moore tormenting a bear in the Gila. Stockbridge doesn't provide the species, either (Brown and Murray 1988).

Living locally and snooping a bit, I have found records of two potential Black Range grizzlies that weren't previously recorded. Neither of these would pass a test of scientific rigor,



Hunting party with Grizzly Bear on a burro, Chloride, New Mexico, in the 1880s, photograph by Henry A. Schmidt.







so must be added, like those of McKenna, to the status of bear tales, not verifiable records. The first of these is noted in a letter provided by Patti Nunn[1] (the words inserted in parentheses are my interpretation of Archie's creative spelling):

> Patti says: *"I was reading a letter written by Archie Beals, in 1896. He herded goats for his brother Carl up in the mountains at Tierra Blanca. He writes:*
>
> *'My umbra (hombre?) had a fight with a bear last Sunday. He ... and then it wand (went?) off and came back that night and eat it up it was about 300 yards from camp. I mean eat the goat up it killed it was a silver tip about five feet high. I think that umbra was a little skirt (scairt?) just like you would be in the same place.' "*

Patti says Archie was not well and writes more like a child. *"He and Carl were Dr. Guy Beals, my great-grandfather's, brothers."*

A bear five feet tall on all fours would be unlikely, but such an estimate by a spooked goatherder wouldn't be unlikely. *"The mountains at Tierra Blanca"* place the bear toward the south end of the Black Range and in country where a grizzly could certainly be expected. We'll never know for sure.

A second recent record involves three framed photographs of a bear in a trap provided by now-deceased rancher Jimmy Bason[2]. Bason could provide no information on who took the picture or when or where the photo was taken. He suggested it may have been taken later than the 1930 Evans bear, which heretofore was considered the last known Grizzly Bear in the Black Range. It was obviously taken high on a southwestern mountain, in the mixed conifer vegetation. So far, searches of local early newspapers have not disclosed corroborating news. Again, quien sabe?

Although the bear in the photos doesn't appear in local newspapers, a search by Bob Barnes disclosed several grizzly hunts in our region, mainly between 1890 and 1910 (see following three pages). How many grizzlies were killed in the Black Range and never reported will go unknown.

The nature of the historical information makes precise determination of numbers, distribution, or trends in an area as small as the Black Range impossible. Accuracy of the earliest records, such as those by trapper James Ohio Pattie (1833), is difficult to assess. Stories were embellished, time uncertain, and in many cases, the individuals involved didn't know exactly where they were. Later results provided by early scientists, such as Bailey (1931), are confounded by the splitter taxonomy of the time, use of incomplete specimens and pickup skulls, and acceptance of records provided by non-scientists, such as Pattie and McKenna.

Finally, the latter days of the grizzly were difficult to track, because the big bears were given the coup de grace by government trappers and bounty hunters who, through indifference or purpose, failed to distinguish between black bears and grizzlies in their reports and were often obscure about the location where a bear was killed. Assessing historic numbers and distribution of grizzlies in the Black Range is impossible. About all we can say, based upon writings of Bailey (1931) and Ligon (1918, 1919, 1928), is that the Black Range was consistently heralded as a hangout of grizzlies, right up to the last one known to be killed in 1930. How many were present prior to 1880 and how many were killed by prospectors, ranchers, and professional predator control personnel is impossible to determine.

By the second decade of the 20th century, at least a few people, even hunters, were regretting the demise of the grizzly (Stevens 1944; Ligon 1928). Nonetheless, by this time, Federal predator control agents had been employed to eliminate any and all large carnivores from the range. For two of these, the grizzly and the Mexican gray wolf, they succeeded absolutely. Somehow, even in the face of modern poisons, the puma, black bear, and coyote survived and remain common in the Black Range.

Continued on page 8

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1. Nunn family correspondence file. Black Range Museum, Hillsboro, New Mexico.
2. Photo files. Black Range Museum, Hillsboro, NM.

What to Believe?

Determining the veracity and accuracy of information is always an issue in today's world - and in the past. Here and on the following two pages we present a few of the newspaper reports of Grizzly Bears (and Grizzly Bear hunts) in the Black Range. Remembering that a hunt does not a bear make. Newspaper companies want to sell newspapers, and sometimes their fact checking may be suspect. And there are always observer error issues... You decide.

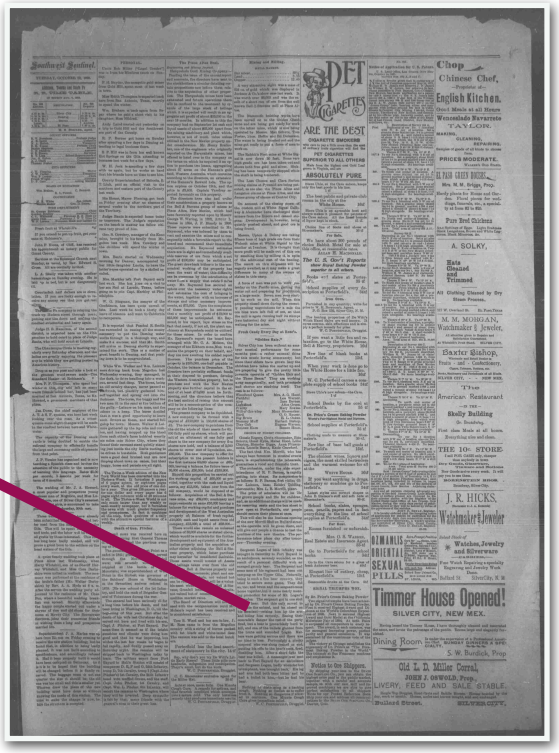
Al Watkins is laying plans for another big bear hunt to the Black range, He will be joined by friends from his old Texas home and local nimrods. Mr. Watkins has a world-wide reputation as a fearless and successful hunter of the terrible grizzly and your hair will invariably raise the lid from your head when he gets in the middle of some tale of a desperate encounter with a monster bear.



Deming Graphic, September 17, 1909

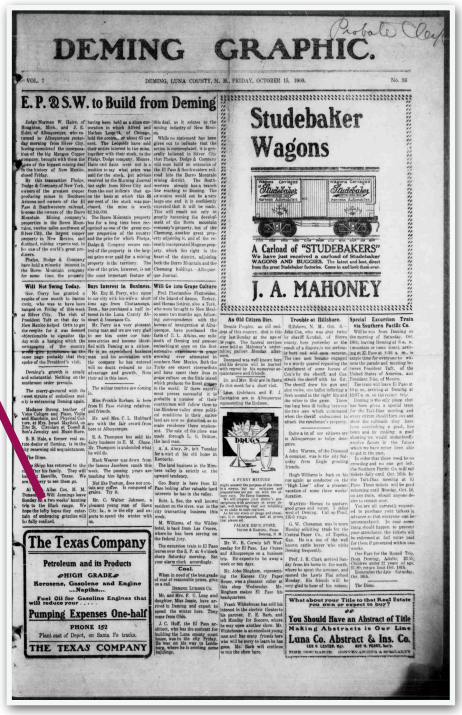
Sergeant Logan of 24th infantry was brought in Saturday to Fort Bayard in an ambulance, severely wounded, as the result of a personal difficulty with an enraged grizzly bear. The Sergeant and some men of his regiment had been out camping on the Upper Gila. Naturally, being in such a fine bear country, they tried to secure some game. They did so, too; and bruin and the sergeant came home together, but it came nearly meaning promotion for some of Mr. Logan's comrades. The sergeant got in one shot on the bear. But this only served to infuriate the animal, and he closed on his assailant—seizing him by the arm and biting him severely. Seeing their comrade's danger the rest of the party fired, but a bear is proverbially hard to kill, and one of the bullets glanced from the brute and wounded Logan. Matters were getting serious and there was no time to lose. Fortunately a plucky corporal who was along rushed in and, putting his rifle to the bear's neck, fired, disabling him. After a short fight the bear was killed. A messenger was sent back to Fort Bayard for an ambulance and Sergeant Logan, badly wounded but triumphant, was brought back. His leg and arm had both been bitten and he had a bullet in him,—but he had his bear.

Nothing to distressing as a backing



Southwest-Sentinel, October 22, 1895

Al Webb, Allan Cox, M. M. Dunson and Will Jennings leave Sunday on a two weeks' hunting trip to the Black range. We hope the lofty hopes they entertain of embracing grizzlies will be fully realized.


DEMING GRAPHIC.

E. P. & S. W. to Build from Deming

Studebaker Wagons

A Carload of "STUDEBAKERS" Wagons and Buggies

J. A. MAHONEY

The Texas Company

Petroleum and its Products

Pumping Expenses One-half

THE TEXAS COMPANY

Deming Graphic, October 15, 1909


LEVI STRAUSS & CO'S SPRING BOTTOM PANTS

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Nearly the Entire Democratic Ticket Elected.

Larrazolo's Majority 250.

THE SAVAGE MAGAZINE RIFLE.

SAVAGE REPEATING ARMS COMPANY.

A CLEAN STEAL—STEEL

SIERRA COUNTY BANK

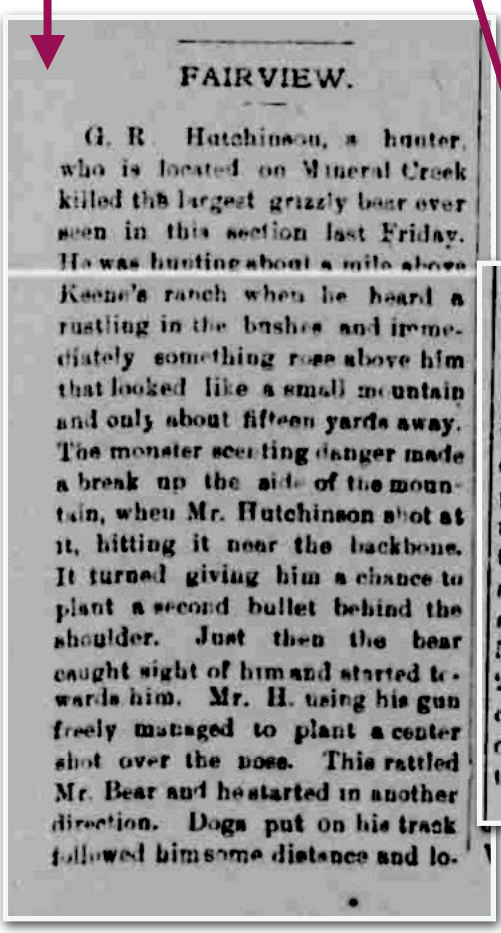
JAS. DALGLISH.

KELLER, MILLER & CO.

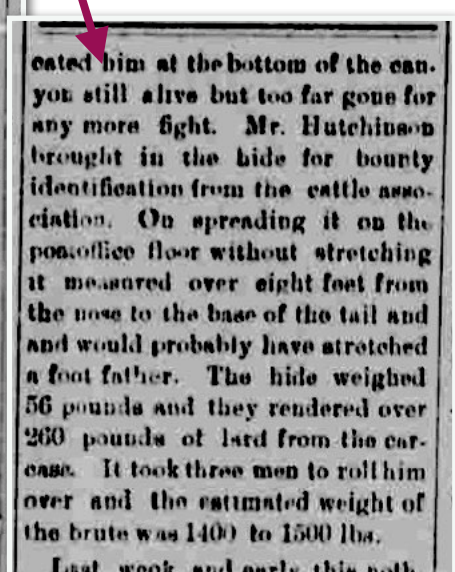
Sierra County Advocate Nov. 9, 1900

Killed Twelve Bear—Thomas Lyons and W. A. Foss of Silver City, in a hunting trip on the Sapello on the Gila forest killed twelve bear and one mountain lion. Six of the bear were grizzlies.

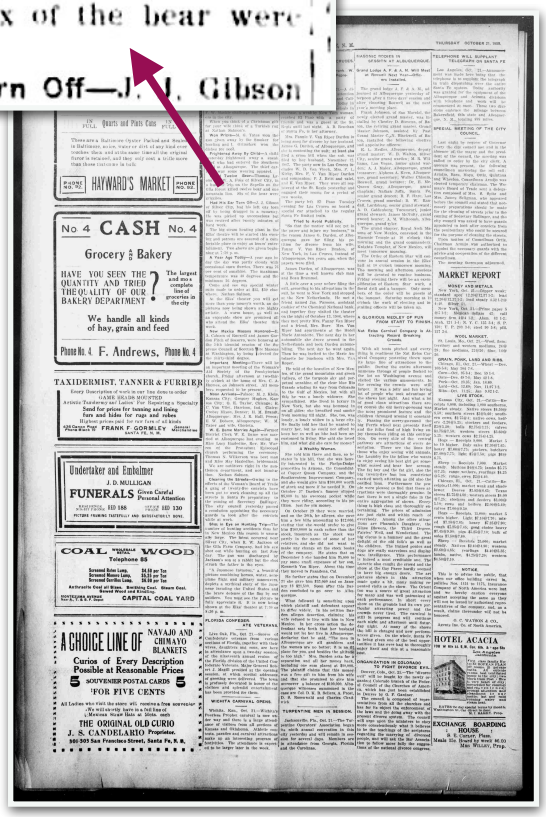
Had His Ear Torn Off—J. J. Gibson


FAIRVIEW.

G. R. Hutchinson, a hunter, who is located on Mineral Creek killed the largest grizzly bear ever seen in this section last Friday. He was hunting about a mile above Keene's ranch when he heard a rustling in the bushes and immediately something rose above him that looked like a small mountain and only about fifteen yards away. The monster scenting danger made a break up the side of the mountain, when Mr. Hutchinson shot at it, hitting it near the backbone. It turned giving him a chance to plant a second bullet behind the shoulder. Just then the bear caught sight of him and started towards him. Mr. H. using his gun freely managed to plant a center shot over the nose. This rattled Mr. Bear and he started in another direction. Dogs put on his track followed him some distance and lo-


cated him at the bottom of the canyon still alive but too far gone for any more fight. Mr. Hutchinson brought in the hide for bounty identification from the cattle association. On spreading it on the postoffice floor without stretching it measured over eight feet from the nose to the base of the tail and and would probably have stretched a foot father. The hide weighed 56 pounds and they rendered over 260 pounds of lard from the carcase. It took three men to roll him over and the estimated weight of the brute was 1400 to 1500 lbs.

Last week and early this noth-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MARKET REPORT

HOTEL ACACIA

EXCHANGE BOARDING HOUSE

Santa Fe New Mexican, October 21, 1909



THE BLACK RANGE.

For Fifty Cents a Year

THE KANSAS CITY

WEEKLY JOURNAL and AGRICULTURIST

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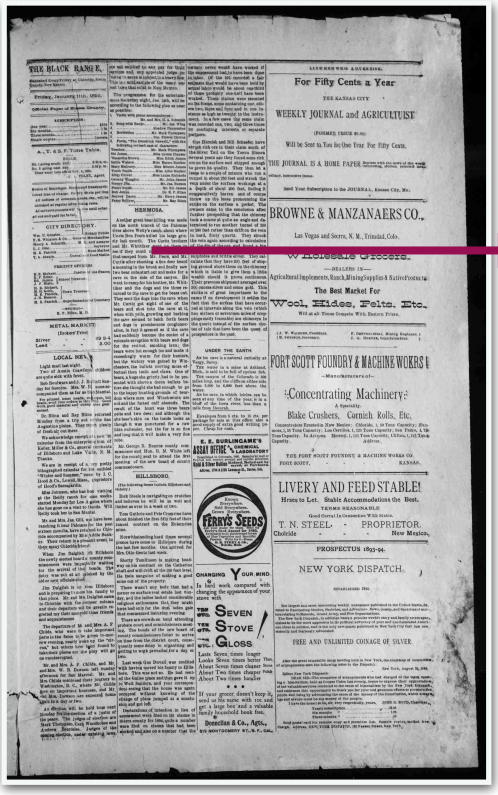
PROSPECTUS 1893-94.

NEW YORK DISPATCH.

The Black Range (Chloride), December 14, 1894



THE BLACK RANGE.

For Fifty Cents a Year

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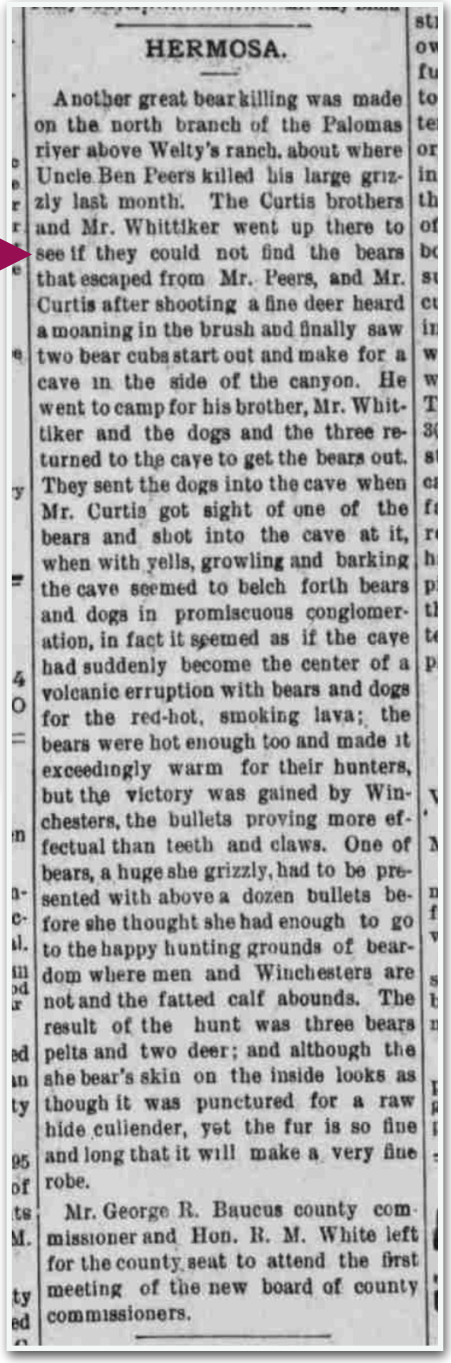
PROSPECTUS 1893-94.

NEW YORK DISPATCH.

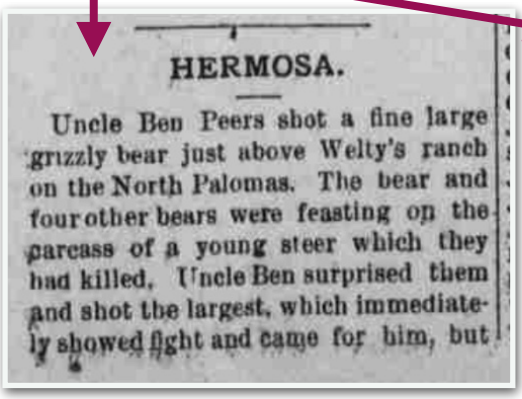
The Black Range (Chloride), January 11, 1895. For you history buffs, note the comment about White going to Hillsboro to attend the new county board of commissioners meeting.



HERMOSA.

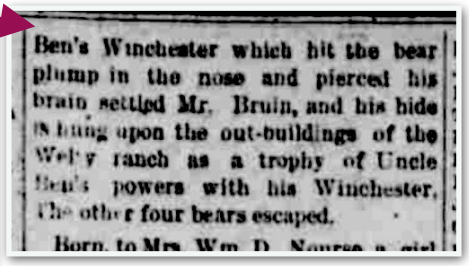
Another great bear killing was made on the north branch of the Palomas river above Welty's ranch, about where Uncle Ben Peers killed his large grizzly last month. The Curtis brothers and Mr. Whittiker went up there to see if they could not find the bears that escaped from Mr. Peers, and Mr. Curtis after shooting a fine deer heard a moaning in the brush and finally saw two bear cubs start out and make for a cave in the side of the canyon. He went to camp for his brother, Mr. Whittiker and the dogs and the three returned to the cave to get the bears out. They sent the dogs into the cave when Mr. Curtis got sight of one of the bears and shot into the cave at it, when with yells, growling and barking the cave seemed to belch forth bears and dogs in promiscuous conglomeration, in fact it seemed as if the cave had suddenly become the center of a volcanic erruption with bears and dogs for the red-hot, smoking lava; the bears were hot enough too and made it exceedingly warm for their hunters, but the victory was gained by Winchesters, the bullets proving more effectual than teeth and claws. One of bears, a huge she grizzly, had to be presented with above a dozen bullets before she thought she had enough to go to the happy hunting grounds of beardom where men and Winchesters are not and the fatted calf abounds. The result of the hunt was three bears pelts and two deer; and although the she bear's skin on the inside looks as though it was punctured for a raw hide culiender, yet the fur is so fine and long that it will make a very fine robe.

Mr. George R. Baucus county commissioner and Hon. R. M. White left for the county seat to attend the first meeting of the new board of county commissioners.



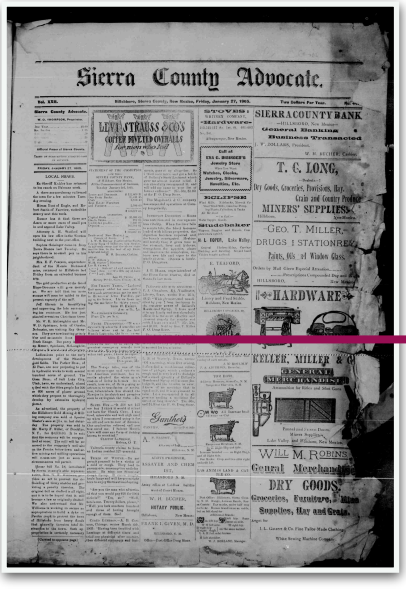
HERMOSA.

Uncle Ben Peers shot a fine large grizzly bear just above Welty's ranch on the North Palomas. The bear and four other bears were feasting on the carcass of a young steer which they had killed. Uncle Ben surprised them and shot the largest, which immediately showed fight and came for him, but



Ben's Winchester which hit the bear plump in the nose and pierced his brain settled Mr. Bruin, and his hide is hung upon the out-buildings of the Welty ranch as a trophy of Uncle Ben's powers with his Winchester. The other four bears escaped.

Born, to Mrs. Wm. D. Nourse a girl



Sierra County Advocate.

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Mr. W. R. McLaughlin and Mr. W. D. Spielman, both of Omaha, Nebraska, are visiting Ray Grayson. They are now hunting grizzly b'ar and mountain lions in the Black Range. The party is made up Messrs. Spielman, McLaughlin,

Sierra County Advocate, Jan. 27, 1905

Accuracy: Weight

The average adult male Grizzly Bear weighs from 300 to 800 pounds. A claim, in the November 9, 1900 *Sierra County Advocate*, of a 1500 pound bear is more than a little suspect. A 1200 pound bear killed near Burns Lake, British Columbia is the current official record holder for largest bear. Some sources claim that Kodiak Bears can range to 1500 pounds at the end of the salmon season. Both the official record holder and the Kodiaks have to feast incessantly on fish to reach that weight. No such food source can be found in the Black Range.

So why did a large, omnivorous species such as the grizzly persist for 30,000 years in the Southwest, only to be obliterated in some 80 years or less? Mattson suggests:

> ***" . . . tradition holds that among Navajo and Puebloans killing and eating bears was considered tantamount to cannibalism (Miller 1982, Pavlik 1997). More to the point, this sort of evidence suggests that prior to the arrival of Anglo-Americans, humans did not often kill grizzly bears, and so were probably not a significant additive source of mortality - in contrast to the probable effects of bear-hunting traditions among indigenous people in boreal regions (Hallowell 1926, Nelson 1983, Rockwell 1991) . . . . The establishment of large-scale ranching in or near areas with the best grizzly bear habitat was restricted up until the 1880s by the presence of Navajo and Apache hostile to European encroachment (e.g., Basso 1983, Roessel 1983, Sweeney 1991), as well as by lack of railways to transport cattle to market (Culbert 1941, Sheridan 2012). By the 1880s these two impediments had been removed." (p. 41)***

The Black Range was homeland to the Hot Springs branch of the Chiricahua Apache. In 1941, anthropologist M. E. Opler published interviews he had done with Chiricahua Apache elders. Bears, both black and grizzly, featured in several of those interviews:

> **Page 315: "***The existence of the earth, the heavenly bodies, and natural forces sets the stage for the appearance of the animals of the mythological period. . . . The moccasin game – a game of the hidden-ball variety – is arranged to determine whether day shall come; the victors are to dispatch the vanquished. The side of the birds wins, and horizon to the east brightens. A few of the losers escape – the snake, the owl, and the bear – and these are still considered dangerous creatures.*

> ***. . . It is not unusual to hear that person possesses great bodily strength because his ceremony comes from Bear. . . .***
> ***Here are three ways that you can get sickness from an animal or from some other source. One is by getting scared. This is typical of owl disease. It is the thrill of terror, the moment of cold fright, that is really the entrance of the evil influence into your body. You might have such an experience and not be sick for months. Then, when you get sick you remember. You say, "Ah, that is when it happened, when I was so frightened." Another way is by smell, odor. Bear and lightning sickness may be spread in this way. Another way is touch. Contact with hides of the evil animals such as the bear, wolf, and coyote will give you the disease."***



This Grizzly was not photographed in the Black Range.

> **Page 358: "***If a Chiricahua tells a story about a bear or any animal or thing that can sicken him, at the end he says, "I'm talking about pollen and all kinds of fruit. Let everything be as good as ever." He makes believe that he isn't talking about that animal.*

> ***Formerly the Chiricahua would seldom say the regular word for bear. They would call it "mother's sibling." It doesn't like to be called by the regular word. It gets after you when you say that. Bear is also called "wide foot" and "large buttocks". It likes to be called "ugly buttocks" too."***

> **Page 359:** ***"Of the animals which are unreservedly dangerous to those who do not "know" their supernatural power, the most important are the bear, the coyote, the snake, and the owl.***

> ***Bear–The general attitude toward this bear, the manner in which bear disease is contracted and some of the symptoms of the ailment are described by one man as follows:***

> ***The bear, like the coyote, causes evil influence. It is killed only in self-defense, for no bear meat is eaten and we are afraid to skin a bear. If you come in contact with the track of a bear or a tree where a bear has leaned, or bear manure, or if you sleep where a bear has sat down, of if you come in contact with a bear by smell or touch, you can get sick.***

> ***The smell is very important. As soon as it gets in a person through smell, that person is under evil influence. If a person does not come in contact with a bear but is scared by a bear, it causes sickness too. The condition of fright that a man gets causes his sickness.***

> ***A person suffering from bear sickness gets run down. It seems like he is smelling that bear all the time. At night he is always dreaming that he has hardly got away from a bear that is chasing him, or something like that. . . . Bear sickness often shows up in a deformity, in a crooked arm or leg.***

> ***Should the path of a bear be accidentally crossed, an attempt is made to deceive the bear about it. "If you have to cross the tracks of a***

bear you say, 'It was a year ago.' It is the custom to say that to make it appear that it happened a long time ago, so the evil influence will keep away.

Specific symptoms equated with the characteristics of the bear mark the onset of bear sickness:

When a man is sick from bear, he acts like a bear. First, he gets a pain all over his body. Then his mouth is twisted, and he bites. His whole face twists. His body swells.

Long ago at Fort Stanton two men got sick from bear and died. These two men were out. It was snowing. There was a big pine tree. A bear had been there. The two men slept there all night. They got sick from it. Their arms went behind their backs, and they growled like bears. I saw them when they were sick. They tried to bite me.

A long time ago, when I was a child, I was playing in a cave where a bear had lived. Pretty soon I got sick. I got tired, wanted to lie down, and foam came out of my mouth as it does from the mouth of a bear when he is tired. They had a ceremony performed for me, and I got better. The shaman sang, and I got well that same night.

Bear–Sorcery and incest: The duality of power – If an illness is long continued, the explanation that it had been caused by a certain animal or force may not satisfy the patient, his relatives, or the shaman. The symptoms, for instance, may point to bear sickness, but then the question will arise, why did the encounter with the bear occur. Time after time, the answer is sought in the machinations of a malevolent human agent. "A witch may cause it. A witch may cause any animal to attack you or make you sick." Whatever befalls a person, and even what he is forced to do, may be interpreted as the work of witches. One commentator defined sorcery as "making an individual do something evil by the power of some animal or spirit." There is little sickness which cannot be attributed ultimately to sorcery.

A witch can cause evil influence through the bear, the snake, or through almost anything.

The way they tell it, some know Sun. One who does might sing and say, "Sun, get that man sick," and it obeys him. He is a witch. Then someone else with stronger power and good power sees it and tells you that someone got you sick from Sun." (p. 385)

"Since many of the diseases are marked by well-defined symptoms, the sufferer is able to hazard a likely guess as to the cause of his illness and to seek a shaman equipped to cope with it:

A person makes his own choice. If he is pretty sure of what ails him, he takes his chance and goes to a shaman for a cure. A person has to use his own judgement. If he thinks it is a bear that made him sick, he goes to a shaman who knows power through the bear. The shaman will tell him whether this is the trouble or not soon enough." (p. 408)

". . . A father would not object if his son ate it (fish), but he would object if his son ate bear meat." (p. 520)

The Apache may not have actively protected grizzlies in the Black Range, but their presence dissuaded European exploration of the mountain range until the tribe was subdued in the 1880s. While removal of Apache resistance and subsequent arrival of the railroad may have been the ultimate releasers that allowed the cattle industry to prevail, a longer history of technological gains and selective human dispersal must be acknowledged. Through 300-odd years of Spanish colonialism, the presence of Apaches in the Black Range held Europeans away. Apaches seldom killed bears, but rather avoided trouble with them.

The demise of the grizzly closely followed the demise of the Apache, and both were victims of a convergence of several historic factors that made their elimination possible.

The primary forces that converged upon both Apaches and subsequently grizzlies began about 1715, when agents from the North American colonies began recruiting Ulster Scots to migrate to the New World. The purpose of this promotional effort was to bring emigrants who could settle the wilderness forests of Appalachia. Bill Gilbert (1983) in *Westering Man* (pp. 13-24) summarizes this effort. The sales program succeeded beyond all expectations. By 1730, some 50,000 lowland Scots had sailed to America and moved westward beyond the lands settled by Englishmen and Germans. Fiercely independent, they spread over the land and soon the Scots-Irish, as they came to be called, were out-Indianing the Indians. According to Gilbert:

> ***"They starved, froze, drowned, were burned out, were stung, poisoned, and mauled by beasts; scalped, ravaged, tortured by Indians, went mad, became suicides and drunks, chopped each other up in bloody intramural feuds and brawls. As and because they endured, they began to learn what could be done to live in a place independent of coastal society. Toward the beginning of the nineteenth century they got the hang of it. When they did, they burst through the Appalachian barrier and in a short fifty years they stormed across the remaining 3000 miles of the continent, making it, all the way to the Pacific, their own."***

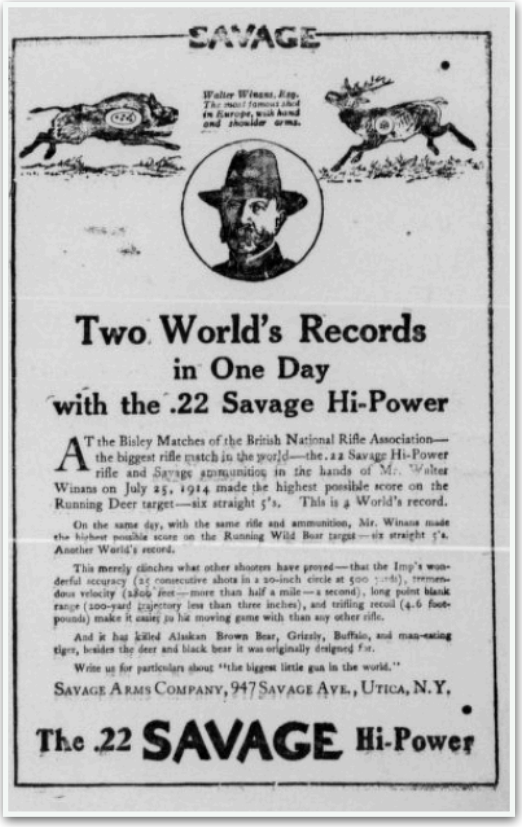
Gilbert calls them them a new kind of American, because they adapted to the wilderness, rather than colonizing like the Spanish or holing up in coastal settlements, trying to replicate England or Germany. Gilbert notes that some people called them White Savages. Although a few British Remission Men and the like began to develop ranches with large, protected headquarters by the 1880s (French, 1965; Stevens 1944; Cook 1923), it was the Scots-Irish and their proteges that moved out into isolated mining claims or homesteads to confront the Apache and the Grizzly on their home ground. [3]

This movement, and the nature of the settlers, was exacerbated by the American Civil War. Many of the people moving west in the 1870s and 80s were displaced southerners, who felt no allegiance to government of any kind. They were looking for land that would support them and for freedom from repression. They were quite experienced with conflict and with firearms.

So from 1860 on a surge of skilled settlers came to Apacheland and grizzly country. Concurrently with this intrusion came a major change in the technology for killing large animals.

One could argue, I believe, that Apache superstitions about bears and other wild species had a practical basis. Until the arrival of Americans, Apache weaponry amounted to lances or primitive bows and arrows. Neither of these was something one would want to use to confront a large grizzly. Even with poisoned arrows, a wounded and angered grizzly would attack and maim or kill a hunter long before dying. The superstitions surrounding the animal acknowledged its immense power and established taboos that encouraged avoidance at all costs. The weaponry of the Spaniards wasn't much more deadly and was slower to load than the Apache's arrows; hunting grizzlies was not a wise enterprise.

From the time Anglos first arrived, as early as 1825, the efficiency of weapons changed. Even the Hawkens rifles of the mountain men like Pattie tipped the advantage of lethal conflict away from the grizzly. Some of these shot balls weighed 200 grains or more backed by up to 187 grains of black powder. This placed them in the realm of killing energy equal to many smokeless rifles that came later. Accurate placement of heavy balls from mountain rifles increased the odds of killing a bear, and ability to make such shots at distances of 100 yards and more reduced the danger of a wounded bear locating the hunter or reaching him before he could reload. Nonetheless, the hunter had to reload after each shot, making it possible for a wounded bear to escape or, perhaps, attack. The advantage for the hunter of an encounter with a grizzly shifted even more after 1870, when repeating rifles with metallic cartridges were developed. While a man was still perhaps foolish to shoot a big bear at short range, he had the ability to keep pumping bullets until the bear died. And concurrent with development of the repeating rifle came cartridges with high killing power. McKenna, in *Black Range Tales* tells of shooting a bear multiple times with a repeating rifle of 40 caliber that held 105 grains of black powder. This could have been one of several 40 caliber cartridges brought out in lever action rifles in the mid-1880s (Barnes 1965). Ben Lilly arrived a few years later in the Southwest carrying a lever actioned Winchester shooting the powerful .33 Winchester cartridge, another that can still be considered more than adequate as a bear gun in the hands of a competent rifleman.


SAVAGE

Walter Winans, Esq. The most famous shot in Europe, both hand and shoulder arms.

Two World's Records in One Day with the .22 Savage Hi-Power

At the Bisley Matches of the British National Rifle Association—the biggest rifle match in the world—the .22 Savage Hi-Power rifle and Savage ammunition in the hands of Mr. Walter Winans on July 25, 1914 made the highest possible score on the Running Deer target—six straight 5's. This is a World's record.

On the same day, with the same rifle and ammunition, Mr. Winans made the highest possible score on the Running Wild Boar target—six straight 5's. Another World's record.

This merely clinches what other shooters have proved—that the Imp's wonderful accuracy (25 consecutive shots in a 10-inch circle at 500 yards), tremendous velocity (2300 feet—more than half a mile—a second), long point blank range (200-yard trajectory less than three inches), and trifling recoil (4.6 foot-pounds) make it easier to hit moving game with than any other rifle.

And it has killed Alaskan Brown Bear, Grizzly, Buffalo, and man-eating tiger, besides the deer and black bear it was originally designed for.

Write us for particulars about "the biggest little gun in the world."

SAVAGE ARMS COMPANY, 947 SAVAGE AVE., UTICA, N.Y.

The .22 SAVAGE Hi-Power

Sierra County Advocate, May 5, 1916. **Towards the bottom of the ad the Savage Arms Company claims that this .22 has been used to kill "Alaskan Brown Bear, Grizzly, Buffalo, and man eating tiger, besides the deer and black bear it was originally designed for." Think this is a good idea? If so please contact the editor about a bridge he has for sale.**

By the 1920s repeating rifles shooting even more powerful cartridges burning smokeless powder became available. Many of these cartridges are still produced today. Some of the more common repeating firearms of the late 1800s, however, shot cartridges of relatively low power that were unlikely to make one-shot kills on big bears. The main result was that many bears were wounded and ran off to die unfound.

But increased firepower wasn't all. The steel leghold trap wasn't new. It had been developed in Europe in the early 1700s, and its efficiency and size both increased for 150 years. Ranchers who didn't care to own and work hunting hounds or pay bounties on bears learned to set large Newhouse traps on carcasses of livestock where bears were feeding. An unknown number of grizzlies that were "shot" were actually killed while in a trap. And in the 1900s, when Federal Predator and Rodent Control agents came on the picture, trapping was the tool of choice for taking bears.

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3. I was skeptical of such a simplistic view of western settlement when I first read Gilbert's book. However, it came out just as I was ending several years of puma research in Arizona, a job that required me to work closely with a generation of mountain lion hunters who dated back to the 1920s. When I mentally reviewed the names of this hearty group of elders—all of whom could still ride me into the ground day after day, I began to think that Gilbert's assessment was worth consideration: George Goswick, Ollie Barney, Irving West, Bill Murphy, Warner Glenn, Clell Lee, Dale Lee, it goes on. These are the ones I knew. Others I've read about include Ben Lilly, Elliott Barker, Jimmy Owen. Not all of these names are necessarily Scots-Irish, but all of them could be. Several of the ones I met told of their ancestors bringing hounds with them from the lowlands, then generation after generation moving westward in stages, always with a member of the younger generation responsible for keeping the hunting pack in tow.

And last, some ranchers early on began to inject strychnine into carcasses of cows. Federal hunters employed poison as well. How many bears, both black and grizzly, died of poison will never be known.

So in both the case of the Apache and the grizzly, the arrival of prospectors and settlers who, if not Scots-Irish themselves, were purveyors of the skills and lifestyles developed by the rough-hewn settlers of Appalachia, strengthened with more modern rifles and, for bears at least, traps and poison, were a major change. While the American military (often populated with fighting Scots-Irish) provided the final blows that subdued the Apache, it was the presence of wilderness-adapted descendants of the settlers of Appalachia who spread over the valleys and mountains of the upper Gila and into the Black Range and created the demand; similarly, it was the well-armed Scots-Irish who brought their families to small wilderness holdings, where they not only killed grizzlies but also created the demand for Federal PARC agents to eliminate the grizzly and the wolf.

And finally, acquisition of the repeating rifle probably even began to break down the superstitious fears of the Apache. To quote one of Opler's interviewees, late in the book:

> ***Hunting*. Page 509:**
> ***"C. told me what happened another time. He said, I saw a big buck in the bushes. I shot him, and the deer just dropped down. So I went over there and put my knife in its throat so it would bleed. Then I had to get my horse that I had left a long ways behind. This happened in a canyon, and when I shot, A. was over there and heard it."***
>
> ***"While I went back after my horse, A. got to my deer. He dragged it about fifty yards into some other bushes. I got back to the place where I had left the deer, but I couldn't find it. I followed the track, but every now and then he had lifted up the deer, trying to make me lose the trail. All the time I was trailing I thought no human would do anything like that. I thought it must be a bear so I got off my horse and loaded my gun and followed it in the brush, down the hill."***
>
> ***"Pretty soon I saw something black. It was moving in the bushes and I couldn't tell what it was. I was just a little way from it, maybe twenty yards. I saw the black hair; I thought it was a bear. So there I was. I waited to see where his head was, for I wanted to shoot him in the ribs. I followed him with my rifle, ready to shoot. . . ."***

As it turned out, a black-haired fellow tribesman was hauling off the deer, so C. didn't shoot, but he seemingly was not reluctant to kill a bear when armed with a modern rifle.

The Navajo were, also apparently, reluctant bear hunters. Bailey (page 349) notes that "On the Navajo Indian Reservation the (black) bears have, until recently, been very little



Purported to be the last Grizzly Bear in Chihuahua, 1957, on the cab of a pickup.

molested, as the Indians associate Shas, the bear, with the spirit world in a manner that has effectually protected it as a non game species."

The final factor that converged with the others to decimate the grizzly was the pervading national belief of the time called Manifest Destiny. While few of the new wave of Americans flooding the western United States in the late 1800s probably had any strong nationalistic inclinations, and many were, in fact, trying to regain their independence after the Civil War, they nonetheless benefitted from what amounted to an official policy that held that acquisition of the continent clear to the Pacific was inevitable--mandated by heaven, if you please. Eradication of Apaches and, ultimately, grizzlies was deemed right by holy decree.

The end of the grizzly in the Southwest was bemoaned by Aldo Leopold in his eloquent essay on Escudilla. Mattson, Brown, and others have repeated the "its only a mountain" paragraph, so it is not needed here. From the standpoint of that essay, the Black Range, like all others in the Southwest, is now only a mountain. Bringing it alive by bringing the grizzly back would seem an arduous task under the best of conditions. In our present divisive political climate, finding general support for such an effort seems unlikely. We can only hope that the grizzly can be sustained further north where it is extant. The best of all worlds would be for a few individuals to find their way on their own to our mountains and reproduce. Such natural restoration would seem to have a greater chance of success.

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Bear Species

We now recognize three bear species in the United States and Canada: the American Black Bear, the Brown Bear, and the Polar Bear.

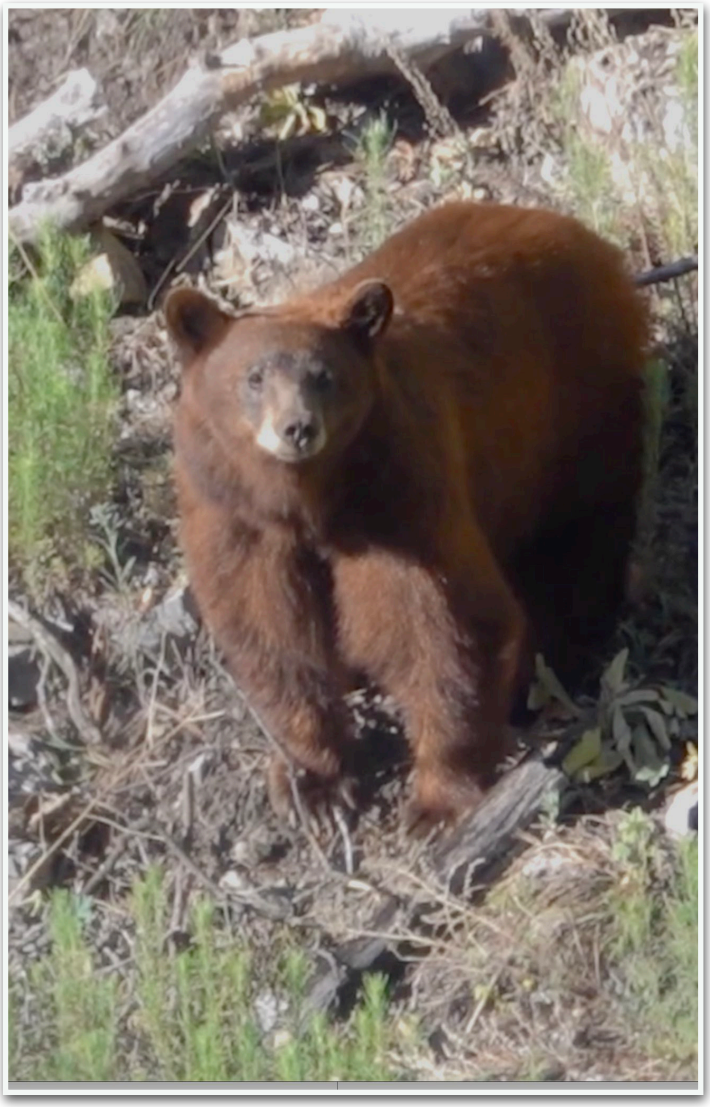
Currently, there are 16 recognized subspecies of the American Black Bear, *Ursus americanus*. Two of these subspecies are found in the Black Range. The Cinnamon Bear, *Ursus americanus cinnamomum* (pictured at the right from the Black Range, May 26, 2021) is said to mimic a Grizzly Bear, leading to possible misidentifications (but see R. Rounds study below).

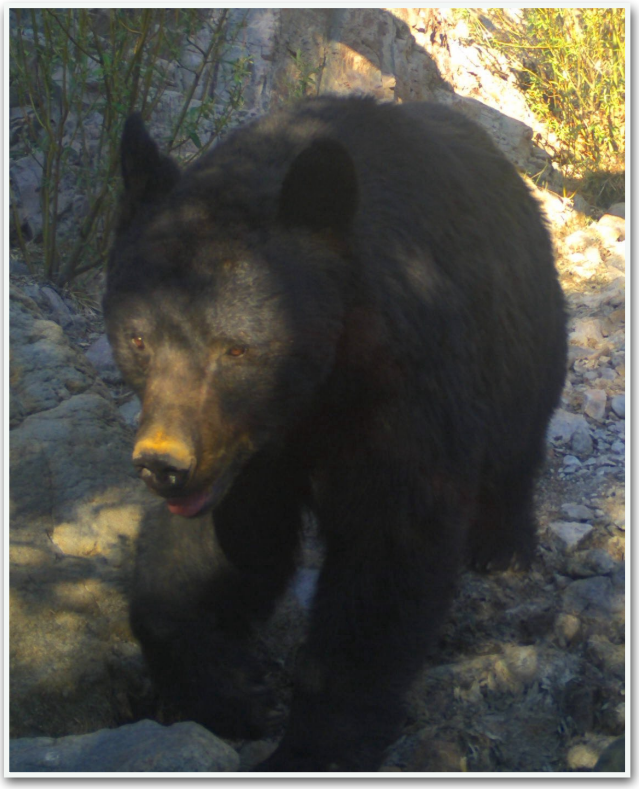
The New Mexico Black Bear, *Ursus americanus amblyceps*, is the other Black Bear in our area. See the photograph at the bottom right.

In "Distribution and Analysis of Colourmorphs of the Black Bear (Ursus americanus)", *Journal of Biogeography*, Vol. 14, No. 6, 1987, Richard C. Rounds reported his examination of more than 40,000 specimen records from the United States and Canada. He assessed the presence and distribution of black and non-black color morphs within the two countries and found that *"the percentage of black individuals in populations decreases from north to south in the Rocky Mountain region and from the Pacific Coast inland. Non-black bears are more common in open forests on the lower slopes of the north and central Rocky Mountains, in the interior mountains of California, and in the desert ranges of the southwestern United States. . . .subspecies, habitat and association with grizzly bears are related to colour ratios in populations. . . .distributional information suggested that colouration is more cryptic than mimetic in black bears."*

The Grizzly Bear (*Ursus arctos horribilis*) is extirpated in the Black Range. It is a subspecies of the Brown Bear, and it is known by some as the North American Brown Bear.

In the 1800s, 86 species of bear (which we now call Grizzly) were recognized. By 1928, that number had been reduced to seven. In 1957









that number had been reduced to one, and presently the individuals living in the United States and Canada are considered a subspecies of Brown Bear.

The history of the Grizzly Bear in Arizona is similar to that in the Black Range. The last Grizzly in Arizona may have been killed in Saguaro National Park in the early 1920s (see Vargas et al., p. 14, link below).

The other bear species found in Canada and the United States is the Polar Bear, *Ursus maritimus*. It is not known from the Black Range.

When explorers, researchers, and settlers were getting to know the area in bygone eras, they had a different taxonomy to deal with, and it can be difficult to sort out what they were talking about, what the reference was that they were utilizing. This and occasional issues of observer bias (a nice way of saying "that bear was 15 feet tall, boy am I brave") and skill sometimes make the determination of what was where and when, difficult.

Evidence of Black Bear presence is usually more stationary (see images on this page). But poop on the trail can tell a lot. In "*American Black Bears (Ursus americanus) in Saguaro National Park: Status and Population Estimate Using Genetic Analysis*",

2010, Vargas, Swann, Camerena, Culver, Nelson, and Zylstra note that "Estimating population size (abundance) with a reasonable amount of precision can be difficult in large mammals such as black bears due to their secretive nature and relatively low densities (Mowat and Strobeck 2000). Wildlife researchers use various techniques such as ear tags, neck collars, radio transmitters, and natural markings to identify and track individual animals to estimate abundance, but each of these methods has limitations (Woods et al. 1999). Most methods for bears involve capturing live animals for radio telemetry or marking (Mace et al. 1994, Miller et al. 1997), which is both invasive and expensive. . . .DNA analysis provides a viable alternative that is inexpensive, permanent, and requires little or no contact with the species of study." They found that scat and hair samples (primarily from scratch trees) were valuable resources when it came to estimating the Black Bear population in that area.

The population of Black Bears has increased in several areas in the southwestern United States (see above study), including in Big Bend National Park. The bears in that area have increased in numbers in the recent past, based on personal observations and published reports. Black Bears were "reportable" as late as a decade ago, but are now "problematic" in the campground in Chisos Basin. The ebb and flow of population, and the human reaction to that ebb and flow, is captured nicely by the concepts of "reportable" and "problematic".

Vernon Bailey, who was the Senior Biologist of the Division of Biological

Survey, listed the bears in New Mexico In *Mammals of New Mexico*, North American Fauna, No. 53, as follows: *Euarctos americanus amblyceps* (our current Cinnamon Bear): *Ursus amblyceps*, Baird, 1859, *U. cinnamomeus*, Baird, 1859, and *U. machetes*, Elliot 1903. He appeared to subsume the Cinnamon Bear within the New Mexico Black Bear subspecies.

In the mid-1800s, what we now call the Cinnamon Bear (a subspecies) was considered (perhaps) as two species, what we would now call the New Mexico Black Bear and the Cinnamon Bear. Bailey, at page 350, included the map at center left, by Ligon. And noted:

"In 1540 Coronado (Whipple et al., 1856, p. 110; Winship, 1896, pp. 512, 560) reported large numbers of bears before reaching Zuni from the south and saw their "paws" at the pueblo of Zuni, but some of these were undoubtedly grizzly bears. In 1825 the Pattie brothers (Pattie, 1905, p. 118) on a trapping expedition through New Mexico reported killing a large number of bears at their camp one day northward from the copper mines. In 1854 John R. Bartlett (1854, v. 2, p. 556) reported bears extremely abundant at the copper mines. The references to the type and three other specimens collected near the copper mines in 1855 by J. H. Clark are so confused with those of the grizzly bears encountered on the same trip that the relative abundance of these animals at that time can not be told with certainty, for the brown grizzly and brown blacks were not always distinguished in the notes and apparently not in the field. But even to very recent times the black and cinnamon bears have been abundant in these mountains. (p. 350) . . . In 1906 Victor Culberson, of the GOS ranch on Sapello Creek, about 30 miles north of Silver City, said that since 1885 he had killed 46 bears and helped to kill 70 more. These included what he considered four species- black, cinnamon, brown, and silvertip. The greater part of these were the black, or cinnamon, bears, which were then common in the mountains about there." (p. 351)

When it comes to Grizzly Bears the number of species was significant (see discussion above). Bailey (ibid. p. 357) notes *Ursus horriaeus*, *Ursus arizonae* (Arizona Grizzly, p. 359), *Ursus nelsoni* (Nelson's Grizzly, p. 360), *Ursus texensis navaho* (Navajo Grizzly, p. 364), *Ursus perturbans* (Mount Taylor Grizzly, p. 364), and *Ursus apache* (Apache Grizzly, p. 365).

At page 368, Bailey included the Ligon map of 1917 (see map at center right).

All of the above can make it difficult to discern the Grizzly population in New Mexico. It is clear, however, that there were some significant numbers.

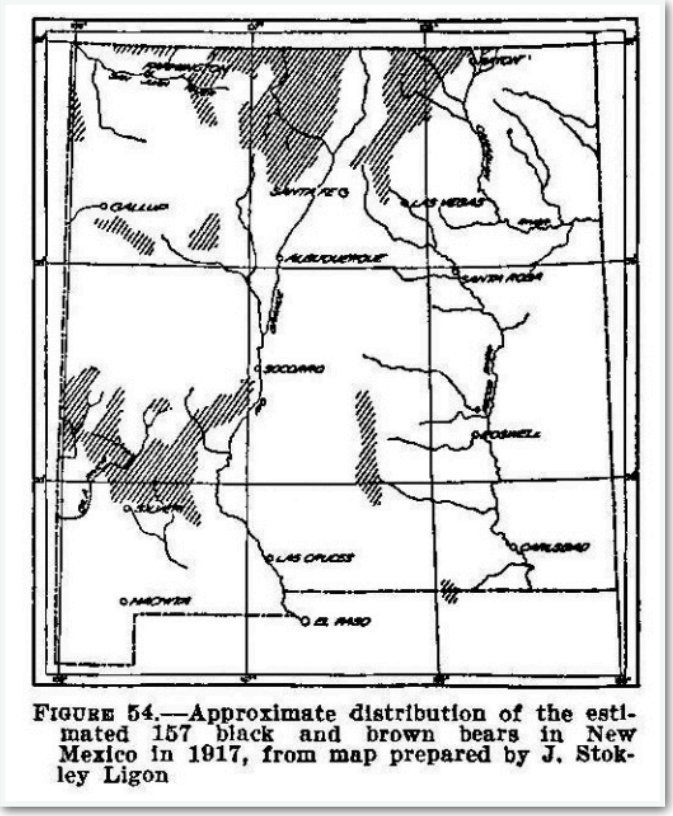


FIGURE 54.—Approximate distribution of the estimated 157 black and brown bears in New Mexico in 1917, from map prepared by J. Stokley Ligon

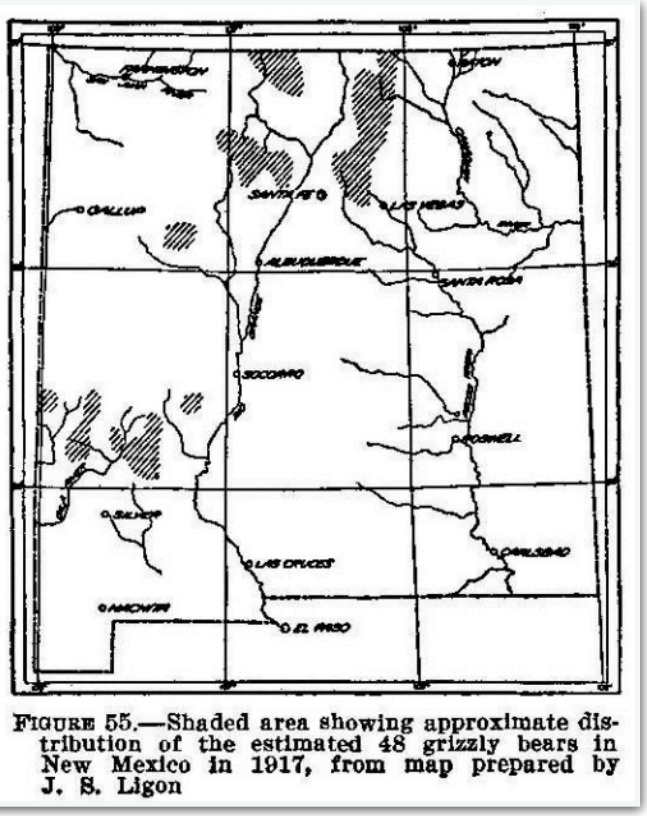


FIGURE 55.—Shaded area showing approximate distribution of the estimated 48 grizzly bears in New Mexico in 1917, from map prepared by J. S. Ligon

The range of both Black and Brown Bears can be significant and is a limiting factor in population expansion, or reintroduction programs, in areas as small as the Black Range.

In most discussions about bears the question of hibernation often comes up. That has been a topic of significant study; suffice it to say that the farther south (and the lower the elevation?) a population is found the less significant hibernation is in their life cycle.

Personal Bear Encounters

Close Encounter of the Turd Kind by Harley Shaw

The Black Range is bear country. During warm months finding bear tracks and droppings along dirt roadways and trails is fairly easy. During the 22 years I've lived in Hillsboro, I've seen more bears and bear sign than I saw during some 30 years employed as a field biologist by Arizona Game and Fish Department. Bear encounters aren't an everyday occurrence, but take regular summer and fall walks in the forested parts of the mountain, and you'll eventually meet one.

Grizzlies, of course, are gone; so black bears are what you'll see. They aren't normally a threat, unless you get between a mom and her cubs or surprise an adult up close. Even under these circumstances, they're more likely to retreat than attack. But they are a large carnivore with big teeth, big claws, and the strength to use them effectively, so caution is wise. Stay back, give them the space to slip away. Or, if you can, quietly back away without disturbing them.

In truth, while bear sign is abundant, I haven't actually seen loads of bears. A quick count of those I can recollect comes up with six, maybe seven. For several years we had a happy female boxer who prided herself in keeping the trail ahead clear of imagined dangers. On one occasion, I and a couple of friends rounded a bend to find Suki sitting under a large juniper, looking up with her stub of tail a blur. A mid-sized bear was sitting some 6 feet above her, looking down. Before we could approach very close, the bear left the tree and Suki chased behind for perhaps a hundred yards, then came back to us looking quite proud of herself. Once again, she had saved our lives.

On another walk, she trailed one into a pine thicket and confronted it head on, wisely staying 10 feet or so away. She barked and the bear stared at her. Neither approached the other. Finally the bear sighed and trotted off, Suki again chasing behind. She stayed with it only a short distance, then came back to report that the way was clear and we were safe to proceed.

Suki's last bear encounter was not long before she died. She was old and her hips had given way. She could hardly stay with me on evening walks; I'm sure the pain was great, but she was determined to go along as long as she was on her feet. We were walking alongside a small canyon, and I was thinking that this was a good place to see a bear – when I did. It was an adult, some 50 yards across the canyon. I put Suki on a leash to ensure that she didn't try to be gallant, and then stood watching the bear, which seemed to be unconcerned with my presence. Then I caught a movement some 15 yards to my left and spotted a cub climbing a young ponderosa pine tree. I felt that this placed me and Suki at risk, so quietly retreated. If Suki saw or smelled either bear that day, she didn't bring it up.

One day, walking dogless down Percha Creek, I passed the camp of two males in camo dress who said they were bear hunting. At the time I met them, they were sipping beers and listening to loudly playing music. I visited briefly, then went on my way, only to spot a half-grown bear wandering leisurely across the trail about 50 yards from their camp. I had to wonder if it liked the music. Whatever the case, I said nothing and hoped the bear kept going.

The remainder of my actual bear sightings in the Black Range have been at a distance, while I was hiking or driving – just glimpses adequate to add to my tally.

However, the two encounters I remember most clearly involved bears that were much too close. The sign on the ground told me that they saw me; I neither saw nor heard them. Ergo, had either of them been having a bad day, I could have been a victim of their ire.

The first of these was in Warm Springs (or is it Cold Springs?) Wash near the Hillsboro transfer station. By this time, Suki was long gone, and my walking companion was Toasty the Beagle, a bold and obsessive trailer of bunnies. We were walking in a light rain – just enough droplets to mark the surface of the ground. I turned into a side wash, climbed over a rocky drop-off in the dry bottom, and immediately spotted bear tracks coming down the wash. I could see where the bear had abruptly stopped, then dashed off up the brushy hillside. The tracks prior to where the bear had stopped had rain drops in them; the tracks scrambling away were on top of the rain. We may not have been exactly nose to nose, but I'm sure the bear could probably smell my breath while I had been climbing over the waterless "waterfall." Toasty was still behind sniffing a cottontail track. I called her over and showed her the very fresh bear track. She assiduously sniffed it from one end to the other, looked up at me as if to say, "So?", and went back to trailing the bunny. She was born a specialist.

The final encounter, and the source of the title of this essay, happened on a summer walk up Percha Creek above Kingston. I was without a canine companion. I had been walking here almost daily and noticed bear sign along the way. This was not unusual. Bears were frequently seen right in town. I walked up perhaps a mile, then turned around and headed back. Within less than a half-mile, I came on a very large, sloppily moist, and undoubtedly warm (I didn't feel of it) bear deposit. I can't call it a dropping or scat, because it was more of a big dense puddle filled with lumps about ¾ inch in diameter. I'd not seen a bear dropping quite like it, and was puzzled for a time regarding Bruin's diet. Nothing in the surrounding ponderosa pine forest produced seeds such as the ones floating in this puddle of poop. I wasn't inclined to pluck one out, but looked as closely as I could and finally recognized them for plum seeds. The bear, obviously, had spent part of the past 24 hours in the fruit orchard in downtown Kingston that belonged, at that time, to a couple with the surname of Skelton. What sent a little shiver down my spine was the fact that hardly 10 minutes had passed since I had crossed this point headed up the canyon. In fact, the puddle was obviously on top of one of my tracks. It didn't take much imagination to conclude that this wasn't just a bear with a tummy ache – the placement of the poop puddle suggested strongly

an implied message. I had no doubt the bear had watched me pass by and had intentionally expressed its opinion of the human species. Another case of had it wanted me, it had me.

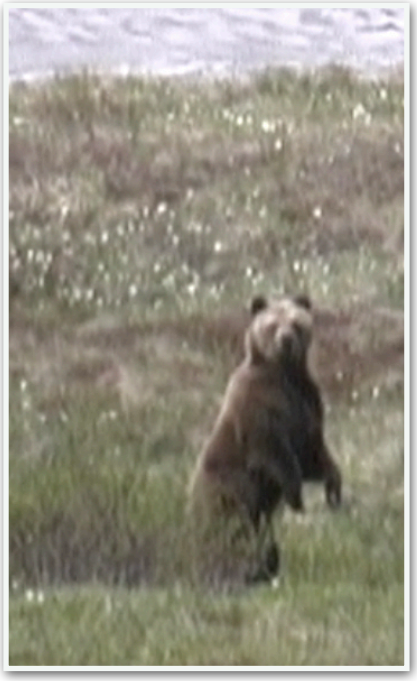
The folks who owned the orchard were off on vacation, by the way, and had a local bachelor staying at their place while they were gone. He lived house to house as needed. I ran into him the next day and asked him if he had seen any bears. He said he hadn't and didn't think there were any around. I didn't tell him my tale, but did suggest he carry a light if he went outdoors at night.

Scared Twice Too Many
by Bob Barnes

Of the 16 subspecies of American Black Bear, I have encountered nine: Olympic Black Bear (*U. a. altifrontalis*), New Mexico Black Bear (*U. a. amblyceps*), Eastern Black Bear (*U. a. americanus*), California Black Bear (*U. a. californiensis*), Cinnamon Bear (*U. a. cinnamomum*), Glacier Bear (*U. a. emmonsii)*, East Mexican Black Bear (*U. a. eremicus*), Kenai Black Bear (*U. a. perniger*), and the Vancouver Island Black Bear (*U. a. vancouveri*). In truth, I have rarely chased them, wrestled them to the ground, and taken vital measurements - I generally have relied on range to make these determinations.

It is not the number of Black Bears that I have seen which may be of interest, it is the nature of those encounters. In hundreds and hundreds of Black Bear encounters I have had, only two have caused me pause. Most encounters with Black Bears, including the few I have had in the Black Range, are glimpses of them running up the next slope. Once in North Carolina, however, one stood its ground and watched. I moved away at a diagonal projecting awareness and disinterest (or at least that is what I thought I was doing). In British Columbia I was video-recording a bear I had seen beside the road. (Along the Cassiar Highway there are a lot of Black Bears, in season.) I stood a few feet from the car and recorded to my heart's delight, easy, dramatic stuff. The bear decided something, I am not sure what, but it started walking toward me, not charging just walking, good stuff, easy, dramatic. The orders to get in the car finally registered and that little adventure was over.

My experience with Grizzly Bears has been much more limited. I have photographed and videotaped this subspecies in Alaska (in the panhandle, on the Kenai peninsula, and in Denali National Park) and in Canada (in The Yukon and in the Northwest Territories - photo below).



First things first, a Grizzly is a different beast entirely.

My experience with Grizzlies in the Alaskan panhandle was during salmon runs when the bears were busy eating fish and thoroughly satiated. In such circumstances there is a general agreement that life is too good to bother another species, other than the fish. I have spent hours recording Grizzlies that were 20 to 30 feet away. Lots of good material of them skinning salmon alive, they like salmon skin, and they like salmon roe, often catching a fish, smelling it, and if it were a male releasing it. Females, a different story; females had roe.

There were also Black Bears in these streams and the two species generally stayed apart. At other times I have watched a Grizzly and her cub race across a glacial fan with so much grace and power that I wanted to cry; since they were going away from me I did not vomit, I just wanted to cry for the joy of it all. At other times, I have come up on a bear gorging itself on berries. Again preoccupied, and I did nothing to change that situation. After all, lunch (or whatever time it was in a land of constant light) is sacred.

But once in the northern Yukon I was recording a Grizzly, the bear pictured here, from the road. It was about a hundred yards away, happily eating berries. But a bit of air must have floated by, a bit of air with my scent on it. The bear rose up, stared at me intently (burning a hole through the lens of the camera and out the back of my head), and sniffed again, more intently. I did the calculus, I knew how fast that bear could get to me, how long it would take me to get back to the car, and the solution to the formula was not good. So I ambled back to the car with the corner of my eye on the bear, not at all interested in what it was doing despite all of the hairs on my neck being rigidly upright.

I have, unfortunately, had no experience with a Polar Bear.

Lewis & Clark

In their journey to the mouth of the Columbia River the explorers of the Lewis and Clark Expedition encountered Grizzly Bear many times. The following are exerpts from a few of their journal entries about the encounters (spelling, grammar, etc., as in the original):

13 April 1805 (Lewis) ***"the Indians give a very formidable account of the strength and ferocity of this anamal, which they never dare to attack but in parties of six, eight or ten persons; and are even then frequently defeated with the loss of one or more of their party. The savages attack this anamal with their bows and arrows and the indifferent guns with which the traders furnish them, with these they shoot with such uncertainty and at so short a distance . . . that they frequently mis their aim & fall a sacrefice to the bear. . . . this anamall is said more frequently to attack a man on meeting with him, than to flee***

from him. When the Indians are about to go in quest of the white bear, previous to their departure, they paint themselves and perform all those superstitious rights commonly observed when they are about to make war uppon a neighbouring nation."

(Older Grizzly Bears are frequently called silver tips. At the time of this expedition they were often called white bears - for the same reason.)

5 May 1805 (Lewis) "*Capt. Clark & Drewyer killed the largest brown bear this evening which we have yet seen. it was a most tremendious looking anamal, and extreemly hard to kill notwithstanding he had five balls through his lungs and five others in various parts he swam more than half the distance across the river to a sandbar & it was at least twenty minutes before he died; he did not attempt to attact, but fled and made the most tremendous roaring from the moment he was shot."*

14 June 1805 (Lewis) "*Under this impression I scelected a fat buffaloe and shot him very well, through the lungs. While I was gazeing attentively on the poor anamal discharging blood in streams from his mouth and nostrils, expecting him to fall every instant, and having entirely forgotton to reload my rifle, a large white, or reather brown bear, had perceived and crept on me within 20 steps before I discovered him.*

In the first moment I drew up my gun to shoot, but at the same instant recolected that she was not loaded and that he was too near for me to hope to perform this opperation before he reached me, as he was then briskly advancing on me. It was an open level plain, not a bush within miles nor a tree within less than three hundred yards of me. The river bank was sloping and not more than three feet above the level of the water. In short there was no place by means of which I could conceal myself from this monster untill I could charge my rifle.

In this situation I thought of retreating in a brisk walk as fast as he was advancing untill I could reach a tree about 300 yards below me, but I had no sooner terned myself about but he pitched at me, open mouthed and full speed. I ran about 80 yards and found he gained on me fast. . . . The idea struk me to get into the water to such debth that I could stand and he would be obliged to swim, and that I could in that situation defend myself with my espontoon. Accordingly I ran haistily into the water about waist deep, and faced about and presented the point of my espontoon. At this instant he arrived at the edge of the water within about 20 feet of me. The moment I put myself in this attitude of defence he sudonly wheeled about as if frightened, ? retreated with quite as great precipitation as he had just before pursued me. & the cause of his allarm still remains with me misterious and unaccountable.

So it was, and I feelt myself not a little gratifyed that he had declined the combat."

The Militia Acts of 1792 specified that commissioned officers of the U.S. would be armed with an espontoon, which is a half-pike (see image below).



Grizzly Jokes

Want to know if something makes people uneasy? Count the jokes about it. There are a lot of Grizzly jokes. A few examples:

Bear Bells

Hikers from NYC: Is there anything we should do when hiking in Grizzly country?

Ranger: You might wear little bells on your boots so they make noise when hiking. We call them bear bells because they allow bears to hear you coming from a distance and not be startled if you're accidentally sneaking up on them.

Hikers: Okay, anything else?

Ranger: You should also carry a pepper spray can just in case a bear is encountered. Spraying the pepper into the air will irritate the bear's sensitive nose and it will run away.

Hikers: Is that like suntan lotion?

Ranger: No, you spray it on the bear, but for it to be really effective the bear has to be really close. That can be a problem.

Hikers: And?

Ranger: Keep an eye out for fresh bear scat so you have an idea if bears are in the area. And, learn how to tell the difference between black bear and grizzly bear scat.

Hikers: What is the difference?

Ranger: Black bear droppings are smaller and often contain berries, leaves, and possibly bits of fur. Grizzly droppings tend to contain small bells and smell of pepper.

Sneakers

Two hikers, Pete and Donald, were deep in the woods when they saw a charging Grizzly Bear. Pete immediately sat down, took off his boots, and started putting on tennis shoes.

Don said "you're crazy, you can't out run a Grizzly".

Pete responded, "I know, I just need to outrun you."

A Russian and a Czechoslovakian

A Russian scientist and a Czechoslovakian scientist had spent their whole lives studying the majestic Grizzly Bear.

Each year they petitioned their respective governments to allow them to go to Yellowstone to study these wondrous beasts.

Finally, their request was granted and they immediately flew to New York and then on west to Yellowstone. They reported to the local ranger station and were told that it was the Grizzly mating season and it was

much too dangerous to go out and study the animals.

They pleaded that this was their only chance. Finally the ranger relented. The Russian and the Czech were given cell phones and told to report in each day.

For several days they called in, and then nothing was heard from the two scientists. The rangers mounted a search party and found the scientists' camp completely ravaged. No sign of the missing men.

They then followed the trail of a male and a female bear. They found the female and decided they must kill the animal to find out if she had eaten the scientists because they feared an international incident.

They killed the female and cut open the bear's stomach, only to find the remains of the Russian.

One ranger turned to the other and said, "You know what this means, don't you?"

"Of course," the other ranger nodded. "The Czech is in the male."

What to do if you are attacked by a bear

If it is a Grizzly, play dead; it might just drag you into the brush and leave you for a later snack.

Black Bears don't tend to attack. They tend to be territorial, so if one does attack you, fight like hell. You probably have a chance.

If it is a Polar Bear, kiss your *** goodby.

Climb a Tree

Unsure if you are being chased by a Black Bear or a Grizzly? Climb a tree. If the bear climbs the tree after you it is a Black Bear. If it just knocks the tree down it is a Grizzly.

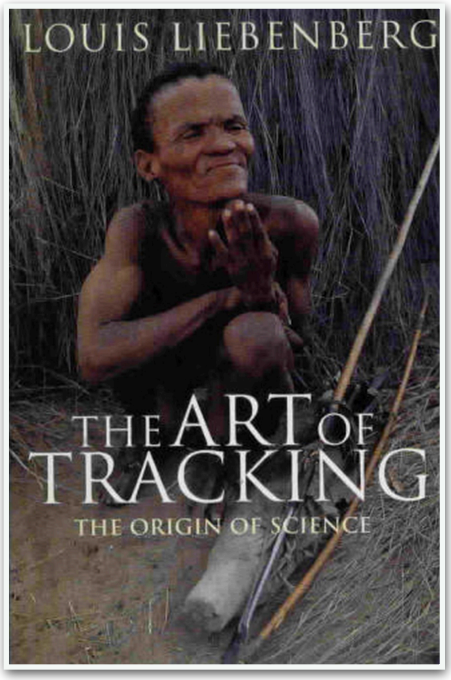
Food

A preacher was being chased in the woods by a large grizzly bear.

Exhausted, he fell to his knees praying, "Good Lord! Deliver me from danger!" Looking back he saw the bear kneeling, paws together in prayer and exclaimed, "It's a Christian bear! Thank God I am saved!" Meanwhile the bear started praying, "For this food I am about to receive, Lord, I give you thanks."

The Art of Tracking - The Origin of Science by Louis Liebenberg (A Book Review by Harley Shaw)

In the *Art of Tracking*, Liebenberg suggests that the scientific method originated from the primitive art of tracking. He develops this thesis using a review of anthropological and archaeological literature, along with his field studies of skilled African trackers, especially hunter-gatherers of the Kalahari. In the book, Liebenberg has assembled a lifetime of thought regarding the skill of tracking, anthropology, and theories of science.



Liebenberg is an intellectual wild card, and we can find plenty to question in the book. This makes it a good subject for discussion. To claim tracking as the sole source of scientific thinking is simplistic and naively radical. In checking Liebenberg's background, I found his profession given in one place as a "scientist"; while his LinkedIn profile shows him as "self educated". Based upon the literature covered in his book, we might classify him as an "independent scholar" who has taken the history of tracking as a lifetime preoccupation. Although his primary premise might be challenged and, for that matter, his basic anthropology and theory of science questioned, his intense interest in his subject, his field skills, and his ability to synthesize ideas from a wide array of disciplines has to be admired. As an anthropologist, he seems moderate compared to Napoleon A. Chagnon (see *Noble Savages: My Life Among Two Dangerous Tribes -- the Yanomamo and the Anthropologists*). In fact, Marlene Zuk, in her new book *Paleofantasy* gives Liebenberg credence, citing his work on the Kalahari. Zuk's book was written to criticize many of the "just so" stories of modern pop archaeology.

As a wildlife biologist, I see Liebenberg playing an important role in keeping the skill of tracking alive. Field biology has improved and suffered from new technologies used in wildlife research. The advent of radio tracking via satellites linked directly to office-bound computers, especially, has taken biologists out of the field and reduced their need for basic, non-invasive skills. To a large degree, current field research on wild species is driven by the availability of this technology, augmented by increasingly efficient and invasive methods of capture - foot snares and darting and netting from helicopters. For many species even basic monitoring involves only annual surveys from helicopters. These technologies, while yielding large volumes of data quickly, all tend to take the wildlife biologists away from the field and reduce their on-the-ground observational abilities. With the possible exception of trail cameras, these tools also all involve increased handling and harassment of wildlife, which bias study results.

Liebenberg and his North American peer, Mark Elboch, now give tracking workshops in the U. S. Many of their students are wildlife biologists hoping to develop their intuitive and

artistic side of field observation. Liebenberg is not the first tracking "guru" to gain a following. For several decades Tom Brown, Jr. has given tracking courses in New Jersey. I've read his books and found them less than credible. Alpine ecologist Dr. James Halfpenny gives tracking workshops north of Yellowstone. Susan Morse, founder of Keeping Track, Inc. has spent decades training locals in Vermont to use track counts and sign assessment to inform community movements challenging land development. Like Liebenberg, she is self-educated but tries to bring science into her methodology. Mark Elboch began with amateur tracking and is now working on a Ph.D. in wildlife ecology. He is studying interactions of large carnivores in the Greater Yellowstone Ecosystem. He and Liebenberg have recently collaborated on a book entitled *Practical Tracking*, a more entertaining and readable book than *The Art of Tracking*, that presents many of Liebenberg's ideas in digestible bites. I believe Sky Island Alliance still gives tracking workshops. They are based in Tucson. Dr. Christine Hass, who has done extensive work on White-nosed Coati and skunks in the SW, is one of their instructors.

Liebenberg is not the first guru to come to the United States "out of Africa" and attract the attention of the resource management community. Some 40 years ago, Alan Savory landed in the Southwestern U. S. with his concept of Holistic Resource Management. The ranching community, then as now surviving on tradition more than economics, beheld him as a savior. Perhaps the most important impact he had was to encourage collaborative management groups that brought environmentalists and ranchers to a common table (literally - eating together was an important part of his regime). I have seen the same phenomenon happen when polarized groups are placed together on track transects and begin to communicate on the ground in a non-controversial atmosphere.

In addition to coauthoring *Practical Tracking*, Mark Elboch has published a series of excellent tracking guides, published by Stackpole Books.

A .pdf copy of *The Art of Tracking* is available at this link.

Tidbits From The Literature

"Optimization of avian perching manoeuvres", Marco Klein-Heerenbrink, Lydia France, and others, *Nature*, Vol. 607, 7 July 2022, pp. 91-96. Why It is worth reading: "The exquisite perching performance of birds has inspired many efforts to achieve similar capabilities in autonomous aircraft" (p. 91). With a lack of success, I might add. The reported study assessed the flight behavior of birds as they approached landing. "Learning to minimize stall distance on the fly requires aero-mechanical information (for example, from feather 1, 2 or muscle 39 proprioceptors) and distance information (for example, from static visual 5 or optic flow 7, 11, 40 cues) to be combined. Fly-by-feel concepts 41, 42, 43, 44, 45 may therefore prove critical to the learning and control of perching in autonomous vehicles" (p. 95). How bird species perceive and assess the world allows them to perform feats which human technology can not match. If you have the opportunity, watch how birds land, and if you are inclined, share your observations and/or images with us.

"Warming weakens the night-time barrier to global fire", Balch et al., *Nature*, Vol. 602, 17 February 2022, p. 442-448 (paywall). When this article first appeared it was another interesting example of how human-induced global warming was making our existence just a bit more difficult. Then came the Black Fire, and we were all watching the nighttime temperatures and hoping they would drop and the nighttime humidity bumps would happen. That did not always happen. The referenced study demonstrated "that night-time fire intensity has increased, which is linked to hotter and drier nights" (abstract). Interested in fire dynamics in the Black Range? This article is a good place to start building a foundation of understanding.

"Sixty-third supplement to the American Ornithological Society's Check-list of North American Birds" R. Terry Chesser et al., *Ornithology*, 03 August 2022. In our area, birders have long struggled to distinguish the Western Meadowlark from the form of Eastern Meadowlark known as Lilian's Meadowlark. The AOS (formerly the AOU and the Cooper Ornithological Society) has now recognized the Lilian's Meadowlark as a full species. It is now known as the Chihuahuan Meadowlark (*Sturnella lilianae*). There are two subspecies; the nominate form is found in our area. Now birders will have to struggle with distinguishing between the Western Meadowlark and the Chihuahuan Meadowlark.

Like many lumps and splits, this one was made on the basis of genetic analysis. Interestingly, the Western Meadowlark was found to be intermediate between the Eastern Meadowlark and the Chihuahuan Meadowlark. (Western and Eastern were found to be more closely related than Eastern and Chihuahuan.)

Listen to the call of the Chihuahuan Meadowlark at this link. This song was recorded by Richard E. Webster at Rodeo, Hidalgo County, New Mexico on December 22, 2019.



Western Meadowlark
Sturnella neglecta
Hillsboro

Listen to the call of the Western Meadowlark at this link. This song was recorded by Sue Riffe, at Mesilla Valley Bosque State Park, Doña Ana County, New Mexico, on October 14, 2018.

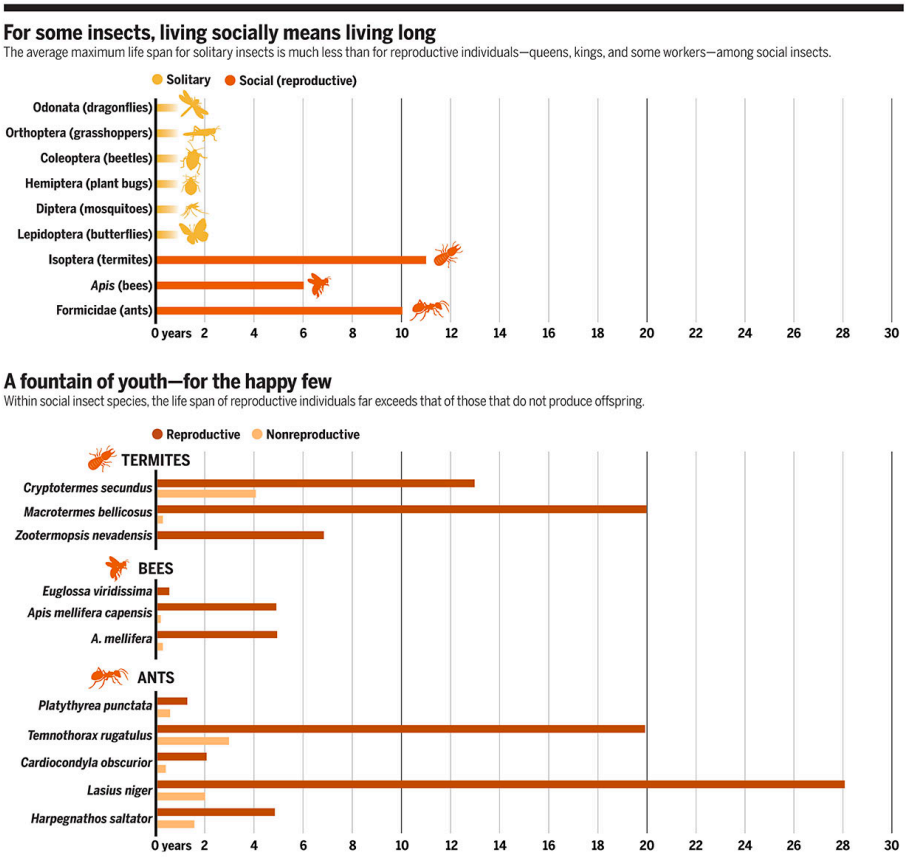
"**Increasing the resilience of plant immunity to a warming climate**", Kim, J.H., Castroverde, C.D.M., Huang, S. et al., *Nature* 607, 339-344 (2022). In the realm of human tinkering – this study "identified CBP60g transcription as a major thermosensitive step in the plant immune system . . . . Mechanistically, we observed that elevated temperature negatively affects nuclear GDAC formation and recruitment of GBPL3 and SA-relevant Mediator subunits to the CBP60g promoter . . . . Recent studies have begun to implicate protein condensate formation in the environmental regulation of plant growth, flowering and germination. Together with these studies, our results support an emerging general concept that biomolecular condensates serve as an important regulatory node for plant sensing and/or response to external temperature and other environmental cues. CBP60g family transcription factors are widely conserved across plant lineages. 35S::CBP60g-mediated temperature resilience applies to both basal and ETI-mediated pathogen resistance, suggesting that the basic findings in this study, with further optimization, may provide a framework for broadly preserving the overall function of the plant immune system in a warming climate" (p. 343). This study may turn out to be one of the most significant research efforts in our attempts to deal with the increasing temperatures which we have created. It also indicates that there may be a mechanism for the evolutionary response, by plants, to global warming. See also, our article on "**Plant Plasticity - Argentina anserina**", *Black Range Naturalist,* Volume 5, Number 3.

"**Rapid speciation via the evolution of pre-mating isolation in the Iberá Seedeater**", Turbek, Campagna et. al, *Science*, Vol. 371, 6536, 26 March 2021, p. 1337. This article is mentioned for two reasons. First, I suspect that our region has a number of attributes which contribute to the divergent development of existing species, and ultimately to speciation. Second, one of the authors of this study (Leonard Campagna, who is at Cornell) is a close friend of Taylor Streit, who has contributed several articles to *The Black Range Naturalist*. Our associations extend far and wide.

"**Long live the queen**", Yao-Hua Law, *Science*, Vol. 371, No. 6536, 26 March 2021, pp. 1302-1305. The operating assumption for many of us is that insects live for weeks, maybe months. Here the author points out the lifespan of several species, with a focus on the social insects (see chart below), noting that even within a species a creature's longevity will vary by role and chance.

"**Build up big-team science**", Coles et al., *Nature*, Vol 601, 27 Jan 2022, pp. 505-507. The authors argue for increases in cross-institutional collaboration so that many of the world's big issues can be tackled effectively. We draw your attention to our much more modest collaborative effort: **The Black Range Exchange**.

"**Grey wolf genomic history reveals a dual ancestry of dogs**", Bergström, A., Stanton, D.W.G., Taron, U.H. et al., *Nature* 607, 313-320 (July 2022). This significant study traces the gene flow of the Grey Wolf up to and after the domestication of the dog.



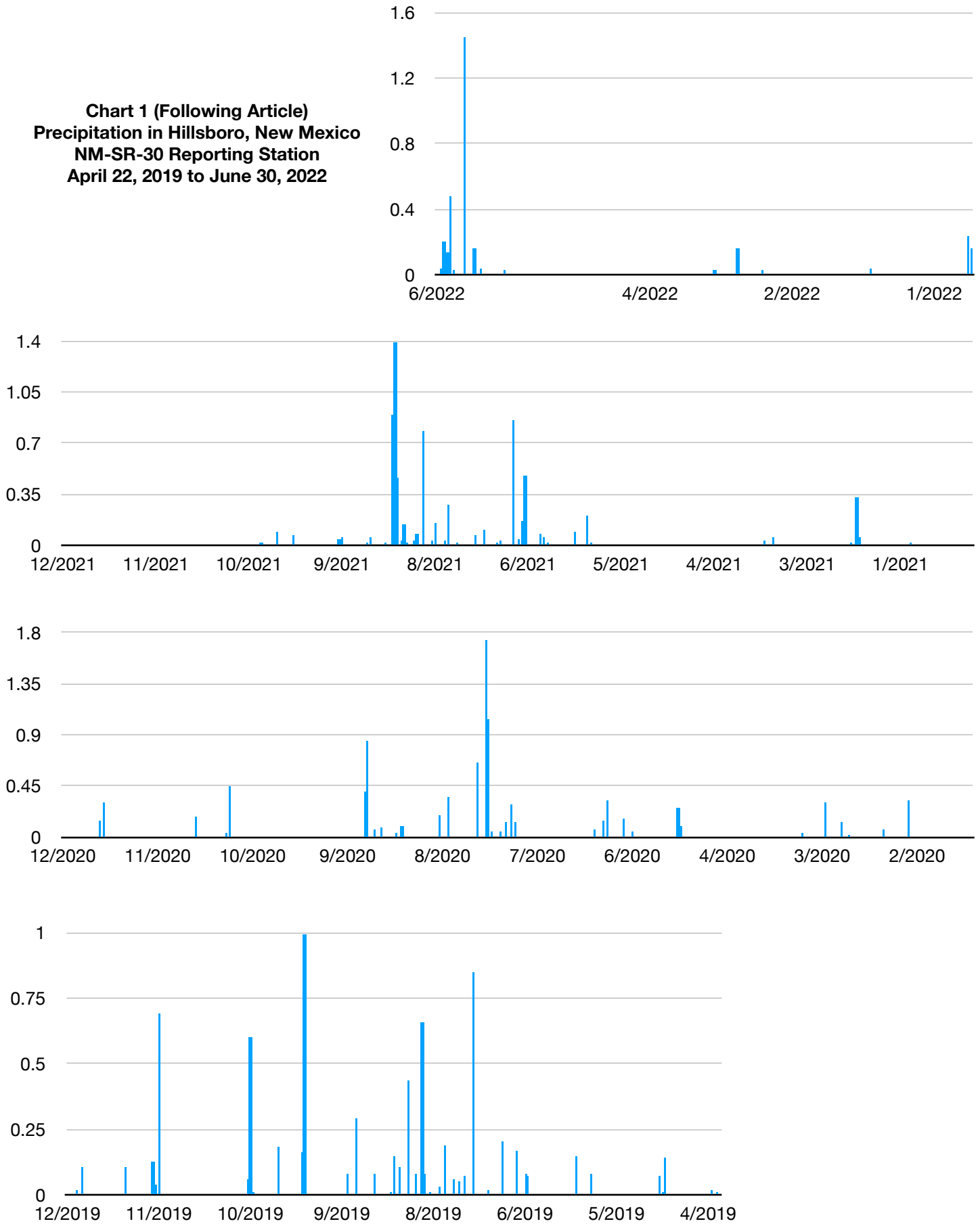
CREDITS: (GRAPHIC) N. DESAI/*SCIENCE*; (DATA) L. KELLER AND M. GENOUD, *NATURE*, **389**, 958 (1997); KORB *ET AL., PHIL. TRANS. R. SOC. B*, 376 (2021); KRAMER *ET AL., EXPERIMENTAL GERONTOLOGY*, **85**, 18, (2016); OETTLER *ET AL., CURRENT OPINION IN INSECT SCIENCE*, **16**, 58, (2016); THORNE *ET AL., JOURNAL OF ANIMAL ECOLOGY*, **71**, 1030, (2002); PEETERS *ET AL., INSECTES SOC.*, **47**, 325 (2000)

In the 1990 movie "Awakenings" starring Robert DeNiro and Robin Williams there is this exchange:

> "Dr. Malcolm Sayer: It was an immense project. I was to extract 1 decagram of myelin from 4 tons of earth worms.
> Dr. Sullivan: Really!
> Dr. Malcolm Sayer: Yes. I was on the project for 5 years. I was the only one who believed in it. Everyone else said it couldn't be done.
> Dr. Kaufman: It can't.
> Dr. Malcolm Sayer: I know that now. I proved it."

In our next article we prove that the same amount of rain does not fall everywhere.

Chart 1 (Following Article)
Precipitation in Hillsboro, New Mexico
NM-SR-30 Reporting Station
April 22, 2019 to June 30, 2022



Variation of Precipitation Over Small Areas

by Bob Barnes

This assessment is not about the amount of precipitation which falls in the Black Range but rather about how that rainfall might be distributed within a small geographic area.

We all know that it rains less in our yard than in our neighbors'. How else to explain the difference in relative green.

My general perception that the amount of rainfall at the east end of Hillsboro varied regularly from that on the west end, in a clinal fashion, was recently challenged. A bit of data will resolve this I thought. How naive.

There are three CoCoRaHS (Community Collaborative Rain, Hail and Snow Network) reporting stations in Hillsboro, New Mexico. They are situated along an east-west axis with the total distance between the three stations being approximately one mile. Elevation difference between the stations is minimal, not more than 200 feet. All are situated along the Percha Creek drainage and all are within 100 yards of the creek. They are all, for all intents and purposes, the same reporting area.

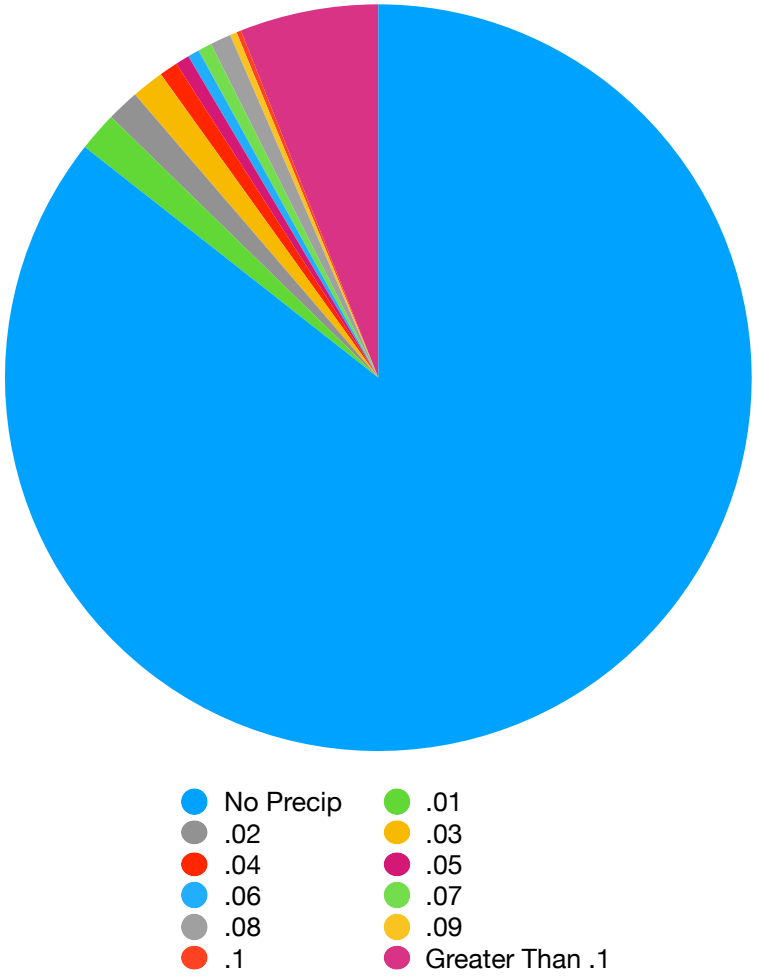
CoCoRaHS data is used extensively by the US NOAA National Weather Service, academic institutions, and researchers. It has a significant level of credibility.

The presence of three reporting stations, situated along an east-west axis, with end stations and an intermediate station, presented me with the opportunity to test my clinal hypothesis. The raw data I used are available (see endnotes) and the decisions I have made in parsing the data are outlined in the text. No claims of rigor are made for this analysis, and in general it should be considered informative rather than definitive.

Data Set

In this assessment, I used data from the three stations between April 22, 2019 and June 30, 2022. The end date (6/30) is straightforward: It is when my assessment began. There are data available from CoCoRaHS for later dates. I decided that I would assess rainfall over a period of 1,000 days in this study (in this analysis "day" is used inter-changeably with the 24-hour standard reporting period). However, in the first 1,000 days assessed, data from all of the three stations were not available for 166 days. The period of assessment was extended until the data set included 1,000 days with reports from all three stations. An assessment of those 166 days is included in this report.

Chart 2: Days of Precipitation



It Does Not Rain Much in Hillsboro

The fact that it is dry in Hillsboro is well known and is indicative of broader trends in the western United States. It is, however, useful to understand what that means - on the ground. There are periods when it does not rain in Hillsboro for weeks, indeed months, at a time. The ability of CoCoRaHS instrumentation to measure precipitation in hundredths of an inch is useful in Hillsboro because rainfall is often less than a tenth of an inch during any 24 hour period. Lastly, the typical precipitation pattern in Hillsboro is monsoonal. In general, most of the annual precipitation falls within a few months in summer. Unlike those in other parts of the US, we eagerly await July because that is when the rains may start and cool things down. The start of the monsoon, its duration, and its intensity are documented well but are quite variable.

Chart 1 (prior page) utilizes the data submitted by station NM-SR-30 at the east end of Hillsboro. It indicates the days of precipitation within the assessed dates. Note how much the amount of precipitation varies from day to day. Rainfall of more than one inch during a 24-hour period is anomalous but is mapped on these charts (1.74" on July 24, 2020, 1.45" on June 22, 2022, 1.39" on August 14, 2021, 1.04" on July 23, 2020, and 1" on September 15, 2019). And, note the lack of blue lines.

Chart 2: On the vast majority of days (86%, or 856 days), it does not rain in Hillsboro. The CoCoRaHS data base encourages the indication of a trace of rain. A trace is not a measurable amount but is an indication that there was a

Chart 3: Amount of Precip When it Happens

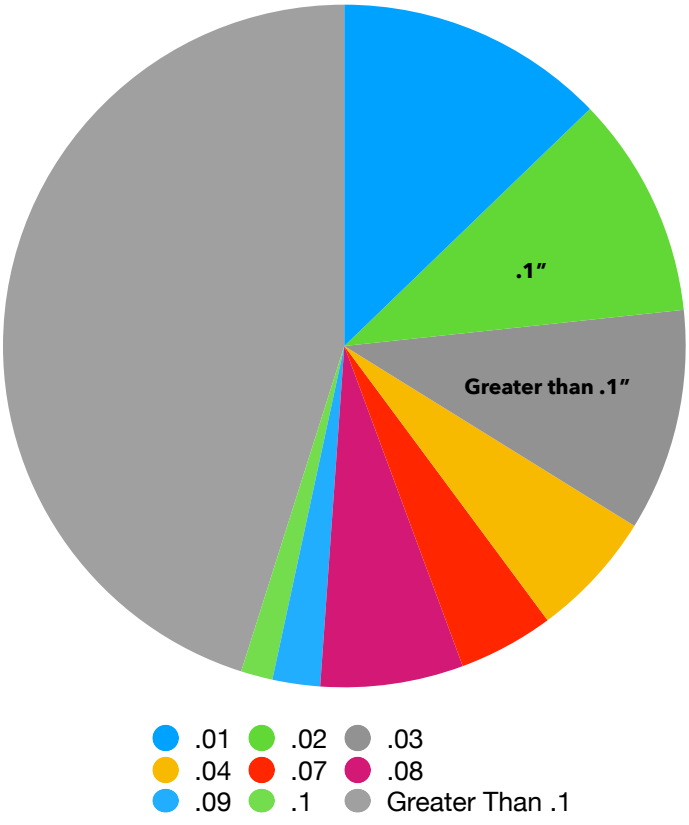
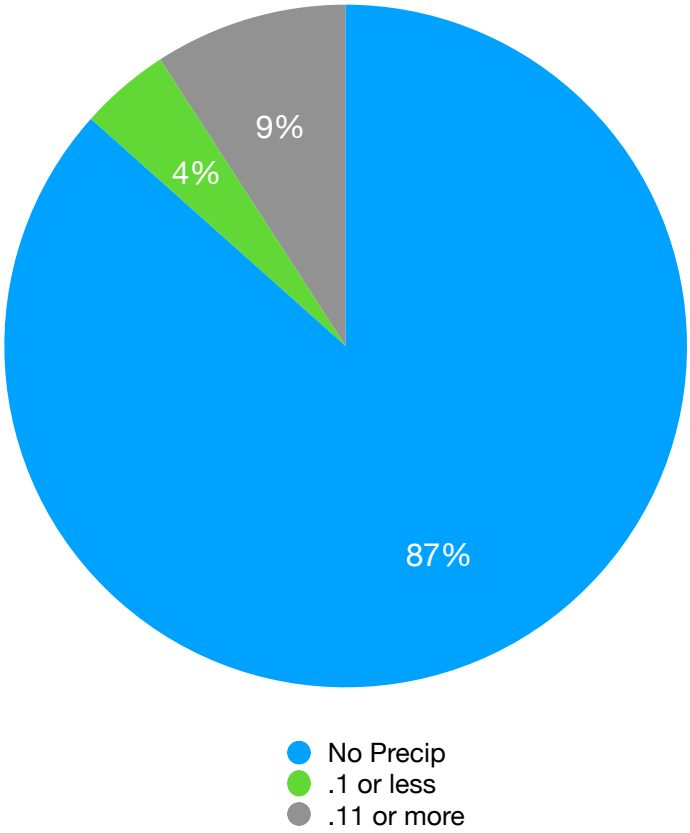


Chart 4: Two or Less Reporting Stations



slight amount of precipitation. In this analysis, but not later, a trace is treated as if it were 0.

Chart 3: When there is rainfall, the amount of precipitation is less than one tenth of an inch 61% of the time. Precipitation occurred during 144 days of the 1,000-day data set. On 60 of those days (or on 6% of the 1000 days assessed) the amount of precipitation was greater than .1".

Days Within The Analysis Period When Only Two Stations Reported

The standard set for the assessment of clinal precipitation across three reporting stations in Hillsboro, was the most recent 1,000 days (ending with June 30, 2022), with all three stations reporting. Analyzing 1,000 days with data from all three reporting stations required the review of 1,166 days. That is, within the data set of 1,166, there were 1,000 days when all three stations reported, 164 days when only two stations reported, and 2 days when only one station reported (Chart 4).

Although the referenced 166 days could not be used to assess the possibility of clinal activity, they did provide useful information about the rate of precipitation.

Table 1: During the referenced 166 days, the two stations reported no precipitation on 144 days (87% of the days).

TABLE 1	All 3 Stations	1 or 2 Stations
No Precipitation	86%	87%
.1" or Less Precipitation	8%	4%
.11 or More Precipitation	6%	9%

Table 2: Although potentially useful for the clinal precipitation analysis, the following data was not included in the assessment of 1,000 days because it describes only two data points.

Of note were three instances where the data were outside the typical range of data. On one day, the more easterly

TABLE 2	1 or 2 Stations Reporting Precipitation
Two Stations Report the Same Precipitation	5
East most station reports higher Precipitation	5
West most station reports higher Precipitation	7

station reported 1.04" of rain while the other reported 1.2" of rain. On the second day, the eastmost station reported 1.72" of rain and the other reported 1.51 inches of rain. In the third instance, the most easterly station reported .61 inches of rain and the other station reported .65 inches of rain.

Although this is a small data set, it is indicative of one of the findings from the larger set. The amount of rainfall varies over small areas, sometimes significantly. Given the dearth of precipitation in this area, a variance of .2" between two sites less than a mile apart may be significant, on the ground.

When Three Stations Reported and There Was Precipitation

This part of our assessment utilized the data reported from all three reporting stations. This differs from the first set, which utilized information from one reporting station. It is not, therefore, possible to directly compare the two sets of analysis.

To determine if there is a discernible pattern of precipitation, a trace of precipitation was treated as rainfall, although unmeasurable. This is different from the first set of analysis where a trace was treated as no precipitation.

A report of "a trace of precipitation" is less reliable than a report of measurable precipitation because it relies on the presence of the observer at the time the trace occurs to identify the trace in some manner. In the case of measurable precipitation, instrumentation is utilized - always on and always recording.

Given the attributes of a trace of rain, we utilized the report of a trace when one of the other stations reported either a trace or measurable precipitation, but not when only one station reported a trace. This assessment measures the geographic differences in precipitation and the significance of that variation. As discussed here this is not a mathematical determination of significance, but rather a determination of what effect the variation might have on the local environment.

Trace of Precipitation

On 726 days (72%) of the 1000-day data set, none of the reporting stations reported precipitation. On 75 days, only one of the three reporting stations reported a trace of precipitation. On 34 days, two or three of the stations reported a trace of precipitation. Given the data quality issues associated with trace reports, these 109 cases were not used in the trend assessment. This sort left 165 days which can be assessed for a clinal pattern.

Intermediate Station Reported Either the Highest or Lowest Precipitation Amount

No cline is present if the intermediate reporting station reports the highest or lowest precipitation amount. Of the remaining 165 days in our assessment this was the case on 46 days. The other situation which does not support a clinal distribution of precipitation is when all three stations report the same amount. Data from 8 days met this criterion. In all, 54 of the 165 days (32%) with measurable precipitation did not show a clinal precipitation pattern.

Clinal Pattern in 68% of Cases

On 68% of the days when all three stations reported precipitation, that precipitation fell in an east-west trend.

East or West?

On the 111 days which demonstrated clinal distribution of precipitation, 68 reports were of higher precipitation rates in the west than in the east, with the intermediate station supporting the trend. Conversely on 43 days the eastern most station reported the highest precipitation. These data are hardly supportive of a hypothesis that the geographic variation of precipitation would trend from lower in the east to higher in the west in this small geographic area. Even though that is the overall pattern with Kingston (9 miles to the west of Hillsboro) routinely receiving higher rainfall amounts than Hillsboro.

Seasonal Trend?

A seasonal assessment was conducted to determine if the precipitation tended to be clinal in one direction or the other according to season (seasons might indicate larger weather patterns). The data set was not robust enough to call out such a phenomenon. For example, only 26 (42%) of the days during Jun-Jul-Aug recorded higher rainfall in the east.

An assessment was made to determine the magnitude of the variance. What were the differences between the eastern and western stations? In 30 cases the difference between the easternmost and westernmost stations was .01". Although we celebrate a hundredth of an inch of rain in Hillsboro, it is hardly significant.

Of the 81 remaining cases the clinal difference was two hundredths of an inch or more, an amount we deemed significant. In 23 cases we found that the difference in recorded precipitation between the eastern most and western most station was greater than a tenth of an inch. (Chart 3) On 15 of the 23 days it was the eastmost reporting station with this higher amount of precipitation. That would be significant absent such a small data set.

Chart 5: Daily Precipitation Variance Between East Most (Left) and West Most (Right) Stations

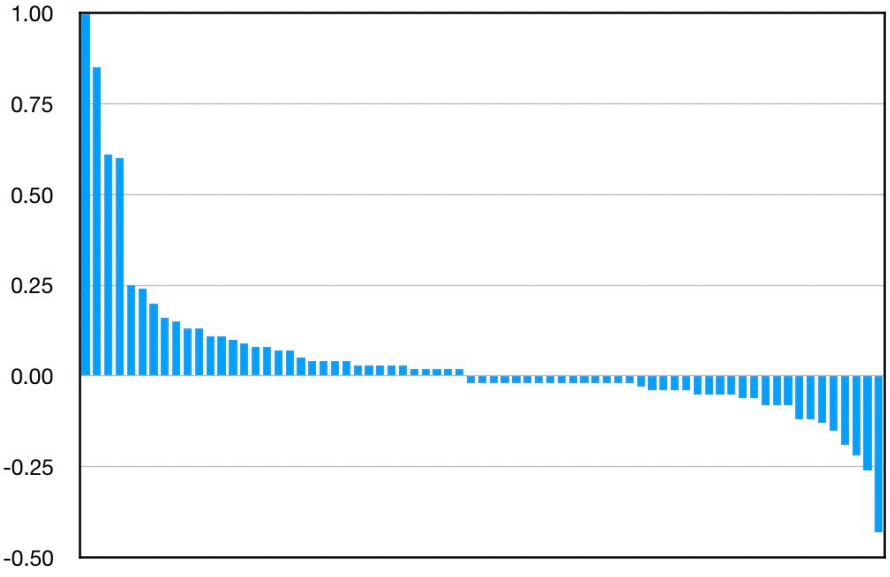


TABLE 3	East	West
Difference of 1 to 2 tenths	8	5
Difference of 2 tenths of one-half inch	3	3
Difference of more than one-half inch	4	0

Table 3 and Chart 5: When the variance between stations was small, the higher amounts tended to be at the westmost station. When the variance between stations was larger, the higher amounts tended to be at the eastmost station.

Expanded Sample

An assessment was made of how frequently the precipitation was the same across all reporting stations. We used an expanded data set of 1149 days for this assessment. Table 4 indicates the incidence as a percent of all cases (including days without rain). Table 5 indicates the incidence as a percent of all days with recorded precipitation.

Summary

It does not rain often, or much, in Hillsboro.

Rain in Hillsboro is spotty, raining more in one location than in another. In only 5% of the cases when there was precipitation recorded during the day did all three stations report the same amount of precipitation.

When precipitation is recorded by all three reporting stations there is generally a clinal variation in the amount of moisture (either the east or west station recording the greatest precipitation with the intermediate station supporting the trend). At times the difference in rainfall between the easternmost and westernmost stations can be biologically significant.

There does not appear to be a seasonal basis for the direction of the cline. However, when there is a greater variation in the amount of rain between stations, the eastmost station has the greatest amount of rain in most cases.

TABLE 4	Number of Days	Percent of Total
Total Days	1149	100%
Days When None of the Reporting Stations Reported Precipitation	844	73%
Only One of the Three Stations Reporting Precipitation	77	7%
Two Stations Reporting Precipitation - With Same Value	35	3%
Two Stations Reporting Precipitation - With Different Values	38	3%
Three Stations Reporting - All With Different Values	80	7%
Three Stations Reporting - With Two Reporting the Same Value	60	5%
Three Stations Reporting - All With the Same Value	15	1%

Study Critique

No claim is made that this study represents broader patterns. Data from the study is from a period of drought and it may be that non-drought weather patterns might produce different distributions.

The amounts of precipitation which make up the bulk of the samples mean that distribution assessments reflect small amounts of difference.

One of the goals of this assessment was to determine if there were biologically important differences in precipitation amounts across the area. In the vast majority of cases, the difference does not appear to be significant.

The most startling findings was one which "common knowledge" already reflects. In 73% of the days reflected in Chart 4, there was no rain. Chart 1 reflects the fact that precipitation tends to group in clumps of days, especially during the monsoon, reflecting the effect of large weather systems. That also means that the periods in which there is no precipitation are longer than the 73% figure would seem to indicate. For instance, no precipitation was recorded for several long periods during the study period:

TABLE 5	Number of Days	Percent of Total
Total Days	305	100%
Only One of the Three Stations Reporting Precipitation	77	25%
Two Stations Reporting Precipitation - With Same Value	35	11%
Two Stations Reporting Precipitation - With Different Values	38	12%
Three Stations Reporting - All With Different Values	80	26%
Three Stations Reporting - With Two Reporting the Same Value	60	20%
Three Stations Reporting - All With the Same Value	15	5%

- **66 days (April 1 - June 10, 2022);**
- **52 days (Oct. 7 - Dec. 9, 2021);**
- **39 days (Dec. 4, 2020 - Jan. 18, 2021);**
- **32 days (Sep. 25 - Oct. 26, 2020);**
- **48 days (Mar. 20 - May 9, 2020); and**
- **30 days (Oct. 6 - Nov. 18, 2019).**

There were many periods of one or two weeks without precipitation during the study period.

In many cases, the periods of lack of precipitation were broken by a day on which a reporting station reported a trace. Therefore, the periods when there is no appreciable amount of rain are actually more significant.

Plant Follow-up
Metcalfe's Penstemon

A fire, like the Black Fire which swept through the northern Black Range this summer, is a cause of concern on several fronts. We have tracked the status of *Penstemon metcalfei*, Metcalfe's Penstemon for a number of years.

The fire burnt through or near some of the traditional sites for this endangered species. We are able to report that some of the stands seem to have come through the fire okay. The status of most of the stands is unknown.

Photographs from the site on the slopes of Cross-O Mountain are shown here. They were taken by Philip Connors on August 5; Rebecca Hallgarth on August 25; and Nichole Trushell on August 25.

The photograph at the upper left on the following page shows the trail the area of the penstemon site.

At the penstemon site, be sure to look for *Clematis columbiana*, Columbian Virgin's Bower. The one shown here was photographed on September 6 when a few of the Penstemon were still in bloom.



Connors, August 5, 2022







Hallgarth, August 25, 2022

Trushell, August 25, 2022



Hallgarth, August 25, 2022





Hallgarth, August 25, 2022



Hallgarth, August 25, 2022



Hallgarth, August 25, 2022



Hallgarth, August 25, 2022



Near the Penstemon spot, *Gentiana affinis*, the Pleated Gentian, was doing well.

Hallgarth, August 25, 2022





Enlargement of the bluet/damselfly head/thorax/legs/abdomen area. I'm always surprised by the number of cilia-like hairs present under magnification, as damselflies appear smooth and shiny when viewed in the sunlight. - James Von Loh

A Taste of Bluet

Article and photographs by James Von Loh

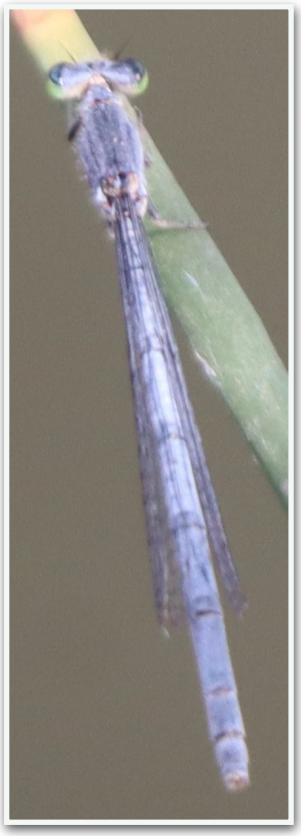
During the spring-through-fall months, should you visit almost any wetland or body of water with a fringe of wetland plants, within the contiguous US (except the extreme NW states) and adjacent southern Canada, you will likely see familiar bluets. They are pretty, common, slender damselflies that some also call "civil" bluets due to their specific epithet, *Enallagma civile* (Hagen, 1861). However, having observed and photographed many of them and their behavior along the Rio Grande since 2019, I'd describe them in human terms as "singularly-focused free spirits".

Taxonomy among damselfly species can be confusing, so I'm referring to the individuals herein as simply "bluets" (however, I believe them to be mostly familiar bluets). Individual bluets don't live all that long, from a few weeks to a few months, which seems to provide them with a very clear and very simple behavioral agenda (emerge/hunt/mate).

From prior egg depositions and hatches, bluet larvae emerge then rapidly enlarge and molt several times, before crawling from the water to dry while clinging to twigs and plants as small but functional individuals. They're soon capable of avoiding capture by predators, searching for/capturing food, mating, and egg deposition. While bluets may mate more than once as adults, they average just over one mating encounter.

As occasionally happens, I see something that either confuses or amazes me when photo-documenting insects doing insect things. Usually I see the "thing" when I'm processing the images by cropping and am left to wonder/research about the "why" and "how". In this case my wonderment about the bluet "thing" I saw was further informed on a later field trip, when I photo-documented a salient answer!

Herein are images I've collected over the past three years that illustrate the bluets using habitat that has become established along the Rio Grande. I provide personal narration informed by my observations and include technical information acquired from the Princeton Field Guide, *Dragonflies and Damselflies of the West* (Dennis Paulson, 2009).



Left: Recently emerged from the aquatic larva-to-juvenile form, a small damselfly perches on a stem, warming in the sun. This may be a juvenile forktail damselfly species (Paulson 2009).

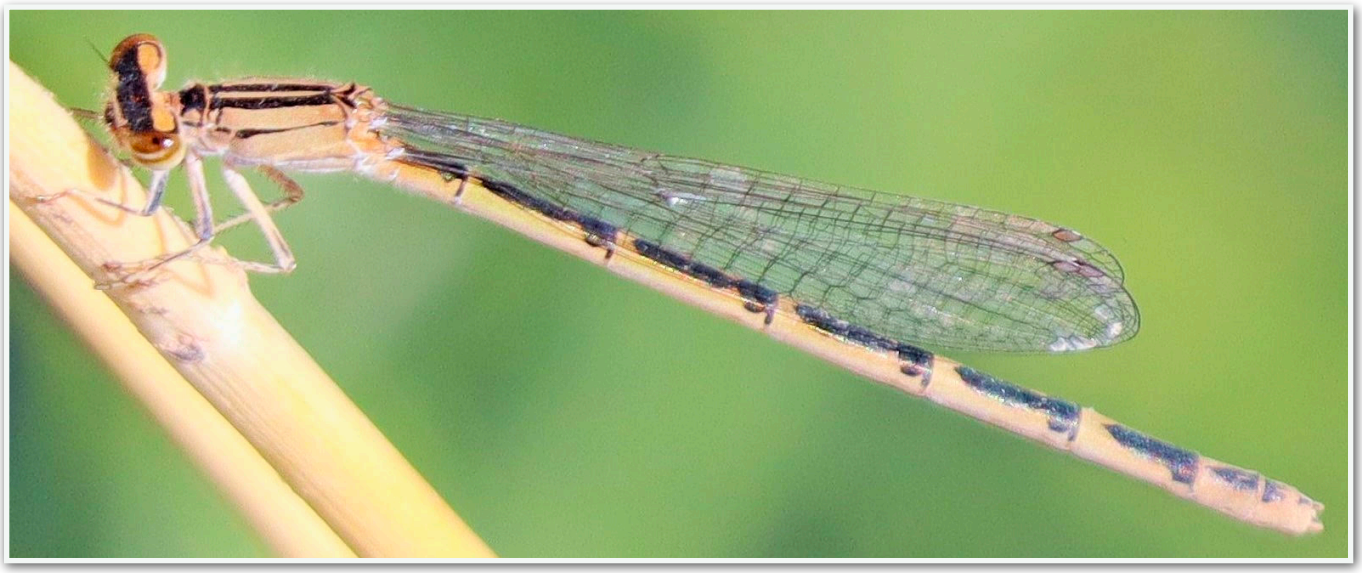
Right: Once matured, female bluets along the Rio Grande occur in three fairly distinct color forms (tan, tan and blue, and blue), making their identification a little tricky at times. This is an adult female, tan and light blue color form.

Middle: This is an adult female, tan color form. Note the uniformly large abdomen of the female.

Left Bottom: Adult female, blue color form. She is in tandem linkage to a male's abdomen and is performing post-mating/egg deposition behavior.

Right Bottom: Adult male pale blue color form. Note narrowing of the abdomen characteristic of males.













Above: Adult male, bright blue color form.

Left: This appears to be a juvenile male bluet.

Below: A tan-colored female entices males to mate (display behavior) by flipping her abdomen upward then curling it downward (usually male bluets arrive in seconds). The damselfly abdomen has 10 segments (numbered S-1 to S-10).





Left: Once a suitable mate is accepted, the male connects its abdomen tip (S-10, equipped with paraprocts, cerci, genital pore) to a site on the female's prothorax (top, front of the thorax).

Below Left: The female then maneuvers, sometimes with several attempts, to connect her S-10 (abdomen tip genitalia) to the S-2, S-3 segments of the male's abdomen where its secondary genitalia are located (enlarged as a "basal bulge" - a way to identify males).

Below: Tan-colored female completes the typical "mating wheel" with the blue male. The "mating wheel" in the long-bodied bluets is somewhat heart-shaped rather than a more ovoid shape of other damselfly species.

Bottom: Enlargement showing sites of male penis (S-2, S-3) and female genitalia (S-10) plus the "mating wheel" formation as male sperm is transferred into the female to fertilize eggs (male transfers sperm from the gonopore at S-9 to the penis at S-2, S-3 via a seminal vesicle).













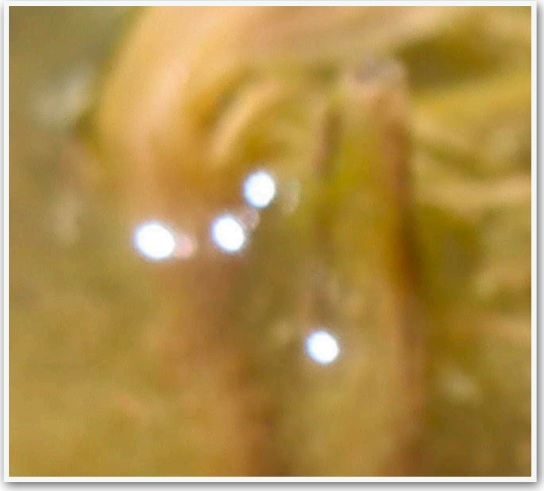


Left: The pair uncouples at the abdomen-to-abdomen site to form the "tandem linkage" and begin fertilized egg deposition. The male remains attached with cerci to the female prothorax to provide a "guide and tow service" to egg deposition sites (and to ensure his sperm fertilizes the eggs).

Left Middle: The female is guided and delivered to a floating cattail stem and leaves. This popular bluet egg deposition site is visited by more than one egg-depositing pair at a time.

Two at Bottom Left: A floating branch provides preferred egg deposition habitat for this bluet pair. Note the female (rear bluet) is all blue in color matching the blue color of the male (front bluet). She deposits eggs first to one side, then to the other side of the stem (some eggs are also scattered on top of the stem, appear as white spheroids). In the bottom left photograph, a tan and blue female deposits eggs along a floating cattail stem as the male moves them forward along the stem's length. This behavior is repeated as the male flies them to other deposition sites, ensuring eggs are placed in more than one place along this and other stems, and the female ensures that eggs are deposited on both sides of the stem.

Below: Four recently deposited bluet eggs shine intensely while underwater under full sunlight.



Following Page

Top: Mating and egg-laying bluet pairs are constantly visited by unpaired males, perhaps sensing an opportunity to mate following this pairing. The last male to mate with a female ensures his sperm fertilizes the eggs by scooping out sperm from previous copulating males.

Left: All the activity of this egg-depositing bluet pair attracts the attention of a male plateau dragonlet, *Erithrodiplax basifusca* (Calvert, 1895) defending his territory from other dragonlet males while seeking a mate.







Immediately Above: Perched on the edge of a water-smartweed leaf, the bluet male lowers the female to the waterline where she deposits several bright white eggs.

Following Page

One day I noticed a congregation of four bluet tandem-linked pairs depositing eggs along floating southern cattail leaves (while a few single males investigated) and I collected several images:

Top: But some "thing" appeared odd when I looked closer at tandem-linked pair in the middle of the photograph.

Middle: The familiar bluet tandem-linked pair appeared to look horrified to me. What was that "thing" hanging from and dangling in front of the female bluet at the left???

Bottom Photos: A look at the "thing's" distal end shows an egg resting on it. I guess you could say, partially tandem-linked female at the left is attached - to only a male bluet abdomen, as she continues to deposit her eggs.







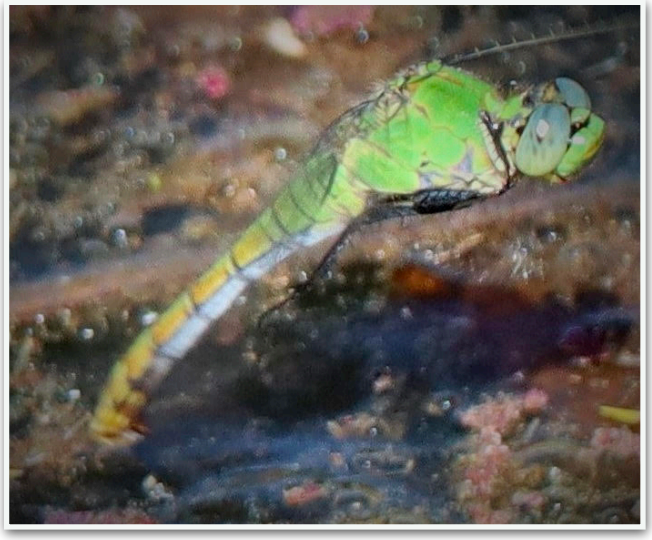




And now, let's meet the western pondhawk, *Erythemis collocata* (Hagen, 1861) and learn of its contribution to this story. This species is in a group called skimmers and occurs from western Texas and Oklahoma, along the US/Mexico border to the Pacific Ocean, then north into southern Canada; in eastern New Mexico and north through Oklahoma, the species overlaps with the eastern pondhawk, *Erythemis simplicicollis* (Hagen, 1861). Over the southern plains and into the desert southwest, they may constitute a hybrid swarm that indicates they may be the same species (conspecific). They are maintained as separate species for convenience because typical populations of both species are quite different, easily distinguishable, and apparently somewhat different in natural history (Paulson 2009).

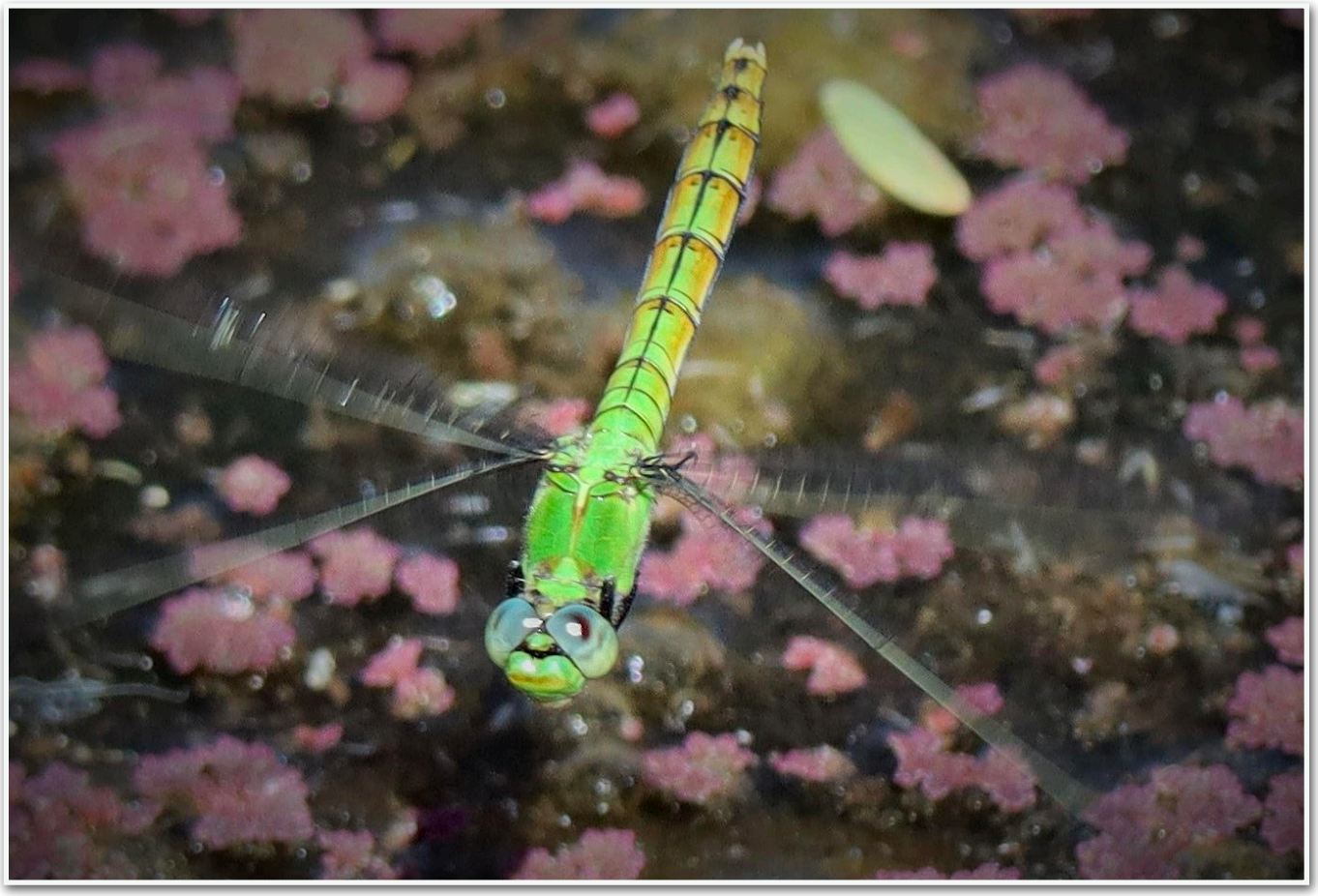
Photograph Above: Other than her striking beauty, I have no real reason to bring the female western pondhawk into the discussion. She is resting on southern cattail leaves.

Middle Photograph: this female pondhawk was depositing her own fertilized eggs, unassisted, into the shallow water (while on the fly). The male with which she had recently mated flew wide circles and high arcs over her during this process.



Below: the male western pondhawk followed the female's movements and overflew her during egg deposition.









Photograph Above: The western pondhawk female selected a floating mat of predominantly Mexican mosquito fern, *Azolla mexicana* Schltdl. & Cham. ex Kunze (May 1845) as her egg deposition site.

Left: This female western pondhawk has captured and is ingesting an unknown species of fly (Diptera).

Below Left: This male western pondhawk, on a hot afternoon, is exhibiting 'sleeping' behavior with its eyes/head pressed against a coyote willow branch to shade them from the sun's direct rays. I normally see dragonflies at willow shrubs or tamarisk trees with leafy canopies that provide complete shade for sleeping dragonflies (evening/night/morning/hot afternoon).

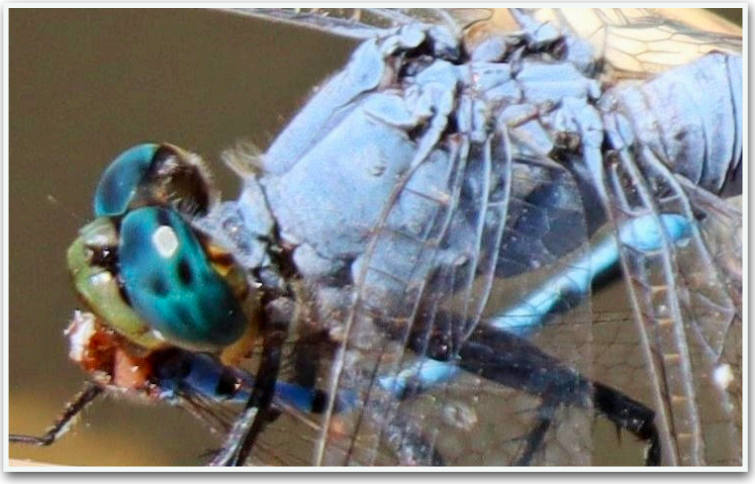
Following Page Top: But this male western pondhawk is essential to this tale. I was rarely able to collect an image of a male and its dazzling powder-blue color (they are quite furtive and flighty), but he had just captured a tandem-linked, egg-depositing pair of bluets and was engaged in chewing the eyes and head off the male bluet. The female bluet's abdomen and wings show behind as she clings to a dried grass stem. Pondhawks (western and eastern) commonly include smaller odonates in their diet, including damselflies and small dragonflies (Paulson 2009).

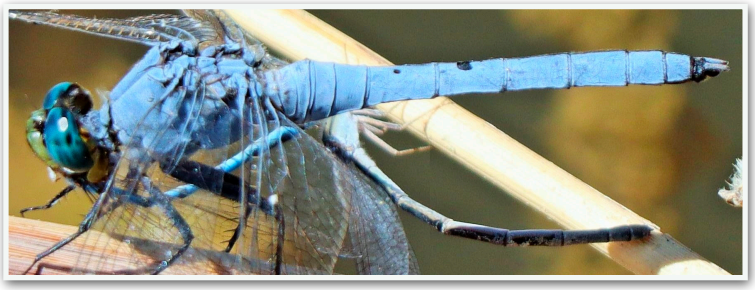




Left: having finished chewing and swallowing the eyes and head, this male western pondhawk begins to ingest a mouthful of the captured male bluet's thorax where the large flight muscles occur. A portion of the bluet's abdomen shows behind the pondhawk's second leg. At the same time a portion of the female bluet abdomen and wings show below the pondhawk's abdomen.













Top Left: As the pondhawk feeds on the male bluet, the female bluet, still connected to the male bluet's abdomen, continues to cling to the dried grass stem.

Middle Left: The male pondhawk ingests the last of the male bluet's flight muscles, located at the back of its thorax and adjacent to its abdomen.

Bottom Left: And the female bluet, still connected to the male's abdomen, continues to cling to the stem.

Top Right: Having completed ingesting the bluet's eyes, head, and thorax, the male western pondhawk drops the female bluet into the water with the male bluet's intact abdomen still attached by its cerci to her prothorax.

Middle Right: Finally, the male western pondhawk examines the male bluet's wing bases for remaining muscle tissue, but he's already eaten them clean. He then also releases them into the water.

Bottom Right: The male western pondhawk also appeared to be chewing along the top of the damselfly wings for a period of time.



Top: The day before, the same male western pondhawk spent quite an amount of time tearing at and ingesting muscle tissue away from another pair of wing bases, likely of another captured bluet (based on wing shape and color/shape of the 'pterostigma', the colored cell near the wing margin).



Left: My last, blurry image of this pondhawk is of him flying to somewhere more secluded, and taking the bluet wings with him.

AND now, the "thing" I saw is visually explained and fully resolved by both field observation and literature research!!!

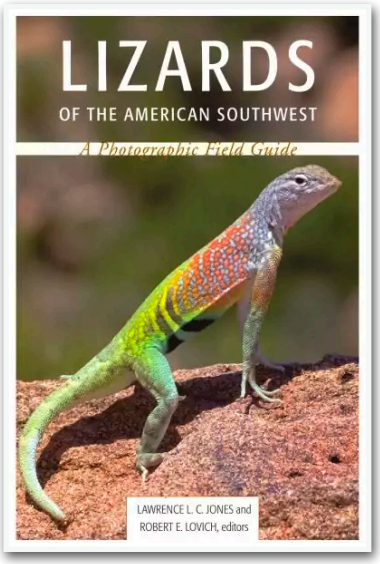
The bluet on the right of the middle image on page 37 is the female bluet of our story, with the abdomen of the male eaten by a pondhawk still attached.

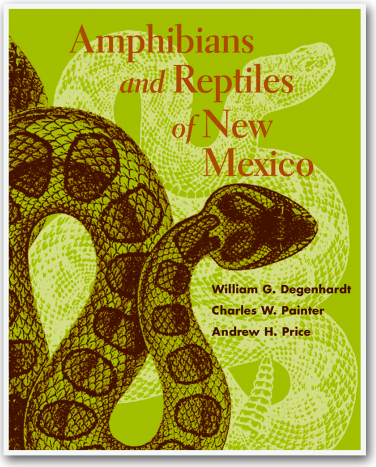


The acorns of Gambel Oak, *Quercus gambelii*, may be "gathered in July and August . . . can be eaten straight off the tree; they are indigenous to the Southwest. Other acorns need to be leached of their bitter tannin before roasting and grinding." ***Breads of the Southwest: Recipes in the Native American, Spanish, and Mexican Traditions***, by Beth Hensperger, p. 136. Methods of harvesting and processing acorns are discussed in the ***Feb. 25, 2016*** blog of Desert Tortoise Botanicals, the ***Oct. 13, 2014/Sep 24, 2021*** blogs of Hunter-Angler-Gardener-Cook, and at page 47 of ***Uncultivated Native Plants Used as Sources of Food***, Edward F. Castetter, 1935.

Lizards of the Black Range

Here, we present a summary of the lizard species found in the Black Range. In compiling this list we relied on the USFS Gila checklist for reptiles, the iNaturalist tabulation of sightings in the area (Sep. 5, 2022), the Reptiles and Amphibian photo gallery of the Black Range website, *Lizards of the American Southwest: A Photographic Field Guide*, and *Amphibians and Reptiles of New Mexico*.





In the following list; red text is a link to the Black Range photo gallery for the species, black underlined text indicates that both the Gila checklist and the iNaturalist site show that the species is found in the Black Range (but that a photo gallery entry on the Black Range website does not exist). See text for information about entries in black text which is not underlined.

Aspidoscelis exsanguis, Chihuahuan Spotted Whiptail (Cnemidophorus exsanguis on Gila Checklist)

***Cnemidophorus flagellicaudus, Gila Spotted Whiptail* (Gila Checklist Only): Some authorities subsume the Gila Spotted Whiptail into *Aspidoscelis sonorae* as *A. s. flagellicaudus*. Others, like *Lizards of the American Southwest,* treat it as a full species. It does not reach the Black Range; however, the eastern portion of its range does extend into the Mogollon of western New Mexico.**

Aspidoscelis inornatus, Little Striped Whiptail

***Aspidoscelis marmoratus,* Marbled Whiptail (iNaturalist indicates sightings in Truth or Consequences). Some authorities consider this species to be a subspecies of *A. tigris*.**

Aspidoscelis neomexicanus, New Mexico Whiptail

Aspidoscelis tesselatus, Common Checkered Whiptail

***Aspidoscelis tigris,* Western Whiptail (*Cnemidophorus tigris* on Gila Checklist)**

Aspidoscelis uniparens, Desert Grassland Whiptail (Cnemidophorus uniparens on Gila Checklist)

***Aspidoscelis velox,* Plateau Striped Whiptail (iNaturalist indicates sightings in/near Silver City.)**

***Coleonyx variegatus,* Western Banded Gecko**

Cophosaurus texanus, Greater Earless Lizard

***Crotaphytus collaris,* Eastern Collared Lizard**

Elgaria kingii, Arizona Alligator Lizard (Madrean Alligator Lizard on Gila Checklist). The subspecies found here is E. k. nobilis, the Arizona Alligator Lizard - the type specimen is from the Santa Rita Copper Mine.

Gambelia wislizenii, Long-nosed Leopard Lizard

***Heloderma suspectum,* Gila Monster**

***Hemidactylus turcicus,* Mediterranean House Gecko (iNaturalist indicates sightings in Deming and in/near Truth or Consequences.)**

***Holbrookia maculata,* Western Earless Lizard Also known as the Common Earless Lizard. The taxonomic determinations made about this genus are in flux.**

Phrynosoma cornutum, Texas Horned Lizard

***Phrynosoma douglassii,* Short-horned Lizard (Gila Checklist Only) This species was once lumped with *P. hernandesi*. They are now split, and *P. douglassii,* the Pygmy Short-horned Lizard, is found in the Pacific Northwest of the United States, not in this area.**

Phrynosoma hernandesi, Greater Short-horned Lizard

Phrynosoma modestum, Roundtail Horned Lizard

***Plestiodon multivirgatus,* Many-lined Skink (*Eumeces multivirgatus* on Gila Checklist)**

Plestiodon obsoletus, Great Plains Skink (Eumeces obsoletus on Gila Checklist)

Sceloporus bimaculosus, Twin-spotted Spiny Lizard

Sceloporus clarkii, Clark's Spiny Lizard

Sceloporus cowlesi, Southwestern Fence Lizard

***Sceloporus jarrovii,* Yarrow's Spiny Lizard (iNaturalist indicates sightings north of Silver City, but not in Black Range.)**

***Sceloporus magister,* Desert Spiny Lizard This species once included *S. bimaculosus* and *S. uniformis*. Subspecies within each are argued about.**

Sceloporus poinsettii, Crevice Spiny Lizard

Sceloporus undulatus, **Eastern Fence Lizard (Gila Checklist Only). This species is now split. *S. cowlesi*, the Southwestern Fence Lizard, is the species found here. Several authorities argue that much more work needs to be done on the species determinations within this group.**

Sceloporus virgatus, **Striped Plateau Lizard (Simply Plateau Lizard on Gila Checklist). This species probably does not exist in the Black Range.**

Urosaurus ornatus, Ornate Tree Lizard (Simply Tree Lizard on Gila Checklist)

Uta stansburiana, **Common Side-blotched Lizard (iNaturalist lists sightings in the Caballos and Floridas but not in the Black Range.)**

Among other things, the above list may clear up some of the nomenclature issues you may encounter. Two major changes which have occurred in taxonomic nomenclature in the recent past are:

- **Lizards formerly in the *Cnemidophorus* genus are now known as *Aspidoscelis* (a change challenged by some); and**
- **Lizards formerly known as *Eumeces* are now in the genus *Plestiodon*.**

Whiptails

Several whiptails (*Aspidoscelis*) species are clonal: all individuals of these species are females, and reproduction occurs absent males. In fact, there are no males in the species. These species developed when hybridization occurred between two sexual species. In some cases the prodigy was a different species, one which did not practice sexual reproduction.

An encounter with one of these species should lead to fairly easy identification. Right? You guessed it, wrong! Not only is there general similarity between the species, there is a general lack of strong distinguishing characteristics. Two other factors confound things: Each of the species goes through ontogenetic changes (their appearance changes) and at various "stages" the mix of characteristics complicates identification significantly. Oh, and their ranges often overlap.

The genus *Aspidoscelis* is the only genus in the family *Teidae* found in the United States. Some members of the *Teidae* family, like the Gold Tegu, *Tupinambis teguixin,* which is found in northern South America, can be quite large, up to 4' long and weighing up to 9 pounds (photo below). They can be quite aggressive. The tail of some lizard species will break off when the lizard has been grabbed by the tail. I often associate this ability with smaller lizards like the whiptails, which readily demonstrate this capability. But the Gold Tegu also has this capability. The tail will break off along fracture planes associated with the vertebrae.

Horned Lizard

What is this lizard stuff? When I was a boy growing up south of Roswell, New Mexico, we called them Horned Toads. Never could figure out why they were called toads. Clearly they were not. But what kind of a name is horned lizard? (The adult says "descriptive".)

Species of this genus are a young boy's delight. Not only are they cryptic and hard to find, but they have wonderful horns, and when you hold them in your hand and gently stroke their stomachs they go to sleep. And, of course, when you are digging up an ant colony to make your own ant farm you can place the horned toads near your efforts and watch them eat ants. How cool is that!

Parthenogenesis

At the time ant colonies were being dug up to make ant colonies in a jar, sexual reproduction, or anything with that word in it, was not taught to



elementary school kids in Dexter, New Mexico. A couple of years later, at Ramey Air Force Base, Puerto Rico, I began to run into discussions of that topic. But the official school syllabus was limited to "there is sexual reproduction and there is asexual reproduction". Apparently really small things practiced asexual reproduction and big things practiced sexual reproduction. But all the drawings showed some type of cell biology, no mechanics.

Much later I was introduced to more nuanced concepts, but the whiptails are an eyeopener when it comes to concepts of reproduction and "sexuality". If you have issues with the public discussion of these topics DO NOT READ ANY FURTHER. Flip forward to the discussion of individual species, or it may be safer to flip to the back cover.

Here we go, grab a beer and ready yourself for some "wild talk".

Except for those little drawings which are asexual, all other reproduction is based on the concept of male and female.

Wrong. As a foundational concept this one is all wrong, it is full of cracks. Certainly, many of the world's species practice sexual reproduction, most of the animal kingdom for example (see human example at the center of the page). But a substantial amount of life on earth is based on other models - and who knows what the rest of the universe holds.

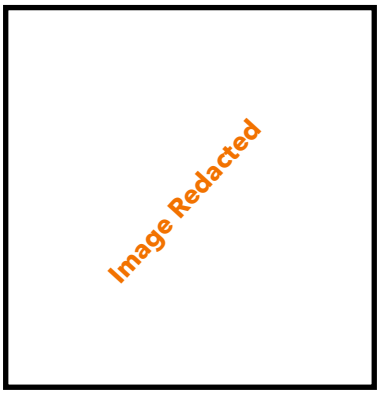
If it is a "higher animal" (meaning, I think, multicellular - but perhaps vertebrates) the species will practice sexual reproduction.

Wrong. (Don't despair, I will get to something "right" in a moment, hopefully.) Rather than continue this logic tree any further, let us jump to the whiptails and discuss specifics.

All Whiptails Are "Abnormal" (meaning, I think - sorry, I don't have a clue)

Since I don't know what we are talking about, I do not know if it is right or wrong (told you we would get away from all those definite wrongs).

About a third of the recognized whiptail species are unisexual, all of the individuals in these species being female. Little Amazons racing across the sand and gravel. All of these species are thought to have resulted from hybridization, as discussed earlier (but see below). When it comes to reproduction, the individual will lay eggs which hatch into little whiptails which are all clones of herself. Unisexual reproduction of this type is called parthenogenesis.



Some authorities will assert that parthenogenesis is an asexual mode of reproduction. However, eggs are produced in this process, something which does not occur in asexual reproduction. It is okay to have more boxes; everything does not have to fit into a few.

Because this is not mind-altering enough, it is important to note that the hybridization process is not as simple as stated earlier. Two sexual species mating to produce a unisexual species is an accurate description of the process if the parents are diploid. If the offspring is triploid, there was an additional stage in which mating occurred between a unisexual individual and a member of a bisexual species.

When it comes to determinations of species, the processes described above (like many other processes) throw a wrench into the good 'ole Linnean model. Some, perhaps most, of the people who study parthenogenesis have concluded that each successful act of hybridization results in a new species (in the cases of the process discussed above). Yes, each act of successful hybridization. Two species might hybridize at different times, and as long as different individuals were involved, they might (probably would, they argue) produce different species.

Successful hybridization of this type is assumed to be fairly rare. If not, the taxonomy of this genus is a lot more complex than anyone imagines. One of the problems with this line of thought originates from where we draw the line, what we consider a different species from a base type. In the case of two hybridization events there are arguably four individuals involved, but there could be only three. Of the four, what happens if each species is represented by a brother and sister pair, or close cousins, or . . . . Genetic differences occur from such hybridization events (and not just the differences which lead to unisexual reproduction versus sexual reproduction), but they may be more or less significant. Clinal differences may be all over the place or it may be that all of the successful hybridizations occurred well in the past and we now have only the multi-generational offsprings.

Parthenogenesis as a type of reproduction does not always produce females. Bird species generally produce males, for instance. This is a complex process governed by chromosome constitution, whether meiosis has been suppressed or not, and other factors. The drones of bee species are produced by haploid parthenogenesis while the females are produced via sexual fertilization, for instance.

Reproduction, gene flow, cross-fertilization, sexual, asexual, unisexual, bisexual, etc., etc., are all fascinating but well beyond the scope of this effort.

Here, we simply wish to point out that the lizard scurrying away from you is a wonder which has carved out a niche for itself in a very diverse world.

Aspidoscelis exsanguis, Chihuahuan Spotted Whiptail



Chihuahuan Spotted Whiptail, *Aspidoscelis exsanguis*
Synonym: *Cnemidophorus exsanguis*
Gila Wilderness, New Mexico

The Chihuahuan Spotted Whiptail is one of the unisexual species of *Aspidoscelis*. All of the whiptails of this species are female and all are sisters, clones of each other.

The tail of this species is longer than the rest of the body. Note the pattern and coloration of the tail of the individuals shown here. The differences between tail and body indicate that the tail was probably lost at some time in the past and has regrown. The light spots on its back tend to be lighter (brighter) in color nearer the tail than the head. Spots are typically found on the rear legs.

Some of the unisexual whiptails will assume "pseudocopulatory postures that mimic mating among sexually reproducing species" (*Lizards of the American Southwest*, p. 340); this is one of those species. Whether an individual "assumes" the male or female role depends on the stage of egg development in its body. Apparently this behavior stimulates the lizard to lay more eggs than if the "pseudomating" did not occur.



Chihuahuan Spotted Whiptail
Aspidoscelis exsanguis
North Wicks Canyon (Black Peak)
East of Hillsboro, New Mexico

Aspidoscelis inornata llanuras, Little (Plains) Striped Whiptail



Little (Plains) Striped Whiptail
Aspidoscelis inornata llanuras
Snake Mine Road East of Hillsboro, New Mexico

The Little Striped Whiptail is a bisexual species of *Aspidoscelis*. Among other traits, the males can be strikingly blue when and where that color is present.

This species is typically found at elevations between 2,700′ and 7,000′.

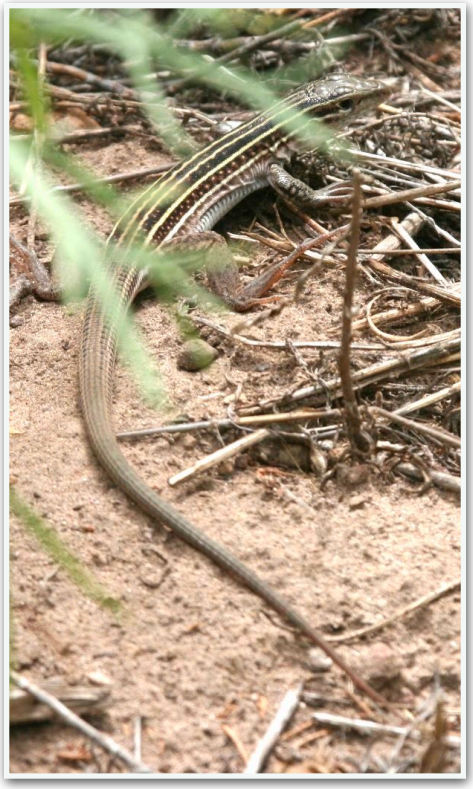
Seven subspecies of the Little Striped Whiptail are currently recognized; three of these subspecies are found in New Mexico. The subspecies shown here is the only one of the three to be found in our area.

This species is typically found between April and the end of September.

Note the lack of spotting on the body, six or seven stripes.

Aspidoscelis neomexicana, New Mexico Whiptail

The New Mexico Whiptail is another of the unisexual species of Whiptail. It has a limited range, basically the Rio Grande Valley from northern New Mexico into the area just southeast of El Paso - with a bit of southwestern New Mexico thrown in for measure.



New Mexico Whiptail, *Aspidoscelis neomexicana*
Synonym: *Cnemidophorus neomexicana*
Gila Wilderness, New Mexico

The mid-dorsal line on the back of this species appears wavy and at its terminus at the head appears to form a "Y" - caused by the lines on either side being longer. Spots are present within the dark lines of the body. Juveniles will have dark lines which are more defined and darker, but the spots within those lines will be less well defined.

The New Mexico Whiptail is typically found at elevations between 3,000′ and 6,000′ feet in areas of mesquite, creosote, and saltbush.

This species is active between April and October. It overwinters in a burrow it digs roughly a foot below the surface, plugging the entrance with dirt. In mid-summer (June-July) this species will lay eggs; sometimes there will be a second clutch. Clutch size is typically two eggs.

This species is thought to have originated from a single hybridization event between a female *Aspidoscelis marmorata* and a male *Aspidoscelis inornata*. Since there is little genetic variation within this species, it (the species) is assumed to have originated recently (within long-term biological time-scales).

Aspidoscelis tesselatusaka, Common Checkered Whiptail





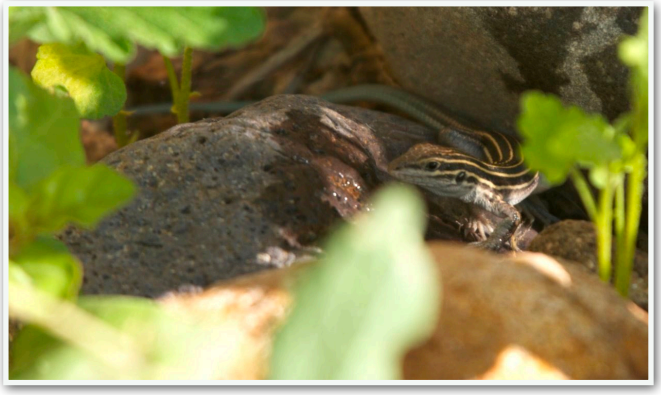
Common Checkered Whiptail, *Aspidoscelis tesselatusaka*
Synonym: Cnemidophorus *tesselatusaka*
Near Summit of Black Peak
East of Hillsboro, NM



Aspidoscelis uniparens, Desert Grasslands Whiptail

All photographs from Hillsboro, New Mexico







Both the Common Checkered Whiptail and the Desert Grassland Whiptail are unisexual species; all individuals in these species are female. Both species have limited distribution ranges. We are at the western edge of the range of the Common Checkered Whiptail and centrally located within the range of the Desert Grasslands Whiptail.

The checkered pattern of *A. tesselatusaka* is distinctive but not unique. It is most easily confused with the other "checkered" whiptails (Marbled, Gray, and Colorado), none of which are found in the Black Range. The taxonomic history of this species is complicated, and it may be identified by a variety of names in the references you have.

The Common Checkered Whiptail is thought to have originated from mating between *A. m. marmorata* and *A. scalaris*. If their ranges have remained stable, this event would have occurred in the Big Bend area of Texas or northeastern Chihuahua.

The short central stripe near the head is helpful (not necessarily diagnostic) when identifying the Desert Grasslands Whiptail.

Cophosaurus texanus scitulus, (Chihuahuan) Greater Earless Lizard



(Chihuahuan) Greater Earless Lizard - *Cophosaurus texanus scitulus*
Hillsboro, New Mexico - July 6, 2013
Photographs above and at left center by Barnes.



The adult Greater Earless Lizard is one of the "poster lizards" of our area, gracing the covers of field guides and depicted regularly in a prominent position on anything having to do with lizards.

The genus *Cophosaurus* is one of the "sand lizard" groups. There is only one species in this genus. There are three subspecies of Greater Earless Lizard; only *Cophosaurus texanus scitulus* is found in our area.

The ventral (bottom) side of the tail is white with strongly marked black bands or spots (see the following page). This is a characteristic that many other sand lizards possess.

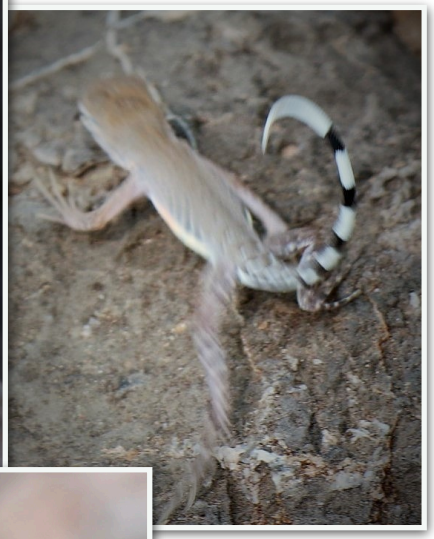
At night, this species will typically bury itself in sand, sometimes in loose rock.

This species likes to perch. Look for it on top of a high rock when walking in a wash or similar habitat.



Photograph by James Von Loh







Top images here and those on the next three pages were taken by James Von Loh on Tortugas Mountain, Las Cruces, New Mexico. He photographed them on the west-facing middle and upper portion of the mountain. He took the bottom image on this page in July 2022 near Las Cruces (Bar Canyon/ Soledad Canyon).







Photographs by James Von Loh

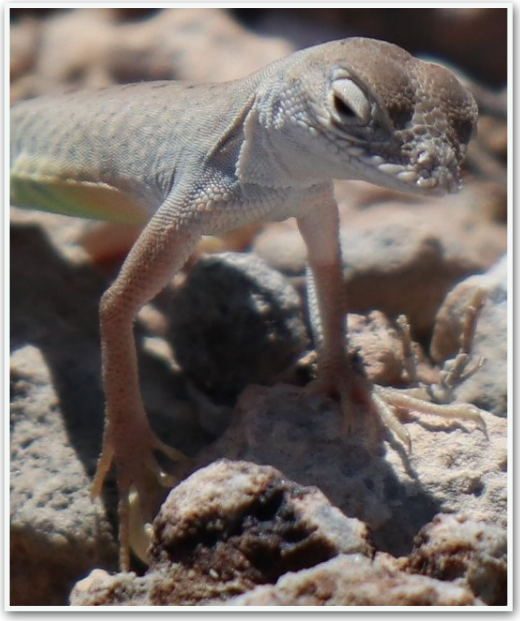








Photographs by James Von Loh







Photographs by James Von Loh





(Chihuahuan) Greater Earless Lizard
Cophosaurus texanus scitulus
Hillsboro, New Mexico





Crotaphytus collaris, Eastern Collared Lizard

These images were taken by Gordon Berman, on the east and northeast side of Tortugas Mountain, near Las Cruces.

Identification Aids: Two black collars around the neck, hind legs longer than the front ones, males are larger than females, females can be bright red/orange during breeding period, with coloration fading after eggs are laid. This species likes to perch on higher ground.

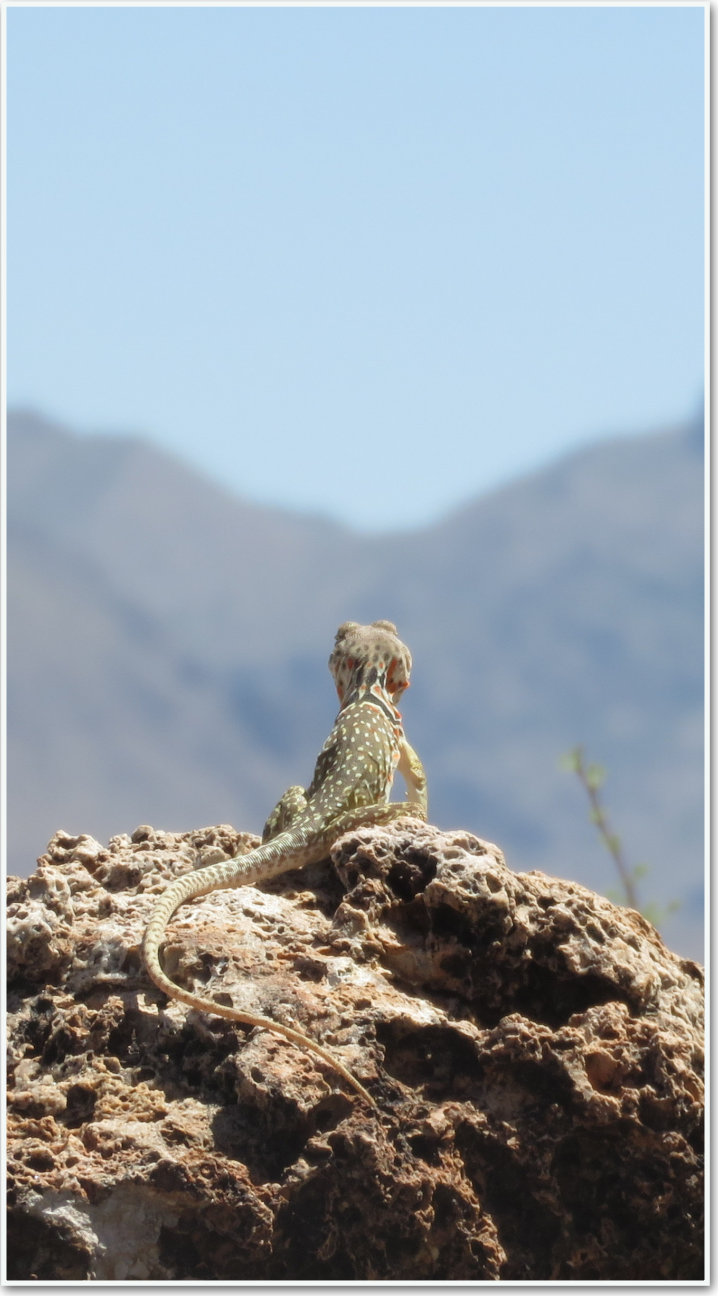
In addition to the normal array of invertebrates, the Eastern Collared Lizard will also take on small mammals and birds, and other lizards.

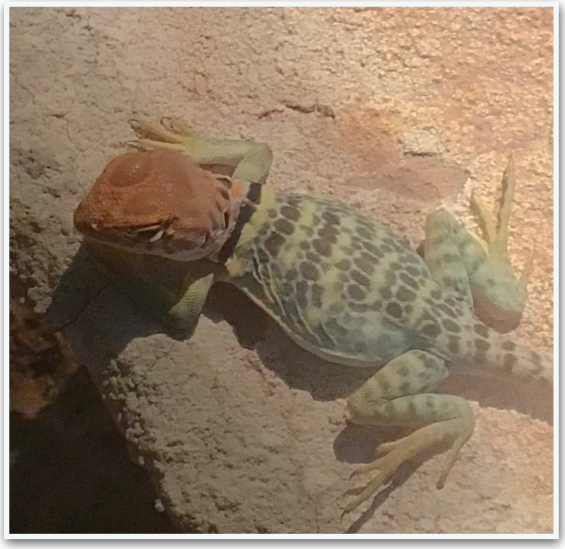
Males display with head bobbing and "push-ups". Confrontations between males do occur, but displays apparently diminish such activity.





Photographs by Gordon Berman





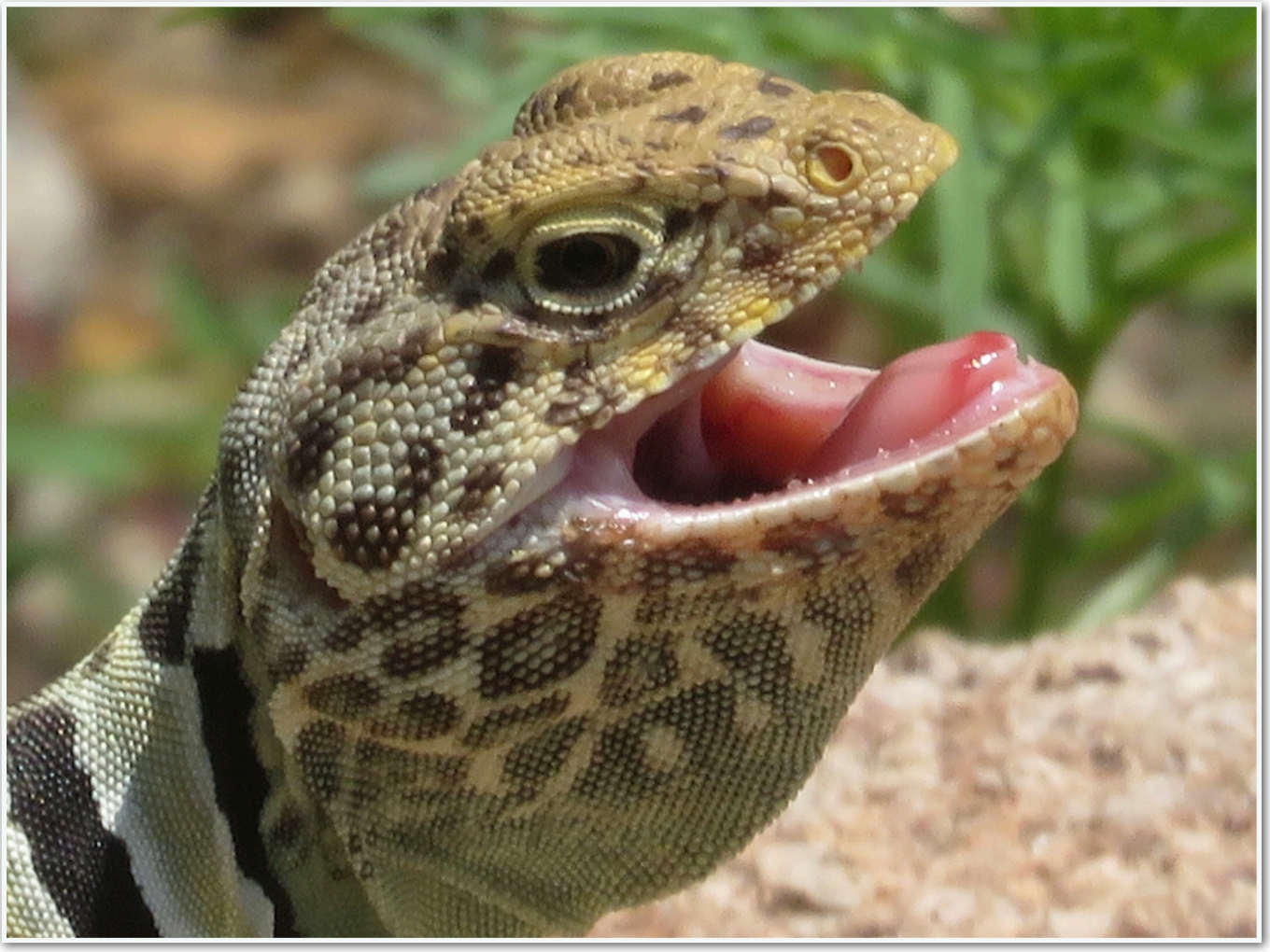
This species is found in most of New Mexico. It is found as far east as Missouri and south into Mexico. To the west it is found in Arizona and southeastern Utah. To the north it is found in parts of Colorado and Kansas.

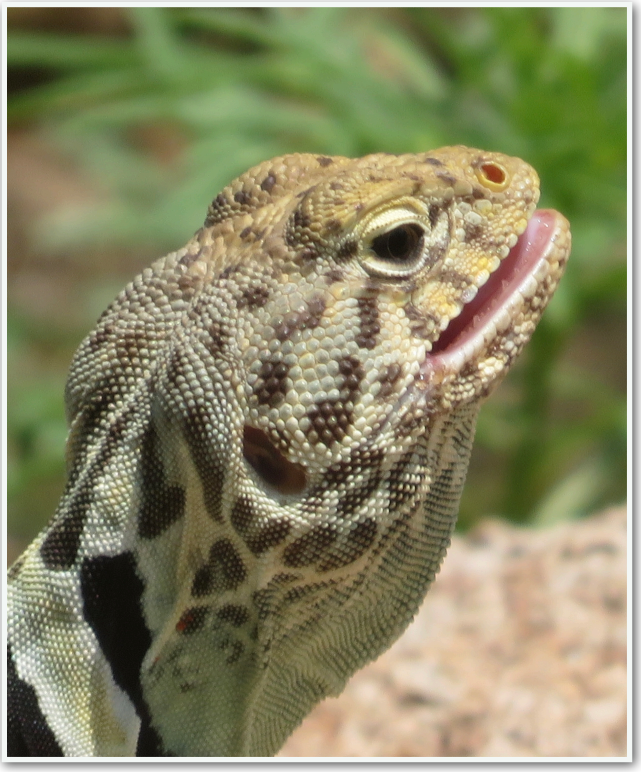
Taxonomy: Take your pick. Wikipedia says five subspecies are recognized, *Lizards of the American SW* says that some authorities recognize six subspecies, some none, some consider some of the former subspecies to be full species. *Amphibians and Reptiles of New Mexico* says there are six subspecies, four of which are found in New Mexico. When it comes to common names, this species is sometimes simply Collared Lizard.

The photograph above was taken in the Canyon of the Ancients in Colorado. It shows the range of color variation in this species. Compare to other photos from this area.

Photographs by Gordon Berman

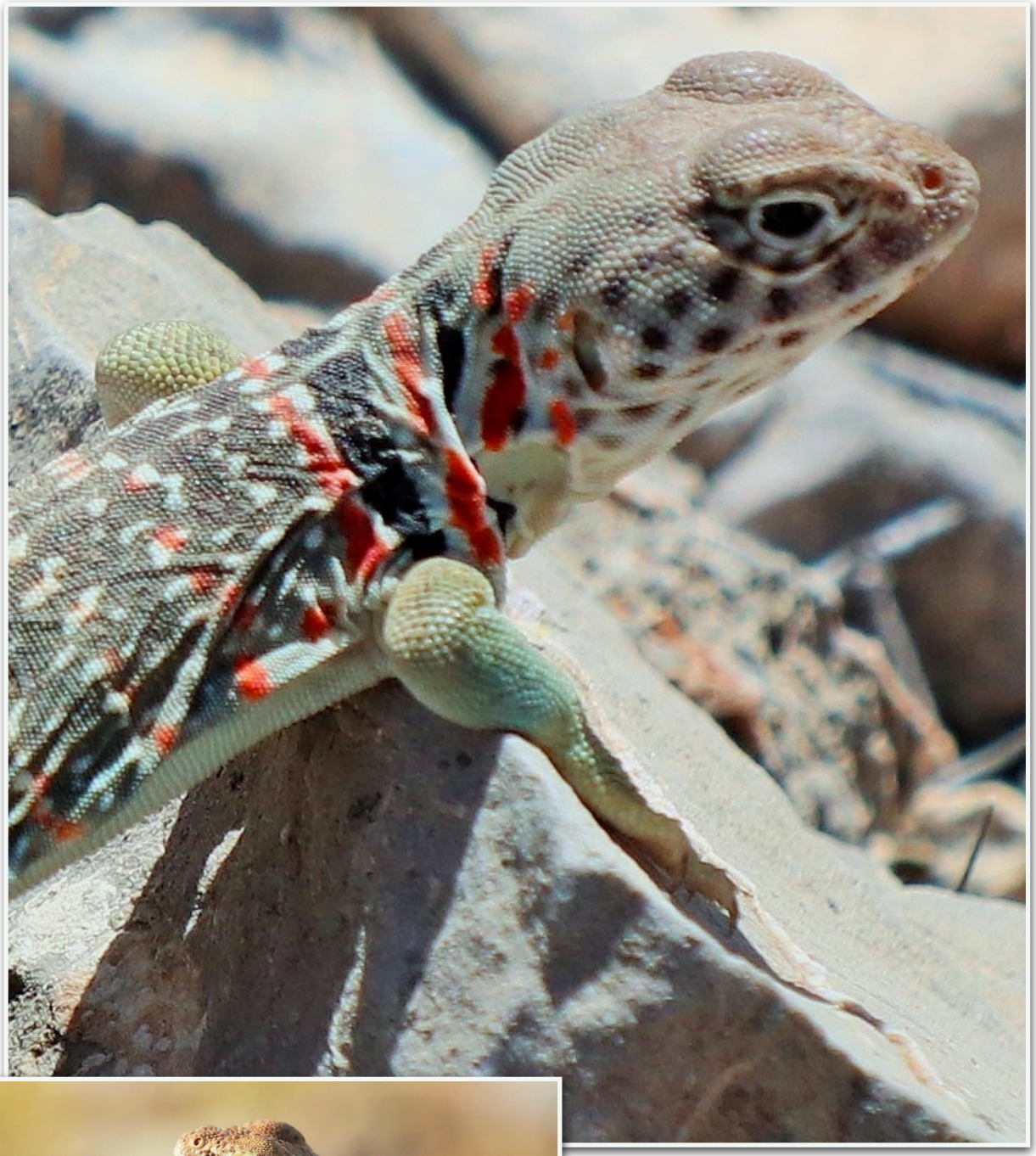






Photographs by Gordon Berman









Photographs by James Von Loh

Elgaria kingii nobilis
Madrean Alligator Lizard

Despite being "cute", Alligator Lizards can be tenacious fighters. If you wish to handle one, remember that they bite and hang on. As is true of many other lizards, their tails will separate from the rest of the body, along fracture planes, during combat or other physical encounters. Unlike in some other species, however, the tail rarely grows back to its prior length, and the new tail does not have the bands found on the original tail.

Alligator Lizards tend to be found in wetter environments than the other lizards living in this area. But beware the skinks.

The subspecies found in our area, and shown here, is generally known as the Arizona Alligator Lizard.

Its movement is reminiscent of that of a snake because of its small legs. In fact, it will sometimes fold its legs against its body and slither like a snake.



Several authorities believe that some Mimbres Pottery (like this Classic Black-on-White, Style III, made between 1000 and 1150 CE), depict Alligator Lizards.



Madrean Alligator Lizard
Elgaria kingii nobilis
Hillsboro, New Mexico



Madrean Alligator Lizard - *Elgaria kingii nobilis*
Kingston, New Mexico
Photograph by Tom Lander



Madrean Alligator Lizard
Elgaria kingii nobilis
Hillsboro, New Mexico





Gambelia wislizenii, Long-nosed Leopard Lizard

Including its tail, which can be as long as the rest of its body, the Long-nosed Leopard Lizard is about 10 inches long. That makes it one of the larger lizards in our area, an advantage for it since it eats (among other things) other lizards. This species was previously known as *Crotaphytus wislizenii* (Baird & Girard, 1852), *Crotaphytus gambelii*, *Crotaphytus fasciatus*, *Leiosaurus halloweii*, and *Crotaphytus fasciolatus*.



Long-nosed Leopard Lizard, *Gambelia wislizenii*, Juvenile
Photographs above and below by Gordon Berman, from west side of Picacho Peak, Summer 2021.





Long-nosed Leopard Lizard from Cooke's Spring, Luna County, May 3, 2018.



Long-nosed Leopard Lizard, by Gordon Berman. This photograph was taken on the west side of Picacho Peak near Las Cruces, Summer 2021.



Long-nosed Leopard Lizard from Cooke's Spring, Luna County, May 3, 2018.

Phrynosoma cornutum, Texas Horned Lizard



Texas Horned Lizard, *Phrynosoma cornutum*. Photo by Randall Gray.



Texas Horned Lizard, *Phrynosoma cornutum*
New Mexico Highway 27 South of Hillsboro

In the Volume 2, Number 1 (January 2019) issue of this magazine, Randall Gray discussed the "Horned Lizards of the Black Range".

When identifying the Texas Horned Lizard, note the two rows of spines on its sides (abdominal fringe scales). Gordon Berman's photos on the following page and the back cover show this well. The base color of its back may vary from red to tan. The black spots on its back are bordered in a lighter color.

Horned Lizards take their name from the bony extensions of the cranium which project from the top and back of the head.

This species is found at elevations between sea level and 5,800'.

Texas Horned Lizards are able to negate the effects of ant venom and that of velvet ants and blister beetles. Most of their diet (almost 70%) consists of ants.



Gordon Berman took these photographs during 30 minutes of observation at the Baylor Canyon west side trailhead near Las Cruces. (A larger version of the photograph to the left is our back cover.) Mating Texas Horned Lizards may be in this type of amplexus for a couple of hours. During this time the male may grasp one of the female's horns, as shown at the right. See "The Breeding Habits of the Texas Horned Toad, Phrynosoma cornutum" by Alvin Cahn, *The American Naturalist* , Nov. - Dec., 1926, Vol. 60, No. 671, pp. 546-551. Female Texas Horned Lizards lay large clutches of eggs, averaging 25 (range 13-50), in mid summer to early fall.



Being a true naturalist, Gordon spent these 30 minutes "lying unaware on a bovine excretory site". The editor believes these photographs are worthy of that extraordinary effort.



Phrynosoma hernandesi, Greater Short-Horned Lizard



Greater Short-Horned Lizard, *Phrynosoma hernandesi*
Hillsboro Peak Trail - Black Range, New Mexico

Volume 2, Number 1 **(January 2019) of this magazine included Randall Gray's "Horned Lizards of the Black Range". In his article, Gray described the range and natural history of horned lizards and noted that in our area we have three species: Texas Horned Lizard, Roundtail Horned Lizard, and Short-horned Lizard. Good reference material is also cited in his article.**

On July 13, 2022, Kathleen Blair and Jan Richmond reported seeing all three species on a hilltop on the western edge of Hillsboro. A mini bio-blitz. (That report was printed in our last issue, reprinted here because of its pertinence.)



Greater Short-Horned Lizard, *Phrynosoma hernandesi*
Percha City Site, Carbonate Creek, Black Range, NM

The Greater Short-Horned Lizard has one row of spines on its sides (abdominal fringe scales). Note that the horns protruding from the head of this species look almost like fans, rather than distinct large horns. These horns are generally reddish in color. The head is broader than it is long, giving this horned lizard a distinctive look.

There is significant sexual dimorphism in this species, with the females being much larger than the males. In the northern parts of its range this difference is more noticeable. The Black Range is in the south central part of the range of the Greater Short-Horned Lizard.

This horned lizard species lives at higher elevations than some of the other lizards in the genus, at roughly 1,800′ to 9,500′.

The Greater Short-horned Lizard gives live birth to a litter that averages 16.



Phrynosoma modestum, Roundtail Horned Lizard



Roundtail Horned Lizard, *Phrynosoma modestum*. Photo by Randall Gray.



Round-tailed Horned Lizard
Phrynosoma modestum
Hillsboro, New Mexico



Round-tailed Horned Lizard
Phrynosoma modestum
Hillsboro, New Mexico





A small lizard with a round tail, *Phrynosoma modestum* is found in the Chihuahuan Desert and parts of the southern Great Plains. This species has been extirpated from parts of its former range, e. g., Oklahoma.

The Round-tailed Horned Lizard lays from 6 to 19 eggs per clutch. They hatch from July-October.

Round-tailed Horned Lizards prefer the smaller ant species but will eat larger harvester ants. Ants make up the vast majority of their diet.

Plestiodon obsoletus, Great Plains Skink



Great Plains Skink, *Plestiodon obsoletus*, Hillsboro, June 9, 2018



This species is readily identified because of its long and slender shape, short legs, (sometimes) orangish feet, and intricate pattern which extends from the neck to the end of the tail. Note, however, that the juvenile of the species looks very different. It is black with small white spots around the edges of its mouth. The adult and juvenile forms are so different that they were once considered separate species.

The Many-lined Skink, *Plestiodon multivirgatus*, is possible in this area, and the Mountain Skink, *Plestiodon callicephalus*, can be found in the far western part of the New Mexico boot heel. Otherwise, we are devoid of skinks. There are, however, more than 1600 skink species worldwide.

The scales of the Great Plains Skink are cycloid and completely encircle the body (there are no other scale types on the body). Cycloid scales have smooth outer edges and overlap. (The part of the scale closest to the head overlaps the adjacent scale closer to the tail.) This scale arrangement results in very smooth skin which creates less drag than other scale forms. Reptiles may have three types of scales: cycloid, the more bumpy "granular" (also called beaded), and the keeled, which has a central ridge and is generally pointed at the end.

Although something of a generalist when it comes to habitat selection, the Great Plains Skink is almost always found in moist conditions. It is a fossorial species, meaning that it spends much of its life in burrows or underground. Females (after age 3) will lay, and guard, their clutches of eggs in their burrows.

Despite its apparent cuteness, this species will bite with a force that is painful to humans.

Older resources place this species in the genus *Eumeces*.



Juvenile photographed by Gordon Berman, August 5, 2022.
Ice Canyon above the Dripping Springs Visitor Center, Organ Mountains.



Great Plains Skink, Plestiodon obsoletus,
Hillsboro, June 9, 2018



Juvenile, photograph by Debora Nicoll, Lake Valley, NM







Photographs by James Von Loh
Soledad Canyon, Organ Mts.

Cycloid Scales

The skink and spiny lizards have dramatically different scales, cycloid in the former and keeled in the later. There are hundreds and hundreds of scales on these lizards, and the type of scale, the arrangement of the scales, their shape, and their color all coalesce into what we perceive as the "look" of the lizard.



Cycloid scales are also found on many fish species. "Cycloid" comes from the Greek *cyclo*, which means circle. The detail, above, shows the round shape of the skink scales but does not show the growth rings which are present on each scale. In some cases, these growth rings can be used to age the creature they came from. If the scales had a fringe of fine protrusions it would be called ctenoid, from the Greek *cteno*, meaning comb.

The dorsal pattern on this skink is even more intricate than it first appears. It is more than lots of little overlapping scales. The light reflection across the middle of the image above picks up a color pattern which is not obvious at first. In the reflected light the bottom edge of each scale appears to have a white triangular or crescent shape. In the other areas this shape shows up as a dark feature. Each scale has this shape and when lit/unlit exhibit these color differences, creating the dorsal pattern.

Keeled Scales

The spiny lizards have keeled scales. Keeled scales have a ridge down the center. Depending on the species, the ridge may not extend from one end to the other of the scale or it may extend beyond the major part of the scale. Twin-spotted Spiny Lizards exhibit this later variation of the ridge shape (see detailed image below).



Depending on the species, a lizard may have several types of keeled scales. Often the dorsal scales will be stronger and the ridge will be more prominent than is the case for the scales on the side of the body. Laurence Klauber, in Rattlesnakes - Their Habits, Life Histories, and Influence on Mankind, 1984, noted this variation in scale patterns, in other species, when he summarized his work on *Crotalus*.

As with cycloid scales, there are many variations in the shape of keeled scales. Some vipers have serrations along the edge of the scale which, when rubbed against other scales with this type of edge, produces a "sizzling sound" which apparently serves the same purpose as the buttons on the tail of *Crotalus*.

Brumation

Brumation is not hibernation. Although it serves the same general purpose, to get the individual through colder periods when there is less food, the metabolic processes are different. Lizards, for instance, will break their brumation to drink water but generally not to eat. Following a bit of water, they will go back to "sleep". Brumation is triggered by lower temperature and shorter days.

Twin-spotted Spiny Lizard

The Twin-Spotted Spiny Lizard was once considered, and still is by some, a subspecies of the the Desert Spiny Lizard, *Sceleoporus magister,* found to the west. The ranges of the two species overlap in the southwestern part of the New Mexico Boot Heel.

The Twin-spotted Spiny Lizard is a species of the Chihuahuan Desert and is often found in desert scrub.

Its active season (following winter brumation) is generally from the last part of March through November.

Clark's Spiny Lizard

The range of the Clark's Spiny Lizard extends into southwestern New Mexico from the west. Its range is thought to extend to the Rio Grande in this area.

Note the bands on the forelegs of the individuals shown on the following pages. The scales of this species are strongly keeled and pointed - giving it the "spiny lizard" look. The black shoulder patches do not meet to make a collar. The tail is not banded, as in the Crevice Spiny Lizard.

Rock Rattlesnakes, some other snake species, and hawks are known to eat Clark's Spiny Lizards. Spiny Lizards eat a variety of invertebrates: ants, caterpillars, grasshoppers, spiders, etc., as well as some smaller lizard species.

Sceleoporus bimaculosus, Twin-spotted Spiny Lizard





James Von Loh took the photographs on this page on Picacho Mountain near Las Cruces. Note the strongly keeled scales on the individual in the photograph above, discussed on page 74.

The photographs on the following page, by Gordon Berman, show the dark line below the eye. The black marking on the neck does not extend across the dorsal side of the body to form a collar. But note (lower left photograph on following page) that in the male the black marking extends across the throat.









hotographs by Gordon Berman



Twin-spotted Spiny Lizard, *Sceleoporus bimaculosus,* juvenile
Bloodgood Spring, South of Kingston, Black Range
July 11, 2017



Sceloporus clarkii clarkii, Clark's Spiny Lizard







The above photograph by Mike Barnes.



Clark's Spiny Lizard
Sceloporus clarkii clarkii
(ssp known as Sonoran Spiny Lizard)
Hillsboro, NM

Sceloporus poinsettii poinsettii, (New Mexico) Crevice Spiny Lizard

The photographs on this page were taken along the Hillsboro Peak Trail (Black Range Crest Trail between Emory Pass and Hillsboro Peak) on September 6, 2022. On that walk, several individuals of this species were seen but only two were photographed.

There are five subspecies of *Sceloporus poinsettii*, two of which are found in the United States. The nominate form, found in southwestern New Mexico, is distinguished by having white spots on the crown of its head. The other subspecies found in the US occurs in south central New Mexico, southwestern Texas, and the adjacent Mexican states. The other three subspecies are all found in the north central states of Mexico.







All of the diagnostic markings for the subspecies are shown in these photographs, including: the collar at the neck with associated blue marking; the spotting on the crown of the head; the heavy scales; and the strongly banded tail.

Although this species has a reputation for being skittish and heading into rock crevices when disturbed, the one shown here was very calm and seemingly unperturbed by the photographer's presence. The second individual to be photographed was much farther away and appeared, generally, to be unaware that it was being observed.

Sceloporus cowlesi, Southwestern Fence Lizard



Southwestern Fence Lizard, *Sceloporus cowlesi*
Gallinas Canyon, Black Range, NM



Railroad Canyon, Black Range



Southwestern Fence Lizard, *Sceloporus cowlesi*
Silver Creek, Black Range
September 27, 2020



Image by James Von Loh, Rio Grande at Las Cruces.

In this species, as in many other lizard species, the tail which regenerates after the original one is broken off will be shorter and have a different pattern than the original.

The Southwestern Fence Lizard can be difficult to distinguish from related species. It is a basker, often sunning itself from any suitable perch.

The Eastern Fence Lizard, *Sceloporus undulatus*, species complex included (but was not limited to) the *S. u. consobrinus, S. u. cowlesi*, and *S. u. tristichus* subspecies, all of which have been subsumed in all or in part into the current *S. cowlesi*.

Urosaurus ornatus schottii, Ornate Tree Lizard



Ornate Tree Lizard
Urosaurus ornatus schottii
Hillsboro, NM, above
Railroad Canyon, Black Range, below





Ornate Tree Lizard, *Urosaurus ornatus schottii*
Railroad Canyon, Black Range

Six subspecies of Ornate Tree Lizard are currently recognized. The subspecies found here is the Schott's Tree Lizard, *Urosaurus ornatus schottii*. Apparently the species' Latin binomial has been stable for a substantial amount of time, but the subspecies determinations have been in flux.

The range of the Ornate Tree Lizard and that of the Common Side-blotched Lizard probably overlap in the Black Range. (See comment in the Common Side-blotched Lizard entry about the probability of its existence in the Black Range.) That is, they are probably sympatric, which could confuse things.

Disclaimer: Some authorities do not believe that sympatric speciation exists. If it does exist, this is the situation where two species exist in proximity to each other and there are no physical barriers to interbreeding. Selection in this case is said to depend on specific behavioral traits and environmental conditions.





Above: Photographs of Ornate Tree Lizards by James Von Loh, from the Pine Tree Trail near Aguirre Springs, Organ Mountains.

Autotomy
Breaking A Tail On Demand

In our survey of the lizards of the Black Range we have frequently commented on a species' ability to separate its tail when needed and the characteristics of the new tail when one regenerates. Although not all lizards have this ability, or at least it is more difficult for some species, it is a common characteristic of the whiptails, for instance.

Other creatures and a certain number of plant species have the ability to separate part of themselves when necessary. The manner in which this occurs is probably not the same for all species.

The shedding of a tail is a phenomenal feat. First of all, a tail is important. The fact that the Eastern Collared Lizard does not (commonly?) exhibit this behavior is explained by the use of the tail to maintain stability when the species is running. The fact that some species are able to shed their tails is generally attributed to a survival strategy.

But how does it work? How does a creature keep its tail from falling off at inappropriate times? How does it assure that it will shed at appropriate times?

The mechanics of tail shedding are explored by Baban et al. in a study they describe in *Science*, "Biomimetic fracture model of lizard tail autotomy", Vol. 375, Issue 6582, Feb. 18, 2022, pp. 770-774. The supplementary material at this link provides a wealth of information about the techniques used in the study.

***Science* summarizes the material: "Microscopy data of the broken surfaces of the tail showed that the fracture plane consists of mushroom-shaped pillars with nanopores at their tops. These pillars allow for enhanced adhesion of the tail in tension and peeling modes but enable fracture during oscillatory bending."**

Uta stansburiana stejnegeri, Common (Eastern) Side-blotched Lizard

There are currently five recognized subspecies of *Uta stansburiana*. This subspecies is known as the Eastern Side-blotched Lizard. It is found in much of New Mexico, parts of Texas, and northern Mexico. Some research indicates that this subspecies should be treated as a full species.

Note the two dark "blotches" behind the front legs. These markings give the species its common name.

Gordon Berman notes that the side blotches are "often more pronounced on the blue tinged males than the brownish females . . . (this species) is most likely to emerge topside during warmer winter days" compared with other lizard species.



Photographs by James Von Loh



Sources like iNaturalist do not list sightings of this species in the Black Range. The Black Range (especially the eastern foothills) is, however, within the anticipated range of this species. Please send sightings to the published resources.

The photographs shown here were taken in or around Las Cruces by Gordon Berman and James Von Loh.



Photograph by Gordon Berman



Photographs immediately above and below by Gordon Berman





Photograph by James Von Loh



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