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In This Issue

The Night Sky

We don't often think of the night sky as part of our natural history, but I would posit that it is an inseparable component of a complex web of interactions which I suspect we will never truly or fully understand.

The full moon of our front cover changes hunting and foraging patterns, influences the tides (not perhaps a big thing in the desert of New Mexico), influences mating activities, and (I am sure) changes the way life is conducted generally. All of that is not the focus of this entry.

There is ample evidence that the night sky has been observed by Homo sapiens for thousands of years. It has affected building patterns and religious practices on every continent - except, probably, Antarctica. In previous issues we discussed how it was depicted in the art of the Mimbres people, for instance. The use of the movement of the sun, moon, and various stars to develop accurate calendars in the southwest is well known.

Here I wish to focus on two elements of the night sky which are only indirectly associated with all of the above: How we document the sky and what the sky tells us about time; and How we use the sky to understand time.

Between 2014 and 2016, Chuck Barrett (formerly of Hillsboro, now of Tucson) wrote a series of articles for the Black Range website. One of those articles is reprinted here. In support of his narrative, Chuck produced drawings of what he saw through his telescope. Three examples are shown in this issue. It is often posited, mostly by the sellers of natural history how-to artistry books, that drawing a natural history subject leads to a better understanding of the subject. From my limited experience in drawing natural history, I would agree. The understanding comes from the focus which the drawing experience requires (regardless of the "type" of art - an expressionistic piece is only good if it is based on a thorough understanding of the subject and a piece which is "realistic", well... .) The drawing experience also allows a distillation of knowledge. A field guide based on drawings depicts composites of many different individuals. The arguments about the merits of photographic based field guides versus those which are based on drawings will go on forever; both have merits.

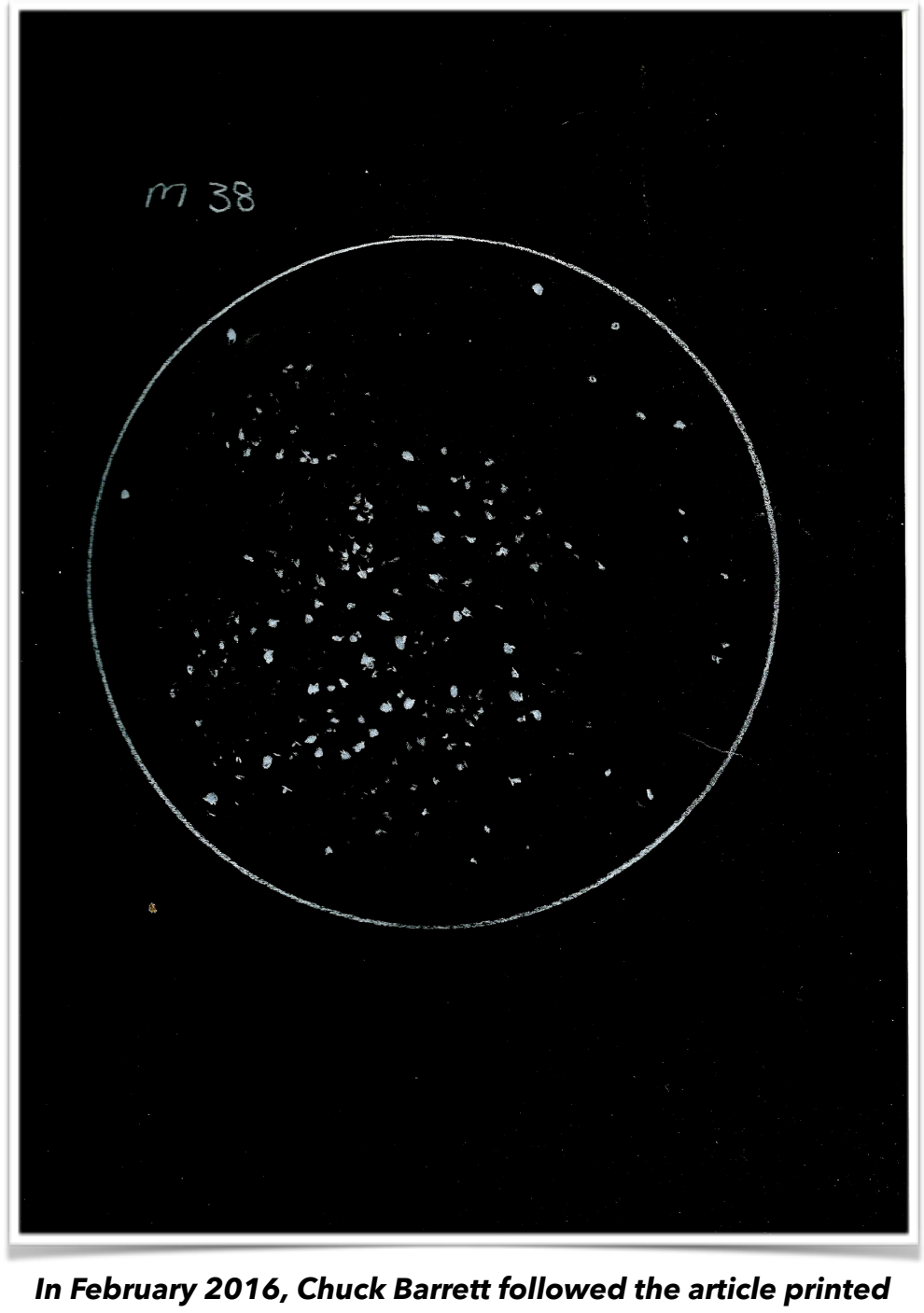
A snapshot of natural history is one thing, understanding natural history over time is entirely different. The timeframes which are at play in the evolution of life on earth or in the changes to the geology of the earth are, from a human perspective, impossible to comprehend. Any one can spout the numbers, big numbers, but I doubt that there is anyone who will ever be able to understand the implications of the flow of time fully - knowing it in the gut as well as in the mind.

Efforts to help us understand time, from studies in quantum mechanics and general relativity to mapping the movements of continents are all helpful. All too often, however, they exist as independent studies. In Chuck's articles he regularly translated the distance that celestial objects were from us into time. What was happening here, when the light we see left the object. It was some intriguing stuff. Without further ado, this a reprint of an article from 2015 which is an excellent illustration of the concept discussed above (but does not tell you what is happening in the sky next month - there are other sources for that stuff).

Time in Night Above the Percha
by Chuck Barrett

M-66, M-65
July 2014

One of the treats of the night sky this time of year is the trio of galaxies known as the Leo Triplet, three galaxies situated in the tail of the constellation of Leo the Lion, currently 30 degrees up in the western sky at around 10 p.m. They are M-66, M-65, and NGC 3628, and they are all about 35 million light years from earth. Yep, that's million! OK, the names aren't very sexy, but the galaxies are really va-va-voom! One thing that makes them spectacular, as you can see, is that they are visible in the same low-power telescopic field of view and make for a wonderful sight.



In February 2016, Chuck Barrett followed the article printed here with one on the M-38, the Starfish Cluster.

Unfortunately I've only been able to sketch M-66 and M-65 because NGC 3628, although large, has a relatively faint surface brightness, and is hard to see at all, much less to sketch with any detail.

NGC, by the way, stands for the New General Catalogue of Nebulae and Clusters of Stars, a well-known catalogue of deep-sky objects in astronomy compiled by John Louis Emil Dreyer in 1888, as a new version of John Hershel's Catalogue of Nebulae and Clusters of Stars. The NGC contains 7,840 deep-sky objects. Now you know—and I guess it's not so new, but maybe it's new to you. And quiet as it's kept, most of those objects are new to me.

First, M-66

Like our Milky Way M-66 is a spiral galaxy. It was initially catalogued by Charles Messier in 1780 when he was documenting stationary objects so that he wouldn't mistake them for moving comets. M-66 is about 95 thousand light years across, and though you can't really see them from my sketch, it has prominent dust lanes, represented in the sketch by streaks and mottled features, between and within its spiral arms. One of these arms, as you can see, extends and sort of defines the galaxy's shape. This is because M-66 is not and has not been tranquilly alone in its many billions of years of life!

It had a run-in some billions of years ago with NGC 3628, which gave it that central highly concentrated bright, dense area you see. NGC 3628 also pulled a lot of star clusters out into an extremely prominent and unusual spiral arm and dust lane structure, which you can also see in the sketch.

Next, M-65

As you can see, M-65 has a kind of oblique angle to us, not exactly edge-on like June's M-82, the Cigar Galaxy, but definitely not face-on, either. The galaxy is low in dust and gas, and there is little star formation in it, although there has been some relatively recently in the arms. The ratio of old stars to new stars is correspondingly quite high.
Astronomers are intrigued by a radio source, offset from the core by about two arc-minutes. The identity of the source is uncertain, as it has not been identified visually, or formally studied in any published papers, so what do you think? Let's see: a mysterious radio signal coming from a distant galaxy? A certain movie we know about? I'm waiting for Jodie Foster to call.

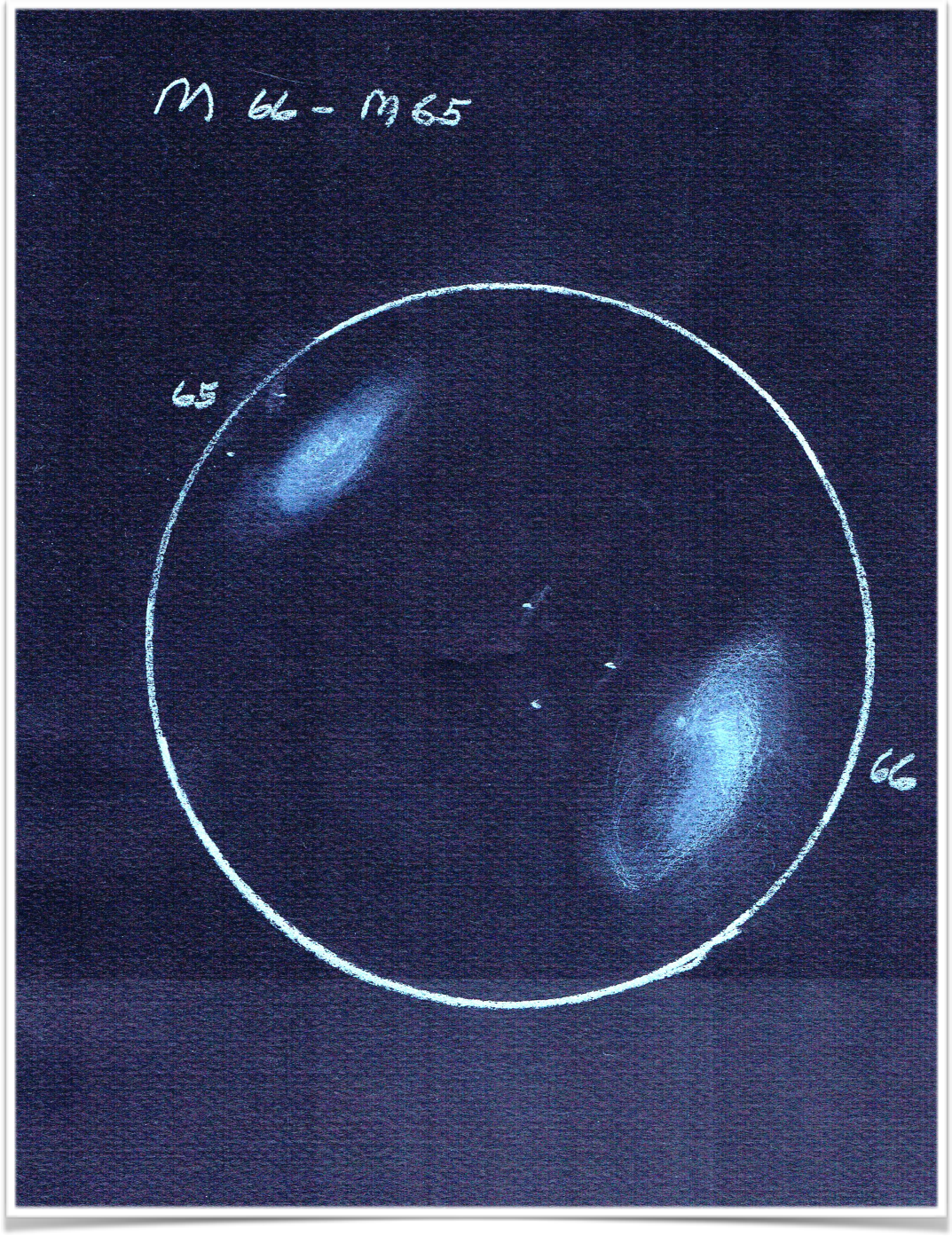
Then there was the Leo constellational prom. M-65 may have had NGC 3628 on its dance card, having passed rather close by in a gravitational waltz. And there are some theorists who believe that rather than NGC 3628, the two Messier galaxies did a pas-de-deux between themselves, or that all three did a polka together long ago, passing within sufficiently few light years of each other to cause major disruptions and pull stellar material from each other or at least pull their spiral shapes out of whack.

Whatever the cause, these staggeringly destructive events of cosmic scale have left us with the terrible beauty of the Leo Triplets.

Time Travel:
The Down Home Scene in the Oligocene

As readers of this blog know, my experience of star gazing includes a sense of time travel in that the photons of light hitting my eye through the telescope's eyepiece have come through space and time to get here. In the case of M-66 and M-65, they've travelled some 35 million years. So the view I'm getting is from that epoch of their lives, and it makes me want to know what was going on here on earth 35 million years ago. That time period is called the Oligocene epoch.

The previous epoch of earth's geologic time is called the Eocene, and it was warm and wet all over, even the north and south poles experienced subtropical climates. The dinosaurs were long gone from the planet, but there were mammals and many reptiles and amphibians. Then, as the scientists say, poof, this warm wet world, which had existed for millions of years, dramatically changed. Temperatures fell rapidly in evolutionary-geologic terms, and in 100,000 years, many species of mammals as well as most reptiles and amphibians became extinct, the land mass that became Antarctica was covered in ice, and sea levels fell. Temperatures of the ocean surface in Antarctica which had averaged 77 degrees dropped to freezing. Yikes!



M-51 (The Whirlpool Galaxy): NASA, ESA, S. Beckwith (STScI) and the Hubble Heritage Team (STScI/AURA) - October 2017

History records this as the beginning of the Oligocene epoch, but the cause of the cooling has been the subject of scientific discussion and debate for many years. It now seems it was due to a rapid drop in greenhouse gasses! (Hmmmm…We could use a little bit of that today!)

Not only did the land mass that would become the Antarctic continent begin to pull up its ice sheets—it also drifted off the land mass to the north and formed itself into its own continent during this epoch. So what was going on farther north, closer to where we call home?

Grasses evolved from among the angiosperms and grasslands began to expand. There was an increase in diversity of cold-tolerant bivalve shrimps and plankton and sea-bed borers, along with corresponding major extinctions: certain types of warmer climate snails, slugs, reptiles and amphibians. Many modern mammal groups began to appear. No direct human ancestors yet, but if you were walking around you might have encountered one of the first giant armadillos—about the size of your average Toyota Corolla!

The era also saw the rise of tiny ground sloths, which then grew to giant ground sloths, way down yonder in Patagonia, not to mention the hesperocyon, ancestor to human's best friends, the canines, which led to our dogs, as well as early species of our favorite peccaries, the javelina, and the first eagles and hawks. Diversity sprung forth in the oceans in the form of toothed and baleen whales.

The 35 million year time-frame also witnessed the evolution of the thylacinid marsupials, dog-like creatures that carried

In March 2016, Chuck focused on M-51, the Whirlpool Galaxy. His drawing, above, and the NASA/ESA photo illustrate the differences between the disciplines of photography and illustration. What they don't depict is the insight gained through the process of illustration.

their young in a pouch like a kangaroo, the last of which, alas! went extinct in the continent where they evolved, thrived, and then died off, Australia.

Our Very Own Backyard Blowout!

We had the number 12th biggest caldera blowout in the world right here in Hillsboro-Kingston! A caldera is a volcanic crater that has a diameter many times that of the vent and is formed by collapse of the central part of a volcano or by explosions of extraordinary violence from it. The Emory caldera is judged to be somewhere around 55 by 25 kilometers in size.

About 35 million years ago, the caldera collapsed into an eruption, estimated to be at VEI (Volcanic Explosivity Index) of 8.5 on a scale of 10, spewing between 1400 and 2000 cubic kilometers of ash into the sky, sufficient to cover 314 square miles of the surrounding area with a deposit 500 - 600 feet deep. The ash, containing many types of minerals from the eruption, solidified as it cooled, and is called tuff. The Emory Caldera deposit is known as the Kneeling Nun Tuff deposit, after the monolithic rock so named based on a 16th century legend of Coronado's time too complicated to recount here.

One fault, the eastern, is said to be at about mile marker 44 on highway 152, and the western fault is said to be either at mile marker 41 or at Emory Pass, although some maps show the fault lines considerably wider apart.

The City of Rocks was created by the solidified ash, or tuff, from the caldera's explosion. It was part of the western slope of the deposit, near the outer edge. Wind and water erosion sculpted the rock formations over millions of years to the forms as we see them today.

Also Up in the Sky

The Summer Triangle is an astronomical asterism, or drawing-like figure, involving an imaginary triangle drawn on the northern hemisphere's celestial sphere, with its defining vertices at Altair, Deneb, and Vega, the brightest stars in the three constellations of Aquila, Cygnus, and Lyra, respectively. It's in the eastern sky, fairly high at 10 p.m. and later moves up higher in the sky. Saturn is still in Libra and Mars in Virgo, but they are getting pretty low in the southwestern sky. Binocular users will be able to spot several fuzzy spots in the space where the Milky Way cascades down towards earth between the constellations of Sagittarius and Scorpio—these are star clusters of various types, some mixed with nebulae.

The Status of the Pyrrhuloxia in New Mexico

By John P. Hubbard

In xeric shrublands--typically dominated by mesquites (*Prosopis* spp.)--from Jal westward to Rodeo, and northward at least occasionally to Silver City, Socorro, and Roswell, New Mexico is host to the handsomely elegant Pyrrhuloxia (*Cardinalis sinuatus*). In such habitats in the lower Rio Grande Valley and from the Guadalupe Mountains eastward, it is difficult to conceive many more typical avian denizens than this species-also known as the Gray Cardinal. However, the available data suggest that this species may have come to inhabit the state only in rather recent historic time--perhaps a century or so ago. This paper will discuss the past and present record, and include comments on breeding and taxonomy.

Pyrrhuloxia, Cardinalis sinuatus, photographed in Hillsboro, New Mexico.

The first record of the Pyrrhuloxia in New Mexico appears to have been in 1881, when C. Dury took at least two pairs (Cincinnati Mus. Nat. Hist.; Purdue Univ.) on 10 and 12 April at Ft. Fillmore, near Mesilla, in Doña Ana County. On 6 April 1887, G. Armstrong took a male in the Mimbres Valley in Grant County, while an obvious vagrant was taken by C. Eckemeier (spelling?) at Santa Fe in the spring of 1897 (American Mus. Nat. Hist.). Oddly enough, Bailey (1928) gives no records from the state prior to 1902--when two birds were taken at Tularosa in November--with most reports being from the lower Rio Grande Valley in the period 1909-1916. The only other reports listed are from the Carlsbad area and eastward--birds recorded by J. S. Ligon in 1916-1919.

The implication from the above is that the Pyrrhuloxia was at least scarce and perhaps absent from its present New Mexico range until the 1880's. Negative evidence includes the failure of most of the 19th and early 20th century workers to record the bird in areas where it now occurs, e.g. Abert (Socorro area in 1846), McCall (lower Rio Grande Valley in 1850), Woodhouse (lower Rio Grande Valley in 1851), Henry (lower Rio Grande and Mimbres valleys in 1852-1858), Heermann (lower Rio Grande Valley to the Arizona line in 1854), Pope (lower Rio Grande to the lower Pecos Valley in 1854), Henshaw (Gila and Mimbres valleys in 1873), Stephens (Socorro area in 1875, Mimbres to Gila Valley in 1875-76), Marsh (Silver City area in 1883-84), Anthony (Hachita area in 1886 and 1889), Barrell (lower Gila Valley area in 1890), Dutcher (lower Pecos Valley in 1892), Fisher (Silver City area in 1894), Mearns (Mexican border west of Rio Grande in 1892-93), Wilson (Silver City area, 1896-97), F. and/or V. Bailey (Deming, 1899; lower Pecos Valley, 1899 and 1901; Guadalupe Mts. area, 1902; Silver City area, 1906), Fuertes (Guadalupe Mts. area, 1901), Gaut (lower) Pecos Valley, 1902), Goldman (Deming and westward, 1908), Hollister (lower Pecos Valley, 1902), Hunn (Silver City area, 19031905), and Ligon (lower Pecos Valley, 1913; Silver City to Mexico border, 1920)--all cf. Bailey (1928).

The exact timing of establishment of populations outside the lowermost Rio Grande and Pecos valleys is unknown, but farther north in these areas reports began to accumulate most notably in the mid-1950's, e.g., in the Socorro and Roswell areas (Audubon Field Notes= A.F.N.). West of the Rio Grande, the first record after the 1887 specimen from the Mimbres Valley was of a male collected near Gila on 22 February 1932 (Cincinnati Mus. Nat. Hist.). This bird was taken by R.T. Kellogg of Silver City, who did not record any other Pyrrhuloxias in his many years in the area, i.e., from 1912 into the 1940's. In 1960, I saw a female in Guadalupe Canyon on 15 May, while other records accumulated soon after south of Hachita (1965, 1967), Silver City (1966, 1967), and near Rodeo (1966)--all in the period October-May (NMOS Field Notes=NMOS). Occurrences in the extreme southeast date from 1961--in the Jal area (A.F.N.)--however, this area was poorly worked prior to that, and it is very likely the species occurred there earlier.

Outside of the lower Rio Grande Valley (Sierra and Doña Ana counties) and lower Pecos Valley (Eddy Co.)--and perhaps in part of the intervening area--occurrences of the Pyrrhuloxia were not only mainly confined to the last quarter century or so, but they were also largely between autumn and spring, Even today, there seems to be only one specific summer record farther north, i.e., 1 near San Antonio on 4 June 1974 (NMOS). West of the Rio Grande Valley one of the earliest summer records is of a bird near Deming on 10 June 1968 (U.S. Fish and Wildlife Service Breeding Bird Survey= F.W.S.). Other summer records in that area include in the Hachita area (1971), Columbus area (1972), Rodeo (1973), and near Antelope Wells (1976)--all NMOS. Summer records in the extreme southeast date from at least 1971--Jal to Maljamar--but again these are probably well after the first actual occurrences.

Summer occurrences in an area may not necessarily indicate breeding of Pyrrhuloxias, particularly in the case of solitary birds and birds early in the season. Of six nests on which I have data, five contained eggs or small young in July: 1 near Antelope Wells in 1976 (NMOS), 1 at Mesilla in 1913 (Bailey, 1928), 2 near Carlsbad in 1954 (Ligon, 1961), and 1 west of Jal in 1971 (NMOS). The only exception is a report of a nest with large young at Elephant Butte Lake on 26 May 1975 (NMOS). From these data it would appear that late spring or early summer records may not indicate breeding, especially in more xeric areas. Indeed, it may be that the Pyrrhuloxia in New Mexico keys its breeding to the summer rains, at least in some areas and/or years.

Aside from these areas in Hidalgo, Sierra, Doña Ana, Eddy, and Lea counties, the Pyrrhuloxia almost certainly now breeds near Rodeo and probably in the Deming and Hobbs areas. There is little present indication of breeding--or summering--near Socorro or Roswell, although this could change. Zimmerman (1965) implied that the Redrock area in the Gila Valley is an area of regular occurrence (or residency), but this is not borne out by the data. True enough, the lower Gila Valley appears suitable for breeding, but the few records to date are mainly in the period from autumn through spring. Extralimital New Mexico records of Pyrrhuloxia to date include the 1897 Santa Fe record, plus one near Portales on 19 March 1970 (NMOS). In addition, the species is still only occasional in Guadalupe Canyon and north to the Gila Valley (Virden to Cliff), Silver City, and La Joya State Game Refuge. Overall, only sparse populations appear to inhabit much of the southwest (i.e., in Luna, Grant, and Hidalgo counties) and the Tularosa Basin, with numbers highest in the southeast in the autumn-spring period. Populations are largest and most widespread in the southeast, westward to the Guadalupe Mts.

This article is a reprint. It first appeared in the NMOS Bulletin 6(3):23-26, 1978 - New Mexico Ornithological Bulletin. Tables have been reformatted from the original.

An examination of specimens taken in New Mexico is revealing in terms of the origins of the populations occurring in the state. Two populations are possible sources for our birds, those of the Chihuahuan Desert (*C. s. sinuatus*) and the Sonoran Desert (*C. s. fulvescens*). To date, all specimens (40) that I have examined from the state have been the Chihuahuan form, although the Sonoran race might be expected in Guadalupe Canyon--from which we have no specimens. Some authorities recognized two forms in the Chihuahuan Desert, i.e., the smaller more easterly *C. s. sinuatus* and the larger more westerly *C. s. beckhami*. Oberholser (1974) distinguishes these two as follows:

Based on 14 specimens for which I have measurements, I find – as expected from Oberholser (1974) – that birds from the Pecos Valley and eastward average smaller (=*sinuatus*) than those from the Rio Grande Valley and southwest (=*beckhami*).

Pyrrhuloxia Subspecies (measurements in mm)		
	sinuatus	beckhami
Male Wing Length	88.4-94.5	94.5-101.1
Female Wing Length	86.1-90.4	88.4-96
Male Tail Length	93.5-104.9	100.6-112
Female Tail Length	83.8-96.5	95-105.9

Obviously, the contradistinctions are not rigid, but my samples are small and the differences between the two populations are not that great. Nonetheless, there does seem to be some basis for segregating the two populations, although perhaps not as formally recognized races. The important thing is that the data point to two different sources for the populations that now occur in New Mexico, one from the area of westernmost Texas (and central-northern Mexico) and the other from farther east. On the other hand, the western Mexican-Arizona race appears not to have invaded New Mexico, based on the data now available.

Pecos - Rio Grande Comparisons			
	sinuatus	Overlap	*beckhami*
Southeast (4 specimens)			
Wing	75%	0	25%
Tail	50%	0	50%
Southwest (10 specimens)			
Wing	30%	0	70%
Tail	10%	30%	60%

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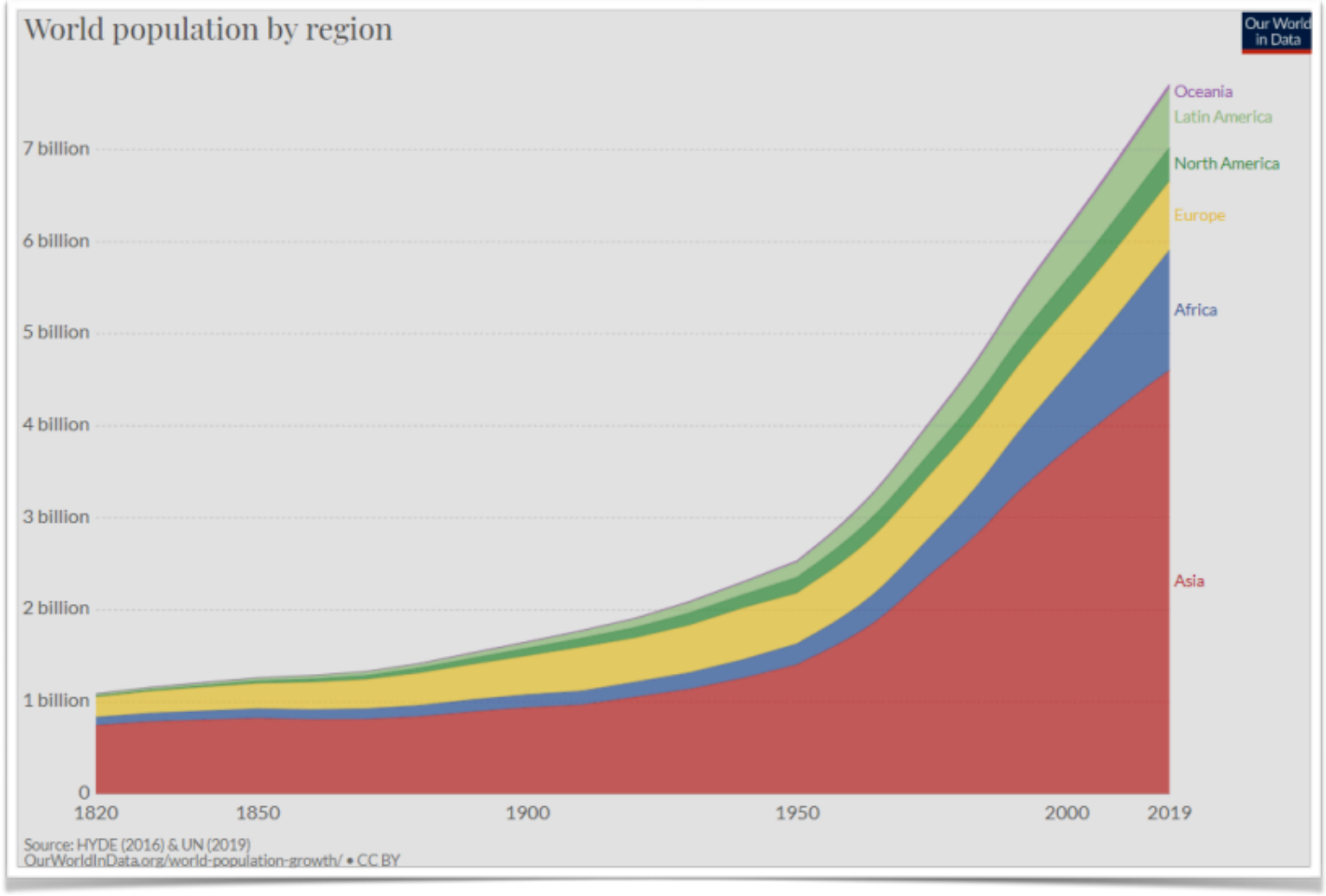
Habitat
by Harley G. Shaw

Wildlife biologists worry about habitat loss more than any other issue. Habitat loss can result from human activities such as logging, grazing, and heavy recreational use or from natural catastrophes such as hurricanes or wildfire. It can also result from loss of land area due to human occupancy. With the exception of limited cases of natural disaster, habitat loss is largely a result of expanding human populations.

Those who attempt to overcome the human tide that destroys wildlife habitat normally do so via public education and legislation. Legislation is, in theory, the product of education carried to a logical extreme, at least in a purported democracy. But educating the public and attaining suitable legislation is increasingly difficult. The causes of this are not clear, but I suspect that increasing demands upon decreasing space and resources are forcing humans to be more competitive and selfish. Also, shift of power to big business has devalued wildlife and wildlands in the public eye. The profit motive of humans trumps quality of life, especially for mule deer or pumas. Hope that humans can relinquish their acquisitiveness for the benefit of other species seems faint, even if we could convey the importance of habitat to wildlife, because wildlife itself has decreasing value in the human experience. As humans compete more for resources and focus on self, the odds that they will care to learn about the complex needs of wild species seem small. And biologists are particularly weak at communicating the concept of habitat to the greater public, even with the powerful medias -- literature, television, internet -- at our disposal. The sheer mass of information and entertainment, now indecipherably intermixed, labors against gaining public attention with our narrow, complicated, and often discouraging stories.

I have, in truth, no naïve hope of modifying the future. I've lost faith in our species and continue writing, I guess, to improve my own understanding. This allows some freedom of expression that I might not exert if I were writing for an audience. I can tap my own knowledge, accumulated

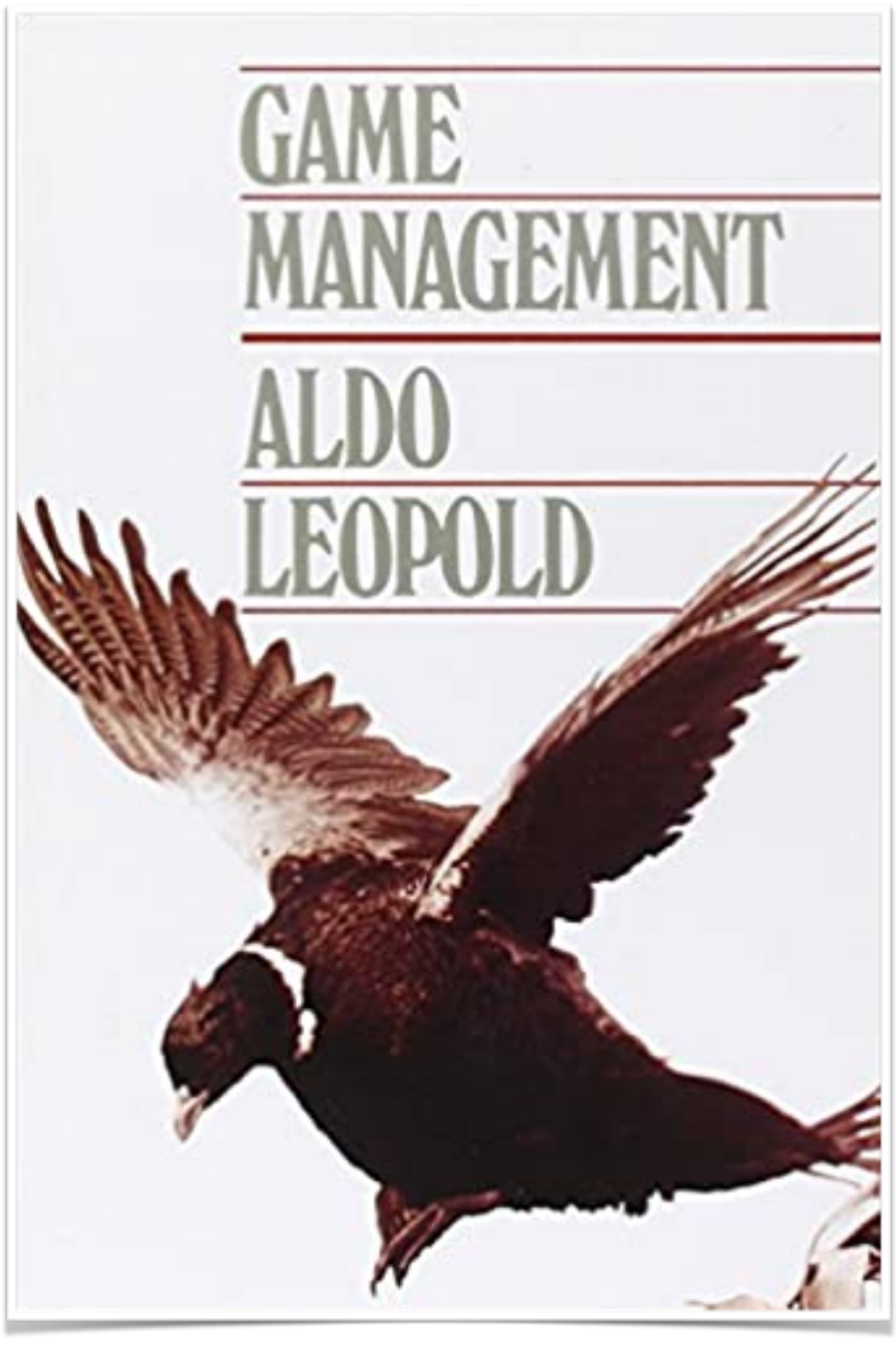


European Commission's Joint Research Center, Atlas of the Human Planet 2019

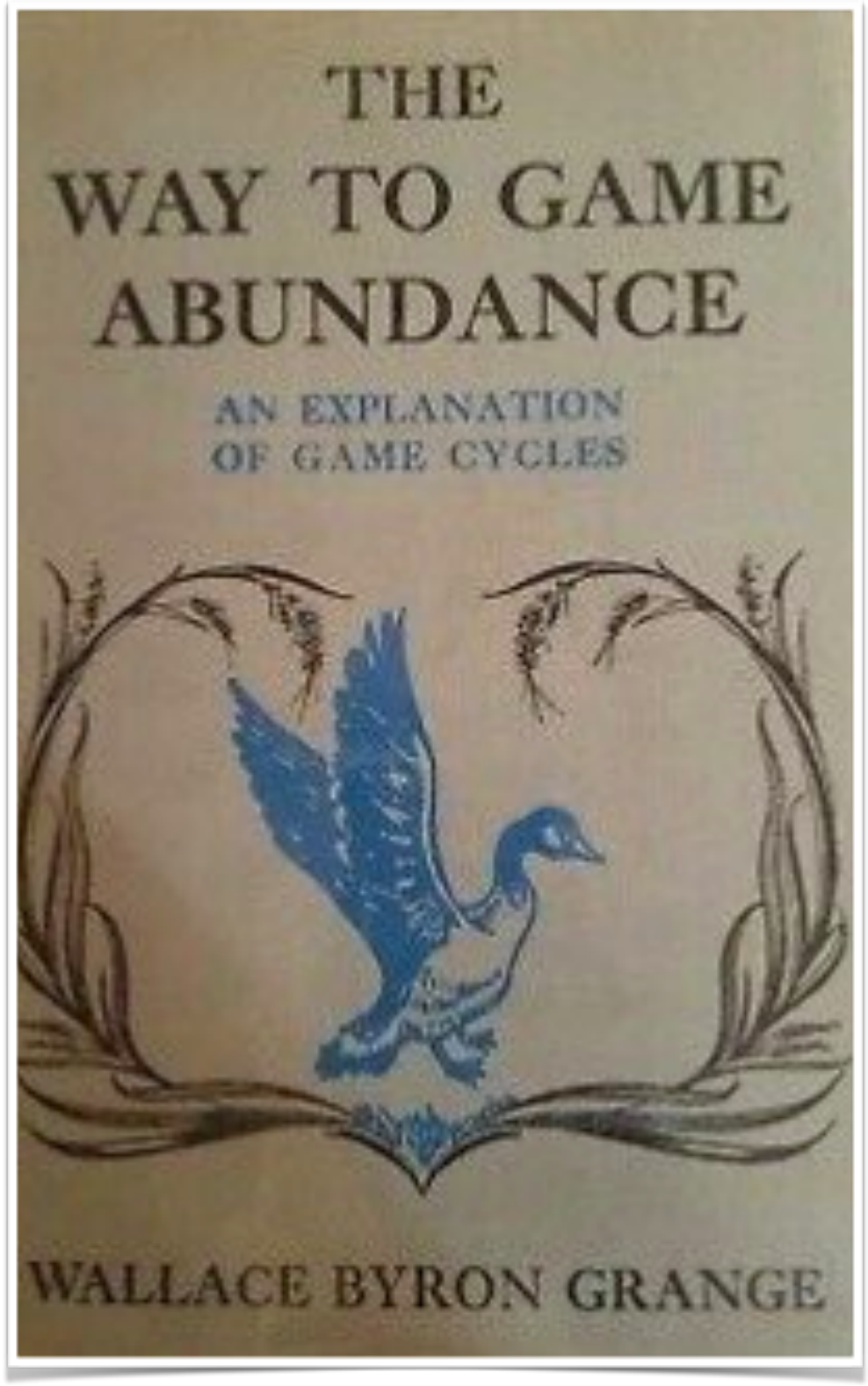
through 80+ years on the planet, I can theorize and expound without excessive concern for precision of fact or for feelings of others, and I can be as negative and cynical regarding humanity as I care to be. I can be honest in my perceptions, and pessimistic in my projections.

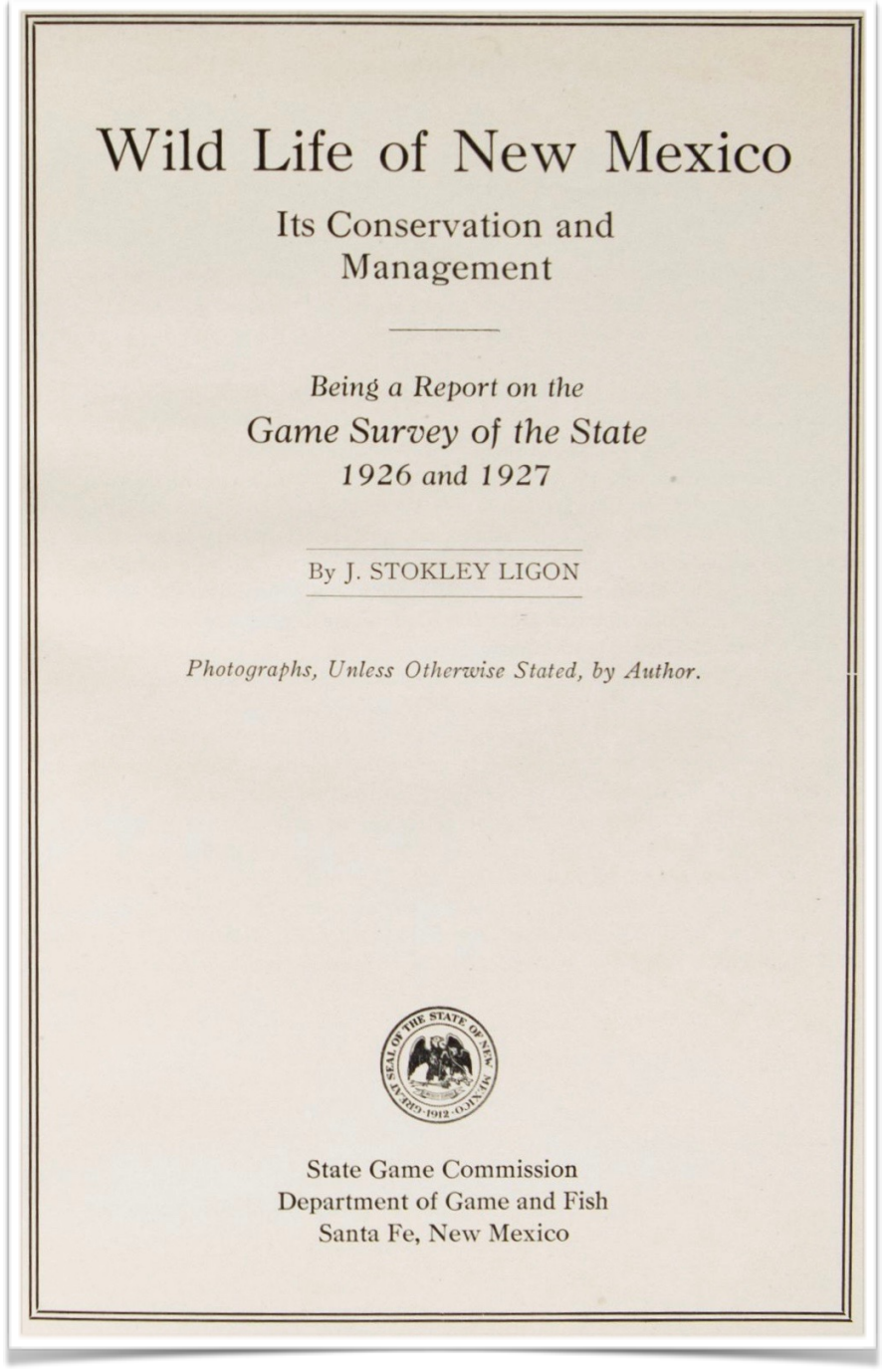
I begin with the notion that insofar as wildlife and wild lands are concerned, humans are a destructive force that cannot be stopped. Humans justify their destruct- iveness via economic and religious arguments. But in the end, our intelligence, if it exists, and our techno- logical competence have brought us to be, quite simply, no damned good insofar as other creatures on the planet are concerned.

I'm not sure exactly when the term habitat entered the lexicon of wildlife literature. The founding textbook for the profession of American wildlife management, *Game Management* by Aldo Leopold, does not list the word in its index. This is not to say that Leopold didn't understand the need for habitat, but he dealt with it in other words – food, water, cover, and juxtaposition of these. The word evolution doesn't appear in Leopold's text either, and evolutionary process and habitat are deeply intertwined concepts. But Leopold was trained as a forester, an agriculturist, and in the 1920s and early 1930s, the evolutionary synthesis had not quite reached applied biology, and we do not know exactly what Leopold thought of evolutionary theory at this time. But he often wrote with confidence on things he understood poorly, perhaps using writing as I am using it here to focus ideas. He was more confident than I about human abilities to learn, change, and to accommodate other denizens of the earth. After he wrote *Game Management*, his ecological understanding broadened. His opus, *Sand County Almanac*, published posthumously, made him a guru for modern environmentalists, few of whom know about the tortuous mental route he followed in reaching his ultimate philosophy.



Perhaps the clearest early application of the idea of habitat to wildlife management was by Wallace Byron Grange who, in 1949, published *The Way to Game Abundance*. On page 10, Grange says, "There is no reason to believe, simply because an animal species is now present on earth, that it will continue to survive, or to maintain abundance. It can survive only if its habitat survives; that particular pattern of plants in a certain climate to which all of the internal and external patterns of the animal have become specialized."





Grange was certainly aware of the concepts of Darwin, although he didn't divulge his own belief in the matter. Nonetheless, he clearly understood that species were adapted to particular habitats and that they could be preserved and even increased through protection or improvement of habitat. Predecessors of Leopold and Grange used habitat or understood the concept. In 1927, J. Stokely Ligon used the term in *Wild Life of New Mexico* – a book he originally planned to coauthor with Leopold. Their lives diverged and each wrote separately. Leopold moved to Wisconsin and became a theorist, professor, and philosopher. His portion of the book morphed into *Game Management*. Ligon remained in New Mexico, working on the ground, coldly observational and descriptive in his writing. But Ligon saw the importance of habitat to wild species.

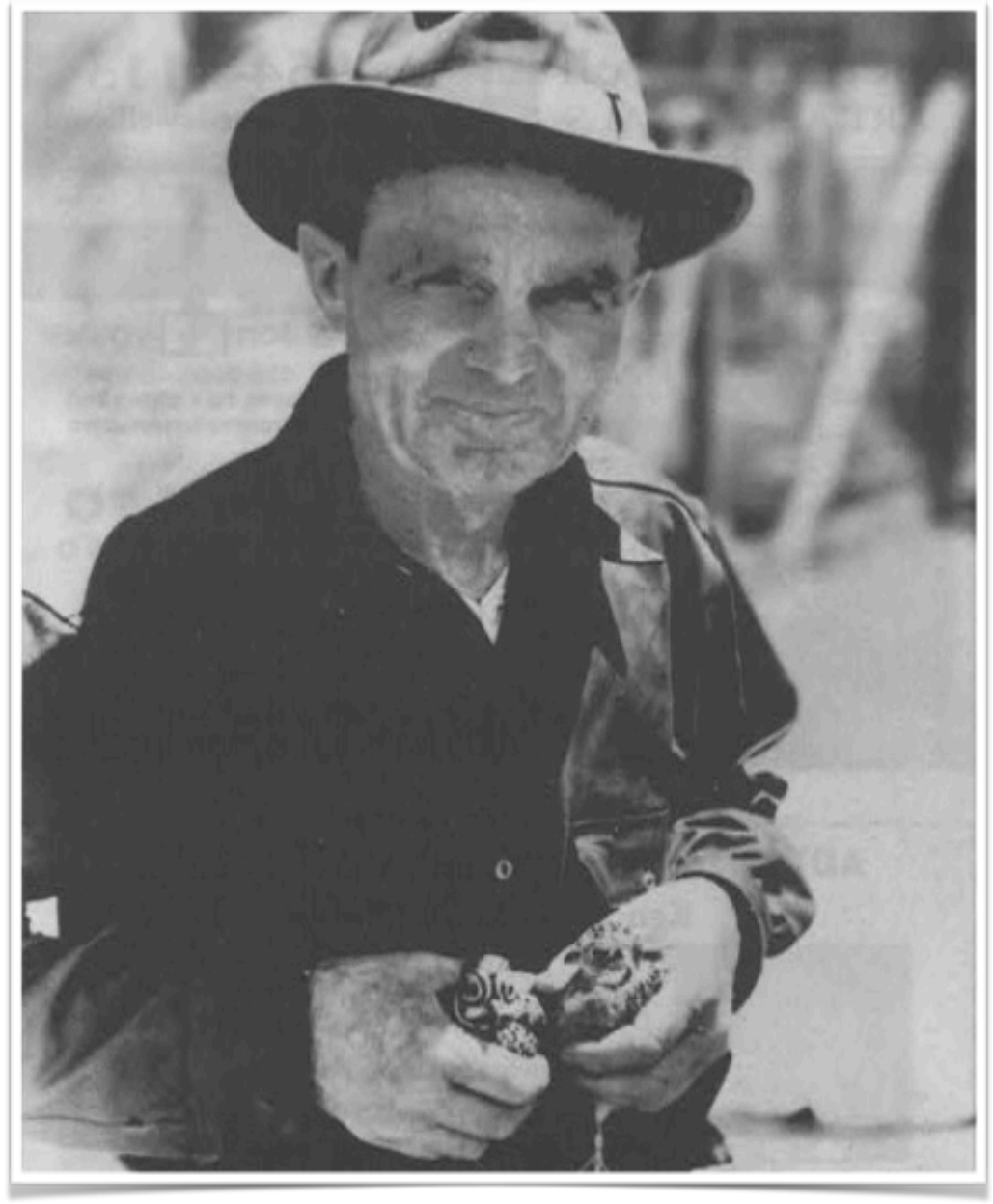
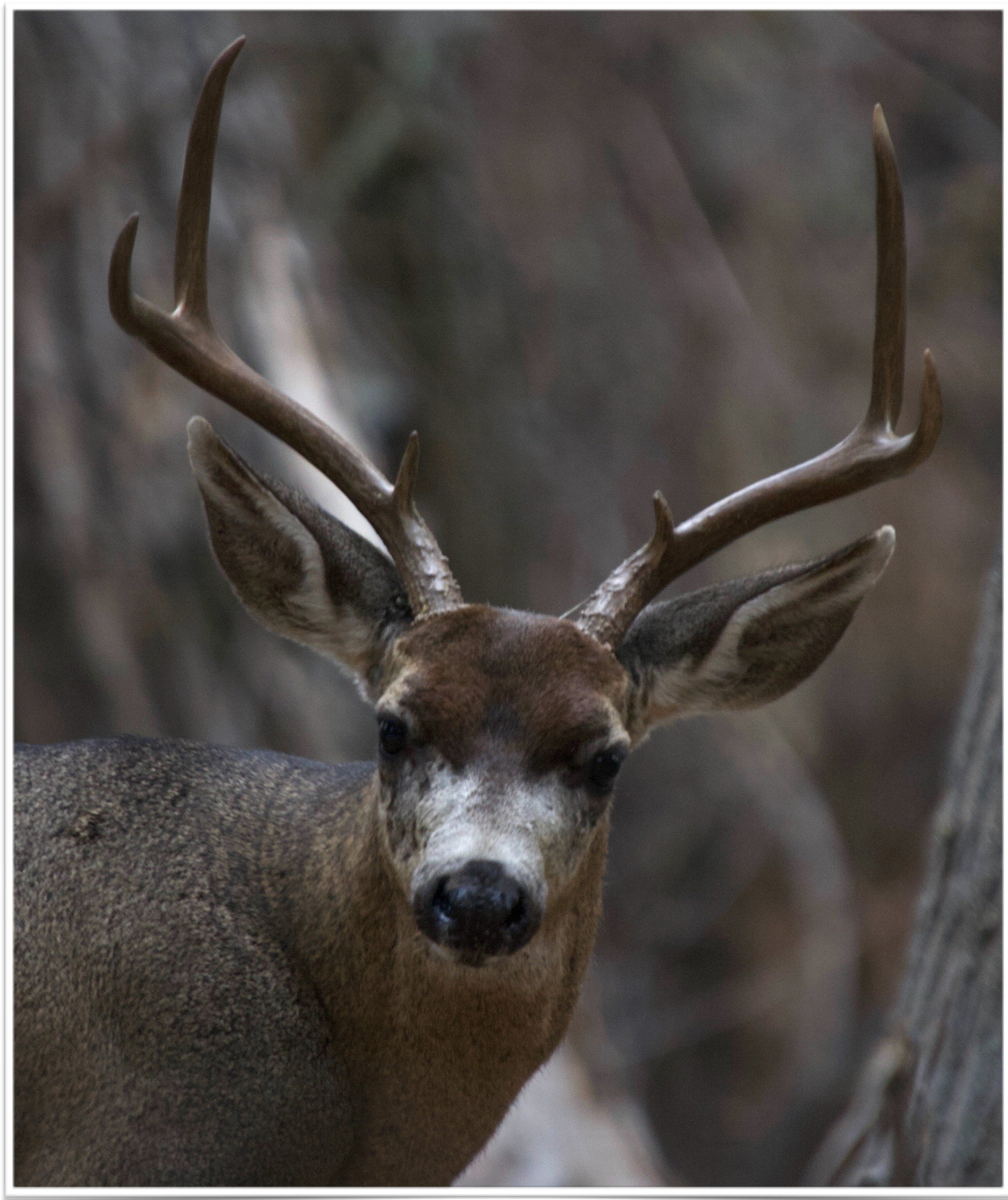


Photo of Ligon - New Mexico Department of Game and Fish (For more on Ligon see "*Twelve Hundred Miles By Horse and Burro*" by Harley Shaw

In America, we normally go to Henry Thoreau to seek roots of ecological thinking. Some scholar may correct me, but I don't think Thoreau had access to the word habitat. Thoreau read *The Voyage of the Beagle*. He admired Darwin's abilities at description, and he took *Origin of Species* unquestioningly in stride, because it corroborated the direction his thinking was already headed. Thoreau himself had an uncanny ability to observe and describe. He increasingly saw humans as part of the natural world rather than outside observers. He read *Origin of Species* two and one-half years before his death at a time when his focus was increasingly on natural science. His voluminous notes suggest that had he lived, he might have become an ecologist – studying the interactions of species with their habitat – a word Haeckel coined four years after Thoreau died.



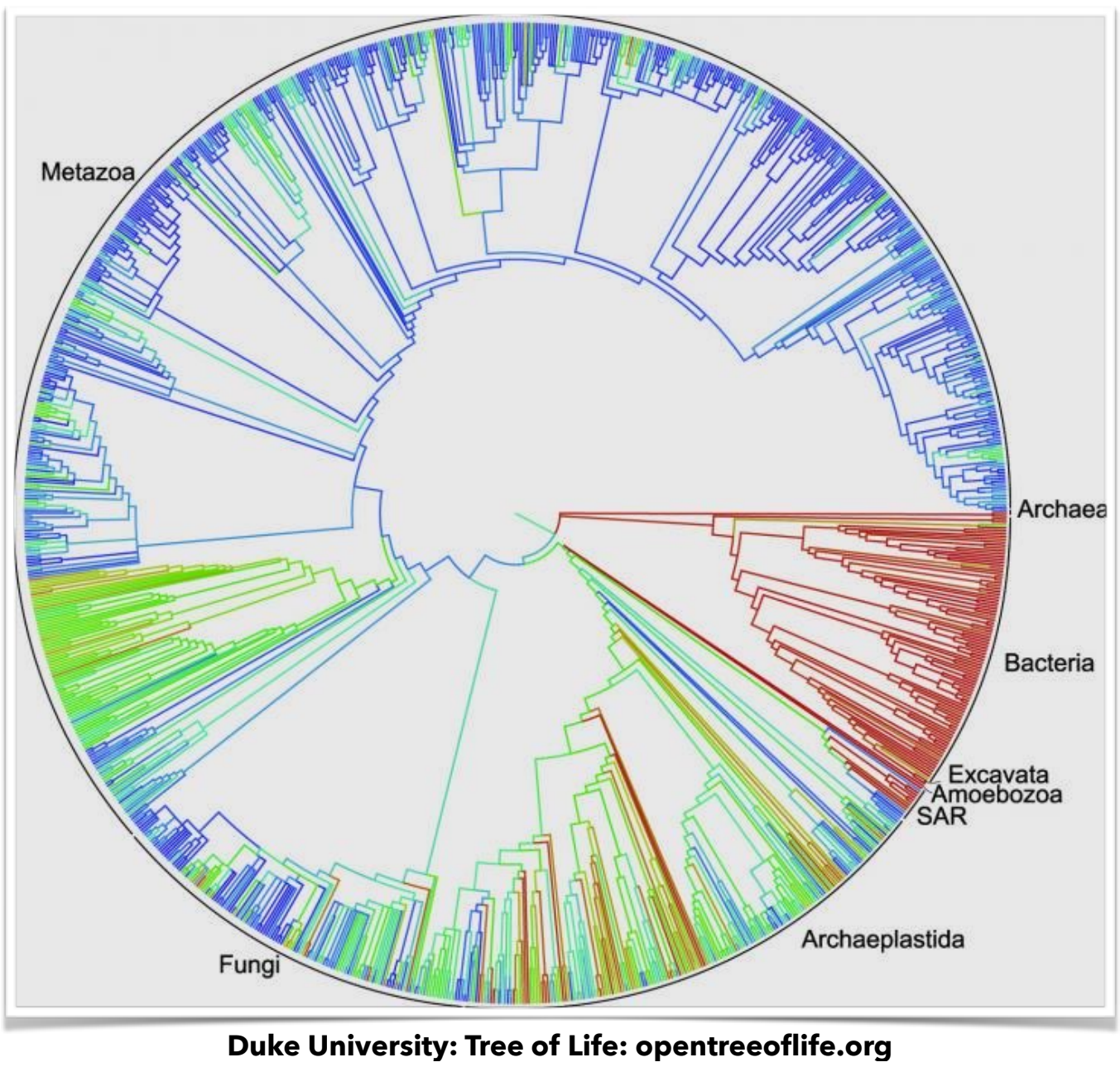
Most early writers saw habitat as the physical environment of a species, usually the combined terrain and structural form of plants. Probably because of Leopold's textbook, food wasn't viewed as a component of habitat. "Habitat" was seen as the cover element in Leopold's trio of wildlife essentials (food, water, cover). Other animals, whether competitors, predators, or food, were also distinct from habitat, and removing competitors or predators was and remains a legitimate game management tool to allow desirable species to increase. Thus, only the supportive elements of the landscape made up habitat. More recently we have begun to view all elements of a species' surroundings to be habitat, including both abiotic and biotic environmental components – the weather and terrain, vegetation composition and structure, and other animals with which the individual interacts. This latter encompasses conspecifics, competitors, predators, parasites, and organisms that provide nourishment. Each of these elements may apply varying pressure against or support for an individual over time, and the individual reacts by seeking, avoiding, or ignoring them. No habitat provides all of an animal's needs at all times, and it must move, constantly balancing comfort, security, and access to food. To succeed, the individual must know the landscape within which it lives and must use its memory and experience to successfully navigate that landscape. Habitat, must therefore be understood at the level of the individual.

The notion that habitat includes everything influencing an individual is a fairly simple idea, but applying it to real situations, using it to protect or manage wild populations, is difficult. The systems within which creatures exist are complex, as are the behavioral and physiological responses of the creatures to these systems. We can locate an individual at a particular time and observe its behavior. With modern radio-tracking methods, we can even record an extended series of locations and, to some extent, quantify the animal's behavior. But we cannot monitor all of the abiotic and biotic forces at play, and for the most part, can only speculate regarding the relative importance of these forces. We might modify specific elements of a habitat and test the response of individuals to such change, but few studies such as this have been carried out at the landscape level. They would have to last years for us to identify and prioritize the significant environmental elements, and would involve an experimental approach using both modified and unmodified areas for comparison. For larger or more mobile species, areas large enough and comparable enough for such experiments are difficult to find, as are funds to support the length of study that would be necessary to provide clear answers.

The alternative would be to station naturalists in areas who would observe species over time, Thoreau-like, developing intuitive knowledge of the ecology of the area. Individuals capable of this level of observation willing to devote a

lifetime to an area, are rare, and they seldom work for wildlife agencies. Modern wildlife agencies, in fact, discourage such close relationships with species, communities, or landscapes. Even more rare are biologists who can persuade others to reduce their impact on habitat, something requiring valid case histories. We have accumulated few such stories, I'm afraid, and those that threaten modern big businesses bring their economic power and propaganda machines into action, thereby cluttering truth beyond understanding. Modern corporations have formed an unholy alliance with fundamentalist religions and science-deniers to discredit any information that might threaten their bottom line.

Seemingly more stories have been told about deer and their habitat relationships than about other species. This includes European red deer, white-tailed deer, and mule deer. The best known is the old story of the North Kaibab mule deer herd, a population that devastated its vegetation and to some extent its abiotic habitat after large carnivores were removed. In spite of its relative isolation at the time, this population came under scrutiny of several well-known naturalists, and a story emerged. This story has been and continues to be modified with retelling, and the purveyors have gone from the naturalists of the day, describing their observations, to subsequent naturalists interpreting in retrospect, to more modern ecologists challenging old interpretations, to modern historians critiquing and revising the stories. Even amidst such revisionism, the story about a deer herd that irrupted then crashed on the North Kaibab remains a part of the conventional wisdom of wildlife biologists; it has not, however, quite taken the conceptual leap needed to accept predators as a component of deer habitat.



Duke University: Tree of Life: opentreeoflife.org

Use of a term forces us into the scholarly corner of trying to define it. As our knowledge increases, the conceptual base from which a word is derived changes. Established definitions therefore tend to lag behind current applications. This can detract from the subject at hand.

Perhaps it is better to do as Thoreau and later Leopold – do without the term. Thus, Thoreau described what he saw without trying to force it into a concept. Leopold conceptualized, generalized, but he did so at a more tangible level, avoiding the obscurity of broad concepts that attempted to incorporate too much under the guise of scientific terms. With clear details, we can slip up on a reader with knowledge, nudging conceptualization without impeding understanding with complex, obscure, or obsolete terms.

Leopold said wildlife needed food, water, cover, and a suitable juxtaposition of these. But a good many other things enter into the daily requirements of a species: suitable social structure of the population within which it lives; presence of predators and disease that impose caution and care upon the animal or affect its welfare and happiness. Of course, happiness is something that we, as wildlife biologists are not allowed to assess. Yet in the end, I am reasonably sure that the impulse that leads an animal to select a particular place at a particular time is a feeling that we, as humans, allow ourselves to call comfort, ergo happiness.

But we, in our efforts to understand the needs of wildlife, are production-oriented pastorals, even though our livestock is supposedly wild and free. If we try to improve the lot of a population of deer, we do so to increase their numbers, so that more will be available to shoot. This very goal leads us to push animals outside of the comfort zone for which they have evolved. Leopold spoke of a harvestable surplus. He also suggested that humans could proxy for wild predators and other natural causes of death (called compensatory mortality), thereby making sport hunting a natural force. And certainly some species that we hunt evolved along with us and we are thus legitimately a natural predator. But with modern hunting technology and modern hunting seasons we have become an annual swarm of death that is not as natural, hence compensatory, as we'd like to believe. Hunting has evolved from the gang pursuit by primitive men through the early capitalistic quest for

wealth (market hunting) through a gentleman's sport to an annual technology-supported invasion.

But what does all of this have to do with animal needs? Underlying our current efforts to incorporate evolutionary thinking into wildlife management (hunting), we are nagged by a hunch that wild prey populations actually need predators. By association, then, we can conclude that wild animals need to be hunted, especially where the wild predators are missing or suppressed. On a simple level, predation or other forms of mortality are needed to prevent prey species from overpopulating and destroying their food base. But on an evolutionary level, we might argue that prey need the constant threat of predators to sustain their wariness. If we remove the predators, we allow the prey to modify how it eats, drinks, and rests. A generation free of fear of naturally-evolved threats is a generation already evolving in a new direction.

Of course, all of this brings humans to see themselves in a key role – that of being needed by wildlife. Such is not necessarily the case. Most wild species would be better off if humans weren't present. And, of course, without the propensity of humans to record, write, and predict, nature in some form would simply go its way, with species evolving, species going extinct, perhaps life disappearing entirely from planets. We are not necessary to the salvation of life, nor are we the only force in the universe that creates catastrophes. In fact, perhaps our environmental conscience could be eased a bit if we acknowledge that we are a single species on an insignificant planet in a tiny solar system within what appears to be a nearly infinite and expanding universe. And this universe might be only one of many. Nature in its most inclusive sense is so large that we must wonder why we, simply because we have developed a rather bizarre trait we call consciousness, consider ourselves so damned important.

To benefit wild animals, removing humans or at least reducing their numbers is the single best thing we can do. And the larger the area within which this can be accomplished, the more good we do. When I say remove humans, I include the caveat that we also remove human values and standards, hence our tendency to meddle and "manage." With non-interference in very large areas, all would not be perfect from our point of view. Habitats would grow better and worse on a rather unpredictable basis, and some species would go extinct. Nothing is permanent. But humans with their whims, fancies, religions, and anxieties, continually mess around with decisions -- nearly always wrong – designed to give some particular human faction its way. The most destructive factions are those that want to live on the land, expand into the wilderness, and take up space with their large houses, garages, driveways and roads. The second most damaging are those that want to grow rich by mining, logging or grazing the land. Mining, logging and grazing are not inherently destructive, but the business ethic of maximizing profits rather than seeking sustained living within a landscape too often leads to shortsighted overuse of the landscapes.

Of course, none of this really matters, because the cosmologists tell us that our earth or our solar system will ultimately be destroyed by forces beyond our control – our sun burning itself out; a very large meteor changing our environment beyond our tolerance; a comet destroying all life. So, what we create through application of our own misguided economics – be it global warming, nuclear holocaust, or simply using up our necessary resources – only brings about catastrophe sooner. And it removes an element of uncertainty from the process. If we bring about our own destruction, at least we are in control, are we not? It is a depressive's mentality, a form of slow suicide. But in an infinite universe with infinite time, such a small event is unimportant and whether it occurs sooner or later is of no consequence at all. With infinite time, sooner or later has no meaning.

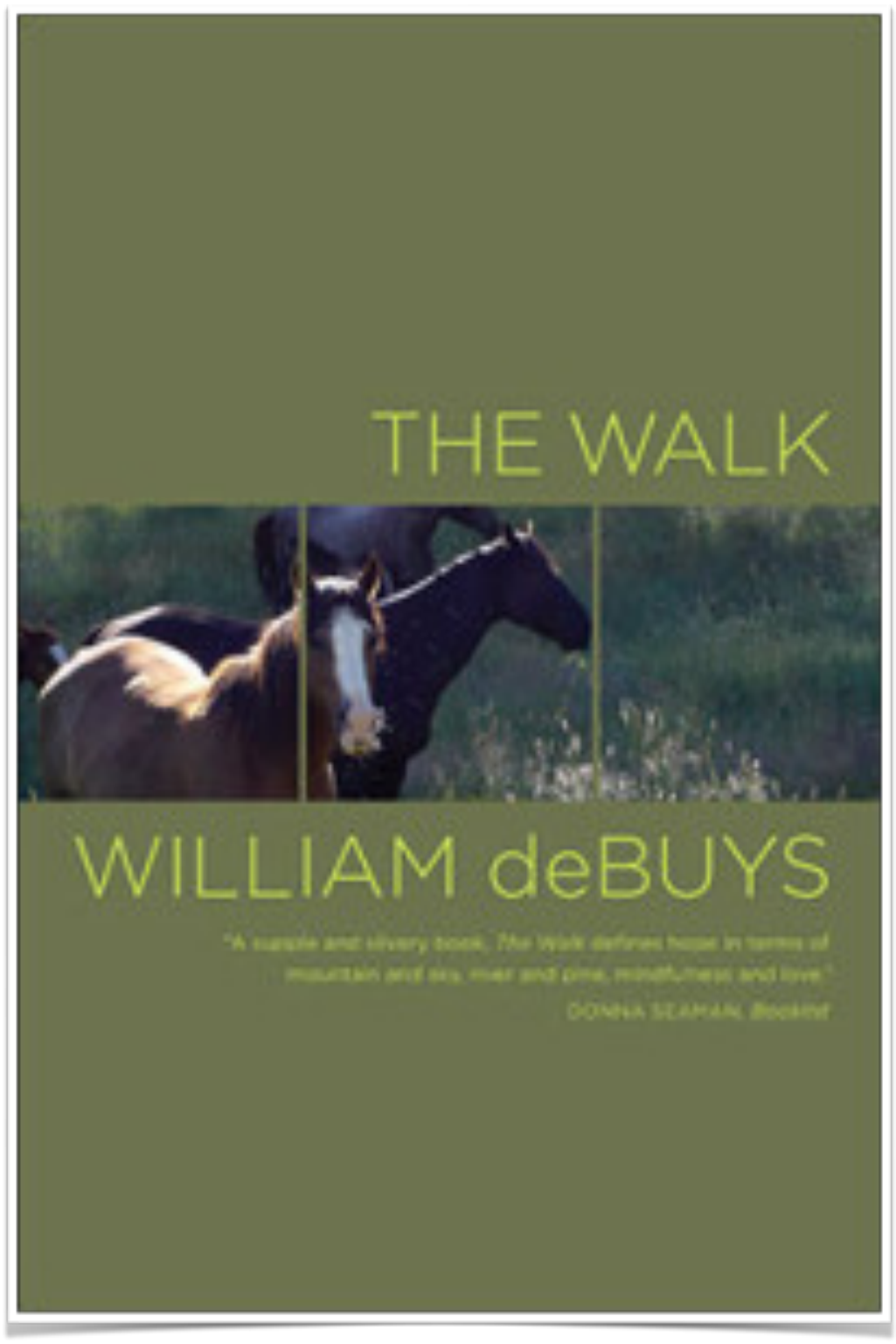
So why do we worry over such matters and involve ourselves in governments, boards, causes? More than anything else, I believe, it is a result of our brand of consciousness. We have this abstraction that we call self, and for some reason, self needs more than nourishment and reproduction to be happy. We could learn a lot if we were able to tap into the mood, to understand viscerally the sense of self, of some other species. Herein lies the mistake of modern ethology as well as wildlife biology. Ethologists, in order to be objective, deny the emotional makeup of other species; wildlife biologists, almost unanimously geared to producing more animals for hunters, cannot allow themselves to acknowledge feelings or consciousness in the creatures they sell to be gunned down. Only in our pets do we acknowledge feeling or intelligence akin to our own.

But I ramble and am not writing about habitat at all. Or am I? Our difficulty arises from our tendency to see ourselves apart from our habitat – in charge and living within a secure and controlled environment. Because of our awareness, we intuit a being distinct from our body – a mental self apart from our physical self. Our body becomes a burden, especially as we age, and we create a soul or other spiritual creature. Such disembodied selves seemingly need no habitat, but the bodies with which they are connected do. Most religions lead us to anticipate the day the two will be disconnected, thereby allowing us (which is only the conscious mind, not the body) to be truly free. Unfortunately, for however long our species has existed, our ability to separate mind and body remains an untested hypothesis and, in fact, what we know from direct observation rules against it. If so, then our own present habitat is immensely important, because it supports our body which in turn is the source of our consciousness.

To understand the needs of other species, then, we must free ourselves from the constraints of objective science and anthropomorphize. Quantification can only limit our ability to think. If such free thinking leads us to new hypotheses,

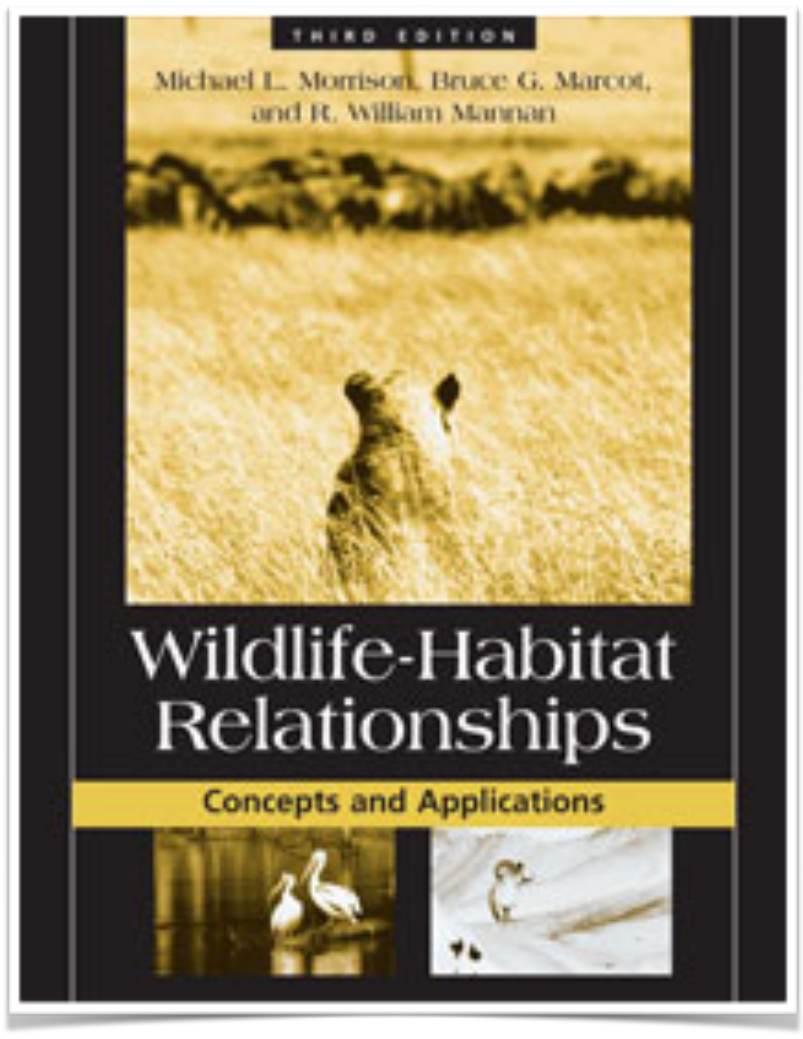
we will someday have to test them via scientific methodology. But ideas must come from a place of freedom, not constraint of academic discipline. Rather than be coldly objective in observing behavior of other species, we must relate to them, placing ourselves in their shoes (or tracks, as it were). Because we cannot experience their level of consciousness, we can only guess what they are thinking. When times are good, certainly most wild species have many empty hours to rest. Their minds must not be empty at these times. I've observed evidence of planning and strategizing by my various dogs, guided by memory. And in the case of wild prey species, no doubt, memories lead to fear. Do they mull over their own close calls or observed deaths of peers? Certainly they must accumulate knowledge and experience at some level, and this affects their future behavior.

So how do we describe the complexities of habitat, and its importance, to non-biologists (and biologists who haven't thought it through, for that matter)? Perhaps William deBuys expresses it best in *The Walk* as he envisions the forest from which his pine desk was derived: "It would have been a forest that harbored uncountable creatures from bacteria to bears, a biota always in tension, always dynamic, a living community of interrelations more complex than the most brilliant among us has the power to conceive."



That said, perhaps we should stop the discourse here and simply acknowledge that nature, in its largest sense, is too complicated for us to understand. In fact, we might conclude that most of human effort over time has been aimed at defeating complexity – eliminating those elements we don't understand and can't control. Some of us believe that nature resists these efforts – slowly, insidiously – and that humans will eventually lose. Whether the loss will involve returning earth to the lifeless orb it once was, or if humans will simply be suppressed by their own modification of the biosphere, making it unlivable for us, remains to be seen. My generation probably won't have to deal with the situation, but some future generation may well hate us for our lack of consideration. I would guess that we will not be seen as heroes to our progeny.

But back to complexity of habitat. Morrison, Marcot, and Mannon begin their book *Wildlife-Habitat Relationships* with the simple statement: "An animal's habitat is, in the most general sense, the place where it lives." These writers attempt to define habitat as: ". . . an area with the combination of resources (like food, cover, water) and



environmental conditions (temperature, precipitation, presence or absence of predators and competitors) that promotes occupancy by individuals of a given species (or population) and allows those individuals to survive and reproduce." This is a far cry from Leopold's original simplistic discussion of the need for "food, cover, water, and suitable juxtaposition" or Grange's discussion of land and vegetation. Essentially this updated definition includes everything in the surroundings other than the species (or population) being considered – everything in the surroundings of an individual. This includes conspecifics, either as mates, competitors, or social support. It might also expand the concept to include all evolutionary forces that brought the various components into focus at a particular

instant. I suppose that if we accept the mind/body separation, we would have to consider the body the (albeit temporary) habitat of the soul.

Once we begin to envision habitat in this expanded form, the truth of deBuys statement becomes compelling. We are not likely to understand it at all. Modern students of ecology try to isolate and quantify the various components, or factors, and in so doing tend to lose sight of the complexity itself – that is the interactions of the factors. Quantification, statistics, too often becomes a cave wall upon which we project illusions of precision, and we ultimately do the human thing – simplify to our own level of understanding. Because of the dynamic characteristics of nature, we may well measure and describe past conditions and relationships that only approximate, perhaps even falsely describe, current conditions. This can create an illusion of knowledge that leads us into a spiral of error, attempting to justify our acts which were based upon our predictions which in turn may be derived from obsolete knowledge.

And rather than delete obsolete knowledge, we incorporate it, pile it on, thereby increasing the layers of our stories with multitudinous literature citations, leading us to not only be unable to understand the complexities of nature but also to believe our increasingly complex story, which in itself may have long-since ventured from the truth.

Yet our hubris called management brings us to repeat our efforts to understand the chaos of nature, hence the effects of our actions on other species. Here, I believe, is where our illusion of importance causes us to err. If we must meddle, our best strategy would perhaps be to develop adequate monitoring tools, so that we can observe on a suitable periodic basis (daily, monthly, yearly, decadal?) what is happening. But before doing this, if we truly want to protect wild species, we must protect large enough expanses to assure that all species will have adequate space and diversity to survive. We will never understand the complexity of nature adequately to reconstruct habitat for diverse species, nor will saving small spaces prevent some species from winking out.

Yet we continue to try to convince the greater public that we as ecologists understand habitat on a scientific level. In a sense, this permits a sense of liberty in the behavior of those who would destroy space for wildlife, mainly land developers and road builders. People who enter these enterprises have always depended upon others to limit them. Even though they may express hatred for government and environmentalists, for example, they depend upon these entities to function as conscience. As long as the opposition is in place, these more acquisitive individuals are able to give free rein to their greed, knowing that at some point someone will rein them in. Battling constraints gives meaning to their lives and it also frees them from having to consider ethics – the do-gooders can take care of that.

But the science of habitat management leads the do-gooder camp to justify constraints on the basis of our knowledge -- knowledge we really don't have. Thus, incrementally, wildlife loses. Our battles should therefore be to retain large expanses of land undeveloped and sparsely inhabited by humans. Leopold and Bob Marshall understood this when they created the wilderness system. But that system, in itself, does not cover an adequate array of habitats to assure survival of all wildlife species, and the existence of that system is often now used as a basis for justifying the destruction of all other wildlands. Human needs continue to be all that counts.

So, rather than attempt to educate the public about habitat, I would suggest we simply protect all of the space we can. There can never be enough and humans have already used too much. The needs of all species on this earth, including our own, are too complex to understand. But I know that my suggestion will fall on deaf ears. The profit motive and human desire to improve its lot will prevail, and, short of a catastrophe imposed by nature, I see no hope that the constant reduction of space for wildlife will end.

White-throated Sparrows

Humans like to build and populate boxes. In the case of biology, some of those boxes are called species. Species determinations are useful, informative, and implicitly simplistic.

In a previous issue (Vol. 2, No. 2, 03 July 2019, "*The Work of Kaiya Smith and Others*", p. 14) we have discussed the role that changing bird songs play in the speciation of birds. We regularly have White-throated Sparrows (*Zonotrichia leucophrys*) in Hillsboro during the winter. Otter, Mckenna, LaZerte, and Ramsay have recently published an article in *Current Biology* entitled "*Continent-wide Shifts in Song Dialects of White-Throated Sparrows*". They record the spread of a change in the bird song of White-throated Sparrow from British Columbia (where the change originated) to as far east as Ontario - and northern New Mexico. Perhaps we should be listening as well.

Old Song: Old Sam: Peabody, Peabody, Peabody (or Oh sweet Canada Canada Canada) - Recorded by Dough Hynes in Newfoundland/Labrador

New Song: Oh sweet Cana Cana Cana

Contact the Editor: Bob Barnes (rabarnes@blackrange.org) or the Associate Editor - Harley Shaw
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Unattributed material is contributed by the editor.

William R. Chapline Jr.

The second volume of *Plants+ of the Black Range of New Mexico* recognized the efforts of William Ridgely Chapline Jr. He was born on January 10, 1891, in Lincoln, Nebraska, and died on December 19, 1986.

Chapline had a long and illustrious career, which is outlined below. But it is the plant collecting he performed in the Black Range during 1914-1916 which led to the recognition in *Plants+*.

William R. Chapline, Jr. graduated from the University of Nebraska with a Bachelor of Sciences degree (forestry, botany, and agronomy) in 1913. While in school, he worked summers for the Forest Service, U.S.D.A., on the Nebraska and Coconino National Forests.

Following graduation, he almost immediately began field work as noted in "Great Basin Station - Sixty Years of Progress in Range and Watershed Research" by Wendell M. Keck, USDA Forest Service Research Paper INT-118, 1972, p. 7.

"As long ago as 1939, Lincoln Ellison remarked in a talk at the Utah State Agricultural College:

> **Great Basin may be regarded as one of the two cradles of range research in this country. The other is Jornada Range Reserve in New Mexico. It is said that almost everybody in range research has, at one time or another, worked on the Jornada, and almost the same may be said of the Great Basin.**

He named A. W. Sampson and F. S. Baker, who were then teaching at the University of California; W. R. Chapline, who had become Chief of Range Research for the Forest Service . . . At the beginning Director Sampson apparently was the only yearlong employee. In his annual report for 1913, he wrote:

> **During the active field season there were three temporary assistants and one permanent assistant. The temporary men were Messrs. William R. Chapline, Jr., who now has a permanent appointment in the Forest Service as Grazing Assistant . . . .**

He comments that Mr. Chapline's services began on June 1 and ended on November 15."

At that time, temporary assistants for the summer field season were paid $75 a month plus $25 for expenses. (ibid. p. 8)

Chapline's appointment as a Forest Service Grazing Assistant was at the Jornada Experimental Range in New Mexico, and by 1914-1916 he was collecting a significant number of plant specimens for the Forest Service. Of interest to us is that many of these specimens were collected on the east slope of the Black Range south of Hillsboro. (He, of course, was also collecting elsewhere.)

In 1920, The University of Nebraska Alumni Association noted that "William R. Chapline of the U. S. Forest Service has been promoted to inspector of grazing in charge of all grazing investigations." (p. 26)

Between 1920 and 1925 he was Chief of the Office of Grazing Studies, Branch of Grazing, and worked with the likes of Will C. Barnes and James T. Jardine.

The "List of Technical Workers in the Department of Agriculture - 1926", Miscellaneous Circular No. 73, March 1926, noted that Chapline held a Bachelor of Science degree and was the Inspector of Grazing, in charge at the Forest Products Laboratory, Grazing Research, in Madison, Wisconsin (at the time Aldo Leopold was the Associate Director of the Lab). In 1928, he held the same position ("Miscellaneous Publication No. 31", July 1928 p. 35). "Miscellaneous Publication No. 63", July 1929 (p.42) listed Chapline as the Senior Inspector of Grazing, in charge, in the Range Research Branch of U.S.D.A..

In 1924, he joined with L. C. Gray, O. E. Baker, and F. J. Marschner to publish "The Utilization of Our Lands for Crops, Pasture, and Forests" in the USDA Yearbook of 1923 (p. 415-506) This was, at the time, an influential work and was cited regularly. He was the author and/or co-author of many significant works during his career.

***Important Western Browse Plants*, Misc. Publication 101 of the United States Department of Agriculture, July, 1931, page 4 notes that there were approximately 1,100 National Forest Range Plant Collectors and that William Chapline, Jr. was one of 52 who had collected more than 200 annotated specimens kept at the Forest Service archives in Washington, D.C.**

Chapline retired as Chief of the Division of Range Research in 1952. Following his retirement from the Forest Service he became Chief of the Forest Conservation Section of the Food and Agriculture Organization of the United Nations. He served there until 1954 and then taught graduate programs in his speciality in Uruguay and Brazil and consulted on projects in Europe and South America.

As he walked the hot hillsides of the Black Range during 1914 and 1916 he might have dreamed of a remarkable future, or he might simply have hoped for a bit of shade and water.

On August 13, 2015, Chapline collected the specimen shown above on the east slope of the Black Range. It was described at that time as *Echinochloa crus-galli* which is an introduced species with a world-wide distribution. In 1967, Ali & Gould (at the Tracy Herbarium) identified the specimen as *Echinochloa muricata*, a native species with wide distribution.

I am far from competent enough to venture an opinion about which is correct. But I would like to note that it was found in wet loam in a meadow which was mostly (60%) covered with sedges and rushes - perhaps one of the long gone ciénegas of the Black Range.

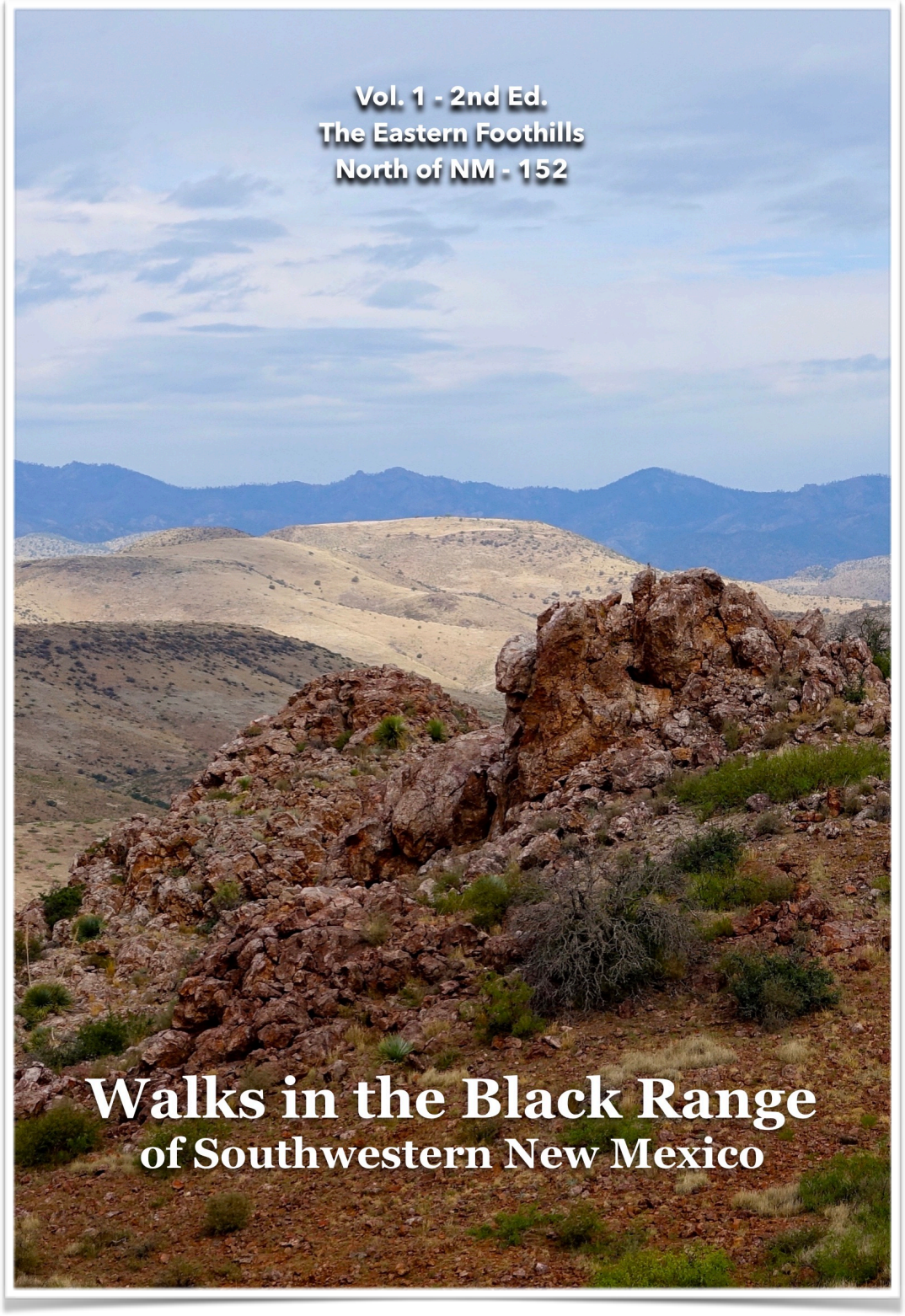
Speciation: American Crow/ Northern Oriole/Mexican Duck

On the issue of species boxes and our strong belief in clinal differences comes news that the Northwestern Crow and the American Crow are to be lumped into one species. Of interest here is that this is not due to a new analysis of DNA and a decision to draw the line somewhere else - nope, the range of the American Crow has been spreading into the range of the Northwestern Crow for decades and the two hybridize. Whereas their species traits spread apart in the past because of geographic separation, they are now experiencing a reconciliation, having moved back into the same neighborhood. "*Corvus caurinus is recognized as representing a geographical trend, rather than a species or subspecies, and thus is treated as a junior synonym of Corvus brachyrhynchos*." It is the process, rather than the particular, of this decision which is of interest to us in the Black Range.

Lest you think that this is a simple process with a predictable outcome, consider the Northern Oriole. During my birding life the speciation determination of Baltimore and Bullock's Oriole has bounced back and forth. It has been known for quite some time that the hybridization zone between these (sub)species has been drifting westward. In "*Genomic and plumage variation across the controversial Baltimore and Bullock's Oriole Hybrid Zone*", Walsh et al., The Auk, August 1, 2020, note that the hybridization zone between the two subspecies has narrowed and that the two subspecies do not appear to be blending into a single species (Northern Oriole).

Taking the leap in the other direction is the decision to recognize the Mexican Duck (*Anas diazi*) as a full species, separate from Mallard (reversing the decision made in 1973 to 'lump' the two). This 'new species' can be found in the Black Range.

In part, the decision to split Mexican Duck from Mallard was based on work by Dr. John P. Hubbard, yes, the same John Hubbard who regularly contributes to this publication. See *The Biological and Taxonomic Status of Mexican Duck*.



2nd Edition of "Walks in the Black Range"

When the Black Range Website published "Walks in the Black Range" (photo above) in May of this year, it announced that a second edition would follow in (about) May of 2021. It immediately became apparent that a second edition, if published in one volume, would be a huge work - a very large electronic file (a problem for some readers in our land of limited internet capability).

Therefore, the second edition of "Walks In the Black Range" has been divided into four volumes to make it easier to download and store. They are:

- **Volume 1: The Eastern Foothills North of NM-152;**
- **Volume 2: The Eastern Foothills South of NM-152;**
- **Volume 3: The Black Range North of NM-152; and**
- **Volume 4: The Black Range South of NM-152.**

Volume 1 of the second edition, cover shown upper right, was issued in July. Other volumes will follow on roughly a quarterly basis.

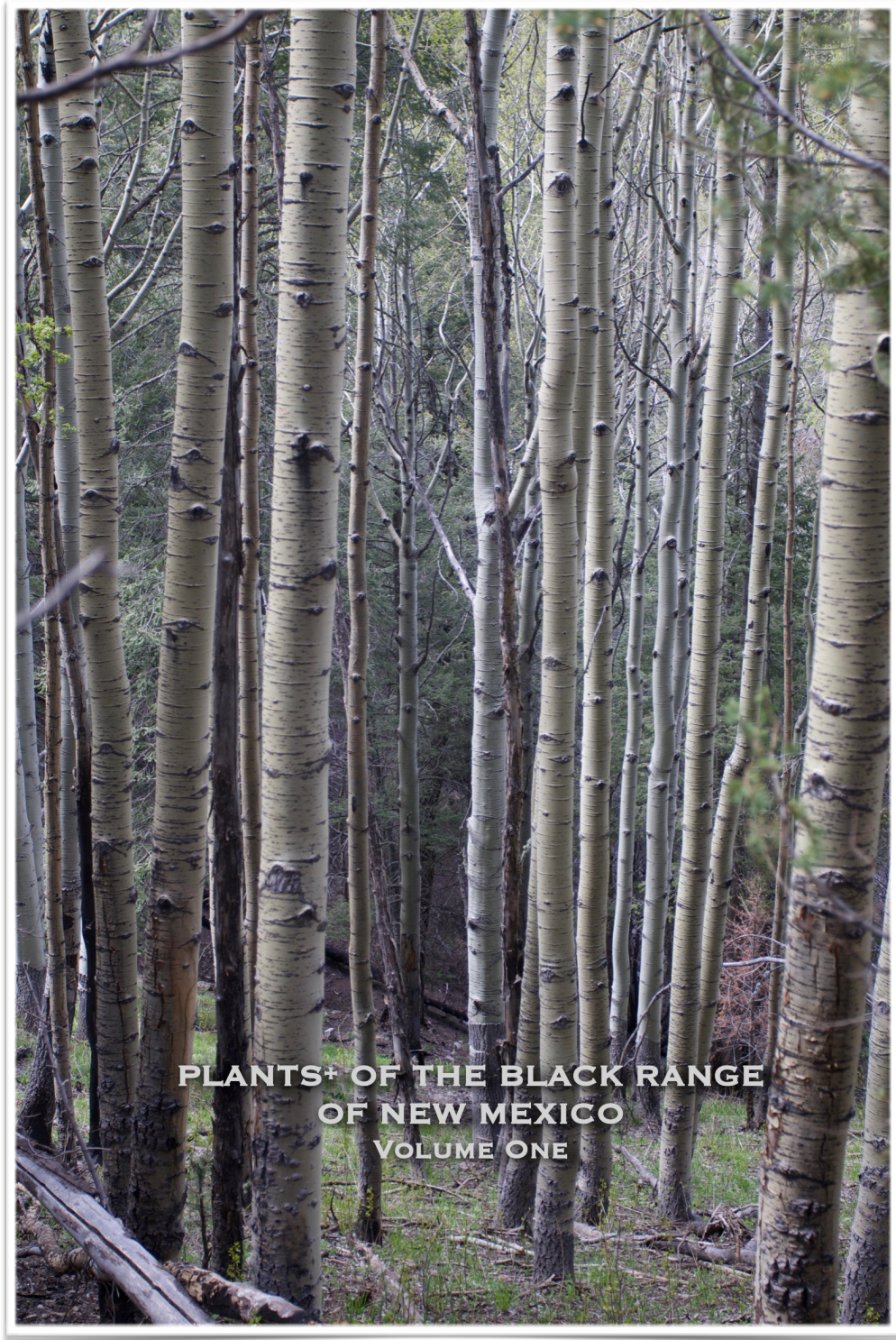
The area covered in this volume has been heavily impacted by human activity. Many of the walks described in this volume are along old mining (now ranching) roads and generally lead into areas where there was mining activity. One way to react to such a disturbed landscape is to crawl within oneself and suck a thumb. Another is to relish the degree to which the landscape has blossomed again - literally. And, instead of relegating the mining activities to a closet, we can treat these walks as walks into history. Each walk description in this volume includes a significant amount of historical material about the mining which happened in this area.

New Road Video - Tierra Blanca

The "arterial roads" of the Black Range (NM-152, NM-61, NM-35, NM-59, NM-26, and NM-27) sometimes provide access to the trailheads of the Black Range. Sometimes those trailheads can be accessed only by "collector/distributor roads" which are universally unpaved and sometimes quite rough. The Black Range Website hosts an extensive collection of road videos which include the arterials and most of the collector/distributor roads. In May, the website posted its latest addition, "Tierra Blanca Road", which depicts the road from NM-27 westward to the trailhead of Forest Trail 135.

Plants+ of the Black Range

In June of this year the Black Range Website published Plants+ of the Black Range of New Mexico - Volume 1, photo of cover below. This checklist documented 1280 (verified) species in the Black Range. It also included 460 species which may possibly be found in the Black Range but which we have not been able to verify in the Range. This was the first of a three-volume set and listed species by family. It is available for download at the link above. Like all products of the Black Range website, it is free for your non-commercial use.



The second volume of the series, which listed the (primarily) plant species of the Black Range in alphabetical order by scientific name was issued in August (photo of cover upper right).

The third volume will be a listing of species ordered by English common name. It will be published at some time before the end of calendar year 2020.

A second edition is planned. We can use your help in improving this, the first edition. If you note corrections which should be made or have material which should be added, please contact rabarnes@blackrange.org.

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During the last quarter we added seven new bird species to our yard list in Hillsboro. In June, we added Lucy's Warbler and Verdin to our yard list, in July we added Yellow-billed Cuckoo to the list, on August 1 we added Purple Martin to the list, and in September we added Townsend's Warbler, Pacific Wren, and Cordilleran Flycatcher, bringing the number of bird species we have seen in our yard to 165.

Bob Barnes
Hillsboro

Scrub-Jay

Ever wonder why Woodhouse's Scrub-Jay is "Scrub-Jay" and not just "Jay". So have lots of other people. It is a hold over from earlier taxonomic decisions - before Scrub-Jay was split into several different species, including Woodhouse's. In June, the American Ornithological Society decided to keep "Scrub-Jay" as part of the English name.

Follow-ups

Coatis

A follow-up to our April 2019 article regarding Coati sightings in the Black Range: An informal survey of those who had reported sightings during the summer of 2018 indicated that no sightings occurred during the summers of 2019 and 2020. If you made a sighting of a Coati in the Black Range during 2019 and to date in 2020 please let us know at rabarnes@blackrange.org.

Porcupines

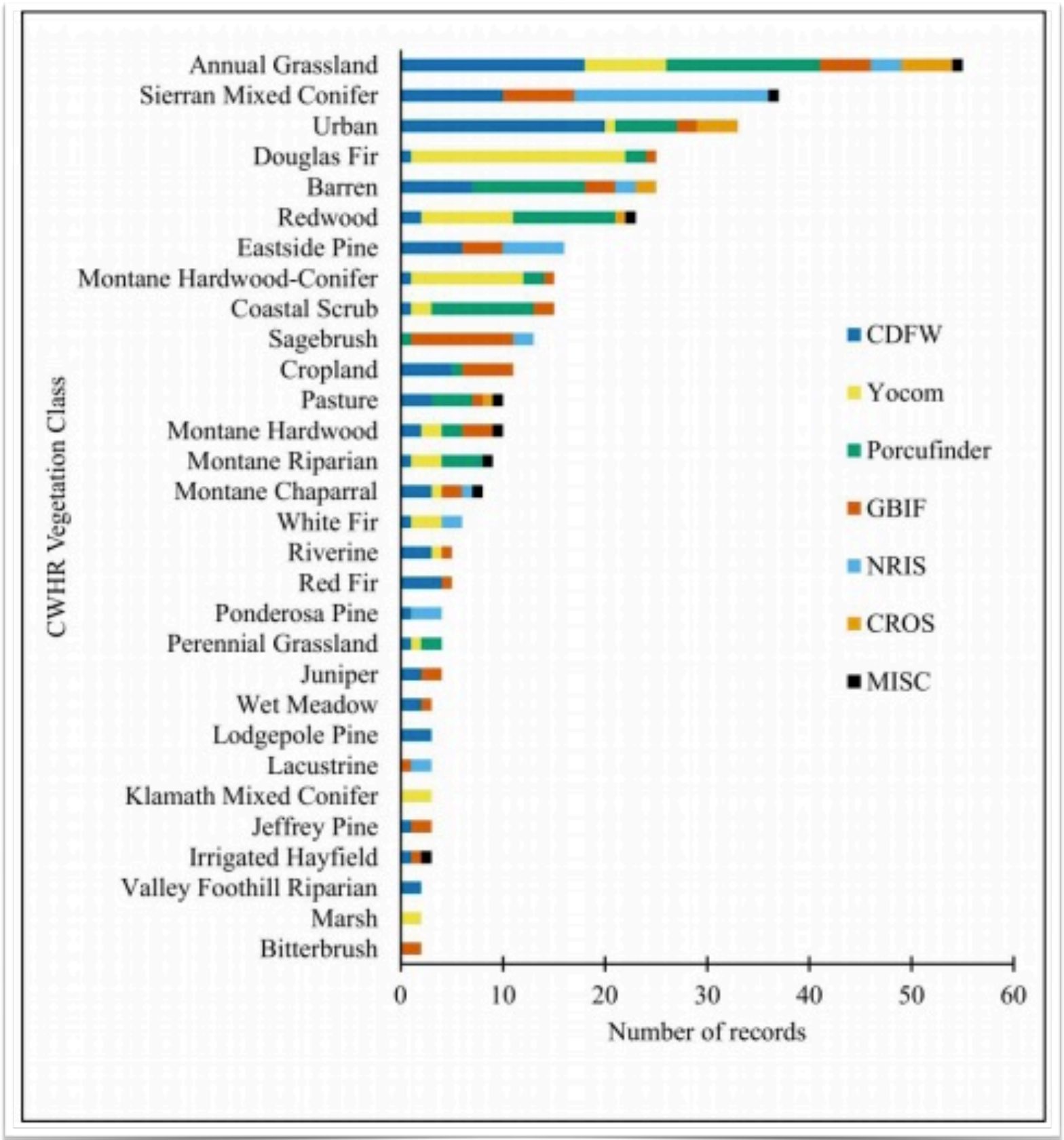
J.R. Absher of the A-Spear ranch, responding to a draft of Harley Shaw's article in the last issue, noted: *"I have never seen any here on the A-Spear, nor have I captured any trailcam images. I've seen some tree (bark) damage that could have been from porcupines, though could have just as easily been caused by other rodents … As an interesting side-note, when I rode wilderness patrol and packed mules in the Mogollons for the USFS in 1979 and '80, I remember the Gila district offices distributed some brochures encouraging hunters afield to shoot and kill any porcupines they encountered while hunting."*

Editor: The USDA Forest Service continues to cite porcupines as a source of substantial damage to their tree crops. A 1986 study found that among control methods, "strychnine bait blocks for porcupine control in forests is ineffective." Efforts "to control porcupine numbers" within the Southwest Region have a long history. "*Porcupine Control Work on Two National Forests*" appeared in The *Forest Worker*[1]. That article noted that in 1927, 1,374 porcupine dens had been baited in the Coconino and Tusayan National Forests in Arizona. This level of activity warranted special staffing. In the mid-1930's, Dean Cutler was a CCC foreman at the Wood-Springs Camp in charge of porcupine control, for instance.[2]

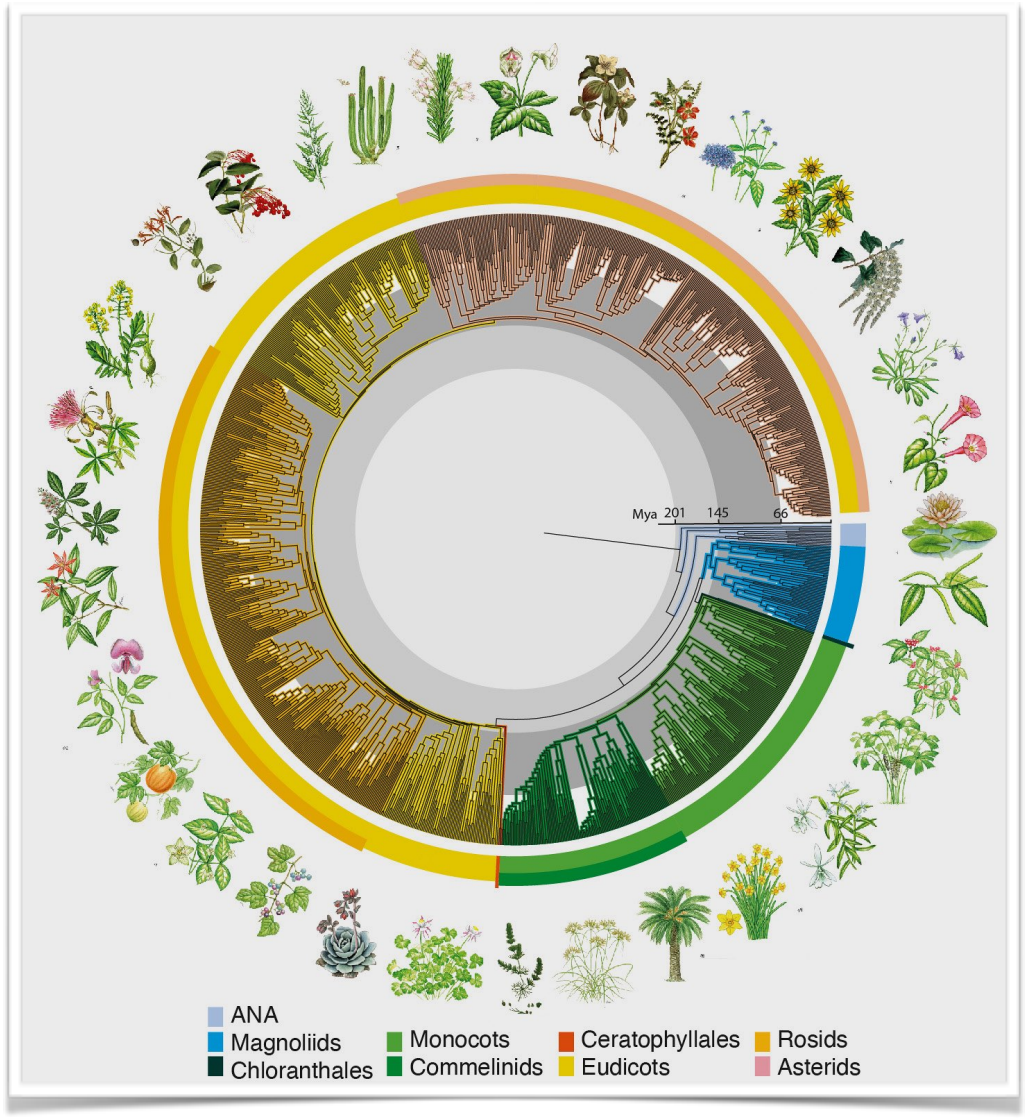
1. ***The Forest Worker*, Vol. 4, No. 2, March 1928, p. 12**
2. ***Timeless Heritage: A History of the Forest Service in the Southwest*, p. 164.**

In "Distribution of the North American Porcupine (Erethizon dorsatum) in Northern California", William T. Bean et al. found that "porcupines may occur in most major regions and habitat types across northern California, in contrast to many published range maps." Of particular interest to those in the Black Range is the study's assessment of porcupine occurrence by vegetation type. See results in graphic at left.

And lastly, see, "Where Have All the Porcupines Gone?" by Ellen Horowitz, *Montana Outdoors*, March-April 2015.



California Department of Fish and Wildlife (CDFW), previously published records (Yocom), Porcufinder.com (PF), the Global Biodiversity Information Facility (GBIF), USDA Forest Service Natural Resource Inventory System (NRIS), UC Davis California Roadkill Observation System (CROS), and miscellaneous sources, including track plate detections, iNaturalist.com, and Flickr.com.



Graphic from: Nature Ecology & Evolution, 06 July 2020, "The delayed and geographically heterogeneous diversification of flowering plant families", Santiago Ramírez-Barahona, Hervé Sauquet, & Susana Magallón.

Tree of Life - Flowering Plants

In Harley Shaw's "*Habitat*" article (earlier in this issue) there is an image of a Tree of Life (constructed by folks at Duke University). Above, is a similar graphic, this one a Tree of Life of the angiosperms (flowering plants). If you grew up in the oak tree, tree of life era (some time in the late Quaternary) this type of graphic may be unfamiliar. This type of phylogenetic tree is known by a number of terms (clock representation, supertree, synthetic [the synthesis of numerous phylogenetic data sets] tree, etc.). Such images depict a time frame with a starting point (middle right [lower] in this case) and an end point (also middle right [upper]). In this case, the history of flowering plants is depicted, as the evolution of the clade is depicted in two ways. The major evolutionary changes are depicted in the inner circle. As individual segments (orders/families/genera/species) of the clade evolved into lines which were not part of the major evolutionary process, their evolution is shown as extended outward from the inner circle. These individual lines depict the evolution of the individual segment and are color-coded to describe different attributes. This graphic depicts a significant amount of information. If you have a desire to more fully understand the mechanics and nuances of the information, see the supplementary material for the cited article and "Synthesis of phylogeny and taxonomy into a comprehensive tree of life", Hinchill et al., PNAS, October 13, 2015.

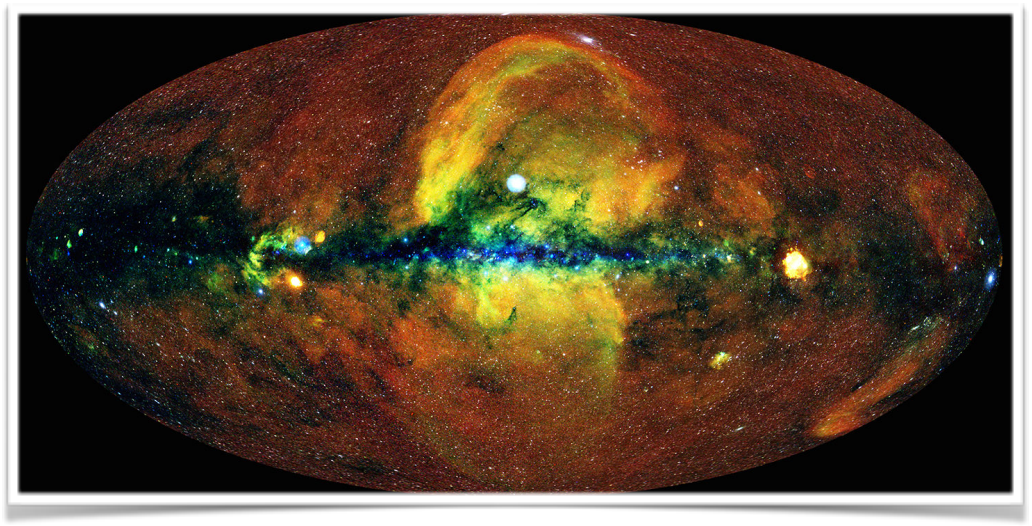
How development (of anything) is depicted without introducing bias through the graphic is a problem which has long been dealt with by people involved in any complex process. This particular type of graphic has the benefit of reducing biological hierarchy, most commonly flawed by human-centric analysis. Like anything, this graphic methodology has its pros and cons, but as of the moment, the pros far outweigh the cons.

Oh, the bottom line for the cited article: Angiosperms evolved during the Early Cretaceous (145-100 Ma) but did not truly begin to flourish until the Paleocene (66-56 Ma). As a frame of reference to our world, flowering plants really came into their own "shortly" after the andesite of Copper Flat flowed out onto the surface (ca. 75 Ma). As you walk the area east of Hillsboro, look at all of that "lava" and say to yourself, "Wow, you have been here since before the flowers overran the neighborhood."

The natural history of the Black Range, as we know the present state, is a snapshot of minutiae. When light left the stars referenced by Chuck Barrett in his article (see earlier) the natural history of this place was very different.

More Night Sky

The eROSITA X-ray telescope has completed the most comprehensive x-ray map of the sky to date (see image right) - identifying 1.1 million x-ray sources. The telescope will be used to complete at least eight additional maps as part of this Russian-German effort.

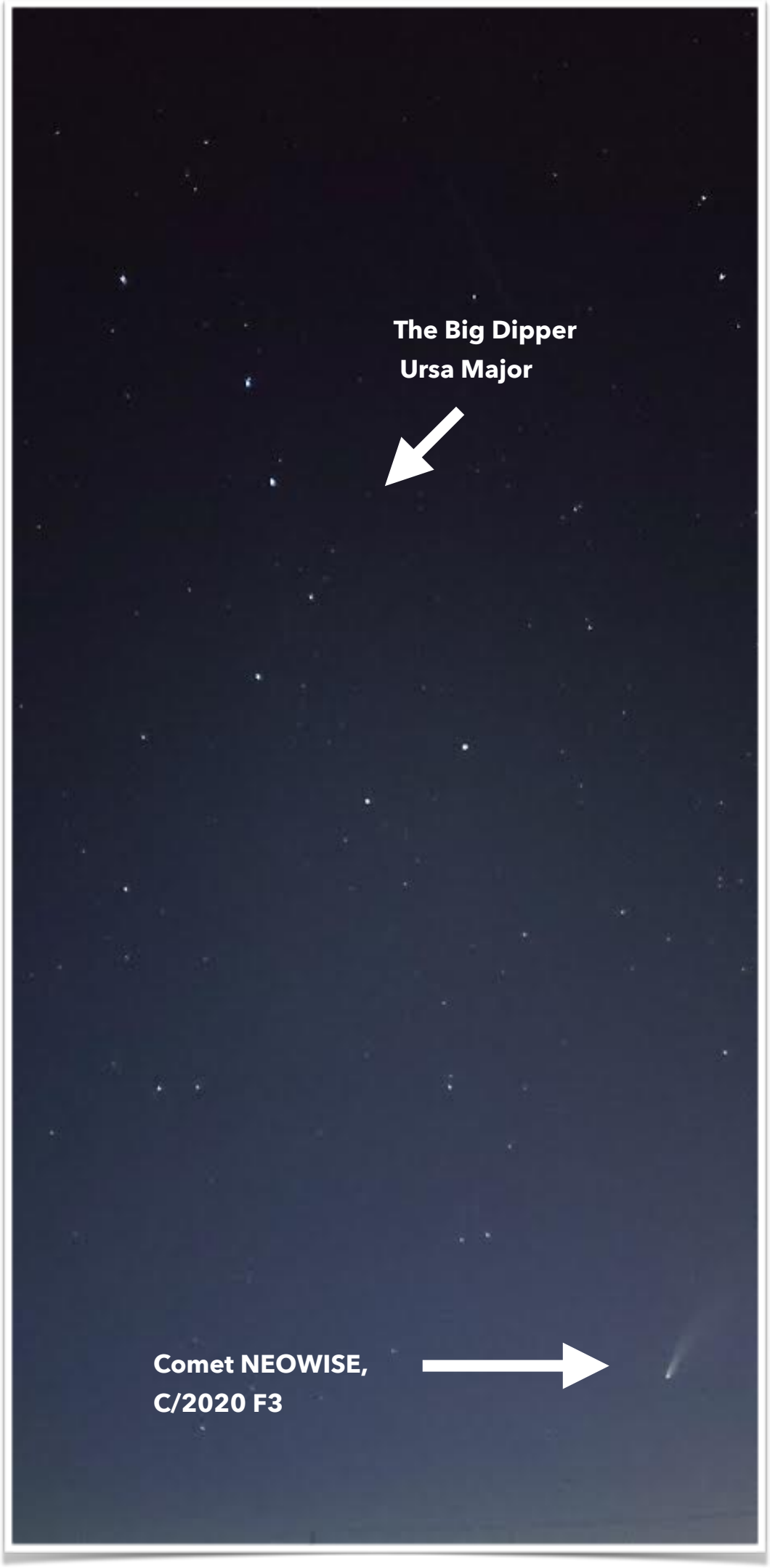


Like many astronomical images, the photo above is depicted in "false colors". Not that the colors are false, they simply are not true. Humans can not see x-ray wavelengths so the x-ray wavelengths detected by the telescope are translated into colors we can see so that we can discern the patterns created by different wavelengths.

Many creatures on this planet can see in wavelengths which humans can not discern, ever wonder what the night sky looks like to them?

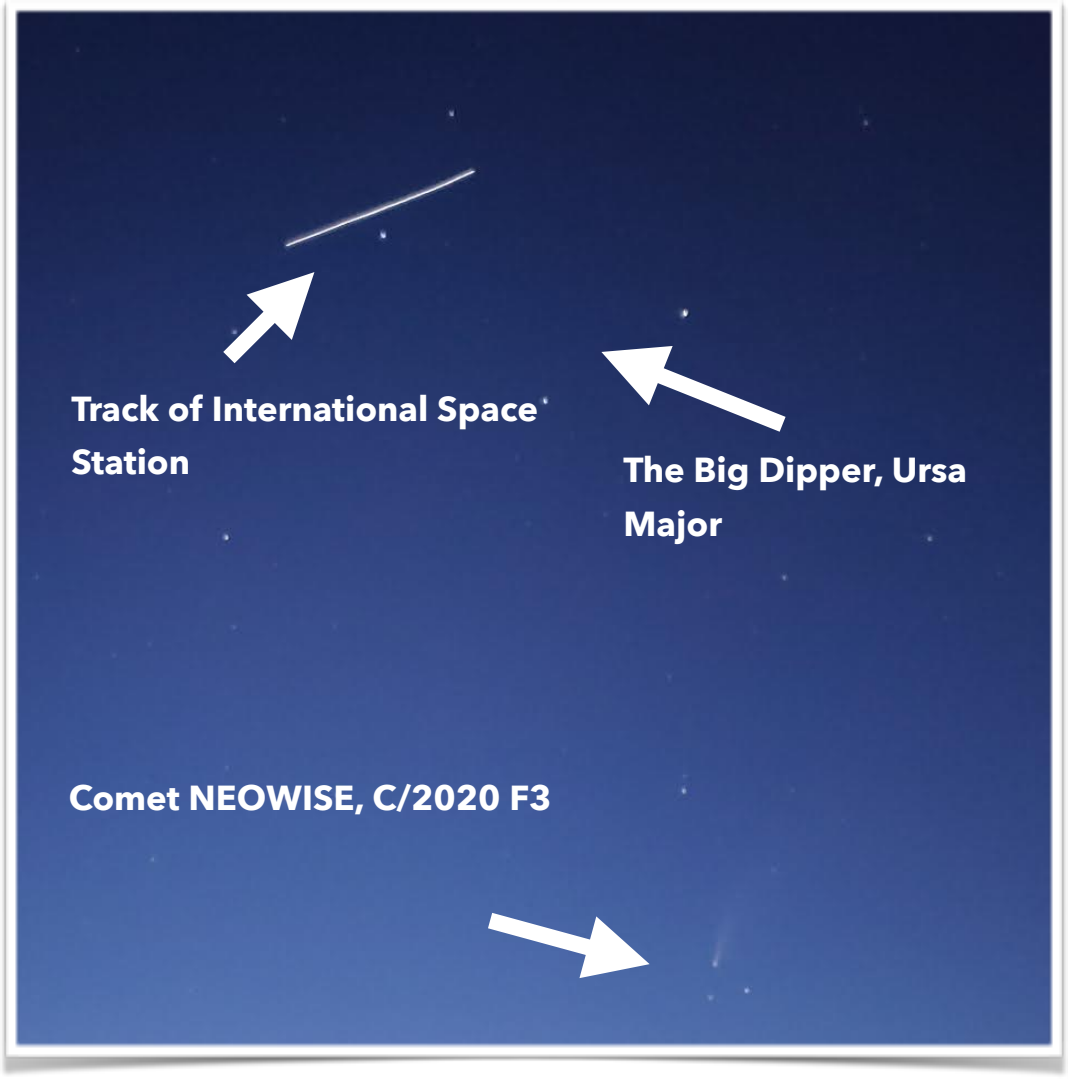
For visually-impaired humans, the big event of the season was the appearance of Comet NEOWISE (C/2020 F3) in our northern sky. It was seen best during June and July.

On July 15, Jon Barnes photographed the comet with a cell phone. The photograph (below) was a 10 second exposure shot at 800 ISO with an aperture of 1.4.



The night sky is integrated with the human cultural history of our region. The Mimbres recorded supernova, comets, and the movement of stars and planets. For them, many of those observations were linked fundamentally to their survival.

On July 18 Jon Barnes once again used a cell phone to photograph the comet (lower right) on a cell phone (400 ISO, 10 second exposure, 1.5 aperture). These images demonstrate a wide array of insight: 1) You don't always need advanced technologies to study the night sky, a cell phone works nicely for the documentation of many phenomena; 2) Our society is marked by numerous sublime juxtapositions; yes, the image was taken by a cell phone – but that streak is about as technologically advanced as you can get; and 3) That the study of the natural world can remain fresh in our minds for as long as our minds function - especially if given a little nudge by imagery (whether a photograph, a rock art engraving, or a drawing on a bit of pottery).



The OTHER Pandemic....Rabbit Hemorrhagic Disease(RHD)

by Kathleen Blair

The Lagomorph (rabbits, hares, and pikas) order's evolutionary linage is among the oldest of the mammals, yet they have changed relatively little in the 85-100 million years of their fossil record. Not long after the dinosaurs went extinct, they had already been around long enough to evolve distinctive characteristics like a hopping gate and double front teeth, as well as a few traits usually associated with marsupials. Today, one of the 90 or so species is naturally found on every continent but Australia and Antarctica – tropical to tundra, deserts to swamps – where they form a critical part of most food chains. Everybody eats bunnies! So, if rabbit and hare populations take a serious, long-term dive, a lot of food webs can be damaged. A few of the most well known species belong to the genus *Lepus*

(hares and jackrabbits), *Sylvilagus* (cottontails), and *Oryctolagus cuniculus* (European rabbits and their domestic descendants).

Humans domesticated European rabbits at least two thousand years ago; and their fecundity, environmental tolerance, and ease of transport and containment have made them a substantial component of human diets, clothing, and economies. Over 300 different breeds of domestic rabbits are derived from the European rabbit, alone. Dutch and Angora breeds, both highly distinctive and modified from the wild rabbit type, were well developed by the middle ages, based on artwork from those times; and Pliny the Elder discussed raising them in cages and colonies in the first century BC. In 2017, 8,600 major farms were engaged in rabbit production in the US alone, with just under 1 million dollars in sales (USDA 2017). This does not include many small producers that sell locally or consume personally. The US has a very low per capita consumption of rabbit compared to most countries. Virtually every country on earth uses domestic rabbits as a substantial meat source. They can be raised inexpensively, are non-competitive with humans, produce the most animal protein per year for food, arouse no major religious taboos, and are readily raised in small, backyard operations in the poorest countries. And they have even become popular urban house pets!

Rabbit Hemorrhagic Disease (RHD) -- also known as Viral Hemorrhagic disease (VHD); Rabbit Calicivirus disease (RCD); Rabbit hemorrhagic disease (virus RHDV1 and 2 or sometimes a and b); and "bunny Ebola" -- represents an integrated complex of rapidly evolving viral forms. This disease is a Lagovirus species (meaning rabbit virus) under the large Calicivirus family. In humans, one of the more notorious Calciviridae is the Norovirus (Abrantes et al. 2012). Caliciviruses are known to be resistant to environmental degradation and difficult to eliminate. A recent webinar on RHD posted by the US Fish and Wildlife Service noted that "COVID-19 is about as easy as a baggie full of jello to get rid of, Calicivirus is more like a golf ball. Lots tougher" (USDOI 2020). It can take 60-90 days to die in the environment and is resistant to many common disinfectants at normal concentrations (USDOI 2020; AZGF 2020). It cannot be readily cultivated in a lab (Abrantes et al. 2012), making it difficult to work with. At this time, the virus has split into 6 distinct genotypes in rabbits, 3 of which are medically significant to rabbits (RHDV, RHDV1, and RHDV2).

This virus is not related to COVID-19 and does not infect humans or any species beyond rabbits and hares (NMGFD 2020; USDA 2020; USDOI 2020).

The RHD incubation period in European rabbits is 1-5 days; and most die within 12-36 hours after the onset of fever. In many cases death is the first visible symptom, so the animals are observed grazing and acting normal just before dropping dead (Kerr et al. Mar 2013). Others may exhibit anorexia, apathy, and congestion of the conjunctiva of the eye and sometimes paralysis, bloody, foamy, nasal discharge, and hemorrhages of the eyes, or cyanosis. The targets of the virus are the lungs, liver and spleen, with acute hepatitis being the fundamental impact and death caused by the buildup of massive intravascular coagulation in several areas of the body. Some individuals, especially younger animals, present milder symptoms and may survive to develop strong antibodies, according to Abrantes et al. (2012). Some individuals become asymptomatic carriers and can shed the virus for at least 3 months. (Wikipedia 2020, AZFG 2020). This symptomology is based on domestic animals but is presumed to be the same in the wild, assuming predators do not get the affected animal first.

In the early 1980s, adult European rabbits suddenly began to experience widespread mortality of 70-100%, in both wild and domestic forms, in Germany (IUCN 2020). Wild populations of rabbits and hares abruptly declined and fragmented by 50-80%. A low-grade Rabbit Hemorrhagic Disease (RHD) is thought to have been circulating in the European rabbit species in non-pathogenic strains for some time before the virus mutated into a more lethal RHDV1. Because the European rabbit is an important food base for at least 29 European and Asian predators, RHDV1 mortality has been identified as a major cause in the decline of several predators of conservation concern, including the Iberian lynx, Bonelli's eagle, and Spanish Imperial eagle. The change in the primary prey base caused shifts in the distribution of these and possibly other species (IUCN 2020). Then, in 1984, the RHDV1 was described in China's Jiangsu province from commercial Angora rabbits imported from Germany. In less than a year RHDV had killed 140 million domestic rabbits in China (Abrantes et al. 2012). By the mid 1980s, the virulent strain had appeared in Europe and spread to Africa. RHDV1 was found in Mexico in 1988 and in a few widely scattered domestic rabbitries in the US in 2000, 2001, and 2005 (Wikipedia). The virus apparently came in with domestic rabbit meat and furs from China to Mexico, and from there into the U.S., although the routes of transmission were never determined (Wikipedia). Stringent eradication of all rabbits in any positive-testing rabbitries in Mexico and the U.S. eliminated this form of the virus from these two countries at that time. No transmission to native cottontails or jackrabbits was found. However, Australia deliberately released the virus on Wardang to test its effect on feral European rabbits, which are significant invasive pests in Australian ecosystems. The virus was estimated to spread at 50 km per week and reduced populations by 95% in some arid areas, spreading across to the mainland by means of air or insect (Abrantes et al. 2012). New Zealand, where rabbits are also a major agricultural and wildlife pest, chose not to introduce the virus due to risks - but private landowners introduced it illegally anyway (Abrantes et al. 2012).

In 2010 a new strain, RHDV2, arose in France (Ghislaine Le Gall-Reculé et al. 2013) and quickly spread to Italy and Spain. Spain is where it is thought *Oryctolagus cuniculus* originated. From Spain, the species was scattered all over

Europe and the Mediterranean by the Romans and Phoenicians. When the Carthaginians settled in present day Spain (about 2,300 years ago) they called the land Ispania, land of the rabbits (American Rabbit Breeders Association 2020; Canadian Wildlife Heath Cooperative 2018).

RHDV2 was found in a rabbitry in Quebec, Canada in 2016 (Wikipedia 2020). In February 2018 nearly every individual in 2 colonies of feral rabbits in British Columbia, Canada was found dead. Tests identified the cause as RHDV2 (Canadian Wildlife Heath Cooperative 2018). No one knows how it got there.

Black-tailed Jackrabbit, Lepus californicus

In New Mexico, things changed again March 24, 2020. The State Veterinarian in New Mexico informed the Arizona State Veterinarian that there was a confirmed case of RHDV2 in a pet rabbit in southern New Mexico, then more confirmed cases were reported in 5 additional southern counties, and, on April 2 RHDV2 was confirmed in a wild jackrabbit. These cases were the first detections of RHDV2 in the US in domestic rabbits, and the first time a native wild species was known to have contracted and died of it (Arizona Department of Agriculture 2020). By early April, wildlife managers in the Douglas, Arizona area were reporting die-offs of both cottontails and jackrabbits. On April 9, dead and dying cottontails and jackrabbits were found in NE Arizona, and RHDV2 was confirmed. As this disease crossed to native species, state and federal wildlife agencies became involved, and stopping RHDV2 transmission has become paramount; positive test cases are tracked both by state wildlife agencies and the USDA. It is a mandatory reportable disease in order to document outbreaks. Again, positive tests in domestic *Oryctolagus*, whether feral or contained, activates the complete elimination of the potentially infected herd; but that does not work with wild species. This summer, a vaccine was developed in France for RHDV2 which will protect domestic rabbits (Zimmerman 2020), although vaccinating cottontails and jackrabbits at $35 each is not an option. In June, RHDV2 was declared "Endemic" by the USDA (Zimmerman 2020) which means it has probably passed beyond containment although domestic herds with individuals that test positive are still "depopulated" unless they have been vaccinated.

According to the USDA, as of August 5, RHDV2 is confirmed in domestic and wild rabbits in southern California, southern Nevada, throughout most of Arizona and New Mexico, in central Colorado, as well as in western and (a few) central counties in Texas, and northern Mexico (2020, Figure 1, following page). At this time, only domestic rabbits have been confirmed to be affected in Sierra County, but cases in both wild and domestic rabbits have been found in Doña Ana, Grant, Socorro, and all but a few other NM counties (USDA 2020). Of course, rabbits in many of these areas may not have been tested. No testing does not mean no cases. The vast majority of infected wild species fall victim to predators before notice by humans, who rarely think of getting a dead rabbit tested (at their own expense!). Unfortunately, most rabbits turned in for testing have been road killed. Unsurprisingly, death reportedly came about by playing on the highway, not RHDV2. The situation is further complicated in that wild rabbit populations are quite variable in their response to changes in the availability of food and cover (particularly during the breeding cycle), local weather conditions, predation, parasite loads, and diseases. Some wild populations may have natural cycles as well. Rarely do these natural events result in mass die-offs, although relative abundance may ebb and flow. Long term climate change will also impact habitats and the species which are adapted to them.

Infection rates and mortality are extremely high in any exposed population, as RHDV2 is extremely contagious and damaging. Transmission is by direct contact of live or dead individuals (nasal, oral, eyes); contaminated clothing, footwear, supplies, equipment, food, and water; as well as feces of infected rabbits. It can be transmitted via breath. Infected carcasses (imported meat from infected rabbits); fur of infected animals; insects such as flies, fleas and mosquitos, are very efficient vectors. Mammals and birds can excrete virus in feces after eating an infected animal (Abrantes et al. 2012); Wikipedia 2020; ARBA 2020; USDOI 2020; Zimmerman 2020).

Unfortunately for the cottontails and jackrabbits of North America, and the predators and ecosystems that depend on them, evolution, in the form of herd immunity, is the only current answer. That will result in high mortality rates, until

individuals develop antibodies and populations acquire resistance. Darwin needs a little raw material to work with but until such develops, this disease is highly contagious, with high morbidity and mortality, and will be an ecologically traumatic presence on the landscape. By impacting a keystone food source in most ecosystems, it will probably impact the population size and distributions of mid-size predators even though they do not become ill themselves. Not to mention a bummer for the bunnies!

What can be done? The meat is safe for humans to eat (ARBA 2020, NMGFD 2020, USDOI 2020). Biosecurity is the best defense we have. These actions apply to anyone (hunters, hikers, wildlife observers, or domestic rabbit owners) in contact with either wild or domestic rabbits. Best not to try and rescue baby bunnies by capturing them at this time (or any other actually. It rarely works). RHDV2 can be easily transmitted by contact with meat, fur, equipment, other animals, or vegetation that have been in contact with an infected individual of any species. Don't be a vector!

- ✓ Avoid wild or domestic animals that appear ill.
- ✓ Don't cross county (or state) lines with rabbits, wild or domestic, alive or dead, whether taken when hunting or raised domestically. Both in response to COVID-19 and to RHD the American Rabbit Breeders Association has canceled their annual convention, withdrawn permission for any rabbit show within 250 miles of an infected county, and discourages attendance of any show where exhibitors must travel from or through an infected area to attend, or having contact with any other rabbit breeder from those areas for 60 days (RHD is longer lasting than COVID-19 so a much longer quarantine period is required. ARBA. 2020). Needless to say, do not bring any animals into your barn from rabbitries in infected areas. Prepare for complete isolation of such animals in a separate building for at least 60 days. Even after returning from a show with exhibitors from unknown areas, isolate your stock for 60 days.
- ✓ Begin strong biosecurity measures. Lock down the barn. Do not allow any outsiders into your barn or go into theirs. Any rabbits you sell, remove from barn and transport to a safe area to deliver.
- ✓ Hunters should use gloves that can be discarded when handling rabbits. Wash hands after handling wild rabbits or entering and exiting rabbitry. After contact with any ill animals, change clothes. Have designated footwear that stays in the barn or is just for hunting.
- ✓ Do not bring in food (hay, forage, vegetables, etc.) which may have been in contact with wild rabbits from areas with outbreaks. Commercial feed has been processed so it is presumed safe. Buy hay or veggies to feed from areas outside of those in or near outbreaks. Dispose of dead rabbits that have questionable symptoms by burying them deeper than predators can dig or burn.
- ✓ For information on domestic rabbits and RHDV2 contact ARBA and Dr. Chris Hayhow www.arba.net. For wild species contact your state wildlife agency or state veterinarian (for New Mexico Dr. Ralph Zimmerman https://nmlbonline.com/).
- ✓ Have your domesticated rabbits vaccinated. A vaccine from France is now available in New Mexico, thanks to the efforts of Dr. Zimmerman. The shot contains vaccine for both the RHDV1 and RHDV2 viruses.

In addition to the links embedded in this article the following were referenced in the article or may be useful.

American Rabbit Breeders Association. 2019. RHDv2. ARBA.net/rhdv2/

American Rabbit Breeders Association.2020. Domestic Rabbit. Jul Aug 2020. Pg 3-4.

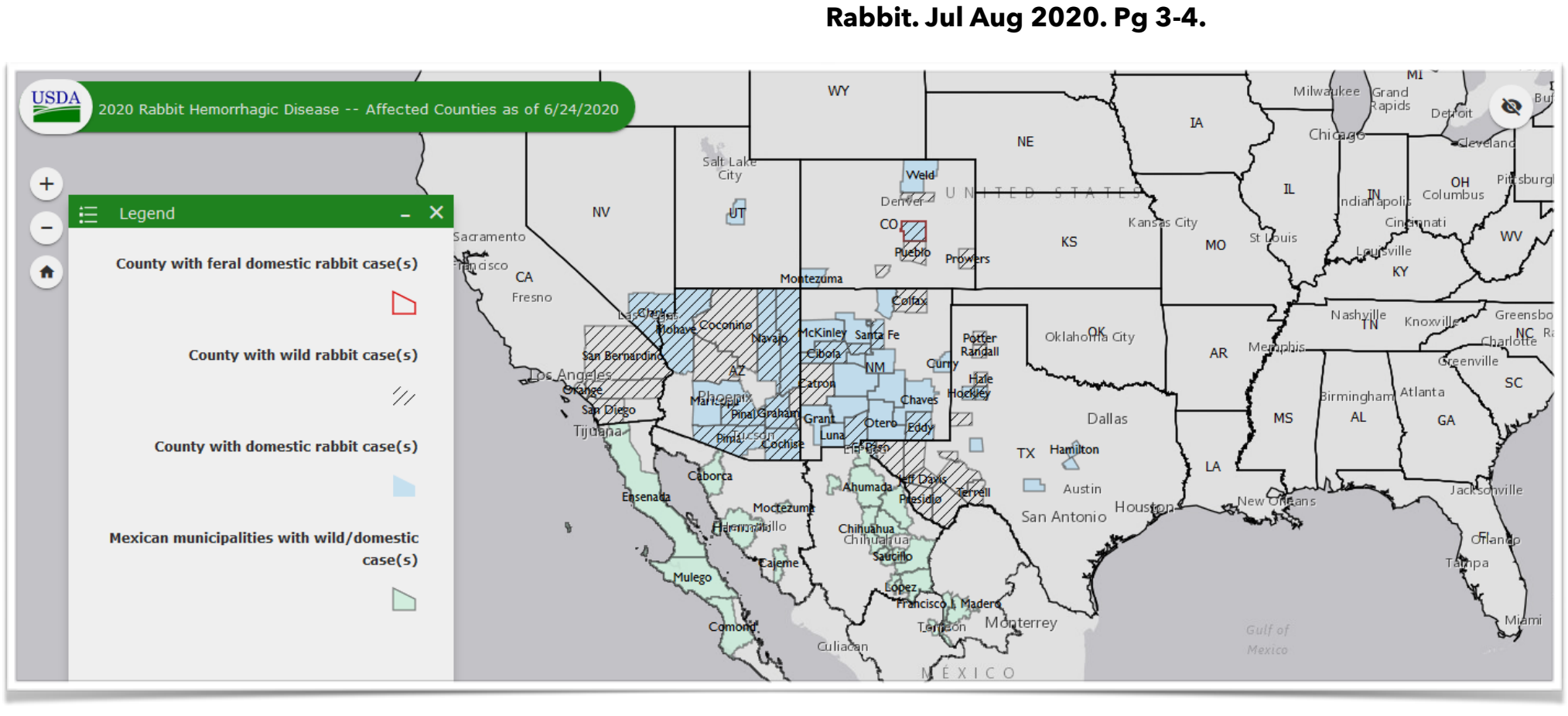


Figure 1. Map of positive test results for Rabbit Hemorrhagic Disease v2 from USDA. Follow link for latest information.

Rouco, C., J. Abrantes, and M. Delibes-Mateos. 2020. *Lessons from viruses that affect lagomorphs*. Science 369(6502):386.

USDOI. 2020. Rabbit Hemorrhagic Disease Virus 2: An Emerging Threat to North American Wild Rabbits.

Zimmerman, R. Pers. Comm. June 12, 2020. New Mexico state Veterinarian.

Aldo Leopold - His Legacy - Part 4

by Steve Morgan

The southwestern lands of Arizona and New Mexico were home to Aldo Leopold from 1909 until 1924. After that time period, he moved his family to Wisconsin. Those fifteen years gave him much of the experience from which he drew to write his two best known pieces, *Game Management* and *The Sand County Almanac*.

His earliest experiences as a ranger on the Apache National Forest and then the Carson National Forest after becoming the Forest Supervisor there, gave him a good, solid grounding in the ecology of the southwest. After he recovered from his sixteen-and-a-half-month bout with acute nephritis, Leopold rejoined the Forest Service in October of 1914. Those months spent away from the active life he so craved, gave him the time to look back and reflect on what he had learned.

Leopold spent the next nine months in the Region 3 Office of Grazing in Albuquerque, New Mexico. Though he chaffed at being confined to an office, it was there that he honed his skills as an office manager, skills which he drew upon a great deal, later in his life. He also became very aware of the impact of livestock on the land. The concept of "carrying capacity," the number of livestock the land could endure without being permanently damaged, became interwoven in his thinking for the rest of his life. This nine-month period also gave him more time to recover from his illness and primed him for new adventures.

June of 1915 found Leopold at the southern edge of the Grand Canyon. He was given the responsibility of developing the recreational policy for governing the eleven National Forests that Region 3 managed. His first assignment was to untangle the mess that the recreational uses at the Grand Canyon had become. In 1903, President Theodore Roosevelt had given America a challenge, to "Leave the Grand Canyon as it was." He said, "You can not improve upon it, not one bit. The ages have to work on it and man can only mar it. What you can do is to keep it for your children, your children's children, and for all who come after you as one of the great sights which every American, if he can travel at all, should see. Keep the Grand Canyon as it is."

Instead, what Leopold found just a decade later was a circus of gaudy electrical signs, vendors loudly proclaiming their wares, and unsanitary conditions from untreated waste and garbage. These abuses masked and detracted from the incredible natural wonder visitors had traveled to see. Leopold immediately began working on a plan with the Tusayan Forest supervisor Don Johnson. This became the first operating plan to guide how the Forest Service dealt with recreation use at the Grand Canyon.

Another part of his new job was to coordinate the fledgling Fish and Game program within the Forest Service. This would become an area where Leopold would devote a good deal of his time over the next ten years. He began by looking at areas with the potential to become National Wildlife Refuges. The Forest Service at this time had not designated any lands as refuges.

In 1903, in an effort to control plume hunting, President Theodore Roosevelt created the first official wildlife refuge at Pelican Island in Florida. In 1906, he designated the Grand Canyon Game Preserve, later becoming the Grand Canyon National Park, as one of the first National Game Refuges. Leopold felt strongly that game refuges were needed to further game preservation policy. So in June of 1915, he submitted a request for Stinking Lake in northern New Mexico to become a National Wildlife Refuge. Interestingly, this was the same lake he had passed when he was stricken with his bout of acute nephritis.

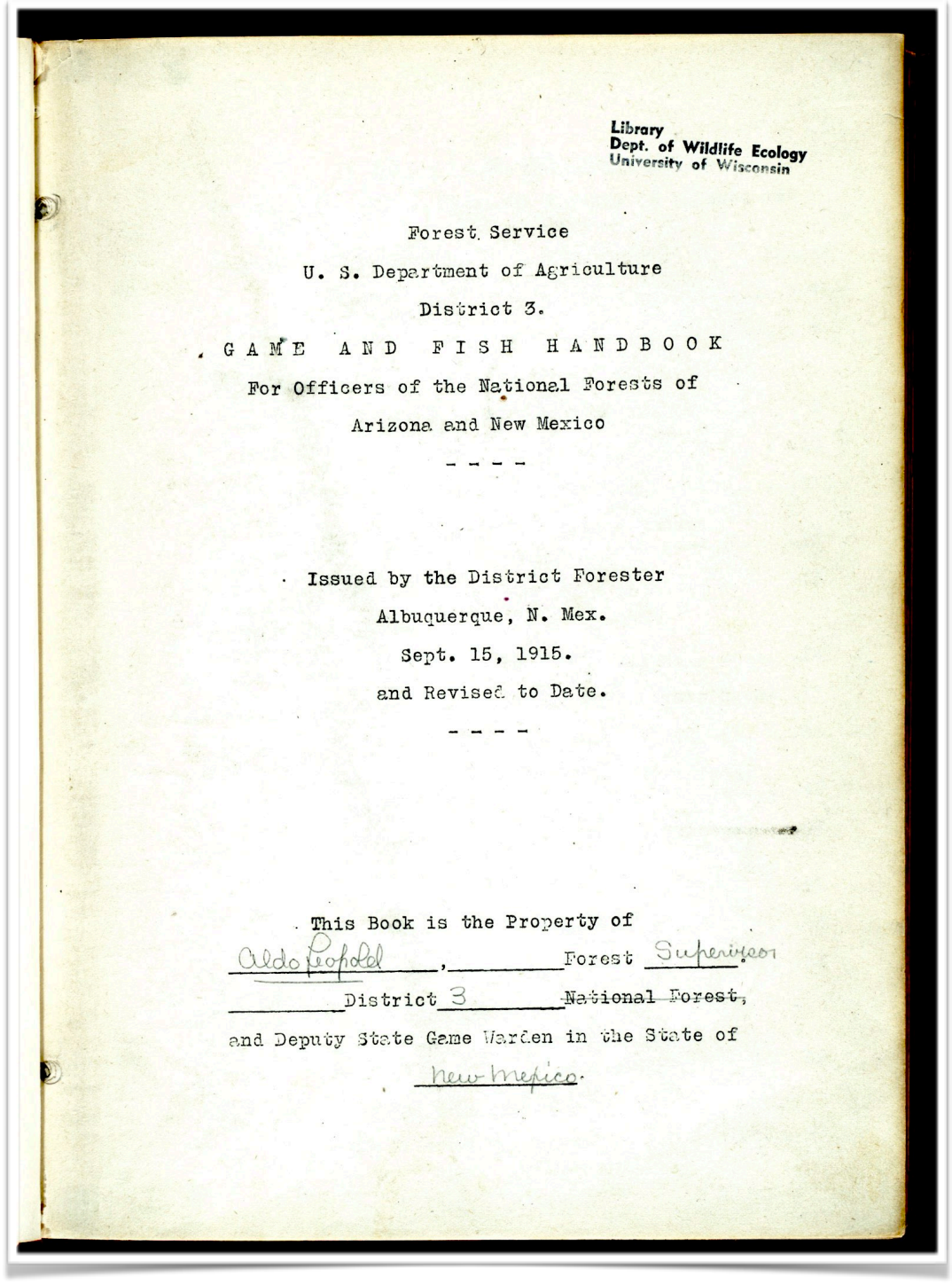
Leopold was now well on his way to publishing his first handbook for the Forest Service. In September 1915 he finished the *Game and Fish Handbook*. The Forest Service had never had this kind of publication before, and it was well received. His early thinking on game management was now starting to show. In his *Handbook* introduction on the biological value of wildlife, Leopold states, "North America, in its natural state, possessed the richest fauna in the world. Its stock of game has been reduced by 98%. Eleven species have already been exterminated, and twenty-five more are now candidates for oblivion. Nature was a million years, or more, in developing a species…. Man, with all his wisdom, has not evolved so much as a ground squirrel, a sparrow or a clam." The .pdf at the link above appears to be Leopold's personal copy of the Handbook, including worksheets, and proposed revisions for future editions.

He also stated that, "The breeding stock must be increased. Rare species must be protected and restored. The value of game lies in its variety as well as its abundance." Interestingly though, he barely mentioned predators in the *Handbook*, and certainly not the need to preserve them. His thinking about the important role of predators in the natural world would evolve later in his life.

At this point with the Forest Service, his mission was to focus on "game protection". On the evening of October 13, 1915, Leopold listened to a fiery lecture by the renowned conservationist William T. Hornaday. His book, *Our Vanishing Wild Life*, had greatly impressed Leopold. After hearing the great orator, who was said to have had a biblical voice and a countenance to match his zeal, Leopold found his own convictions and thinking about game protection inflamed; supported by the Forest Service, he started on a campaign trail to further the cause.

In January 1916, Leopold was sent out on a speaking tour of New Mexico. His goal was to help local sportsmen build cooperative associations to protect wildlife on the national forests. He was very successful in his mission. He found very strong support with the local hunters. This was the result of their reaction to an unusual situation found in New Mexico hunting grounds: a European barony style where the large landowners had most of New Mexico's game locked up for their own personal use. The evolution of the reasons for this will be discussed in the next installment of "Aldo Leopold: His Legacy", as will his final years in the Southwest.

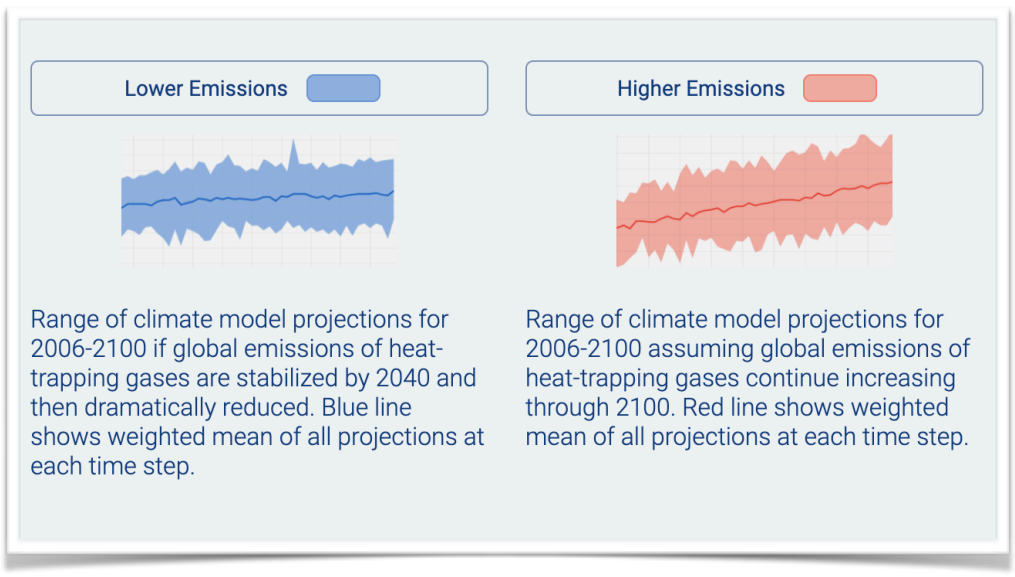
*****NOTE: The bulk of the data this article is based on, came from Curt Meine's book: *Aldo Leopold – His Life and Work*. Data from Louis S. Warren's book: *The Hunter's Game* was also referenced.**

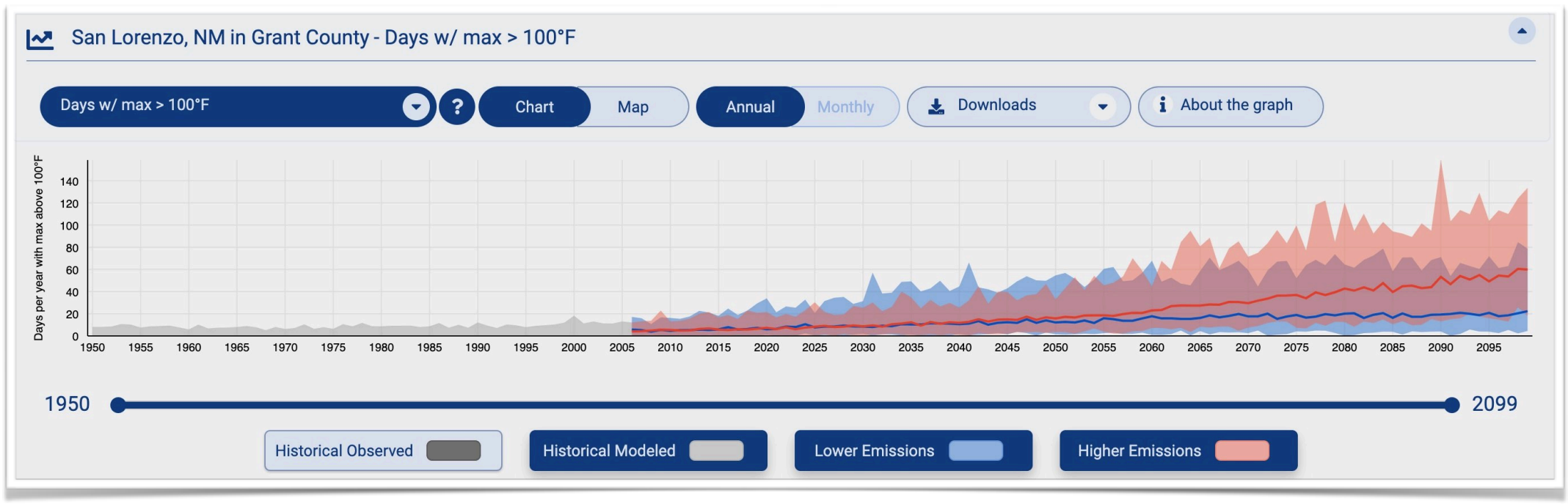


Heating Costs To Be Reduced

The Climate Explorer (a combined effort of NOAA, NASA, USGS, and others) has been published at this link. It allows the user to access a number of projections using differing base assumptions.

In the graph below, the number of days with temperatures over 100 degrees is projected for San Lorenzo. With higher emissions, it is projected that by 2090 more than a third of all days will have temperatures over 100 degrees Fahrenheit in San Lorenzo on the west side of the Range.





VIDEOS OF THE BLACK RANGE

VIDEOS OF INTERVIEWS, PRESENTATIONS, PLACES, AND EVENTS WITHIN THE BLACK RANGE. THESE VIDEOS WERE CREATED FOR THE BLACK RANGE WEBSITE (BLACKRANGE.ORG). INTERVIEWS WERE CONDUCTED WITH RESIDENTS OF THE BLACK RANGE, NEW MEXICO, USA AND WITH PEOPLE WHO HAD "STORIES" ABOUT THE BLACK RANGE. THIS PORTFOLIO, WHICH ALSO INCLUDES PRESENTATIONS MADE IN OR ABOUT THE BLACK RANGE, IS HOSTED BY THE BLACK RANGE WEBSITE. THIS PORTFOLIO IS MAINTAINED BY BOB BARNES IN SUPPORT OF HIS WEBSITES, ABIRDINGLIFE.ORG AND BLACKRANGE.ORG. ALL MATERIAL IS ORIGINAL.

Trailing With Toasty

Renowned Mountain Lion researcher, Harley Shaw, discusses his latest "retirement project". He is now studying predator/prey interactions in the foothills of southwestern New Mexico. In this case, rabbits and their predators. This is a HD 720 version of the video. Presented by blackrange.org and The Black Range Naturalist.

Powered by vimeo PRO

Trailing With Toasty

The Black Range Website has added to its collection of videos about the personalities of the Black Range. "Trailing With Toasty", which features Harley Shaw, was published on September 1. It may be viewed at this link. Another video featuring Harley, "Dogs and Lions", is also part of the collection which may be viewed at Videos of the Black Range.

"Trailing with Toasty" features narration by Mountain Lion researchers Harley Shaw and Megan Pitman, photography from the Furman Cougar Project, and video by Bob Barnes and Emmy winner Mike Abernathy.

As always, these productions are free for your viewing and or download and may be used for non-commercial purposes.

Ciénega Trail - City of Rocks State Park

The Ciénega Trail is just north of NM-61, within City of Rocks State Park. The walk as depicted on the inside back cover is 2.07 miles long with minimal elevation change (166' between the lowest and highest points on the trail, some up and down). The trail crosses the Faywood Ciénega near the park boundary. "The Faywood Ciénega is in the southwest corner of the Park. It is one of only two ciénegas in the area that have remained wet. The other is Faywood Hot Springs. The rest of the ciénegas in the area have dried, mostly due to water extraction, cattle grazing, and subsequent downcutting of arroyo channels, which will lower water tables." (p. 10 of the 2016 Park Management Plan).

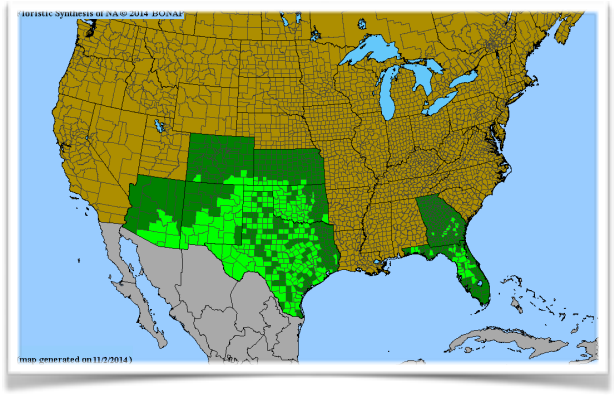
A ciénega (aka ciénaga) "is a wetland system unique to the American Southwest.[1] Ciénagas are alkaline, freshwater, spongy, wet meadows with shallow-gradient, permanently saturated soils in otherwise arid landscapes that often occupy nearly the entire widths of valley bottoms. That description satisfies historic, pre-damaged ciénagas, although few can be described that way now. Incised ciénagas are common today. Ciénagas are usually associated with seeps or springs, found in canyon headwaters or along margins of streams. Ciénagas often occur because the geomorphology forces water to the surface, over large areas, not merely through a single pool or channel. In a healthy ciénaga, water slowly migrates through long, wide-scale mats of thick, sponge-like wetland sod. Ciénaga soils are squishy, permanently saturated, highly organic, black in color (and) anaerobic." (Wikipedia)

The following entries are keyed to the map found on the inside of the back cover.

A. On March 5, *Lomatium nevadense*, Biscuit Root, (photo top right) was just beginning to express itself.

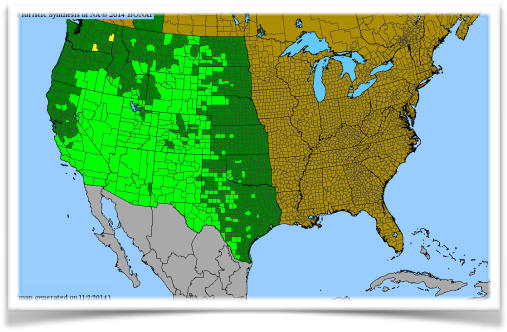
B. On May 20, we found many Band-winged Grasshoppers along the upper part of the trail. The individual pictured above is probably an Aztec Grasshopper, *Lactisa azteca*. In "Foliage Insects and Termites", Walt Whitford (January 3, 2020 issue of this magazine, p. 22) noted that Band-winged Grasshoppers are the "most common ground loving grasshoppers in the northern Chihuahuan Desert". Band-winged Grasshoppers are a subfamily (*Oedipodinae*), which has several tribes, which, in-turn, have several genera, each genus may have several species (or only one). Given the number of possible species which this individual can be attributed to, and given it is a photograph - not a specimen - I will stick with "probably" as my assurance of a correct identification.

C. *Krameria lanceolata*, Trailing Krameria, (photograph from May 20 - following page) is found in the Mexican states of Chihuahua and Coahuila as well as in the counties shown in the BONAP map below. Like other species in the genus, *K. lanceolata* is a root parasite, sucking a variety of nutrients - but especially water - from its hosts. The *Krameria* genus has an unusual pollination biology. Its flowers produce fatty oil, not nectar. Female bees of the genus *Centris* collect the oils from the modified external surfaces of the eliaphores (what appear to be upright flags), pollinating the flower in the process, and mix the oils with pollen to feed their larvae. Although the



Krameria **plants are wholly dependent upon *Centris* bees to effect their pollination, the relationship is not mutually exclusive – Centris bees utilize other oil-producing plants as well.**

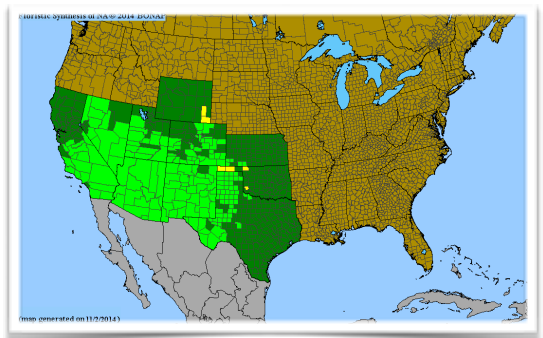
D. In the photograph above, the trees at right center are at the end of a wash system and just east of the flat plain of the ciénaga. (Mike Barnes - May 20, 2020)



E. Four-wing Salt Bush, *Atriplex canescens*, (photograph from May 20 to the right and at the top of the following page) is found in much of the western United States (see BONAP map left) and southward to southern Mexico. Vascular Plants of the Gila Wilderness notes that "The silvery appearance of the leaves is not due to hairs, but rather due to a covering of flaky scale-like structures, almost like dandruff." (See photo on the following page.) This species readily hybridizes with others in its genus, causing some disagreements about specific specimens. In the case of the type specimen for this species there is the following from Flora of North America:

> **"Materials from the vicinity of the type locality of the species in South Dakota are low subherbaceous**

plants that differ from our shrubby tall material. However, the type area is presently covered with water from a dam on the Missouri River, and it is not possible to exclude the possibility of *A. canescens* as it has been interpreted for the past century to have existed at that site during the Lewis and Clark Expedition, if that is indeed where the lectotype was collected."



F. Wire Lettuce (aka Few-Flowered Wire Lettuce and Prairie Skeletonplant), *Stephanomeria pauciflora*, is found along the southern part of this loop walk. The range of this genus is confined to the western United States and northern Mexico. This particular species is found in Sonora and Chihuahua in addition to the range shown on the BONAP map above. Skeletonweed, which it may be confused with, is a noxious plant and is in a different genus. This species may hybridize with *S. tenuifolia*. Like many plants in our desert borderlands, this one has few leaves. (Photograph from May 20, to the right.)

G. Many species of grass are growing at the mid-point of this walk, where a wooden walkway (photograph from August 18 at the top of following page) crosses the main "waterway" of the ciénaga. (Photograph from May 20, by Mike Barnes, at the middle of the following page.)

For all practical purposes, the monsoon did not develop in 2020 so in August there was no water at the boardwalk (above). The grasses were just as beautiful, however, as they had been in May (right - Mike Barnes, May 20, 2020).

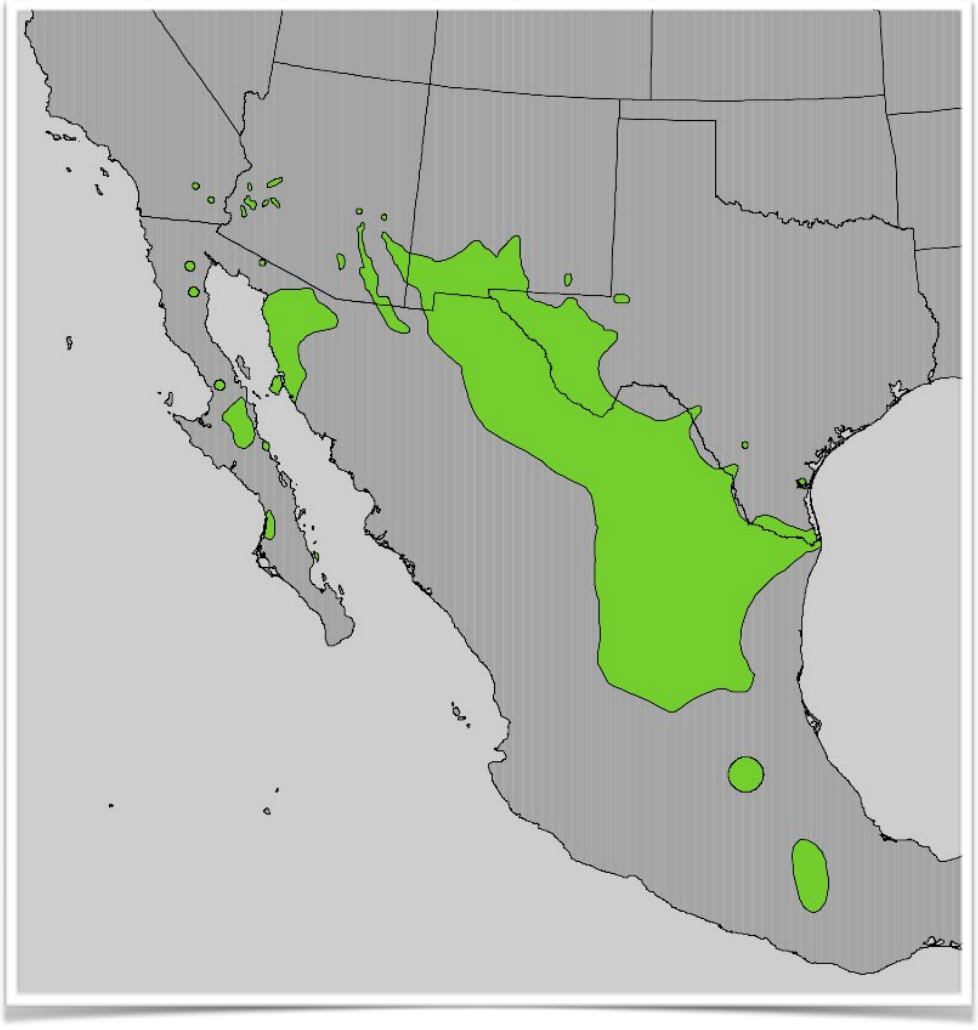
Most of the ciénaga appears to lie within the property bounds of Faywood Hot Springs. In spots there are islands of yucca and sunflower (below on August 18) "across the fence".

H. At the base of the trees we found many *Wislizenia refracta* – Spectacle Fruit, blooming in August (photo - top next page). In the US this species is found in California,

Nevada, Arizona, New Mexico, and far western Texas. In Mexico it is found in Chihuahua and Sonora.

I. In the range of the unexpected were several ***Koeberlinia spinosa var. spinosa***, Crown of Thorns, in flower (photo following page, August 18). In April, I took the photograph below on Apache Peak (Hill) just north of Lake Valley. This is

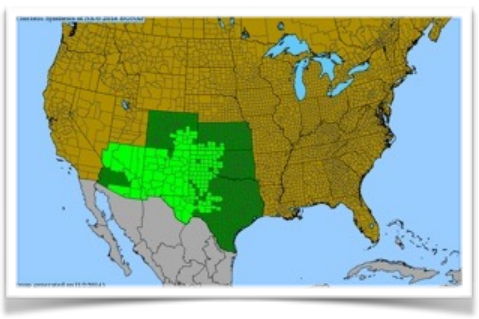
how I have grown accustomed to seeing this plant: A skeleton of stout sharp spines that you really do not wish to venture too close to, and we have that opportunity - as shown in the U.S. Geological Survey map of the range of this species (left). The range is limited, and we are at the very northern boundary.



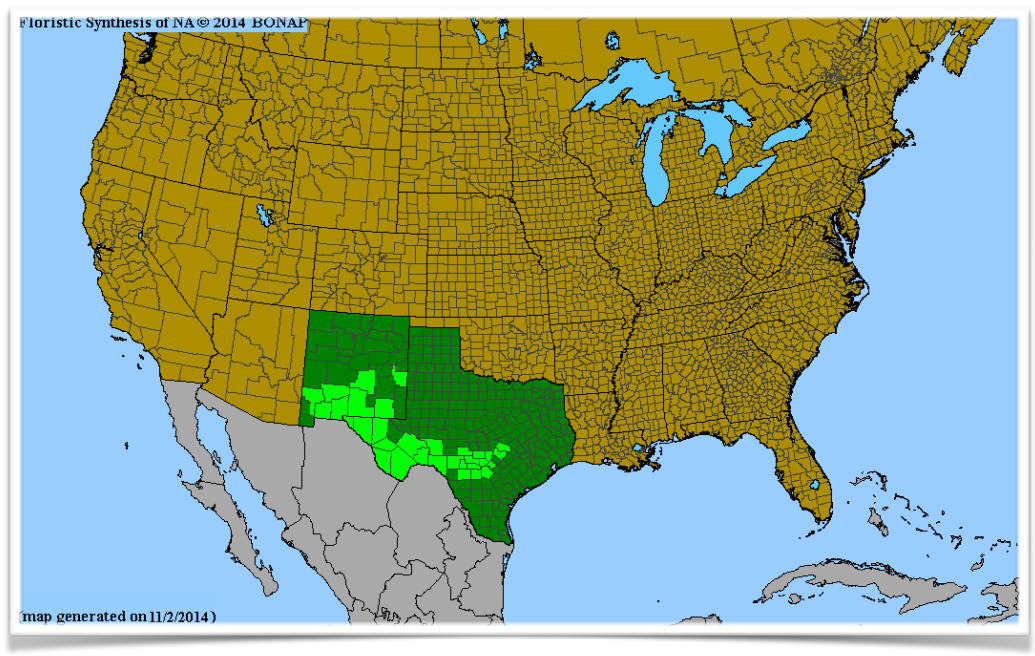
This is a rather remarkable plant. The leaves have diminished to scales, for instance. It is a tree, and most of the photosynthesis happens in the branches, thus their bright green color. Most sources consider it to be one of two species in the family Koeberliniaceae. The other, *K. holacantha* is found in Bolivia.

J. The watershed for the ciénaga is limited, but at times the rainfall can be intense and the volume of water collected by the watershed can be substantial. Small arroyos channel the water from the hillsides into the ciénaga. On August 18, the arroyos had recently been scoured, indicating that a significant amount of water had flowed through them and down into the ciénaga (photo right).

Along the banks of the arroyo there were a few of the more common plants of the area, including *Zinnia grandiflora*, Plains Zinnia, shown below right. But the fact that it is common here does not mean that the species is common world-wide. As shown in the BONAP map below, its range within the US is limited. In Mexico, it is found in the north (Chihuahua, Coahuila, Sonora, and Zacatecas).



We also found *Chrysactinia mexicana*, Damianita Daisy or simply Damianita (photograph from August 18 at the top of the following page) in the arroyo. Again, although common in our area, this species has a limited range. Its US range is shown on the BONAP map to the right. In Mexico, it ranges south of the borders with Texas and New Mexico to as far south as Puebla.



And lastly, *Eriogonum pharnaceoides*, Wirestem Wild Buckwheat, Wright's Cudweed, Slender Cudweed, was growing on the rocky banks of the arroyo in mid-August (see photo at the end of this article). Within the US, its range is restricted to New Mexico, Arizona, and S. E. Nevada. In Mexico, it is found in Chihuahua.

The bird species found along this trail are typical of the area and include Loggerhead Shrike, Black-throated Sparrow, Northern Harrier, and various wrens.

The route shown on the inside back cover does not cover the established trail exactly. The northern half of the route depicted follows an arroyo which the formal trail crosses not far from the start (or end) of the trail. The established trail is roughly 1.9 miles long. Two loops making for a 4 mile walk is easily done, and if you are a runner this is a good trail for that.

K. The photograph below was taken along the trail just before the arroyo. The light-colored rectangle just below the skyline, right of center, is the ciénega. The flora and fauna of this area are of the Chihuahuan Desert. City of Rocks State Park is at the western fringe of the area covered by the Black Range website and just barely included in the focus area of this publication.

The Ciénega Trail is a nice outing, but not at midday in June. Remember, there is no shade along this route.

the geologic formations which the spring water flows through to get to the ciénegas. The chemistry and access to primordial archaea make for an astonishing biological environment. I will not dwell on the particulars; if you have an interest, see the article.**

Here I simply want to note that the Mexicans, like their neighbors to the north, want to drain the local ciénegas to grow alfalfa and water cattle. A few quick dollars on one hand always outweighs the loss of thousands of unique life forms (which, most likely, are of huge economic import). It is the human way.

*** *Science*, 3 July 2020, Vol. 369, Issue 6499, "Improbable Oasis - Pools in the Mexican desert are a hot spot of microbial diversity - and window into early life", pp 20- 25, by Rodrigo Pérez Ortega. Map below right is from this article.**

**** *Black Range Naturalist*, Volume 2, Number 2, April 3, 2019, "Carl Woese, An Interview With Lloyd Barr", pp. 12-14.**

Footnote

1. **Wikipedia got one part of the definition wrong when it describes ciénegas as unique to the American Southwest. They are also found in northern Mexico. (See following article.)**

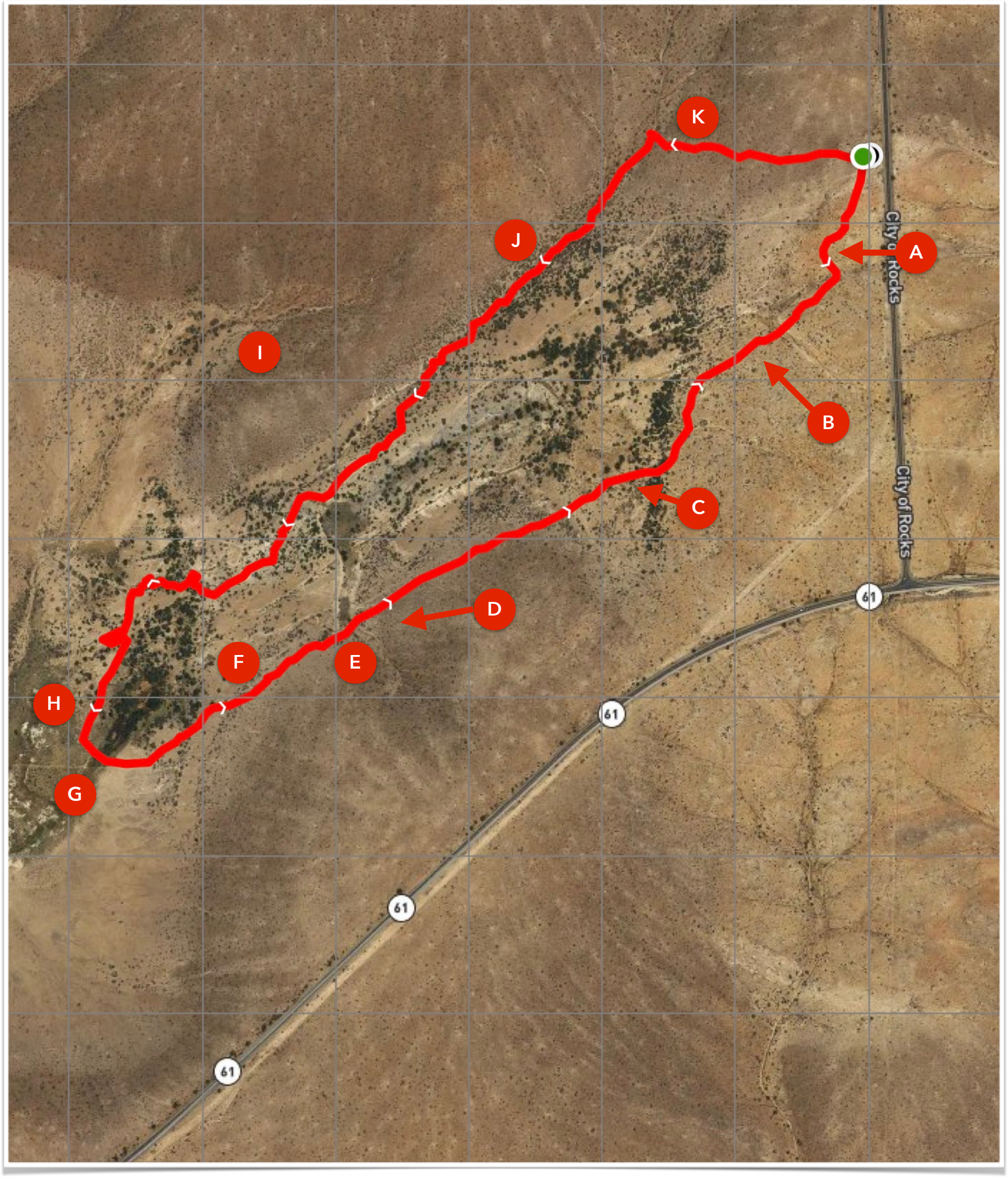
The Fate of Ciénegas

A ciénega is a feature with hydrological, biological, and geological features. So many components means that there is a lot of room for diversity.

Most of the ciénegas in the Black Range have long disappeared under the hooves of cattle. But that is not just an American, or New Mexican, phenomenon; it is true in Mexico as well.

Cuatro Ciénegas in northeastern Chihuahua may be the most biologically diverse place in the world. (Every nature show you have ever seen has someone claiming some version of "most diverse". But in this case it is probably the real thing.)*

The ciénegas of the Black Range are very different from the Cuatro Ciénegas, primarily because (it is currently thought) of



Back Cover: A drawing of M-42, the Great Nebula in Orion, by Chuck Barrett.

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