The Black Range Naturalist

Volume 4, Number 1
January 3, 2021

In This Issue

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Unattributed material is contributed by the editor.

Faunal remains from archaeology sites in southwestern New Mexico

On September 21, 2020, Karen Gust Schollmeyer and S. O. MacDonald published this work as an Occasional Paper of the Museum of Southwestern Biology, University of New Mexico. Free Download at the link. We believe this peer-reviewed paper will be of significant interest to many of you.

- Editor

Human Land Use of the Nutt Grasslands: A First Look

by Karl W. Laumbach

Abstract

The Nutt Grasslands, a landscape of grassy plain cut by drainages and bounded by desert, river and mountain, has been a definable geographic entity since the first human entry into the Southwest. Like grasslands everywhere with limited farming potential, the area has been a place of herds and predators, a place that people occasionally visit, often travel across, but rarely inhabit for long. Isolated by environmental factors from the encroaching shrubs of the Chihuahuan Desert, this land has endured the drying trend of the last 10,000 years from a unique vantage in the matrix of ecosystems that is southern New Mexico. This article will discuss the known archaeological and historical record of human activity in the Nutt Grasslands.

answers to those questions. When I started asking questions about the Nutt Grasslands I found out two things; 1) Everyone that I asked immediately recognized the area as being generally between Lake Valley and Nutt, New Mexico, and 2) No one that I asked had ever seen an actual definition of the boundaries nor had anyone written anything specific about the grasslands. So, in some ways I found myself on the "cutting edge" of research on environmental parameters of the Nutt Grasslands, which was certainly not my intention when I agreed to to this effort. As a result, instead of an article on human use of the Nutt Grasslands that is based on extensive research on the area, what follows is a synthesis of what I have been able to find out, most of it from email correspondence or conversations with ranchers, land managers, local historians, and scientists who were kind enough to share their knowledge with me. In that vein, I would like to thank Jim Winder, Rita Arnett and Trent Boykin of the Heritage Ranch Institute, Pam Smith, Tom Holcomb, Marcia Whitney and Tom Phillips of the Bureau of Land Management, Ann Welborn and Larena Miller of the Geronimo Springs Museum, and Dr. Walt Whitford, Senior Research Ecologist Emeritus, Jornada Experimental Range for their patience and help in understanding

Pronghorn, Antilocapra americana, on the Nutt Grasslands, March 17, 2017. Image not in original article.

Introduction

In the summer of 2003, Margot Wilson heard me speak in Monticello, New Mexico, and subsequently asked me if I would give a presentation on the Nutt Grasslands. I am an archaeologist by profession and, of the thirty years that I have worked in southern New Mexico, a very small amount of that time has been spent either in or around the area between Nutt and Lake Valley known locally as the "Nutt Grasslands". I could not claim any in depth knowledge of the area and in the course of preparing this article have often wondered why I agreed to do it. Having a general knowledge of both cultural and environmental change in southern New Mexico and having access to the recorded archaeological data for the area, I felt that if I could find some published data on the soils, vegetation, hydrology etc., then I would be able to cobble together something that would be meaningful and perhaps not embarrass myself too badly.

When archaeologists, or other scientists for that matter, begin a research project, they put together something called a "research design". A research design is quite simply a review of all applicable knowledge about the subject, a list of questions about things that are not known, and a plan to find out the the causal environment of the Nutt Grasslands. Much of the following discussion is based on what they believe to be the case and, as such, forms a testable model to guide field research in the area.

In preparing this, I was several times reminded of a sign by the grill in the little café located in Nutt, New Mexico. It states rather tersely that "this is not Burger King, you don't get it your way. You get it our way or you don't get it."

The Environment of the Grasslands

The first question is one of boundaries. What area should be included in the Nutt Grasslands? The foothills of the Black Range make a convenient boundary that angles in a northeasterly direction from Cookes Peak to Lake Valley. Just north of Lake Valley, Berrenda Creek forms the northern boundary as it cuts deeply into the terrace on an easterly run to the Rio Grande. The eastern boundary is defined by "ceja" or eyebrow that marks the beginning of the "breaks" or broken land of the Rio Grande escarpment. On the south, the grasslands are bordered by first the Uvas, and then, the Good Sight Mountains, although technically the Nutt Grasslands could be considered to continue south into the Uvas Valley. Once past the Good Sights, the

grasslands also continue south toward Deming. For the purposes of this discussion, I leave that boundary open, to be defined at another time. It should be noted that the grasslands do continue well into the adjacent foothills. Next comes the question of what are the distinctive characteristics of the Nutt Grasslands. The advance of the Chihuahuan Desert shrubs into the grasslands of southern New Mexico is well known and has been heavily studied. We will return to that discussion shortly. The question here is "what has prevented the Nutt Grasslands from being similarly inundated with mesquite, creosote and other intrusive elements of the Chihuahuan Desert?" I asked that question of Dr. Walt Whitford, who responded thusly: "The Nutt Grasslands that have resisted the invasion of creosote bush and mesquite are dominated by tobosa grass which is quite resistant to grazing by domestic livestock. I think that the characteristics of the dominant grass species accounts for the susceptibility of Chihuahuan Desert grasslands to damage by livestock grazing." When asked if the tobosa was more resistant to drought as well, he responded "Yes, tobosa does seem to be more drought resistant but that may be as much a function of the soil type (clay content affecting soil, water potential and soil evaporation) as the genetic characteristics of the grass." As to the antiquity of the Nutt Grasslands, data from other areas of southern New Mexico indicate that it is quite likely that the Nutt Grasslands were a pinon-juniper-oak savanna 8000 – 10,000 years ago. It is probable that the area also supported small lakes that held perennial stands of water during this period.

Pronghorn, Antilocapra americana, on the Nutt Grasslands, March 17, 2017. Cooke's Peak is in the background. Image not in original article.

Conversations with Jim Winder, a rancher with extensive holdings in the Nutt Grasslands, provided a perspective that can only be gained through living and working on the land. Like Whitford, Winder feels that it is the depth and type of the soils that nurture the grasslands. Furthermore, he pointed out that it is the gentle slope from the foothills into the flats that is key. The gradual slope of the area keeps the run-off from having great velocity. The low run-off velocity allows water born sediments to drop and soils to develop. The area has a high clay content as a result. The ever-developing deep soils hold the moisture that the gradual flow allows to percolate into the subsurface and the grasslands are supported.

Newspaper articles indicate that, in the early part of the 20th century, water could be found at a depth of 300 feet in the lower elevations of the grasslands. Currently wells require a depth of 500 feet in the low elevations but water can be found at much more shallow depths in the adjacent foothills.

Berrenda Creek, the northern boundary of the grasslands is also the last of the major Black Range drainages to flow to the Rio Grande. The next major drainage, Macho Creek, flows southwest to Osceola Draw, eventually sinking into the Mimbres Basin. Of the smaller drainages, the actual divide between the Rio Grande and the Mimbres Basin is between Ricketson Draw on the north of Round Mountain and an unnamed drainage that flows immediately south of Round Mountain. The upper part of Ricketson Draw was lush enough to be farmed for hay during the early ranching years. Water in Ricketson Draw eventually makes it to the Arroyo Cuervo and the Rio Grande while that in the unnamed drainage flows toward Nutt before taking a turn south near the Good Sight Mountains.

Despite the flow of these drainages, much of the moisture that falls directly into the Nutt Grasslands stays there, sinking into the basin's soils. This is due to the numerous playas or lakebeds like those that gave the mining town the name "Lake Valley". These were farmed in the early historic period, primarily for hay. Photographs of the

lakes, like that below, were taken by Henry Schmidt in the 1890's and are available at the NMSU library.

Image not in original article.

Besides the lakes there are lots of potholes, small sinks that hold water. These provide water for animals when filled by the summer rains, making it good cow country because it naturally spreads out the grazing. In winter, these sources of water tend to dry up, forcing animals to go to the foothill drainages. This seasonal availability of water in the grasslands would have affected human populations in the same way. Winder also stated that the grasses in the area are much more diverse than the stands of tobosa seen from the highway would indicate. While the vegetation is dominated by the tobosa, grasses included healthy stands of blue and black grama, giant sacaton, vine mesquite, bluestem, and Arizona cottontop. It is these other grasses that make the area excellent grazing in all seasons as the tobosa, lush as it appears, is only palatable to cattle when green and growing. When I commented on the herds of antelope in the area, I was told that antelope really don't like grass that much, preferring to graze on weeds and forbs. It is the open country that is the attraction for them, as it provides an opportunity to use their speed to outdistance predators.

Thus the combination of gentle slope, moisture, deep soils, and diverse grasses has combined to stand against the onslaught of the Chihuahuan Desert shrubs even in the face of heavy grazing. As Winder noted, "The Nutt Grasslands were as heavily grazed as the rest of the country. The SLC ranch ran as many as 100 head per section but the resistivity of the tobosa and the deep soils never reached the critical threshold to allow the shrubs to dominate." Mesquite plants have started, as they will, in the ruts of the old trails, but unlike the Jornada del Muerto, the mesquite has been forced to stay small and has not been able to dominate the resilient grasslands on either side.

Now to human side of this story ……..

Human Activity on the Grasslands

As most interested folks know, for years the prevalent theory for the first human entry into the Americas involved crossing the iced over Bering Strait between Asia and Alaska some 15,000 years ago. While that may still be true, both the dates and manner of arrival have been challenged in the past few years. Regardless, the first humans that we are sure were in southern New Mexico were the Clovis hunters, who arrived early enough to hunt the Colombian (wooly) mammoth before those large hairy elephants became extinct at the end of the last ice age. Following the Clovis hunters by a thousand years or so were the Folsom hunters and a thousand years after Folsom came the last hunting culture of the late Pleistocene, known as the Plano Complex. The latter two hunting cultures focused on an extinct form of bison that shared the cooler, moister climate with ground sloth, camel, dire wolves, and condors, to name a few of the 31 species that became extinct approximately 8000 years ago. Each of these cultures is considered to have been true nomads who followed the herds wherever they might roam. Occasional Clovis points are found in southern New Mexico but they are rare and actual sites with Clovis material are even more rare, although they do occur. The later Folsom and Plano materials are comparatively more common.

Artifacts from these early nomadic hunters are limited to dart points, scrapers and a few other stone tools. The extensive travel of the hunting groups allowed them to select premium stone materials from distant quarries for their tools. No grinding implements are associated, presumably because plant food was so universally available in that late Pleistocene Eden that no processing or storage was required.

Typically, these early sites are found in rolling grasslands with old lakebeds and occasional high points that served as hunting overlooks. Remember that in those times the Chihuahuan Desert had not yet invaded and the cool, moist climate allowed the Nutt Grasslands and other lowland areas in southern New Mexico to be juniper/oak/piñon savannas, a perfect hunting ground for now extinct species of large game animals.

To my knowledge only one site that can be attributed to these early hunters has been found in or near the Nutt Grasslands. That site is a Folsom period camp site with a variety of tools. Intriguingly, one of my survey crew found the base to a Folsom point in the foothills area and in the same area was found an isolated fluted point that may date to the Clovis era. The lack of known sites doesn't mean they aren't there, it just means that either we haven't looked or, more likely, that the sites are not visible due to the heavy grass cover.

Now I've alluded to environmental change, ice ages, the intrusion of the Chihuahua Desert and so on. How do we know all this? Well, there are many lines of evidence but the most telling story comes from the pack rat. Pack rats are wonderful critters, as long as they're not in your camp. Pack rats have been around for at least 20,000 years. Pack rats eat and make nests of every kind of vegetation that they can find in a 200-yard diameter from the nest location. And, they urinate in; on, and around their nest, preserving and fossilizing the plant remains. Over time, nests found in rocky areas become stratified as generation after generation of pack rats build on top of old nests. Then the trained environmental scientist can come along, carefully excavate the nests by layer, send samples of each layer to a botanist to identify the plant remains and then obtain a radiocarbon date for each layer. Because we know that the pack rat didn't range farther than 200 yards, we know that the plant remains were growing in that area. This results in dated samples of vegetation through time from one spot and a sequence of vegetation change for that area.

As a consequence we know that 8000 years ago, all the upland plant species were found at lower elevations than they are today and some species, like mesquite and creosote weren't even around. As the ice age ended, the glaciers receded and the long 10,000-year drying trend, which we are still in by the way, began. Species like Ponderosa Pine and Douglas Fir that were in the foothills, now are only in the higher elevations. The juniper, oak and piñon that were in the lowlands are now only found in the foothills and above. And so on.

With the end of the Pleistocene and the subsequent drying trend, 31 species of animals became extinct and the big game hunters lost their way of life. The next 5000 or so years of human development in the Southwest is referred to as the Archaic. The drier conditions forced human populations to adapt to a region instead of being true nomads. They exploited these regions by following a seasonal round that was adjusted to the times that resources were available. Piñons in the fall, fresh greens in lowland locations in the spring, grass seeds at the end of the summer and so on. They were still hunters but now the game was smaller and probably less plentiful.

The change in climate and adaptive strategy also forced humans to process and store plant food, leading to the use of grinding implements and baskets for storage. Stone tools continued to be used but instead of the really fine stone that was available to nomads who could travel far in search of the best stone, the regionally based groups had to make use of whatever stone material was locally available.

The Nutt Grasslands and adjacent areas would have offered a number of resources to these Archaic Period hunters. Antelope and deer were certainly present and even modern bison may have existed there. The lakebeds and potholes would have attracted migratory waterfowl. The grasses themselves would have yielded a bounty of storable seeds in good years. Stones for tools were available on three sides. To the north, outcrops of glassy gray rhyolite can be found in the Tierra Blanca and Berrenda drainages. To the south, Nutt Mountain and the Uvas Mountains provide a more varied source of workable rhyolite. And to the east, the gravels of the ancestral Rio Grande exposed in the terraces yield a wide array of workable stone, including obsidian, washed in from northern New Mexico.

Sites from this long period have been found in the Nutt Grasslands but most of them are from the later end of the period about 2000 to 3000 years ago. Like those of the Clovis and Folsom hunters, the earlier Archaic remains may be present as well but, as yet, they have not been found. Not that anyone has looked very hard.

About 4000 years ago, the drying trend brought the first plants of the Chihuahuan Desert into southern New Mexico, mesquite and creosote in particular. At about 2200 years ago, right at the end of the Archaic period, a particularly severe drying trend dramatically increased the desert scrub community. This may have been the first real challenge to the sanctity of the Nutt Grasslands. By this time the piñon, juniper and oak had retreated upslope and the grasslands looked much as they do today.

Karl Laumbach developed this article in a different time and for a different purpose. He has kindly allowed us to reprint it here. His original material continued with a discussion of the human culture following the Archaic. Interesting stuff but outside the scope of this publication.

Our seasonal monsoons were looked forward to during the periods discussed above as much as they are today. Monsoon over the Nutt Grasslands, Cooke's Peak to the left. Photograph not in the original material.

A Guide to Moths of the Gila by Ron Parry

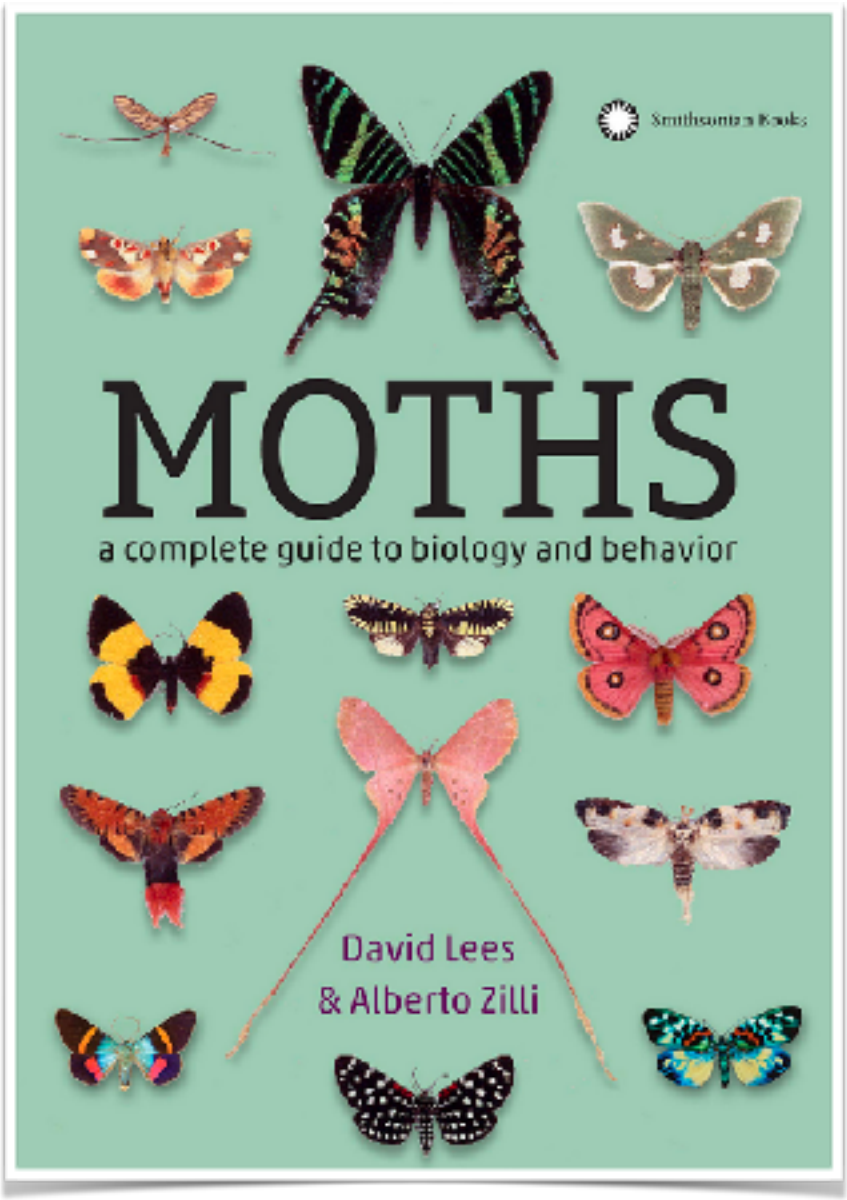
I imagine many people have left a porch light on overnight and returned the next morning to find a large number of intriguing insects on the wall near the light. A closer inspection would probably show that most of those insects were moths. If you've had that experience, wondered about the names of some of those moths, and live in Southwestern New Mexico, I may be able to help you identify them. But first let me provide you with some background information.

My name is Ron Parry. I grew up in Los Angeles. When I was young, our house had a long porch at the front with a light that was on nearly every night during the summer. I developed the habit of checking on the insects that came to that light since I found them fascinating. At that time, I thought I wanted to be a scientist, but I wasn't certain which area of science attracted me the most. I read Ralph Buchsbaum's "Animals Without Backbones," and briefly thought I might study invertebrate zoology. I also had an inexpensive microscope and enjoyed looking at all the strange organisms in pond water. Every spring following a wet winter in Southern California, the hills displayed a beautiful array of wildflowers, so I became attracted to botany as well. As fate would have it, my direction was finally decided when I received a chemistry set from my parents one Christmas morning. I quickly developed a passion for chemistry that eventually led me to a Ph.D. in organic chemistry. But I never forgot my love for biology, so my academic career focused on the biochemistry of plants and microorganisms. When I retired from Rice University after thirty-four years of teaching and research, I decided to take up some kind of hobby that involved biology. Since I was living part-time in Southwestern New Mexico, a biologist friend suggested that I look at the summer courses offered by the Southwestern Research Station in Portal, Arizona. I already had an interest in butterflies, so I took the Lepidoptera course at the Station during the Summer of 2011. I found Lepidoptera so interesting that I quickly decided to begin studying the Lepidoptera of the Gila region.

Lepidoptera are the second largest order of insects after the beetles (Coleoptera). The Lepidopteran life cycle involves a complete metamorphosis that proceeds through four stages: it begins with an egg from which a larva (caterpillar) emerges, the larva feeds until it becomes a pupa, and an adult emerges from the pupa. The larvae generally consume plant material, but there is considerable variation in larval diets. Caterpillars are highly

UV Lamp and Sheet - Moths are attracted to the light and settle on the sheet.

diverse in their appearance and lifestyles, and there is much to be learned about their biology[1]. Both butterflies and moths are Lepidoptera. The major difference between the two is that butterflies usually fly during the daytime (diurnal), while most moths fly at night (nocturnal). While many people love butterflies, moths are relatively neglected by amateur naturalists. The number of moth species greatly exceeds the number of butterflies, and moths have generally been less studied than butterflies. For this reason, I've focused my attention on moths. About 160,000 species of Lepidoptera have been described[2]. While this is an impressive number, there are still many undescribed moth species even within the United States. The scientific study of Lepidoptera requires careful documentation. Specimens must be collected, pinned, and spread. Each specimen must be carefully labeled with information showing the date and precise location where it was collected. In some cases, dissections to examine the genitalia of a specimen must be carried out in order to obtain an identification. This is the protocol I have followed.



My interests in Lepidoptera are broad. They include Lepidopteran ecology, the seasonal variations in Lepidopteran life cycles (phenology), and the preservation of Lepidopteran biodiversity. As most people are aware, the planet is in the midst of a human-caused, mass extinction. Recent investigations have shown that the size of many insect populations has decreased dramatically over the preceding half century. The causes for these declines include habitat fragmentation and climate change. In these circumstances, it is important to increase public awareness of the complex and beautiful insect biodiversity that is being threatened since "we will not fight to save what we do not love" (Stephen Jay Gould). For this reason, I decided to photograph each moth specimen I identified and create a website that displays the photos to stimulate interest in moths and help other naturalists identify the moths of the Gila.

The website is called "Southwestern Moths," and the URL is "southwesternmoths.com." It currently displays photos for approximately 600 species of moths collected in the Gila region, and, on separate pages, some moths that were collected in the Texas Hill country. The photos are listed numerically by Hodges number. Ronald Hodges was a distinguished lepidopterist who created a checklist of all known, North American moth species in 1983. There have been many changes in moth taxonomy and discoveries of new moth species since Hodges created his checklist, but his numbering system is still a useful way to organize data such as moth photos. The legend for each moth photo on my website shows the Hodges number, provides the Latin name of each species, and lists a common name if there is one. In addition, the legend lists the date and collection location as well as the identity of the larval food plant if that is known. Most of the moths that are illustrated were collected by using a mercury vapor lamp as a source of UV light in combination with a white sheet to reflect the light. Some moth species that are diurnal were collected with a net. A separate page on the website provides a list of all the moth species illustrated on the website organized by Hodges number. Another website page provides a list of internet links to other moth websites that can be useful for moth identification. The most important of these websites is called "The Moth Photographers Group (MPG)." It displays photos of moths from the entirety of North America. I recommend it to anyone interested in our moth fauna[3].

Happy mothing!

Notes

1. While there is currently no text that surveys the caterpillars of the Western United States, an excellent book is available for the Eastern U.S.: D. L. Wagner, Caterpillars of Eastern North America. A Guide to Identification and Natural History, Princeton University Press, 2005.

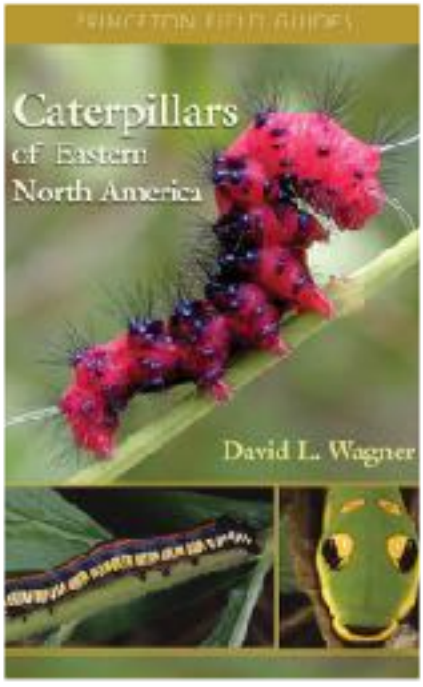
A portable light trap, note the alligator claps at the lower left of the photo. Such units are often powered by car batteries or in some cases, special purpose batteries.

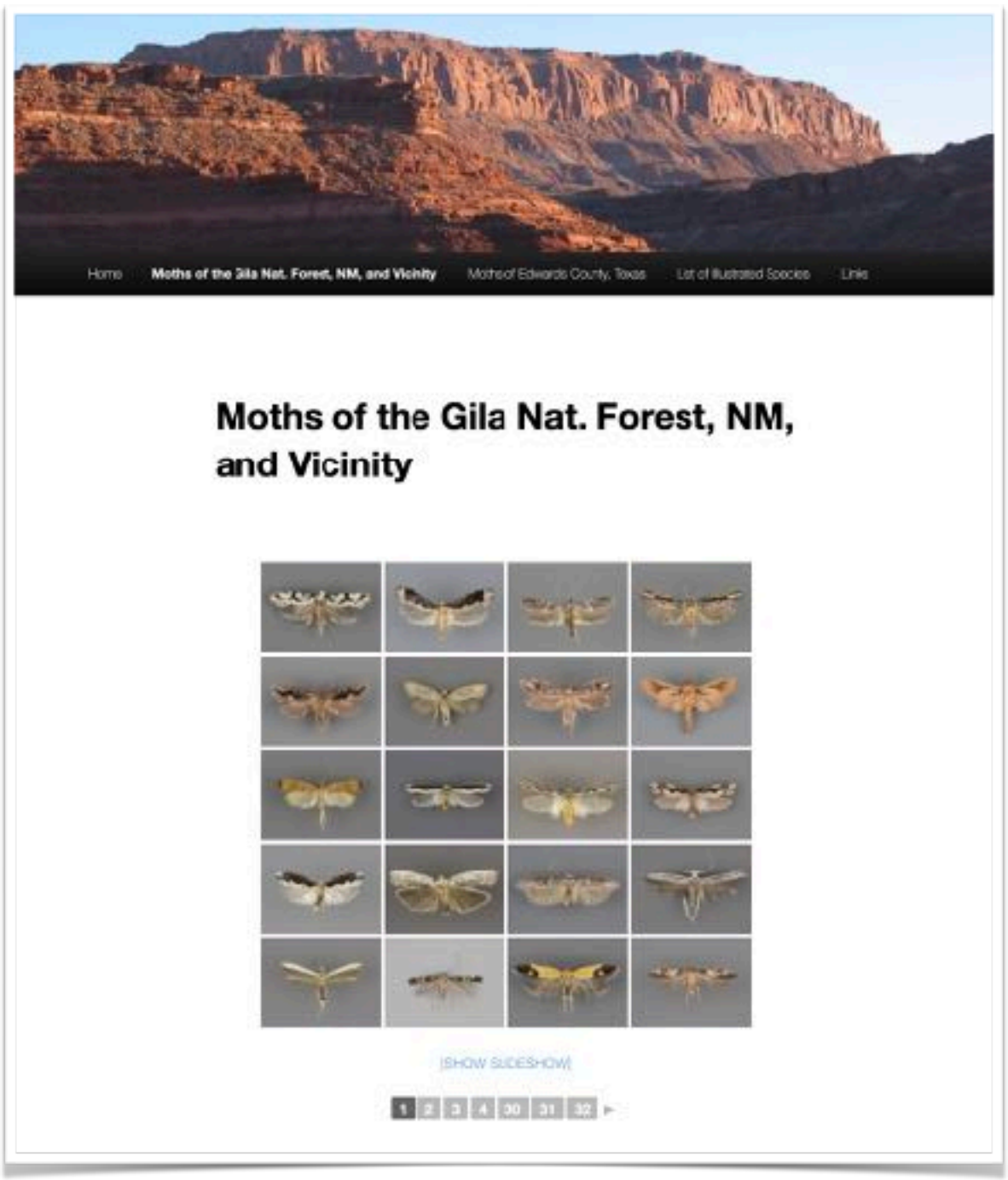
2. For an excellent introduction to moth biology, see: David Lees and Alberto Zilli, Moths: A Complete Guide to Biology and Behavior, Smithsonian Books, 2019.

3. The MPG site provides geographical data for the species it displays as well as the ability to search for moths in a specific geographical region of North America. Since the geographical data for many moths is incomplete, I strongly recommend that anyone using the MPG site search the entirety of North America rather than a specific region. Regional searches are likely to miss species due to incomplete data.

Southwestern Moths Website

- **Don't overlook the links page - lots of resources identified**
- **Species images often include information about host plants**
- **Moth caterpillars are an important food source for birds**





The first page of the section on the Moths of the Gila National Forest, NM and Vicinity - Southwestern Moths Website..

Penstemon spinulosus - Wooton and Standley: New Mexico Endemic, Error, or Introduction?

by John P. Hubbard

Penstemon spinulosus **was described by Wooton and Standley (1913) on the basis of a George R. Vasey specimen (U.S. National Herbarium no. 156865), which was said to have been collected in June 1881 in the Magdalena Mountains, Socorro County, New Mexico. Since its description, this taxon has been variously treated – including as a full species (e.g., Wooton and Standley op. cit., 1915; a sub-species of *P. heterophyllus* Lindl. Keck 1932, Lodewick and Lodewick 1987; and a synonym of *P. bridgesii* Gray [= *P. rostriflorus* Kellogg] Tidestrom and Kittell 1941, Martin and Hutchins 1981, Roalson and Allred 1995). In other instances, its existence as a New Mexico taxon has either been overlooked/ignored (e.g., Nisbet and Jackson 1960; Kartesz 1998) or disputed (Bleakly 1998), assuming the latter's rejection of *P. heterophyllus* as a member of that flora actually refers to *P. spinulosus* -- treated as a subspecies of that species. Given this range of opinions, a status review of this taxon would seem in order – if for no other reason than to summarize and update what is known about *Penstemon spinulosus* for people interested in the plants of New Mexico.**

In describing *Penstemon spinulosus*, Wooton and Standley (1913) gave the following diagnosis: "Stems slender, ascending, 20 to 30 cm. high, purplish, minutely puberulent; leaves linear-oblanceolate to linear-lanceolate, numerous, obtuse or acute, slightly reduced upward, glabrous, narrowed at the base to sessile, 5 cm. long or less; bracts linear-lanceolate, 1 to 2 cm. long; inflorescence few-flowered; pedicels short, stout; sepals 7 mm. high, the lobes lanceolate, rather abruptly acuminate, not scarious, glabrous, the tips spreading; corolla 3 cm. long, dilated in the throat, not bearded, the spreading limbs 2 cm. wide; stamens included; anthers sagittate, dehiscent for half their length, finely spinulose along the sutures." They also stated that "This is more closely related to *P. bridgesii* than to any other southwestern species, but it may be separated by the glabrous instead of glandular inflorescence and the much dilated corolla tube. Whether the corollas are red as in that species cannot be told from the faded dried specimens." Although not stated as such, the basis for this presumed relationship undoubtedly had to do with the means by which the anthers open (dehisce) to disperse pollen in these two species. In both, dehiscence occurs via a short suture, slit, or orifice across the connective, with the free tips of the anthers remaining closed (e.g., Nisbet and Jackson 1960). By contrast, in other New Mexico penstemons the anthers open from the free tips all or part way to the connective region. Incidentally, I assume that Wooton and Standley (op. cit.) selected the name *spinulosus* for this taxon because of the spines along this suture, as quoted above.

As far as I am aware, the next serious taxonomic treatment of *Penstemon spinulosus* following its description was by David D. Keck (1932), in the first of a series of landmark papers on the genus published through 1945. In the former, he accepted *spinulosus* as a valid taxon, but assigned it subspecific status under *Penstemon heterophyllus* Lindl. of California. This determination was based on his study of the type specimen, which he cited as being from the Santa Magdalena Mountains of New Mexico. In discussing his findings, Keck (op. cit.: 410) indicated that *spinulosus* was most like *P. h. ssp. purdyi* Keck of central and northern California, but differing in having the "[spines] margining [the] orifice of the anthers stout, subulate, often curved, [and] as much as 0.40 mm long." He further stated (op. cit.: 410 and 413) that "cannot be said that *spinulosus* has any discernible strong morphological characters on which to stand. But it should be recalled that the only known collection came from a little-frequented portion of New Mexico so many years ago that it would seem certainly to be native to that region rather than an introduction by man. The type specimen is well faded and scarcely complete enough to assure a complete comparison with *purdyi*. [However,] no California collection has been observed to have anthers directly comparable to those of *spinulosus*, so that the differences which at first appear trivial seem to be definite. Other characters have failed to disclose themselves but may be noted when the subspecies is recollected in New Mexico. Apparently this is a migrant from California at an early time when the desert region was a less imposing barrier to such a migration. At all events, *spinulosus* connects definitely with *[P.] heterophyllus* of California, rather than with any of the Utah or Great Basin species of the Section [*Saccanthera*]."

Although my review is not exhaustive, Keck's views on the taxonomic status of *Penstemon spinulosus* have apparently been accepted by most serious students of this genus. For example, in the most recent American Penstemon Society checklist (Lodewick and Lodewick 1987), *spinulosus* is listed as one of four accepted subspecies of *Penstemon heterophyllus* – the others being restricted to California. However, for reasons that are not clear to me, Nisbet and Jackson (1960) made no mention of *spinulosus* in their monumental treatise on the penstemons of New Mexico. It is difficult to believe they overlooked it, for it certainly would have been noted in consulting Wooton and Standley (1913, 1915) during the course of their study. Perhaps instead they assumed that the taxon was described from an erroneously labelled specimen, i.e., one that had come from California rather than New Mexico. In fact, F.S. Crosswhite (pers. comm., Sep. 30, 1984) indicated to me that Keck may have later concluded this himself – although I have not found such a conclusion in print. Later works on New Mexico plants by Tidestrom and Kittell (1941), Martin and Hutchins (1981), and Roalson and Allred (1995) did treat *Penstemon spinulosus*, although all placed it in the synonym of *P. bridgesii* Gray [= *P. rostriflorus* Kellogg]. I suspect this resulted from oversight rather than any disagreement with views expressed by Keck (1932), for these two taxa have little in common beyond the way their anthers dehisce. Finally, in a publication I have not seen (i.e., U.S.D.A. 1994--or is it 1997?), *P. heterophyllus* is listed as a

This article was initially published in The New Mexico Botanist Number 12:1-4, July 6, 1999, and then reprinted in the Bulletin of the American Penstemon Society Volume 60(2): 31-40, 2001. Except for the correction of one typographical error (see below), the present PDF version (issued on December 28, 2010) contains the verbatim text of the original 1999 publication – although the latter's pagination and formatting have not been retained. The error referred to above is the word "fora" in the "Literature Cited" entry for "Tidestrom, I. and T. Kittell. 1941. " for which corrected "flora" has been inserted in this printing. – John P. Hubbard

New Mexico species – presumably based on Keck's (op. cit.) inclusion of *spinulosus* in that species. However, Bleakly (1998) rejects *heterophyllus* as a New Mexico species, whether the name is applied to the California species (as discussed above) or the Utah endemic *P. sepalulus* A. Nels. (of which he regards *heterophyllus* S. Wats. as a synonym; however, Lodewick and Lodewick [1987] consider the latter synonymous with *P. azureus* Benth. of Oregon and California).

Based on what is now known, I believe Keck's (1932) taxonomic assessment of *Penstemon spinulosus* is fundamentally correct – notably that this taxon is so similar to *P. heterophyllus* Lindl. as to be conspecific and thus included under that older name. As to whether *spinulosus* is a valid subspecies, it should be recalled that Keck found this taxon to differ in only minor degree from *Penstemon heterophyllus ssp. purdyi*. In addition, *spinulosus* apparently remains known only from the unique type, which means its distinguishing characteristics rest on a single collection. As such, these could represent individual variation rather than the characteristics of an entire population. Thus, it seems safe to say that the infraspecific status of *spinulosus* is less certain than that at the species level. Beyond this, it should be empahsized that except for *spinulosus, P. heterophyllus* is otherwise a strict endemic of California. There, it occupies an area extending from the southwestern to northwestern sections of the state (west of the Sierra Nevada), with an elevational range of 50 to 1600 m (Kartesz 1998). (It seems likely the species would also occur in northwestern Baja California, based on the availability of seemingly habitat there.)

Given the species' distributional metropolis in California, the authenticity of alleged New Mexico specimen of *Penstemon heterophyllus* is certainly open to question – even if it does represent a distinct subspecies. Not only has *spinulosus* never been recollected, but *P. heterophyllus* is not known to occur in Arizona (Kearney and Peebles 1960) or even most of eastern California (Kartesz op. cit.). Surely, if the species were indeed relictual in western New Mexico (as presumed by Keck 1932), one would expect at least scattered populations in the intervening area. In fact, a number of penstemons do display such a distribution, including *P. rostriflorus* , *P. eatonii* Gray, and *P. pseudospectabilis* M.E. Jones – which reach their eastern limits in western New Mexico. It should also be noted that *P. heterophyllus* is a member of the Section *Saccanthera* of the genus *Penstemon*, which contains 18-20 species found primarily in California and the Great Basin – with none in Arizona and only *P. heterophyllus ssp. spinulosus* allegedly from New Mexico (Lodewick and Lodewick 1987, Kartesz 1998). Taken together, this body of evidence suggests that regardless of its subspecific validity, it seems unlikely the type of *spinulosus* actually came from New Mexico. As a consequence, the most likely explanation for the record is that the specimen was indeed mislabelled – having actually been taken in California rather than New Mexico.

As indicated earlier, the collector of the type of *spinulosus* was George R. Vasey (1822-1893), a respected botanist especially known for his studies of North American grasses (e.g., Vasey [and Richardson] 1889). As for his collecting plants in New Mexico, there is no question that he indeed did so between May and September 1881 (e.g., Wooton and Standley 1913). In fact, in addition to *Penstemon spinulosus*, that material also provided types for seven other plants described by Wooton and Standley

One of the Penstemons of the Black Range, P. fendleri - photograph not in the original article.

(op. cit.). Moreover, additional (specimens) of his 1881 collections were cited by those authors in discussing distribution in other New Mexico plants, including from Socorro and the Magdalena Mountains (Socorro Co.), Gorieta (Santa Fe Co.), and the Organ Mountains (Doña Ana Co.). Except for the type of *spinulosus*, I find no case in which Vasey's collection localities are

at variance with those now known for plants in the state. Illustrative of this are other penstemons he collected there in 1881, of which I examined specimens of six species and subspecies (plus one hybrid) at the U.S. National Herbarium in 1991. These included material from what Vasey called "Santa Magdalena Mountain", namely a specimen of *P. jamesii ssp. ophianthus* (Penn.) Keck and another of the hybrid *P. thurberi* Torr. X *P. ambiguus* Torr. The latter bore the additional term "plain" after the locality, no doubt in reference to grasslands north of the Magdalenas – where such a population was later studied by Nisbet and Jackson (1960).

Although suggestive, the above obviously does not preclude the possibility that Vasey incorrectly labelled some of the New Mexico plants he collected in 1881, most notably in the case of the type of *Penstemon spinulosus*. The fact is that virtually all collectors occasionally mislabel specimens, and quite likely Vasey was no exception to this rule. In fact, other evidence might do more to advance this possibility, such as a revelation that Vasey was a chronic mislabeler of specimens, or that some of his 1881 material became intermixed with other collections. On the other hand, in the absence of such findings and given that Vasey did indeed collect plants in the Magdalenas that year, it is possible he actually did secure the type of *spinulosus* there. If so, this would fit Keck's (1932) perception of this taxon as a naturally-occurring population of *P. heterophyllus*, as disjunct from others in California as it might be. However, another possibility is that the Magdalenas occurrence of this species resulted from an introduction by 19th-century humans. While Keck (1932) believed the early date of collection mitigated against *Penstemon heterophyllus* having been introduced into the Magdalenas, he may have underestimated the potential for this to have occurred. While there were certainly no easy means of transit or large-scale human movements from California to the Magdalena region as of 1881, horseback and wagon travel by a select few was another matter. For example, prospectors, miners, and their ilk had been moving about the western U.S. since the 1840-1850's searching for mineral riches, and that travel was certainly not limited to an east-to-west direction. In fact, Stanley (1973) wrote that "soldiers from California stationed in New Mexico during the Civil War made unsuccessful efforts to locate gold, silver, [and] copper [in the Magdalena Mountains] – which would have been 15-20 years before Vasey's visit.

One of the Penstemons of the Black Range, P. barbatus - photograph not in the original article.

By 1866, a promising mineral discovery had been made in the range, and an 1879 boom led by silver and then zinc resulted in the establishment of the mining town of Kelly (Julyan 1996). Miners and others flocked to the area from a variety of places, including California. By the beginning of 1880, at least 200 people were working in the area (Stanley op. cit.), and the population of Kelly eventually reached 3000 (Julyan op. cit.). Given these events, it is conceivable that seeds of *P. heterophyllus* could have found their way into wagons or packs in California, then been transported to establish a population of this species in the Magdalena Mountains. If this produced even a temporary population of the species there, Vasey could have collected specimens and never had an inkling the occurrence was anything out of the ordinary.

If 19th century humans indeed brought *Penstemon heterophyllus* from California into the Magdalena Mountains, this would constitute the earliest introduction of a non-native penstemon into the wild in New Mexico. However, it would not be the only or last such instance, and in fact the process may be escalating – as discussed below. Among other likely examples was a population of *P. palmeri* Gray documented by Nisbet and Jackson (1960) in 1959, growing along U.S. Highway 66, some 70 miles east of Albuquerque in the Pedernal Hills, Torrance County. This occurrence represented the first confirmed state record of this species, but even earlier there may may have been a population in eastern Santa Fe County. The latter was along the Santa Fe Trail east of Santa Fe and were pointed out to me in the 1980's by a longtime resident (and wildflower enthusiast) – who said the species had been there for decades and had not been planted by anyone to his knowledge. In both cases, the New Mexico "colonies" were some 300 miles east of central Arizona, the nearest place where natural populations of the species occur (Kearny and Peebles 1960). Another obvious introduction is that of *P. cobaea* Nutt. of the humid southern Great Plains and vicinity, wild populations of which has been found 150 or more miles to the west in Sandoval, Taos, and Santa Fe counties (occurrences in Quay County might represent a natural population). These records date from the 1970's and 1980's, which coincides with rising local popularity of penstemons as cultivated plants – a factor that obviously increases the potential for non-native species to spread into the wild. (An even earlier arrival of this species at Flagstaff, Arizona led to the collection of what became the type for *P. hansonii* A. Nels. [Kearney and Peebles 1960]!). Finally, road and highway departments have also become agents in the extralimital dispersal of penstemons, namely through the inclusion of the seeds in mixes broadcast to stabilize and beautify transportation corridors. For example, there are several collections of *P. strictus* Benth. from along roadways in Catron and Grant counties, where this Rocky Mountain species is certainly not native and was unknown in the wild before the 1970's.

Of the three scenarios discussed here, mislabelling is admittedly the most plausible explanation for the alleged occurrence of *Penstemon heterophyllus* in New Mexico's Magdalena Mountains in 1881. While this scenario may not be supported by evidence presented here, it certainly deserves further examination – including along a number of additional avenues of inquiry. For example, if Vasey kept a catalog, journal, and/or notes, these might contain some indication of whether he indeed collected this penstemon in New Mexico. In addition, a comparison of the type of *spinulosus* with other Vasey material might also prove useful, including to confirm this was indeed one of his specimens. Yet other insights might be gained from examination of the U.S. National Herbarium catalog, such as determining when, by whom, and other details concerning the accessioning of the type into that collection. In the case of the date, this obviously could have been any time after the type was collected (1881) and before *spinulosus* was described (1913). It may be the longer it took to accession the specimen, perhaps the more likely it may have been mislabelled. As for Vasey himself, it would be interesting to know when and if he ever collected plants within the range of *P. heterophyllus* – especially prior to the accession date of the type of *spinulosus*.

Clearly, if evidence emerges suggesting the type of *Penstemon heterophyllus ssp. spinulosus* did not come from New Mexico, then the taxon should be deleted from the flora of the state. However, if such is not forthcoming, then the possibility will

One of the Penstemons of the Black Range, P. virgatus - photograph not in the original article.

remain that the record is valid on its face – which means the type could have indeed originated in New Mexico. Given this, what factors might help determine whether this represents a relictual or an introduced population? As indicated earlier, although Keck (1932) found only minor differences between *spinulosus* and other *P. heterophyllus* populations, he considered these adequate to accord the former subspecific status. However, a restudy of specimens might provide new insights into geographic variation in this complex, with particular emphasis applied to the anther characters used by Keck to distinguish *spinulosus*. Once completed, two possible outcomes might result – the first showing that *spinulosus* characters are also present in California populations of *P. heterophyllus*, and the second that they are not. If the characters hold up, this would support Keck's perception of *spinulosus* as a relictual population of this species. If they do not, this would argue for "*spinulosus*" resulting from a recent introduction of *P. heterophyllus* into New Mexico (or a mislabelled collection). However, a possible complication is that some characters in this complex may vary ecotypically, e.g., the teeth around the anther sutures could be better developed in plants growing in more arid areas. If this were the case, then a population of *P. heterophyllus* in the Magdalenas could prove divergent but still be introduced!

My point is that no guarantee exists that further study will fully resolve questions concerning the origin of the type and thus the status of *Penstemon heterophyllus* ssp. *spinulosus* (Wooton and Standley) Keck. Thus, one may still end up having to choose among scenarios in seeking such resolution, which could then decide this taxon's place in the state's flora. Whatever the choice, hopefully it will be arrived at through the broadest and most objective approach possible, rather than subjective or arbitrary judgment. No taxon deserves the latter treatment, even though this has been the fate of *Penstemon spinulosus* by dent of its being ignored, incorrectly synonymized, or dismissed because of doubts about its legitimacy as a member of New Mexico's flora. Indeed, until and even after its status is resolved, both the type and the taxon it spawned should continue to be matters of interest – if not attention – for New Mexico botanists. After all, the process of determining the status and relationships of living organisms is ongoing, and today's dictum may be tomorrow's erroneous conclusion. If anyone doubts this, a case in point is *Penstemon metcalfei* Wooton and Standley, a taxon described from the Black Range and long relegated to the synonymy of *P. whippleanus* Gray (e.g., Keck 1945). Quite to the contrary, Todsen (1998) has shown that *P. metcalfei* is in fact a distinctive member of the *Oliganthi* alliance, which in New Mexico consists of four other nominal species (Crosswhite 1965). Oddly enough, no member of this group had previously been reported from the Black Range, and now we can see why! Who knows? Perhaps further inquiry will be equally revealing in the case of *Penstemon heterophyllus* ssp. *spinulosus*, which certainly populates New Mexico's botanical archives – if not a site somewhere in the wild.

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Antlions

As a boy I was fascinating by the antlion funnels I found in loose sand. The idea that there was a creature hiding at the bottom of the pit waiting for an ant to slip down the slope was full of mystery. A mystery exploded into stark realization by the swiftness of the take.

The study of antlion pits has been a continual source of scientific papers and has yielded significant economic benefits.

One of these recent studies had an unexpected finding. On earth, creatures feed on others and they in turn are fed on, true for antlions as well as other species. Antlions, when they encounter a predator, will "play dead", and the length of the time that they "play dead" varies ("*Post-contact immobility and half-lives that save lives*" by Sendova-Franks, Worley, and Franks, Proceedings of the Royal Society B (Biological Sciences), 8 July 2020). Apparently the variability of the "dead time" confuses would-be predators.

Adult Antlion, Brachynemurus ferox, photographed in the Black Range (Dry Creek, just west of Kingston).

$117,000,000 (USD) per mile

The ecosystems of the Black Range are an extension of those found in northern Mexico, the desert of Chihuahua and the Sierra Madre. More evidence of that obvious fact was documented by Bryan Calk, Jonathan Batkin, John Gorey, and others on 29 September 2020 when they observed Eared Quetzal (Trogon), *Euptitotis neoxenus*, north of Pinos Altos - not far from the western boundary of the Black Range. The Sky Island Alliance's Border Wildlife Study captures the shared diversity of this area and our own.

The free flow of species across the international boundary is essential to the viability of the species which inhabit this ecological zone. The National Wildlife Refuge Association continues to report disturbing news from the border. Not only are unique springs being destroyed to make cement for a border wall motivated solely by political interests but Guadalupe Canyon - a premier ecological area on the border - is being damaged severely.

The Birding Community E-Bulletin, October 2020 (available at the National Wildlife Refuge Association website) - you may join the direct distribution list for the E-Bulletin at this link reported the following:

"Guadalupe Canyon, in southeastern Arizona and southwestern New Mexico, is being torn apart by the construction of the border wall. This very rugged and remote canyon rises in New Mexico and cuts across the southeastern corner of Arizona, before meandering south into Mexico.

It is an impressive stronghold for such species as Violet-crowned Hummingbird, Gray Hawk, Thick-billed Kingbird, Northern Beardless-Tyrannulet, and Varied Bunting. Other species of interest and localized to southwest New Mexico and southeast Arizona are Elf Owl, Gila Woodpecker, Dusky-capped and Brown-crested Flycatcher, Mexican Jay, Bridled Titmouse, Verdin, Phainopepla, Lucy's Warbler, and Hooded Oriole. In addition, the New Mexico portion of the canyon - an Important Bird Area (IBA) - holds that state's only breeding populations of Black-capped Gnatcatcher and Rufous-winged Sparrow.

The canyon has also been given high-priority status by the U.S. Forest Service (the Guadalupe Canyon Zoological and Botanical Area) and the Bureau of Land Management (the Guadalupe Canyon Area of Critical Environmental Concern). It is also designated as a globally Important Bird Area by BirdLife International.

A construction company has been engaged in blasting and bulldozing the canyon and adjacent uplands since at least the start of September, in an attempt to install the border wall. This is resulting in the destruction of one of the region's natural treasures and vital habitat for unique southwestern species.

It has been estimated that this short 4.7-mile section of the border wall would be the most expensive segment of wall built to date. Using funds from the Department of the Defense, the initial cost is $111.7 million per mile, totaling $524,000,000. The cost could also reach as much as $170 million per mile in some steep terrain. In short, this proposed wall segment would cost American taxpayers an enormous amount of money for a project of no perceptible value and enormous destruction.

Security is already achieved by a combination of Normandy barricades and remote surveillance. And any needed additional security can be achieved through new surveillance towers without any road infrastructure or wall.

Moreover, information suggests that very few policing apprehensions have occurred in the area precisely because of the formidable landscape, thus raising the question of the rationale for the wall there in the first place."

The Office of the Inspector General for the Department of Homeland Security has reported on irregularities associated with these activities and that "Customs and Border Protection has not demonstrated acquisition Capabilities Needed to Secure the Southern Border" (OIG-20-52). In its report it stated:

"What We Found: U.S. Customs and Border Protection (CBP) has not demonstrated the acquisition capabilities needed to execute the Analyze/Select Phase of the Wall Acquisition Program effectively. Specifically, CBP: did not conduct an Analysis of Alternatives to assess and select the most effective, appropriate, and affordable solutions to obtain operational control of the southern border as directed, but instead relied on prior outdated border solutions to identify materiel alternatives for meeting its mission requirement; and did not use a sound, well-documented methodology to identify and prioritize investments in areas along the border that would best benefit from physical barriers. The Department also did not complete the required plan to execute the strategy to obtain and maintain control of the southern border, as required by its Comprehensive Southern Border Security Study and Strategy. Without an Analysis of Alternatives, a documented and reliable prioritization process, or a plan, the likelihood that CBP will be able to obtain and maintain complete operational control of the southern border with mission effective, appropriate, and affordable solutions is diminished."

Office of Inspector General
Department of Homeland Security
July 14, 2020"

Two New Books

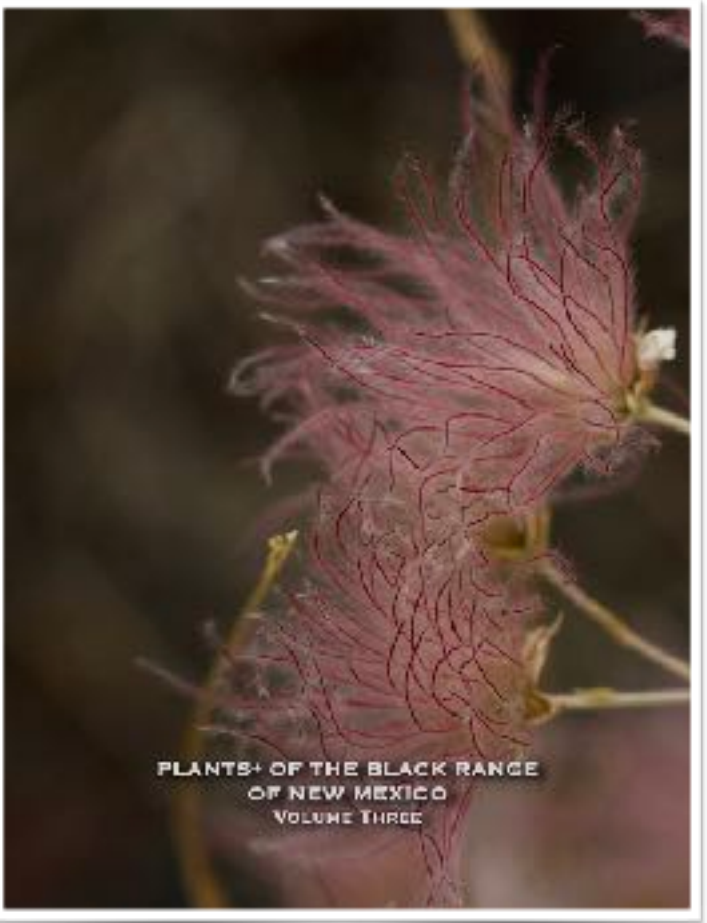
The Black Range Website released two new books during the last quarter; Volume 3 of Plants+ of the Black Range and Volume 2 of the second edition of Walks in the Black Range.

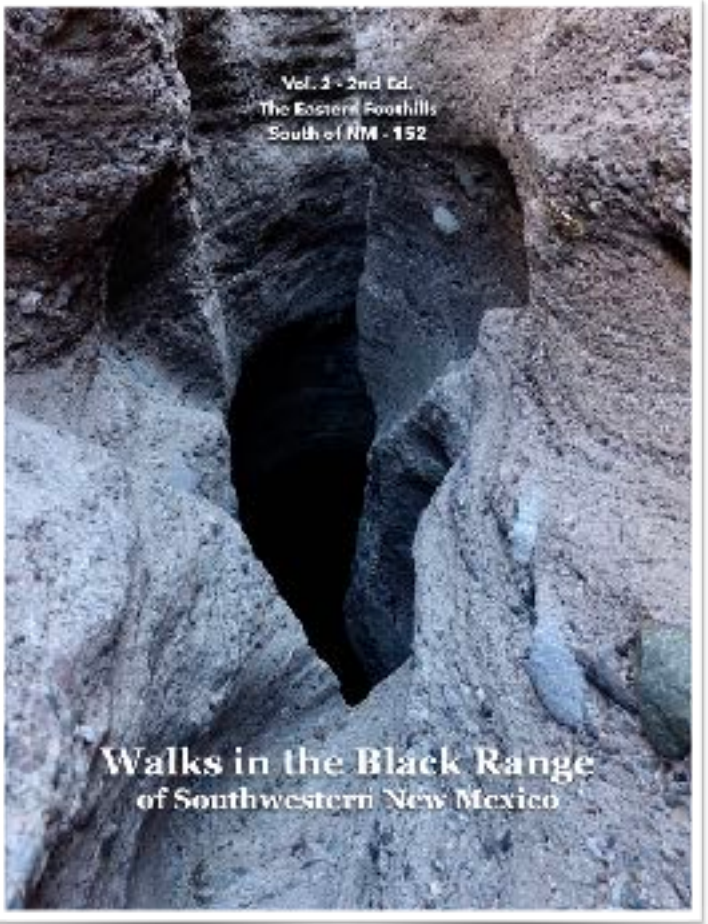
Volume 3 of Plants+ of the Black Range **lists the plant (and a few lichen, algae, etc.) species which have been recorded in the Black Range. It was released at the end of November. The material is arranged in alphabetical order by English common name. Since some species are known by more than one English common name there are sometimes multiple entries for a species. In addition to the common name, the species family is listed as is the Latin binomial name of the species. Links are provided to websites with additional information as well as to the photo galleries of the Black Range Website.**

The second volume, of the second edition, of ***Walks in the Black Range*** **was issued in late October. This volume features the walks which are in the eastern foothills of the Black Range - south of NM-152. Volume one of this series dealt with the walks which are in the eastern foothills of the Black Range - north of NM-152.**

As with the first volume of the second edition this volume includes a substantial amount of information about the natural history and mining activity which is found along the described trails.

Both books are available in two .pdf versions, one an uncompressed file with very high quality images and one which is a compressed file. Both are also available as an online book, with "flippable" pages at the Black Range bookshelf.



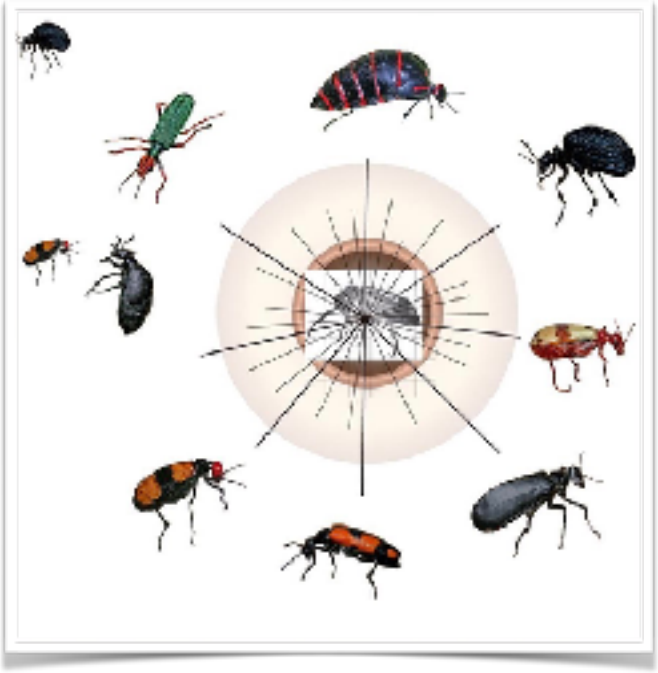


The Covers

***Megetra punctata*, a blister beetle, graces the front cover of this issue. The photographs on the front cover and below were taken on August 22, 2016 in Hillsboro, New Mexico. The species is typically seen between July and September. In the U. S. this species is generally found at elevations between 4,000 and 5,000 feet (photographed at about 5,200'). In Mexico it is found at elevations as high as 8,500 feet. The range of this species is limited to south-eastern Arizona and southwestern New Mexico in the United States and to Chihuahua, southwestern Coahuila, and southern Durango in Mexico - a range which is close to that of the species discussed below. There are two other species in the genus, both have similar ranges to *M. punctata*.**

A photograph from April 16, 2015, of an individual of the *Cysteodemus wislizeni* species, graces the back cover. This species is generally seen between May and September. The photograph was taken just east of Hillsboro, New Mexico. The English common name for the genus *Cysteodemus* is Desert Spider Beetle. The English common name for *C. wizlizeni* rolls off the tongue like honey - Black Bladder-bodied Meloid. There are two species in this genus in the United States, this one is native to the Chihuahuan Desert, which basically defines its range. The other species, *C. armatus,* is native to the Mojave Desert.

Estefany Karen López-Estrada, Isabel Sanmartín, Mario García-París, and Alejandro Zaldívar-Riverón recently performed research on the question of why blister beetles show low species diversity (there are few species) and "wild body-shape variation". They published their findings in "*High extinction rates and non-adaptive radiation explains patterns of low diversity and extreme morphological disparity in North American blister beetles (Coleoptera, Meloidae*)"; Molecular Phylogenetics and Evolution, Vol. 130; January 2019; pp 156-168. The graphic below is from that article.



They found that during the extinction event which occurred between the Miocene and Pliocene most of the diversity previously seen in this family (*Meloidae*) was extinguished (extinction is forever). Subsequent to that "extinction event" the remaining species underwent rapid morphological changes without species diversification. Thus, when walking in the Black Range, you may find beautiful examples of species which survived a major ecological disaster, underwent significant morphological change, but did not generate significant numbers of new species.

The "back stories" of the species we regularly encounter in the Black Range often provide key insights into the natural history we find about us today.

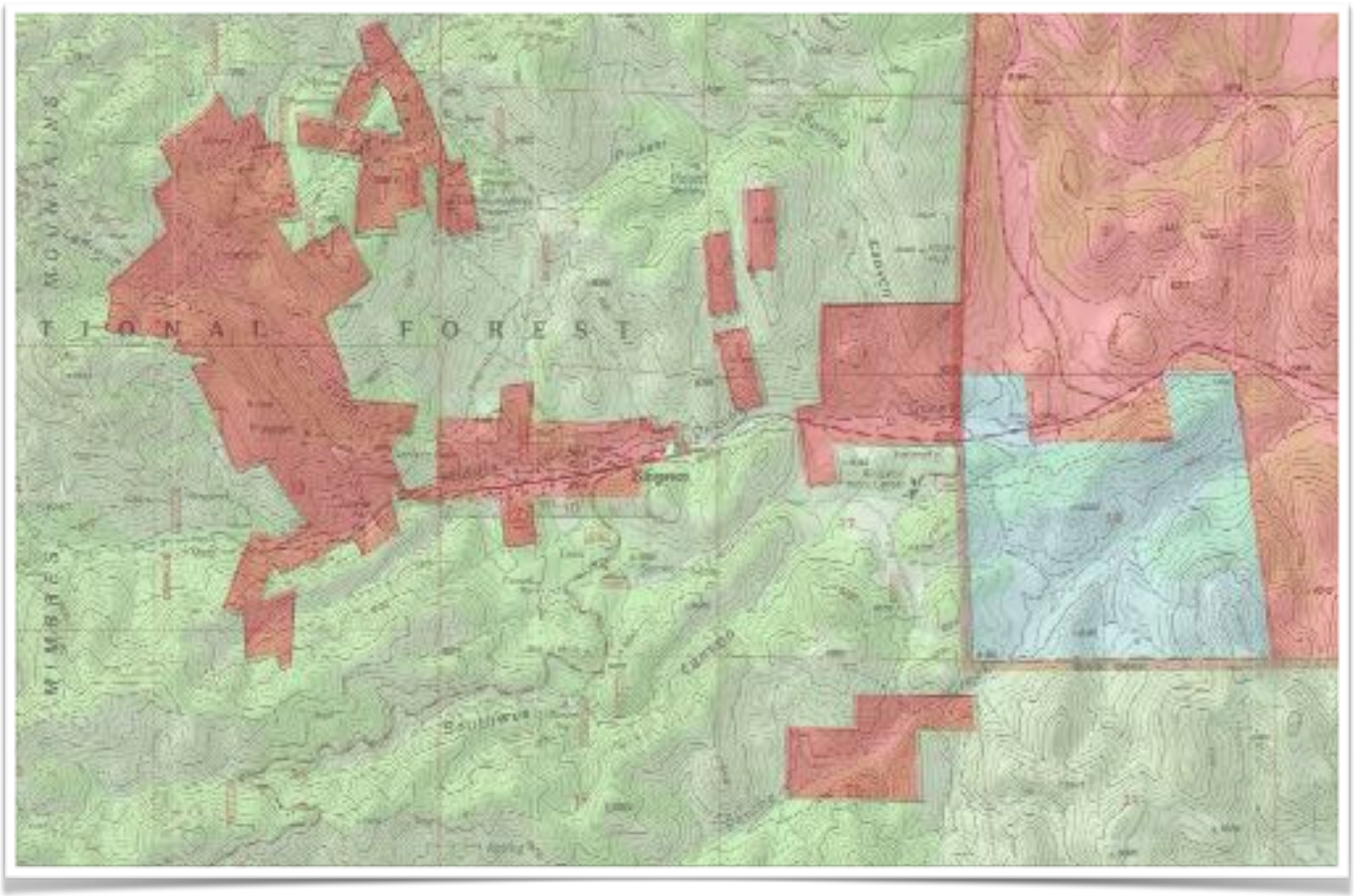
Springs and Land Ownership Tool

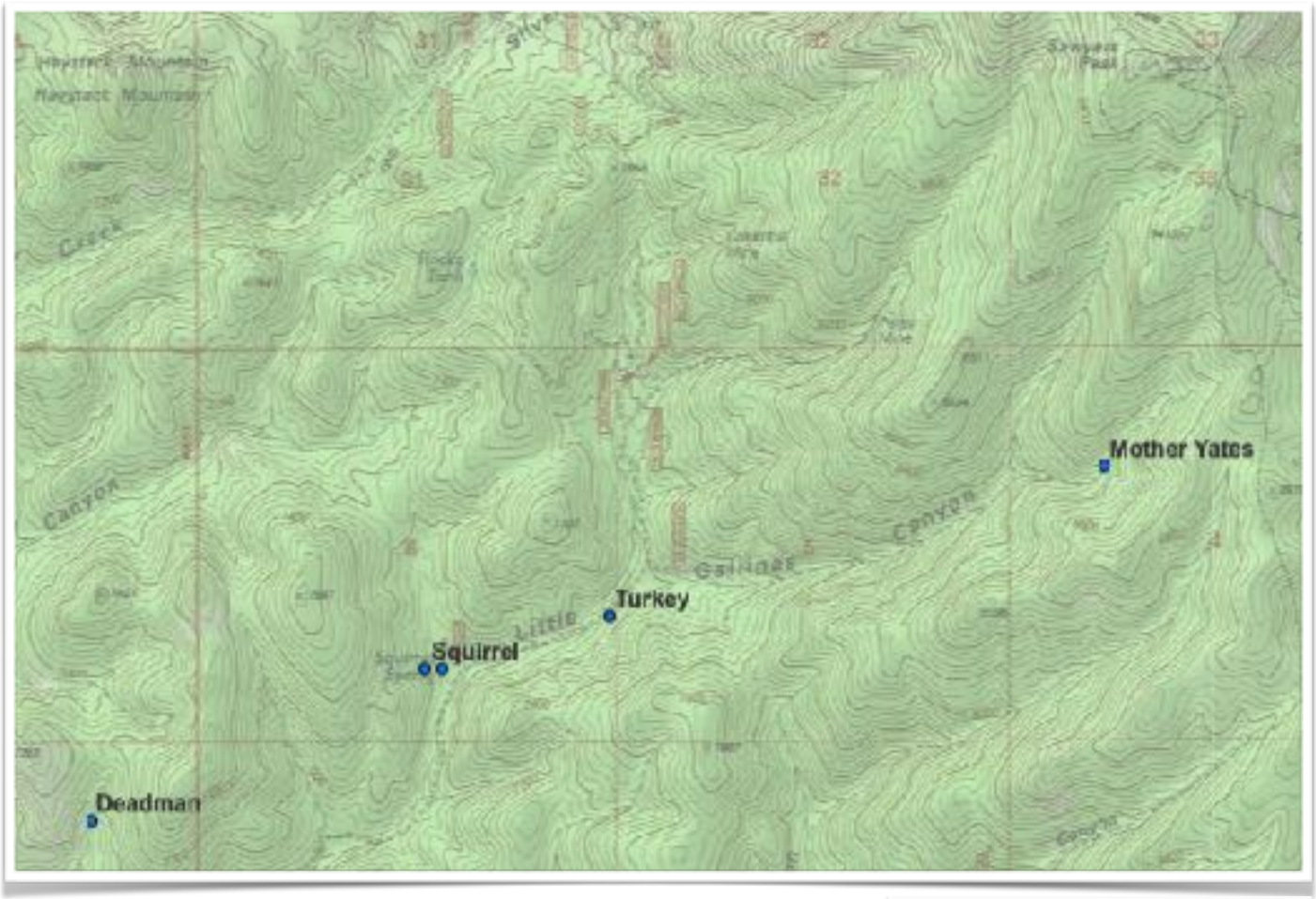
It is always nice to discover an information tool which can be used to answer multiple questions. Two unrelated issues that people exploring the Black Range routinely encounter are: Who owns the land?; and Where are the springs? The Spring Seeker Waters application provided by the Sky Island Alliance addresses the first question in significant detail. The (unreadable) map to the right covers the southern portion of the Black Range. It is included here to show the variety of colors which are depicted on the map; each indicates a different type of owner. The blue dots scattered along the map are the springs which are identified in the programs database. (Not all springs are included.)

The detail of the map from around Kingston is shown below. It shows Forest Service, private, and state ownership of various parcels. In this case, a topographic layer has been added to the map. There are a variety of layers which can be added to the map, and the "zoom in - zoom out" functionality of the program is significant.

It is safe to say that if you are interested, you never need to wonder about whether you are on public vs. private land and you never have to wonder if that "No Trespassing" sign is an attempt at unlawful taking of public land or is legit.

This information is available for Arizona and New Mexico.





The detail above shows a series of springs in Little Gallinas Canyon SW of Sawyers Peak. The detail to the right indicates the level of topographic detail which can be accessed. The type of information which may be accessed varies with the layers which are applied. This is a very information-rich program. In the case of the topographic layer, all of the information contained on many topographic maps is available: mines, springs, the names of geographic features, elevation contours, etc.

It also comes with a variety of tools not typical of topographic maps. (It has the full functionality of arcgis maps.) For instance, you can determine - if it is important to you - that in a straight line it is 2.17 miles from Mother Yates spring, south of Sawyers Peak, to Silver Creek Spring, north of the mountain. You can also determine the size of an area specified by you (hectares, acres, square miles, square feet, and so on). Determining the location of a specific point (degrees, DMS) is also possible.

The degraded nature of many springs is a matter of concern. The contracts associated with the usage of allotments - as they pertain to springs - are often ignored, to the detriment of the long term viability of the spring and the life forms it supports.

Arcgis is a sophisticated and powerful tool. Much of the information contained in this data base, for instance, can be accessed intuitively. With knowledge of arcgis, there is so much more.

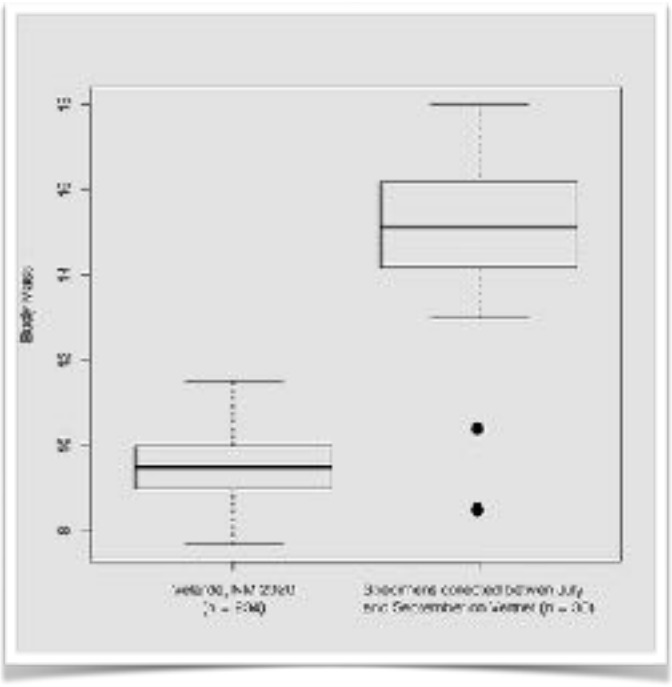
The Spring Seeker Waters database is limited to the southeastern quarter of Arizona and from the Gila south to the international border. The information from the Black Range is at the eastern boundary of the program data base.

New Mexico Bird Die-Off

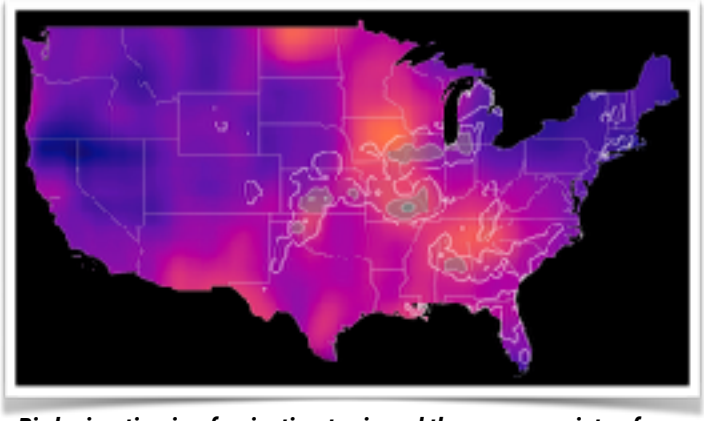
During the 2020 bird migration significant numbers of dead and weakened birds were reported from the U. S. Southwest, with very high numbers in New Mexico. It is estimated that the number of deaths was in the hundreds of thousands. Most of the birds died during their migration and were insect-eating songbirds. Migration is a very dangerous time for birds, but the number of deaths during this period was extraordinary.

During the second week of September the White Sands Missile Range biologists, who might find 6 dead birds in a normal migration, found "a couple hundred". This story, a story of greater deaths told in orders of magnitude, was repeated throughout the state. Large numbers of deaths were reported starting in the third week in August.

Many of these deaths were attributed to a cold front which came through the state on September 9. Temperatures dropped by as much as 60° when the cold front came through. To attribute the large numbers of deaths to this event is overly simplistic, however. (This type of weather phenomenon often causes significant numbers of bird deaths when they occur during the migration timeframe. In August and September more seems to have been going on, however.)



Jenna McCullough, a researcher at the University of New Mexico Museum of Southwestern Biology, collected 305 dead birds at Velarde on September 14 and found that the vast majority of them had little or no fat reserves. The graph above is "*A comparison of body mass from the birds we salvaged on 14 September 2020 with that of other Violet-green Swallows collected during fall migration across the North America, downloaded from Vertnet, an open access biodiversity database. Both outlier points on the right refer to specimens that had little to no fat stores.*" (The data behind mysterious bird deaths in New Mexico.) Birds need significant fat reserves (reflected as "body mass" here) to migrate successfully. Many of the birds showed signs of wasted breast muscles, indicating starvation and dehydration.



Bird migration is a fascinating topic and there are a variety of tools which can be used to understand it better. BirdCast, maintains migration forecast maps, live bird migration maps, and local bird migration alerts. It is maintained by Colorado State University and the Cornell Lab or Ornithology.

There is seldom one simple answer to significant issues. The bird's lack of body fat meant that on September 9 many of the birds may have died of hypothermia. Not only could they not deal with the cold, they did not have the strength to go elsewhere.

Birds were dying off prior to the September 9 weather event. In fact, they were dying off during a period of very high temperatures. Recent research has indicated that heat waves can be just as harmful as cold snaps. (*Mapping evaporative water loss in desert passerines reveals an expanding threat of lethal dehydration*, Albright et al, PNAS, February 28, 2017)

Smoke from the west coast fires has been posited, by some, as a cause for the die-off, either directly or indirectly (by causing birds to leave their breeding grounds - where they are fattening up for migration - early). There do not appear to be any data, at this time, to support that hypothesis.

The insect population throughout the world has been plummeting. For insect feeders that means less food. It is likely that less food on the breeding grounds was a contributor to the low body mass of the dead birds.

In "Decline of the North American avifauna", Rosenberg et al. found a 29% decrease in bird populations since 1970. This is not simply a case of a "perfect storm" where emaciation, dehydration, and a cold front all came together. This is a case of ecological collapse.

One of the attributes associated with climate change is the increase in the variation of weather events, in terms of numbers of events and the characteristics of the events (more hurricanes, with higher winds and more rain, for example).

The changes we have unleashed will occur over decades. In the meantime there are things that we can all do to mitigate the effect on our natural world. We hope to cover some of those activities in future issues.

Searching for the Bigleaf Sedge in the Aldo

by Jim McGrath

Walking along Diamond Creek I felt the allure of the wilderness. I had escaped the city and was now experiencing the quiet serenity of the Aldo Leopold Wilderness in the Gila National Forest. I had entered the Aldo from the Turkey Run Trailhead, walked less than a mile and dropped down off a ridge onto the narrow floodplain of Diamond Creek. Diamond Creek originates high up in the Black Range below Diamond Peak and flows north until it encounters the afore-mentioned ridge forcing the creek to drain to the west.

As I explored the forest walking upstream to the south, I observed pools in the stream. I paused for a moment as I noticed a fish dart out from beneath a log that lay across the stream. As I explored more of the stream, I noticed more of the fishes. I also quickly noticed that the fishes, despite being underwater, became keenly aware of my presence and quickly disappeared beneath a log. In one case, I observed a fish burrow in dark brown soil at the edge of a rock, creating a murky patch of water as it disappeared. I noted that the gray-brown fishes have round brown spots on their upper bodies and contrasting pale coloration around their eyes, giving them a kind of ghost-like appearance. I knew then and later confirmed (Guaderrama 2020; Park 2020) that I had found the Gila Trout (*Oncorhyncus gilae gilae*), a federally Threatened fish species (CBD 2020, BISON-M 2020). I experienced a feeling of satisfaction and joy that I was in a quiet, serene, and majestic place that is still wild and free.

The wilderness immersion notwithstanding I had come to Diamond Creek in May 2020 as a botanist to relocate two populations of the bigleaf sedge (*Carex amplifolia*). I was also interested in trying to determine if additional populations were present. I hoped to take photos of the sedge and document any populations found and make collections of specimens from any new populations.

Bigleaf sedge is a tall (to 1 m), robust sedge with long pistillate (female) spikes that contain perigynia or sacks open at the top that surround the developing seed. Long and narrow staminate (male) spikes are usually above the pistillate spikes. Bigleaf sedge is an obligate wetland plant (USACE 2018) that in NM occurs adjacent to streams or on floodplains in conifer forests (NMRPTC 1999). The bigleaf sedge with numerous photos and a species description may be found on the New Mexico Rare Plant website (https://nmrareplants.unm.edu) and on the Vascular Plants of the Gila Wilderness website (Kleinman 2020).

The two populations I was attempting to relocate had been found by me in 2004. At the time I was interested in a plant collection made by E. H. Roalson on June 16, 1994 (see right) along Diamond Creek at about 8000 feet elevation in a location identified as T12S R10W, sec 1 or 2 (SEINet 2020). The junction of Diamond Creek and Doubtful Canyon is about this location. I was intrigued by this collection because at the time it was the only known collection of this species in New Mexico. In fact, bigleaf sedge is a common dominant plant in shaded wet areas west of the Cascade Mountains, and its range extends beyond Oregon and Washington to California and Montana (Wilson et al. 2014).

Since Roalson had made this initial discovery along Diamond Creek, two questions immediately arose: 1) Are there more populations along Diamond Creek or elsewhere in the Black Range? 2) Why was this sedge found so far from its normal range (more than 1000 miles)? I was determined to find out.

I do not remember much from that July 28, 2004 visit to Diamond Creek. I do recall starting my hike from the Turkey Run Trailhead to find Roalson's population. The distance to Roalson's collection site would be about 2 miles.

I made 2 collections that day, one each from two widely separated populations on the edge of Diamond Creek in a narrow, shaded canyon. I do recall that the stream of Diamond Creek was very narrow (perhaps about a foot wide) and there were very few sedge plants present in the population at one of

the collection sites. I had no GPS unit in those days, so my location description was limited to Township, Range and Section. I did not find Roalson's original collection site (there would have been a weir present, but I never did see one - SEINet 2020).

So, my visit in 2004 indicated that there were at least 3 small populations of bigleaf sedge along the upper part of Diamond Creek. How many more populations are present along Diamond Creek and does it occur elsewhere in the Black Range and Gila country in general?

Since my 2004 visit to Diamond Creek, I, like so many others, learned to use a GPS unit that allows incredible accuracy in determining precise locations in the field. In addition, further improvements in the use of the internet has allowed the creation of SEINet, which allows instantaneous access to plant specimen records of about 350 herbaria around the United States. Now we can know precisely where collections of bigleaf sedge have been made throughout the U.S., Mexico, and Canada. In 2020 there still is a huge gap of about 1000 miles between the known bigleaf sedge populations of the Pacific Northwest and those in the Black Range of New Mexico (SEINet 2020). We also know that Owen Williams made collections of bigleaf sedge at two locations, one at 8800 feet elevation (image left) and the other at 7800 feet elevation, in Water Canyon below and east of the crest of the Black Range back in May of 1996.

Thus, when I set out in May 2020 to search for the bigleaf sedge, there were only 5 known sites in NM where bigleaf sedge had been previously collected by botanists - and all of the collections had been made in the Black Range.

When I reached Diamond Creek on May 15, 2020, I chose to descend from the trail system to hike upstream to the south. I wanted to know if additional populations might exist along the stream. A topographic map indicates a trail on the slopes substantially above the stream. Although I have no recollection of what route I took to relocate Roalson's collection site in 2004, I presume that I attempted to follow this trail. Nevertheless, I am quite certain that I did not bushwhack upstream in 2004. But in May 2020 it was slow traveling upstream due to numerous rocks, logs, and brush to negotiate. I only explored about 0.7 miles upstream. The forest was very well developed with a great variety of trees – Engelmann's spruce (*Picea engelmanni*), Colorado blue spruce (*Picea pungens*), southwestern ponderosa pine (*Pinus ponderosa* ssp. *brachyptera*), Douglas fir (*Pseudotsuga menziesii*) and western white fir (*Abies concolor*) with thinleaf alder (*Alnus incana* ssp. *tenuifolia*) growing along the stream. The forest and stream were consistently shaded. The Gila trout was observed in several pools.

On the next day I worked my way west downstream from the bend in the stream about 0.5-1.0 mile or so. The forest was much more open with several grassy patches. I was able to follow a trail along a broader floodplain surrounding the creek. I saw very few trout along this stretch of the stream. The pools were much less shaded compared to the upstream section I explored the previous day. I suspected the fewer trout observed were due to higher and perhaps more variable temperatures in the water. I did find an oxbow – an abandoned stream channel - that now had become a wetland. A group of tiger swallowtail butterflies congregated on one small bare patch of soil oozing water and perhaps some salts that appealed to the butterflies.

But my two days on Diamond Creek failed to reveal any sign of the bigleaf sedge. I had no more time to try and relocate my 2004 collections. Yet, I had no reason to believe that bigleaf sedge was no longer present at these two sites. I left with the

feeling that the bigleaf sedge is still present on Diamond Creek, but that its populations are probably few and quite small. I left the Aldo with a wonderful feeling of satisfaction having thoroughly enjoyed my brief exposure to the wilderness.

However, my story does not end here.

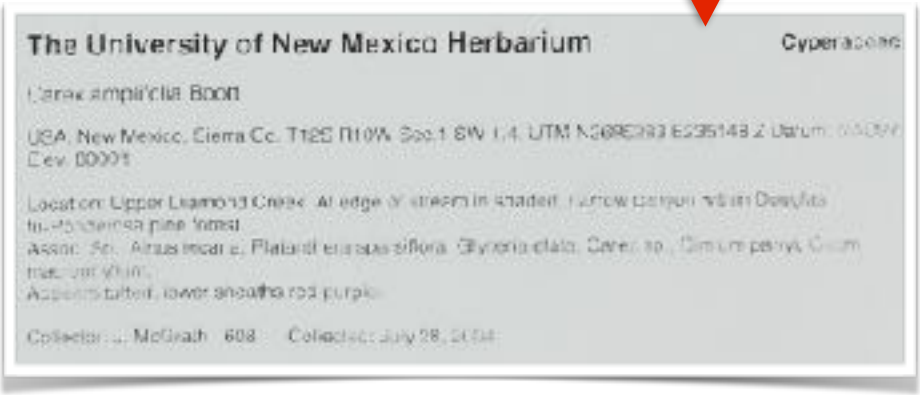
What prompted me to visit the Aldo in 2020 stemmed from my participation in the Southwest *Carex* Working Group. Our group consists of 4 botanists (William "Bill" Norris, affiliated with the Dale A. Zimmerman Herbarium at Western New Mexico University (WNMU) in Silver City, Max Licher and Glenn Rink, who are both affiliated with the Deaver Herbarium at Northern Arizona University (NAU) in Flagstaff, AZ, and me – I'm affiliated with the University of New Mexico (UNM) herbarium in Albuquerque). Our group spent 6 years examining specimens of all species of genus Carex that were collected in NM, correcting misidentifications, writing keys and

The Native Plant Society of New Mexico provided some funding for this effort, see the write-up at the link. Please consider helping them help researchers. (ed. BRN)

descriptions, determining the distribution of collected specimens and culminating with our treatment of *Carex* (Licher et al. 2020) in the recently published Flora Neomexicana III: An Illustrated Identification Manual. 2nd ed. Part 1 (Allred, Jercinovic and Ivey 2020).

Both Max Licher and I were interested in taking photos of bigleaf sedge, but I knew that Max was a much better photographer than me. With a goal of finding and photographing the bigleaf sedge in the Gila, Max paid a visit to Bill Norris in Silver City a couple weeks later than my visit to the Aldo. Bill recalled an event 4-5 years earlier when Dale A. Zimmerman brought into the herbarium an "over-mature" sedge specimen that Bill tentatively identified as *Carex amplifolia*. Max's impending visit stimulated Bill and Russ Kleinman, botanist and author of the Vascular Plants of the Gila Wilderness website, to find the site where Zimmerman had found the plant. The site location is on private property on the floodplain of the Mimbres River near Bear Canyon reservoir at an elevation of 6100 feet. With permission granted from the property owner Bill and Russ discovered several extensive colonies of bigleaf sedge in

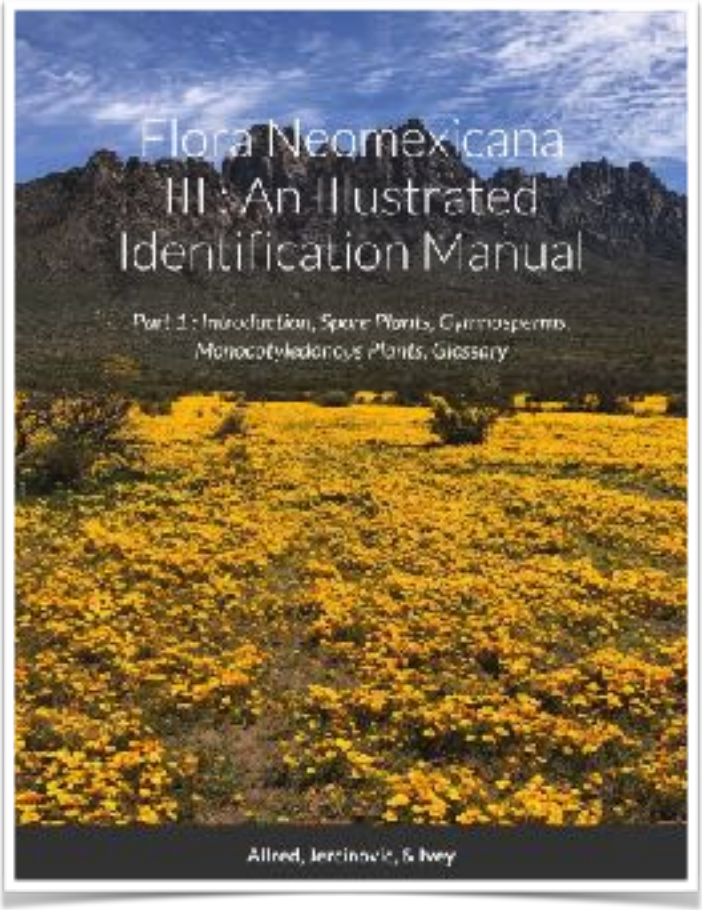
***One of the specimens* collected by J. McGrath at Diamond Creek in 2004.**



mid-May 2020 (Norris 2020; SEINet 2020). Later that month, Max Licher visited the site to make collections and take photographs of the sedge. However, Russ reported that he and his wife, Karen Blisard, had recently found bigleaf sedge while botanizing and birding in Railroad Canyon. Russ and Max then hiked up Railroad Canyon where they found the bigleaf sedge population to be much more extensive than what Russ and Karen had noted. Max documented the population and took more photos of the sedge in a riparian zone of "Ponderosa Pine/ Deciduous Forest" (SEINet 2020).

So now we know of 7 populations of the bigleaf sedge in the Black Range.

But still unanswered is how this sedge arrived in the Black Range 1000 miles away from its normally widespread distribution in the Pacific Northwest. My pet hypothesis is that firefighters from the Pacific Northwest may have brought in the seeds on their equipment, tools or clothing while fighting the 48,000-acre McKnight Fire of 1951. Seeds may have gotten washed by subsequent rains into the Water Canyon and Railroad Canyon drainages and then became established. Presumably, the seeds could have been washed into the drainage of the East Fork of the Mimbres River in McKnight Canyon. This a very remote canyon and I suspect small populations of bigleaf sedge may be found there if an intrepid botanist would be willing to explore it. In any case, perhaps seeds from such populations were eventually washed down to the site on the Mimbres River near Bear Canyon Reservoir. But the McKnight Fire hypothesis does not explain how bigleaf sedge got into the Diamond Creek drainage – perhaps animal dispersal after populations were established elsewhere. Who knows? Other hypotheses have been proposed. Waterfowl may be dispersers of large seeds like those of bigleaf sedge, but there is no waterfowl habitat in the high elevations of the Black Range. Backpackers hiking the Continental Divide Trail may possibly have dispersed the seed that eventually wound up in Water Canyon and Diamond Creek. This hypothesis implies that the backpackers would have had to have acquired these large seeds on their clothing, boots or packs somewhere in the Pacific Northwest, then transported that gear all the way to New Mexico, and then accidentally dispersed the seeds in multiple places along the trail. This scenario just seems too unlikely. In short, we will probably never know how bigleaf sedge became established in the Black Range.



Available from Lulu at this link.

Nevertheless, there are likely more bigleaf sedge populations to be found. You can look at the accompanying article describing the bigleaf sedge and how to recognize it. You can easily view the bigleaf sedge by hiking up Railroad Canyon about a third of a mile from the trailhead on Highway 152. You may find the sedge elsewhere while hiking in the Black Range. If you do, make a plant collection of it (put the specimen into a plant press or put it in some newspaper and put some weight on top the specimen for about 3 weeks). Be sure to document the location with a GPS or pinpoint it on a map or describe the geographical landmarks, the type of habitat and what other plant species you found growing with it. Turn the specimen with associated collection information into a herbarium. The nearest herbarium to the Black Range is the Dale A. Zimmerman Herbarium at Western New Mexico University, where Bill Norris is the Curator. If you can't make a collection, contact Bill Norris at norrisw@wnmu.edu or me at sedges@swcp.com. Provide us the GPS location or a description of landmarks where you found the sedge and a photo if you are able. Hopefully, one of us will have time to collect the sedge and document the location and habitat.

I did not find the bigleaf sedge on my May 2020 visit to the Aldo, but I did gain an appreciation of the Aldo Leopold Wilderness and was thankful we Americans had the wisdom to establish this magnificent area as wilderness. And I feel a lot richer after quietly watching the Gila trout in the pools of Diamond Creek. The trout is doing very well in Diamond Creek thanks to our country's wisdom in creating the Endangered Species Act. I left the Aldo with a wonderful feeling that all is right in the world.

(Editor's Note: Images and annotations provided by the Black Range Naturalist. Please see the accompanying article as well.)

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Recognizing the Bigleaf Sedge by Jim McGrath

The bigleaf sedge (photos right) or *Carex amplifolia* is in the sedge family of plants or *Cyperaceae*. Sedges are grass-like in appearance, but they are not grasses, which are in the grass family or *Poaceae*. Grasses usually have hollow culms (stems), while sedges have solid culms. The genus *Carex* contains 92 species in NM. The distinguishing feature of all *Carex* species is a sac-like structure called the perigynium which surrounds the developing ovary, which produces a single achene (the seed). The perigynium narrows to a thin tube called the beak at the top of the perigynium. The beak is open at the top, from which project the stigmas (part of the female flower). The perigynium is extremely important in *Carex* identification because it is always visible, while the achene is not readily visible because it is inside the perigynium. In *Carex* the flowers are unisexual – either male or female – and the way the male and female flowers are arranged is important in identification.

Photographs by Max Licher

In the bigleaf sedge the male and female flowers are arranged in long cylindrical spikes. Each individual flower is directly attached to a central axis in a *Carex* spike. However, each spike in bigleaf sedge contains either all female flowers (pistillate) or all male flowers (staminate). The distinguishing feature of bigleaf sedge is the long cylindrical pistillate spike with very plump green to brownish green perigynia with subspherical bodies that abruptly constrict to sometimes bent beaks (0.7-1.1 mm long) – see photo below. The narrow, brown staminate spikes are typically above and contrast sharply with the green pistillate spikes containing the plump perigynia (see photos on the previous page).

Note the beak on the perigynium on the right with a broken stigma poking out the top. The position of the beak on the perigynium in the photo can be confused with a stipe on the bottom of the perigynium.

The culms of bigleaf sedge are robust – reaching 50-90 cm tall. The leaves are relatively broad for a sedge, measuring 7-15 mm wide. In N.M., bigleaf sedge is found along the edges of streams or in wet meadows on floodplains. Only a few robust wetland *Carex* might be confused with bigleaf sedge. Southern beaked sedge (*Carex utriculata*) is a common wetland sedge in N.M., but its perigynia are green to straw-colored or reddish-brown (i.e., not brownish-green) with often longer perigynia (3-5 mm compared to 2.4-3.6 mm in bigleaf sedge) and longer beaks (0.8-1.8 mm vs. 0.7-1.1 mm) that are never bent. The swamp sedge (*Carex senta*) is also robust and occurs along major streams, but its perigynia are somewhat flattened with short beaks (0.2-0.3 mm) and its leaves are narrow (1-6 mm wide). The Cochise sedge (*Carex ultra*) generally occurs at a lower elevation (1800-6500 feet) than *Carex amplifolia* (6100-8800 feet) and it is only known to occur in 2 N.M. sites, both in the N.M. bootheel (Hidalgo County). The Cochise sedge has pale green to reddish brown perigynia with red spots and shorter beaks (0.2-0.6 mm) than bigleaf sedge (0.7-1.1 mm).

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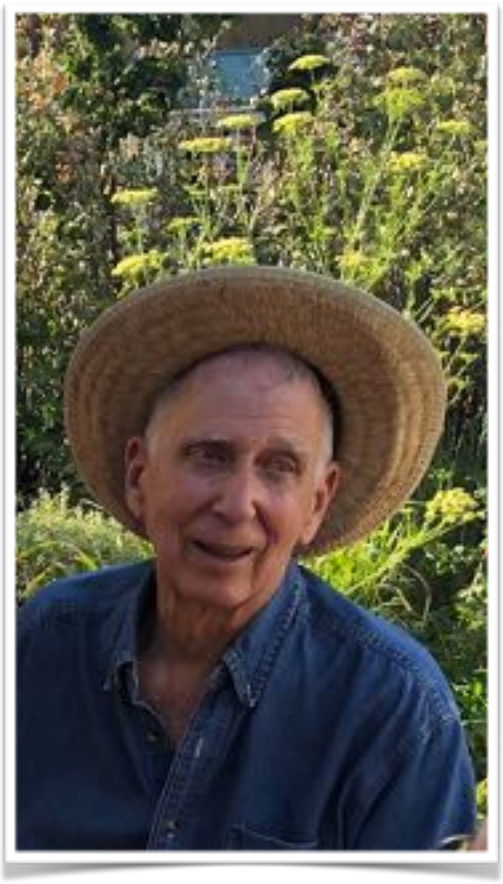

Dr. Richard Felger - Remembering

Richard Stephen Felger, ethnobotanist, worldwide desert researcher, poet, champion of sea turtles, and visionary proponent of dry-land food crops, passed away peacefully at his home in Silver City, with his wife by his side, on October 31, 2020. He was 86.

Born in Los Angeles, he became fascinated with beach drift and tide-pools in early childhood. A gift of cacti and succulents for his eighth birthday set his course as a botanist, and by high school he had found mentors who recognized his calling. A holiday field trip from L.A. through the Sonoran Desert into the tropical forest of Álamos, Sonora, Mexico, was the fulcrum on which his future life would turn.

Dr. Felger attended the University of Arizona because it was in the Sonoran Desert and near the Mexican state of Sonora, where he returned at every opportunity. By the time he finished his dissertation on the vegetation and flora of the islands and Gulf Coast of Sonora, he had formed a lasting connection with the

region's Native residents, the Comcaac (Seri) and Yoeme (Yaqui) people, as well as its plant life.

After receiving his Ph.D. from the University of Arizona, Tucson, in 1966 he served on the faculty of the University of Colorado, Boulder, then as Senior Curator of Botany at the Los Angeles County Museum of Natural History. His political activism and involvement with population and environmental studies led to friendships with notable artists and scientists including John Brandi, Michael McClure, Allen Ginsberg, Gary Snyder, and Paul Ehrlich. His friends encouraged Richard to publish a limited-edition volume of poetry, ***Dark Horses and Little Turtles***, in 1974.

Returning to Tucson, he worked at the Arizona-Sonora Desert Museum from 1978-82, founding its research department. He was active in regional and international conservation, including pioneer conservation of Pacific Coast sea turtles. In 1988 he founded the Drylands Institute in Tucson and was Executive Director until 2007. He also served as Adjunct Senior Research Scientist at the U. A. Environmental Research Laboratory and Associate Researcher at the U. A. Herbarium.

Strongly interested in addressing world hunger through agricultural independence for arid regions, Dr. Felger advocated the use of perennials for no-till agriculture of food crops to fit to the land rather than changing the land to fit the crop. He pioneered development of mesquites as a global dryland food crop and worked with nipa, a rice-sized grain that thrives with pure seawater. Since moving to Silver City in 2006, he embraced the bioecology of the Chihuahuan Desert and recognized that native food plants used by the Apache people could contribute to food resiliency in a dry world. A popular field-trip guide and speaker for the Gila Native Plant Society and other environmental groups, he mentored young people and actively engaged area residents of all ages in planting and cultivating native grass crops and mesquite.

A prolific writer, Dr. Felger authored or co-authored over 100 peer-review publications as well as books and popular writings in desert botany, ethnobiology, new food crops, and other fields. In 2020 alone, two major scientific books and a professional journal article co-authored by him were published and his poetry book was re-released after decades out of print. Another collaborative work, *Field Guide to The Trees of the Gila Region of New Mexico*, is slated for release by U. N. M. Press next spring. More information can be found on Richard's website, https://www.desertfoodplants.org/. (Reprint)

Aldo Leopold - His Legacy - Part 5
by Steve Morgan

Our story ended last time with Aldo embarking on a speaking tour of New Mexico to drum up support for a New Mexico Game Protection Association or the NMGPA. In January of 1916, he began his statewide tour in Silver City. He met with Miles W. Burford, who had formed a group of one hundred hunters, fisherman, local ranchers and miners. It was to this group, the Sportsmen's Association of Southwestern New Mexico, that he first proposed the idea of a statewide coalition of GPA's. From Silver City, he traveled to Rincon, El Paso, Alamogordo, up to Cloudcroft, east to Carlsbad, then on to Roswell and back to Albuquerque.

He was surprised by the welcoming reception that had met him at each stop. The reasons for the willingness of people, who had in the past been against working with the Forest Service, are deeply buried in New Mexico's past. The openness and freedoms of life in the American Southwest had led to hunting practices by native Americans and early settlers which granted a year long hunting season on wildlife. The people of those times relied completely on hunting for food on their tables and income.

Leopold was seeing the numbers of game wildlife diminishing because of the uncontrolled practices of the times. He was also convinced that without Federal intervention, American wildlife, and the hunting associated with it, was doomed. What he saw in New Mexico was dwindling pubic access to hunting grounds. New Mexico had allowed its wealthiest and most powerful landowners to privatize the states' wildlife. For a nominal fee to the state, those landowners acquired title to the wildlife on their property and many constructed fences to keep the wildlife in and public hunters out.

They had what resembled a European barony, their own private hunting grounds. The largest of these private land blocks was the Maxwell Land Grant in Northeastern New Mexico. Its boundaries were determined by the Supreme Court in 1887. The grant contained 1.7 million acres of fine grasses, good timber, minerals for mining and perennially flowing rivers.

The Dutch owners of the grant broke up the properties into large tracts to sell. They hired local businessmen, lawyers and politicians to sell the parcels and in turn, this group became quite wealthy and powerful in Santa Fe. They even developed power connections in Washington, D.C. The group became known as the Santa Fe Ring and some members went on to become state governors. By 1916, when Leopold was touring the state, the Santa Fe ring still wielded a lot of political might.

Statehood for New Mexico in 1912 brought a stronger focus on those large land holdings. The state did not have funds to create and maintain wildlife refuges on state lands, so they relied on the large landowners to adopt conservation measures. This led to a series of laws that eventually prevented the average citizen from hunting on public lands. The control of hunting and fishing in New Mexico became the right of the very wealthy landowners and their friends.

This set up a strong groundswell of support for the GPA ideas Leopold was promoting. Since he represented the US Forest Service and a lot of federal land in New Mexico, the public gathered behind him. Leopold referred to the National Forests as the "Last Free Hunting Grounds of the Nation". He felt that incorporating wildlife management into National Forest policy was the only way to protect and preserve wildlife which, in turn, preserved free hunting on public lands. The New Mexico Game Protection Association (NMGPA) held its first convention in early March of 1916 in Albuquerque. Leopold had traveled throughout the state to generate a common interest in

preserving wildlife and free hunting and fishing; as a result, more than one thousand new members attended.

The NMGPA established three main goals. The first was law enforcement. This meant taking the control of game warden appointments away from the political arena. Second was the establishment of game refuges on the National Forests. The third was predator control. They proposed the "wise control", meaning extermination of wolves, mountain lions, coyotes, bears, bobcats, foxes and birds of prey. The prevalent thinking at that time is summed up by this Leopold quote from his essay titled "Thinking Like a Mountain". He said, "I was young then, and full of trigger itch; I thought that because fewer wolves meant more deer, that no wolves meant a hunters paradise." Centuries of cultural indoctrination, and an almost complete lack of scientific information on the role of predators in natural systems, resulted in a common observation from both stockmen and sportsmen on the carnivores: "That varmit takes my food."


THE PINE CONE

OFFICIAL BULLETIN OF THE NEW MEXICO GAME PROTECTIVE ASSOCIATION

The 15th Issue, March 1920

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EXTERMINATION or REFORM

After his role in creating the NMGPA, Leopold refocused on his Forest Service duties. In 1915, Congress had passed the Term Permit Act, which authorized the Forest Service to approve private recreational facilities on suitable forest lands. His duties included the siting, mapping and surveying of these lots and had him back on the road. His travels this time were mainly in Arizona. He continued his push for GPA's and helped establish the first in Arizona in the towns of Flagstaff, Springerville, Tucson and Payson. Always concerned about uncontrolled hunting practices, he convinced a group of soldiers in Nogales to stop using the endangered Bighorn Sheep in the Patagonia Mountains for target practice.

Unfortunately, this non-stop traveling was taking a toll on Leopold and he suffered a minor reoccurrence of Acute Nephritis. This sent him back to Albuquerque, concerned for his future health.

By 1917, the First World War was raging in Europe. When the United States entered the conflict in April of that year, the abilities of the Forest Service became greatly curtailed. One of the greatest needs was for foresters to harvest the woods of France for lumber needed to build barracks, trenches and aircraft. The Forest Service lost many of its rangers and administrators as they went overseas to "do their duty."

This brought most of the ongoing Forest Service projects to a halt. One other major change was the order from Washington to "stock the ranges with cattle to their fullest capacity." There was a major push to produce more food for the war effort and increasing the number of cattle was part of the plan. Unfortunately, by the time the cattlemen had increased their herds, the war was over.

Weather conditions also were rough the following few years for livestock. With the loss of market for beef driven by the war effort, financial overextension to increase their herds and poor range conditions, many ranchers lost their lands. Another result of this government request was the resulting overgrazing on lands which were already damaged.

Though the Forest Service employees were working hard to fill in for the many empty positions, Leopold continued with his original duties which included implementing the Grand Canyon Working Plan. He also retained his focus on the GPA's in New Mexico. He was concerned with the current hunting practices as new equipment had changed the attitude of many sportsmen. Leopold had grown up on the lessons of hunting based on "fair play". He saw the rules of sportsmanship as the only reasonable response to technological innovations that had outstripped their reasonable application. For Leopold, hunting was not just about the game bagged at the end of the day but deeply included watching wedges of geese and flocks of mallards fly over the sandbars on the Rio Grande. It was his love for the outdoors, for the cottonwoods and willows, the winds and waters, the sandstone rims and the sandy bottoms of the river valley that drew him to the wilds. To Leopold, hunting was an expression of love for the natural world.

He was approached in late 1917 and offered a new job. His family now had grown to three children, and this opportunity brought a substantial raise in pay. It meant leaving the Forest Service, but in January of 1918, Leopold started a new adventure. He took on a new job as Secretary of the Albuquerque Chamber of Commerce.

***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.

The Natural History of the Grandview Trail - The Trail That Was

It is safe to assert that most of the less popular trails in the Black Range were in disrepair prior to the Silver Fire and the following water events. Following the fire the hillsides were covered with burnt snags and debris. The rains that followed were not held back by vegetation and scoured the hillsides even more and washed much of the debris from the hillsides into the mountain ravines. As a result, some trails that appear on maps are non-existent at this time. The last time we were in East Railroad Canyon we found that to be the case and suspected that was what we would find as we explored the Grandview Trail which runs from Silver Creek to the Black Range Crest Trail, just north of Sawyer's Peak.

This is a trail you must really want to walk on; it is not a casual outing. Access begins at the junction of Royal John Road and NM-61 southeast of Sherman. The Royal John Road was the subject of a road video recorded a few years ago. This is beautiful country, so if you have a high clearance vehicle and are looking for a Sunday outing this road could be your cup of tea - but look at the video first.

The road to the trailhead is 14.3 miles long, mostly on the Royal John Road. Near the end of the trek the Silver Creek Road turns off of the Royal John Road and travels north to its end. Along the Silver Creek Road there are at least two ruins of log cabins, photos on the following page and "1" on the map to the right.

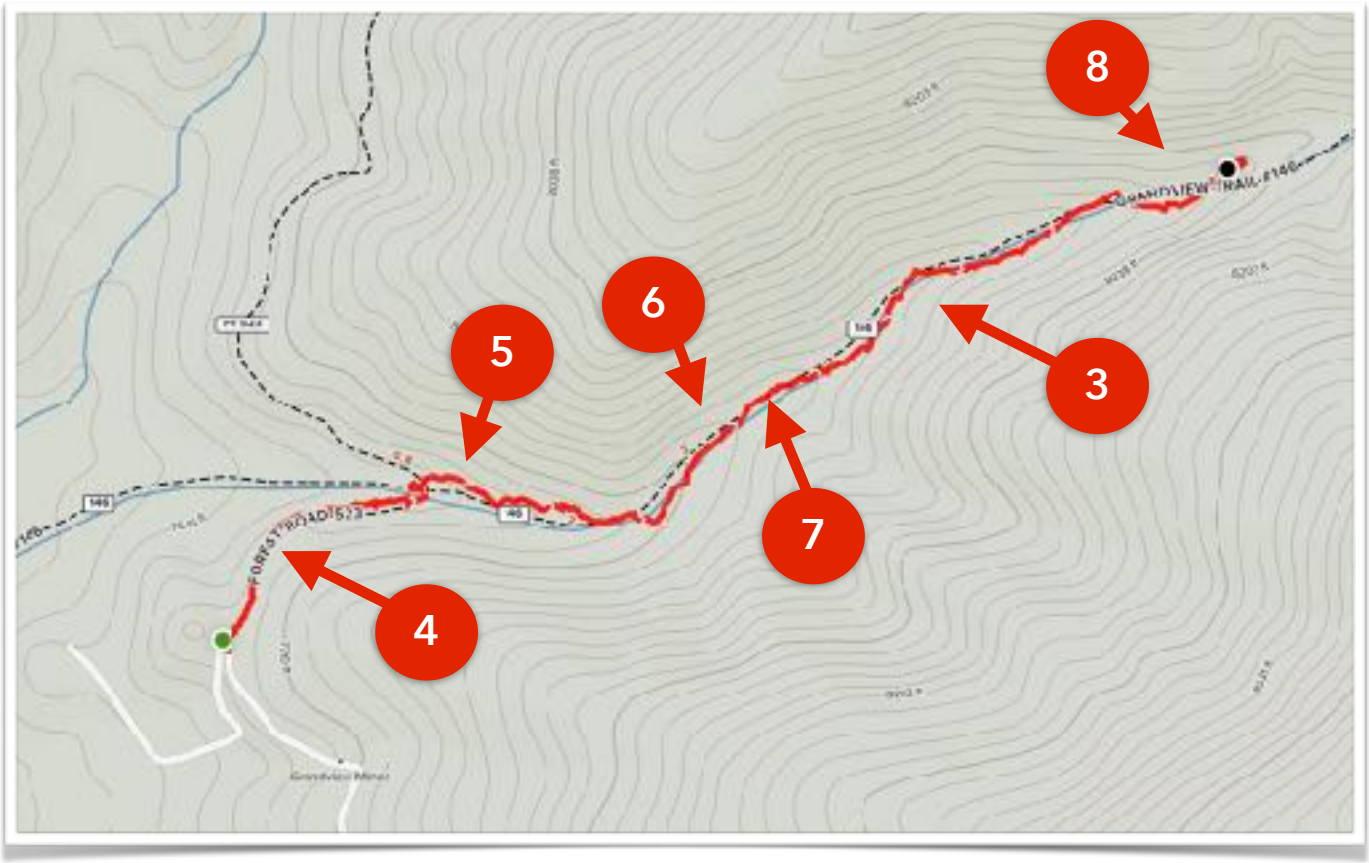
2. Southwestern Fence Lizard, *Sceloporus cowlesi*, was found on the logs of one of the cabins.

3. The following describes our experience on September 27, 2020. An improved trail does not exist in the lower reaches of this walk. At times the walking is fairly easy, short sections of the remnant trail, animal tracks, and sections where it is possible to walk on bedrock where the stream bed has been completely scoured. Generally, however, this is a strenuous walk with unsure footing, loose rock, downed trees and lots of debris. Only the first mile, of roughly a three mile walk, is discussed in this part of the article. During our walk we found an occasional trail blaze on a standing snag and some sections of what appears to have been a trail at one time. After stumbling a lot we simply decided it was not worth the effort. That was not an easy decision, however, because this canyon is both beautiful and dramatic. Over the first quarter of a mile or so the walk is through unburned forest, mostly Ponderosa Pine and oak.

4. Mexican Catch-Fly/Cardinal Catchfly, *Silene laciniata*

1. Two of the log cabins which are along the Silver Creek Road. Other photographs are included in the Black Range Website photo gallery.

2. Southwestern Fence Lizard, Sceloporus cowlesi, Silver Creek Canyon Road



4. Mexican Catch-Fly/Cardinal Catchfly, *Silene laciniata* is one of the more common flowers of the Black Range, but nonetheless, beautiful and abundant at the start of this walk.

In the same area as the *Silene* there was a nice stand of Gambel Oak. *Gambel Oak* is the only native oak found in the southern Rockies which has deeply lobed leaves (see inside back cover).

5. *Dieteria bigelovii*, Bigelow's Tansyaster, and *Clematis ligusticifolia*, Virgin's Bower, were growing near where the walk started up the stream bed. The *Clematis* is one of two species in that genus which are sometimes found in the Black Range, the other being *Clematis columbiana*, Columbian Virgin's Bower, which we have found in Railroad Canyon.

6. *Mirabilis longiflora*, Sweet Four O'clock (directly below) was growing in the stream bed, somehow holding on between the scouring floods which commence with the rains.

The flowers of this species typically open late in the afternoon and as a night blooming plant attract large hummingbird moths. The seeds of this species are poisonous.

Some authorities will separate out the plant that we have here as a distinct subspecies, *M. l. wrightiana*. The range of the Sweet Four O'Clock is restricted to central Mexico and the southwestern United States. If you are inclined to recognize the existence of subspecies in this plant then the nominate form is found in central Mexico and *M. l. wrightiana* is found farther north. The range within the United States is restricted to southwestern New Mexico, southeastern Arizona, and the Big Bend region of Texas.

***M. l. wrightiana* was noted as *M. wrightiana* in 1894, in the Transactions of the New York Academy of Sciences - see right - by Britton and Kearney. Their initial comments on the specimen are shown as well.**

3. Grandview Trail.

AN ENUMERATION OF THE PLANTS COLLECTED BY DR. TIMOTHY E. WILCOX, U. S. A., AND OTHERS IN SOUTHEASTERN ARIZONA DURING THE YEARS 1892–1894.

By N. L. Britton and T. H. Kearney, Jr.

The plants enumerated in this list were collected in the neighborhood of Fort Huachuca, by Dr. T. E. Wilcox, and about Fort Apache, by Mrs. Capt. R. W. Hoyt. A few were collected near San Carlos and in Tanner's Cañon, by Dr. R. G. Ebert, U. S. A. Where no locality and collector is mentioned, it is understood that the plant was obtained by Dr. Wilcox, near Fort Huachuca. The greater part of the collection of 1892–93 was made by Dr. Wilcox, and was sent by him to the Herbarium of Columbia College. Further collections were made by Dr. Wilcox in 1894 and were deposited in the United States National Herbarium. These have been submitted to us for determination by Mr. F. V. Coville and have been included in the present enumeration.

Mirabilis Wrightiana A. Gray ined. No description of this species appears to have been published. It differs from *M. longiflora* L. to which Wright's plant (No. 1702) was first referred, in its much more slender and less glandular calyx-tube, thinner and less glandular leaves; and from *M. Jalapa* L., with which it nearly accords in foliage, in its much longer calyx-tube, this being from 3 to 5 inches long.

5. Dieteria bigelovii, Bigelow's Tansyaster (above) and Clematis ligusticifolia, Virgin's Bower (below) were found within a few feet of each other at the beginning of the "stream walk".

7. *Juncus torreyi*, Torrey's Rush, (left) was growing in the stream-bed where the trickle of water formed small pools. (Note that this has to be a tentative identification - I am outside my scope of competence here.)

One of the common geraniums of the Black Range, *Geranium richardsonii*, Richardson Geranium (bottom photo), was growing in several large clumps near the rushes.

8. *Pericome caudata*, Taperleaf, (following page) was growing in the stream-bed as clumps of flowers on plants which barely reached my knee. On the stream bank the plants were very large, easily over 6 feet high and more in diameter.

Western Honey Bees (below), *Apis mellifera*, were busy working the Taperleaf. Some sources refer to this species as the

European Honey Bee, for the reasons cited at the BugGuide website. We use Western Honey Bee here and on the www.blackrange.org website. There are at least 24 recognized subspecies, some of which hybridize. There are also feral and domestic populations. Attempting to delineate these bees to subspecies is problematic. The rather notorious "African Killer Bee" is one of these subspecies.

These bees have experienced significant hardships of late. The first was the introduction of a parasitic mite, *Varroa*, which *Apis mellifera* had no natural defense against, the second is Colony Collapse Disorder which may be caused by something like the Israeli acute paralysis virus.

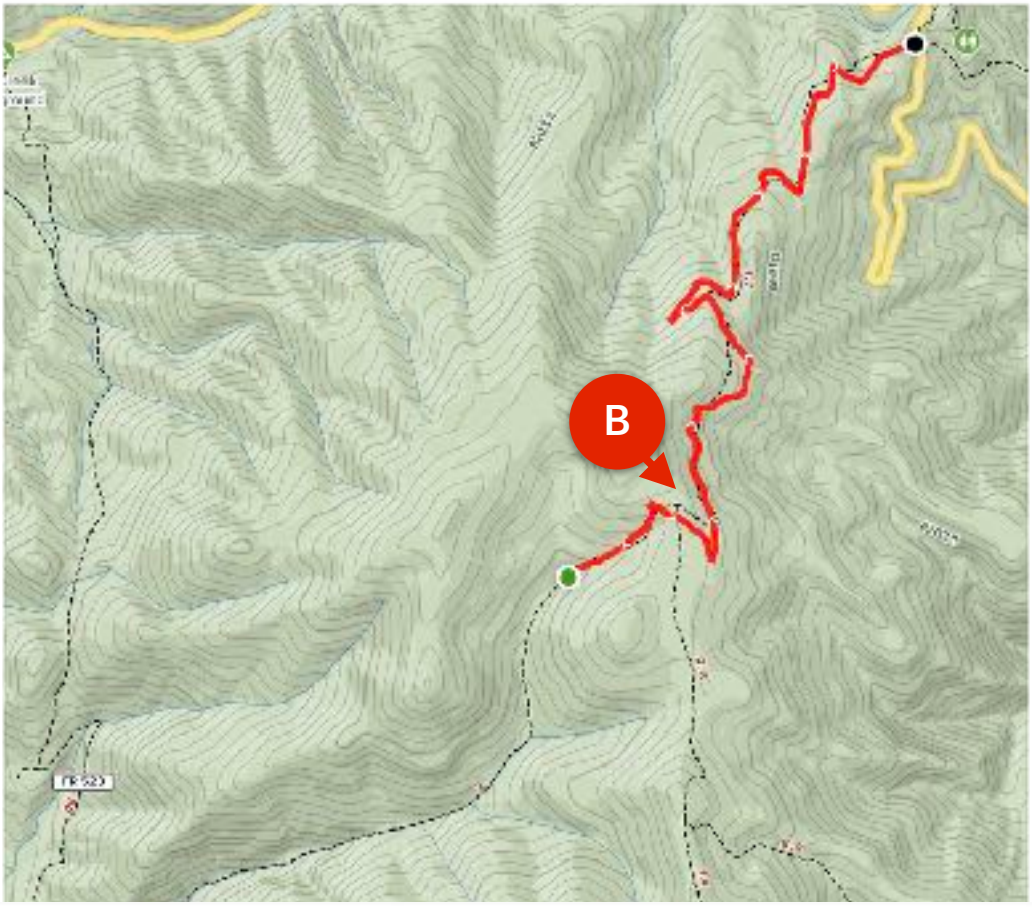
At this point on our walk, a scant .9 miles up the "trail" we were tired of crawling over debris, shifting rock and boulders, and avoiding tripping in the tangle of vines and vegetation. We gave up. We opted instead for another try from the top, from the Black Range Crest Trail.

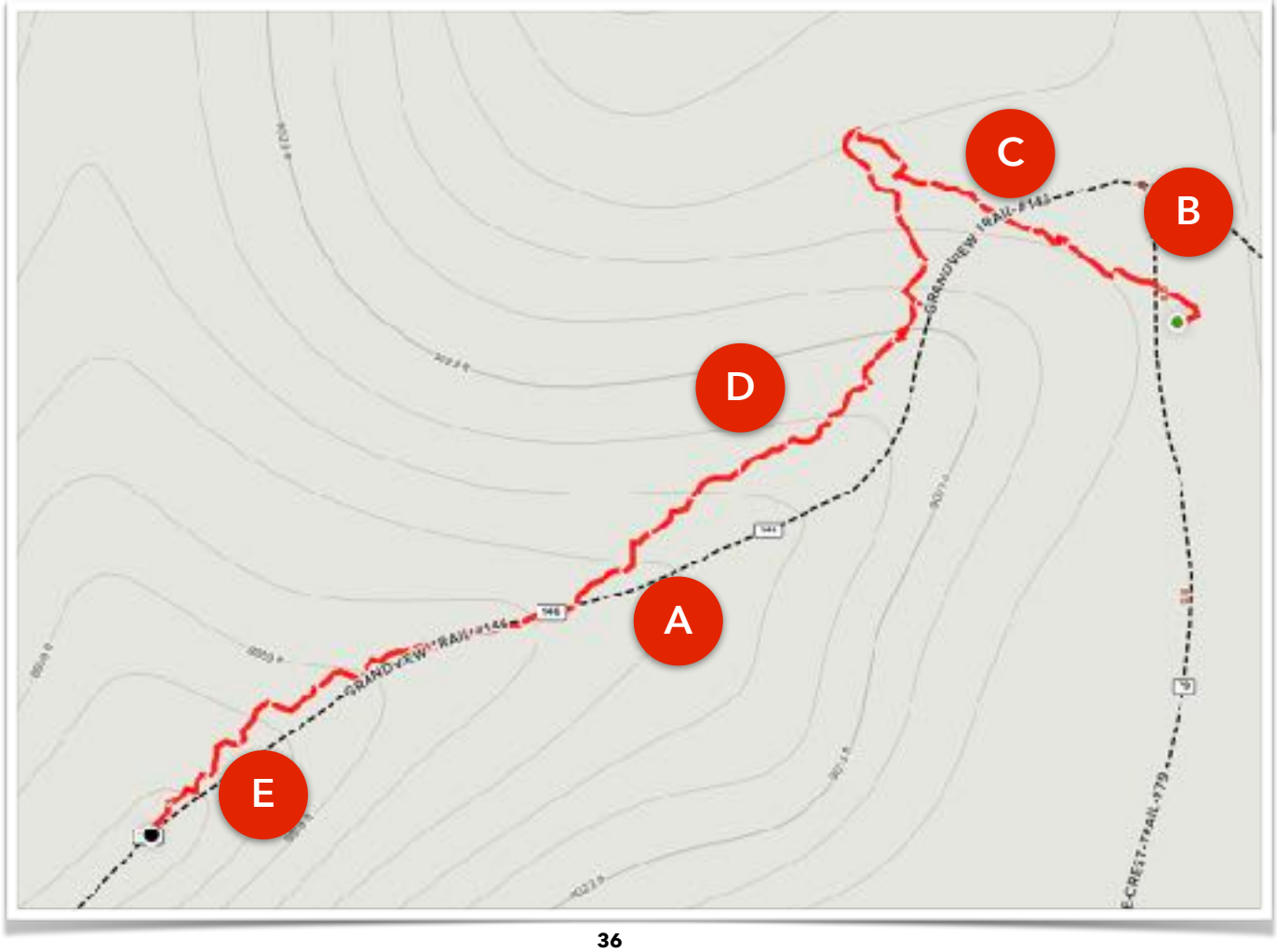
A few days later, on October 2, we walked south on the Black Range Crest Trail from Emory Pass (Sawyer's Peak Trail, see Volume 2, Number 4, October 2019 of this magazine) for 2.2 miles to the junction with the upper part of the Grandview Trail. The trail junction is well marked here ("B" on the map). The map on the following page indicates the distance is 1.7 miles; this is an error. The elevation gain on this portion of the trail is just over 1,000 feet. From the junction we wandered around a great deal (see detail of the Grandview Trail on a following page) trying to find the trail. Eventually we saw some burned tree blazes (at "C" on the map and pictured on a following page) - not that route finding is difficult, you are after all walking down a ravine. Before long we found the trace of the trail. The map indicates that the trail is in the stream bottom; it is rather on the north side of the ravine.

At "A" on the map a small stream came to the surface and continued on the surface at least as far as where we stopped - and given that there was a small stream flow in the lower reaches of the trail it is probably continuous all the way down the canyon. In the section which we visited the stream was mangled, but not completely destroyed, by cattle.

The upper section of this trail did not burn very badly in the Silver Creek Fire. There are several mature Southwestern White Pines in this area ("D" on the map). This species, *Pinus strobiformis*, is listed as *Pinus reflexa*, in some sources. It goes by several common names, including; Chihuahua White Pine, Southwestern White Pine, Mexican White Pine, and pino enano.

At "E" on the map the small stream is badly trampled but





B. The trail junction of the Black Range Crest Trail and the Grand View Trail is well signed at the saddle.

with its layers of moss and Iris is quite striking. It should be especially pretty in the spring when the flowers are in bloom.

We walked a half mile down the ravine and then decided to call it a day. I am pretty sure that the upper and lower trail descriptions provided here describe the natural history of the middle section of the trail which we did not visit.

As mentioned earlier, this is a trail you really have to want to walk. But if you are motivated and can put up with a hard go of it, it is well worth the effort.

C. The upper trail goes between these two large trees, a blaze can be seen about half way up the tree on the right.

E. *Iris missouriensis*, Rocky Mountain Iris, grows in the stream in this section. If the cattle have not destroyed everything it should be quite beautiful in the spring.

Published in Hillsboro, New Mexico