

The Black Range Naturalist



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Unattributed material is contributed by the editor.

Making "Trailing With Toasty"

by Bob Barnes

On September 1, 2020, the Black Range Website released "[Trailing With Toasty](#)". The video documents the predator-prey research which Harley Shaw is conducting east of Hillsboro. Sometimes we take natural history videos for granted. They just appear, to quote Aristotle and Plato - "out of the ether". (Actually they would have called it αἰθήρ.)

But let me tell you, it just ain't so. Like the idea that everything is made of earth, water, fire, and ether, the concept that these videos just appear is now generally held in disrepute. But if not from the ether, how?

I have made natural history videos for decades, always to share, always for the common good. The recording equipment has become much more sophisticated, much higher in resolution, and lighter (a big deal for an old man like myself). Even the tripods are much lighter. And the editing, well let me tell you, the days of starting one dissolve and going to breakfast, coming back to watch it finish up, and then to decide that it really doesn't work are history. Now a dissolve happens as fast as a keystroke.

Harley Shaw is retired. He now works full time but is no longer paid for his efforts - that is the definition of retired. When he had a day job he conducted research projects on various fauna in Arizona as part of his career with the Arizona Department of Game and Fish. More than a decade of that career was spent on Mountain Lion research. He is renowned for that work and for the numerous books on natural history which he has written. A few years ago, he and I made "[Dogs and Lions](#)", a video about his

time doing Mountain Lion research. Now he is focusing on fauna of a different size, specifically - cottontails, even more specifically, their role in the predator-prey cycle. His primary equipment in this effort is a beagle named Toasty. That equipment melds perfectly with the curiosity that flows through Harley's head. It is interesting stuff, and I have walked the foothills east of Hillsboro on several early morning outings watching Toasty trail bunnies, watching Harley watch Toasty (photo below).

At some point Harley's thinking about the predator-prey issues east of Hillsboro matured to the point that he asked if we might do another video.

We started in March 2020 and over several weeks spent a great deal of time recording raw video. Harley recorded a narration track and I did an initial edit. That first edit was as I put it "a lot of dog barking and sniffing".



By June we were into multiple takes of narration and reediting. This initial work was sent out to a few "candid critics" for comment, asking "what now?"

In July, Harley and I met with Travis Perry and Megan Pitman, two researchers with the Furman (University) Cougar Project. They offered some photographs from their camera traps - photos showing Bobcat and Gray Fox predation of cottontails. That was a real start in the editing effort to break up the sequences. They also offered to talk with Mike Abernathy about our project.

In early August, [Mike Abernathy](#), joined the effort, bringing a different visual perspective to the project. Mike is an experienced glider and motor glider pilot who wrote, produced, and piloted the camera-ship in the award winning movie [CloudStreet: Soaring the American West](#). In 2016, he won an Emmy for his photography in that project. (*CloudStreet* was nominated for an Emmy in four categories.)

In our case, the aircraft he piloted was a bit smaller (photo previous page). Each morning we were on site early so that we could get at least an hour of recording done before 8 a.m. After the sun crested the hills it created significant contrast problems in the wide-angle shots.

COVID-19 did not make this any easier. Meetings with masks and social distancing occurred periodically, emails were exchanged, video drafts were posted on Vimeo for comment, and every one remained in good spirits.

During the remainder of August we went through a lot of editing and reediting, recording and re-recording narration. I use the video sharing platform Vimeo to support the [Black Range website](#) and my personal website, [A Birding Life](#). Although not all of my work is on Vimeo, I do have more than [2,200 videos](#) on that site - mostly species accounts, but also [some long forms](#). And, it provides many tools which are typically used for collaborating on long-form videos. Upload a video (which takes

hours and hours given our internet "speed" in Hillsboro) and everyone on the team can view and comment on it - using time-code (so comments can even be made about a specific frame, or in time-code-speak, 1/30th of a second). At this stage of a project, candid, substantive comments are required and useful. Being able to provide such comments is not something that everyone can do, but when a team has the competence and the skill to do that, it is incredibly valuable.

We were lucky enough to be working with pros so the project came together in a reasonable amount of time. At the very end of August I was able to upload the final edit to Vimeo and announce the project to the world.

Harley indicated that he liked the final product, and from a producer's perspective that is really all that counts, and apparently many others were appreciative of the effort.

Perhaps most importantly, the film has opened up a new dialogue with regional and international

practitioners about how science, and the process of science, can be made accessible to the "lay" public. In an era of much anti-scientific bias, being able to talk about science in a manner that everyone can relate to is more important than ever.



Mike Abernathy piloting a drone during the recording for "Trailing With Toasty".

The Environment

by Taylor Streit

Although global warming is becoming quite unkind to planet Earth, it has been positive in some respects; especially in cold climes where a longer growing season means more fruit, fish, or crops. The delicious lobster's range has expanded. The Northwest Passage is more often open now, should you want to take a long boat ride whenever.

But it's tenuous, and small or big potatoes notwithstanding, the rest of the world is going down the tubes. Extremes have become commonplace. For instance, after the horrible drought of 2018, when water levels on the Rio Grande in northern New Mexico were the lowest on record, the following year, 2019, had nearly the highest recorded flows. (The lowest ever –by a lot– was in the summer of 2020. Followed closely thereafter by the great songbird die-off in the Rio Grande corridor.)

Small streams have dried up in the Southern Rockies. This is not that unusual and, normally, these little creeks bounce back in just a year or two – if it should happen to rain. But more concerning is that some of these smaller streams and lakes – especially in the lower elevations – are experiencing significant algae growth, high temperatures, and loss of fish and, probably, insect life. This is exacerbated by too many homes along waters with outdated septic systems. These are often extraneous second homes. And over it all is human want and greed – the 1960s vision of an

America where people would discover that they had enough money has not quite come to fruition!

And the huge catastrophes of climate change make it sort of passé to even notice the little infractions of mankind's upon the earth. Clean water is attacked by mining, development of all sorts, overgrazing, erosion, and pollution (in its thousand forms). All allowed, if not encouraged, by a government that appears to be our enemy. All such a bore!

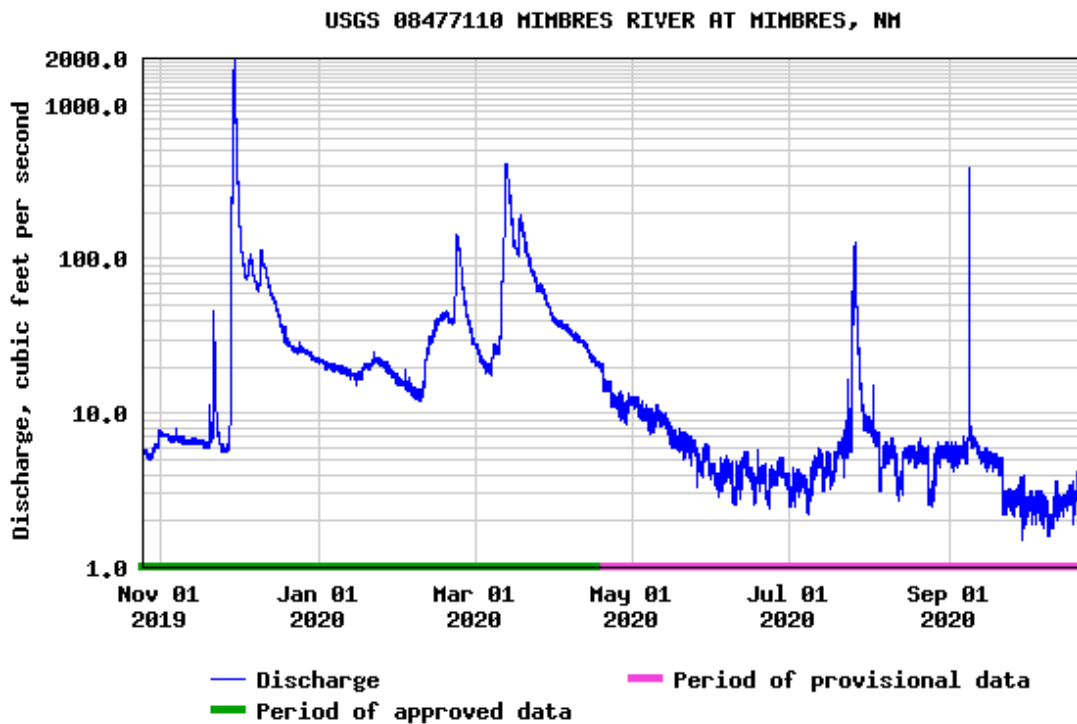
Global warming is about myriad items, some big and splashy like an iceberg crashing into the sea, and some local that make only ripples – like your neighborhood trout stream turning green.

Recently, I had two folks remind me of my place in these plain old "environmental issues." First was Greta Thunberg on the tele, and the second was a visit from an old friend – Steve Harris of [Rio Grande Restoration](#).

We all love Greta because her face seems incapable of showing lies and denials. Maybe that girl was just "raised right," or perhaps deception forms in our faces later in life – after years of trying to survive in a phony world. She had already floored that world with her UN speech the week before, and then I saw her on TV with Michael Moore. She seemed pretty much bored with the interview and split early. I wondered if she hasn't learned that adults can't handle – or fathom – what is happening. The best-intentioned "grownups" have a profound – and perhaps healthy – denial system that says, "World ending? Sure!"



Taylor Streit - photograph courtesy of Nick Streit



Even within one year, the variability of our streams is significant, as indicated by this data from [United States Geological Survey, Water Resources](#).

If you look close, it's easy to say, "What's the use?" But that ain't going to work, is it? And those who have been working at saving a sick earth – rather than a dying one – need to stick with their job and not go to that dark place. While adults are bickering about another little ugly matter, the youth of the world might win over the powers that run the universe. Save the world, kids. Adults are incapable.

Steve Harris brought me to this conclusion too. His 501(c)(3), Rio Grande Restoration, has done decades of work to protect many aspects of the Rio Grande and Chama Rivers. He is also the owner of Far Flung Adventures – support him in all forms, please. (Cisco Guevara of Los Rios River Runners is another man in the rafting business who does great work for the environment.)

High Country News printed: "It's hard to pin accomplishments on Steve Harris because he usually works behind the scenes. While other environmentalists make headlines, Harris toils quietly, in search of nuts-and-bolts solutions." That was written almost 20 years ago, and Steve has been "pinned" with many medals since – all while working for the rivers of New Mexico.

Here are a few items that my years outdoors in New Mexico have taught me need special attention.

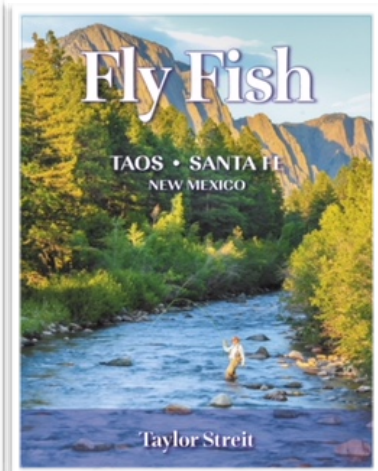
Grazing is a monster that devastates trout waters, their riparian areas, and the entire watersheds of rivers. Nowadays, so few people are aware of what's happening outside that few know what a healthy range looks like: where vegetation is full, green, and varied. Look at the sides of an un-mowed highway – and then look over the fence to where the cows are. Startling contrast – especially if you are looking at federal land! New Mexico state land is going to look a lot healthier than federal land because the state charges four times as much to graze a cow/calf unit than the Bureau of Land Management, Bureau of Reclamation, or Forest Service does. That's \$5.50 per head per

month rather than the sweetheart deal of \$1.35 on federal lands. That usually turns out to be about \$8 per year per cow because cows do not graze on the allotments during all months!

Grazing fees are so cheap on "Multiple Abuse" federal lands that cattlemen can run too-high numbers of cows, hope it rains, and then check and see how many are left standing at roundup. If it doesn't rain, no worries; the minuscule "fee" then qualifies the grazer for emergency green – in the form of free feed programs, wells, loans, and grants. For your \$1.35 per month, you also get predator control with antiquated tools, like cyanide canisters, and the corresponding mentality.

Real estate development is a real heartbreaker to me personally; I become depressed when I visit a place I used to frequent that has been ruined by building. When I moved to New Mexico 50 years ago, houses didn't litter the countryside but were in town where they belong. It would be rare to even see a house out in the sagebrush back then. When all the ranchettes are added up, they cause a lot of damage, including erosion, habitat

The article is a reprint, with modifications, from [Taylor Streit's most recent book](#). Graphics included here were not included in the original publication.



degradation, and wildlife displacement and extinction. I'm always astounded when meeting urban people who move to New Mexico and think they are doing nature a favor by only putting one house on five sprawling acres.

Maybe some of the problem is that the city people who make the environmental sin of putting their house on five acres might actually think that they are making the least impact. That's how it plays in town and people might not know better; unfortunately they take counsel from their once-urban neighbors and real estate beings. Ask a country-raised person their opinion and they are gonna say right off that spreading houses over a wide area benefits only the homeowner.

I once wrote a piece about a sprawling subdivision that had an "elk refuge" at its center. Perhaps there were signs directing the elk there, but to find an elk there would be a surprise – as it was only fifty acres. And it probably wouldn't stay long, as elk eat as they mosey, and if one should find its way to the sanctuary it will pass thru in about 3 minutes. Too bad the elk – or their representatives – didn't get a say in the planning process. (There was herd of antelope that lived on that subdivision's area – as I used to drive by there often I sadly watched their numbers recede and they are now gone.)

This is a massive problem in spread-thin New Mexico and I don't recall ever reading or hearing anything on this from all of our environmental groups. Could it be that many of the members of the groups are living along their own elk refuge? Well we humans are all greedy and want things our way so forgive yourself; but if you are said person, help straighten out your karma by making an effort to inform would-be home builders of the impact of their actions.

One step further is the dreaded billionaire class buying up the rare – and consequently expensive – riverfront properties. You don't get that rich by being good neighbors, and this crowd needs ousting. If we could get a stream-access law, it would help curb this huge threat to our waters by making the waterfront properties less attractive to the jet set. It's no fishing allowed – for free or fee. Consequently, we will never fish there again! So please get on the bandwagon for fishermen's stream access! (Stream access is currently being addressed by the New Mexico State Game Commission).

The revised federal Clean Water Act is a horrible ruling for New Mexico because it ends protection for "intermittent" waters, which include many of our watercourses. In the Gila, most streams fall into this category, as they go underground and then pop back up once they exit the mountains.

I, personally, devoted a lot of time and energy to battling the "moly mine" on the Red River (please read "Red River Blues" in Man vs Fish). More recently, my son Nick and many others have helped the Questa area get back on its feet with stream and lake improvement projects.

That mine is finally shut down, but as I write this there is a proposal for a mine on a branch of the Pecos. The governor has finally come out against this, but mines along other watersheds – where there aren't so many people living nearby, like Copper Flat near Hillsboro – get approval because they "create jobs." What good is a job if your surroundings are dying?

All mines pollute, but some more than others. I once fished a stream in central Colorado with my famous fly-fishing brother, Jackson Streit. After a great day on the water, we were driving up the same drainage we had been fishing. We passed a group of mine buildings and I asked him what it was.

"A molybdenum mine," he said.

I, accustomed to the devastation from the moly mine along my favorite Red River, said, "Can't be. We were just catching big, wild trout a few miles downstream."

My brother said, "Yes, but there are too many people around here, so they do it right."

We don't hear talk of the Sagebrush Rebellion much lately, but the threat to privatize public land has not gone away. Greedy people are on the top rung of the ladder all over the world right now, and they like stealing land. It's usually done in sneaky and convoluted ways.

But, lots of groups are watching this and other issues that are important to our waters. These include Amigos Bravos, Sierra Club, Trout Unlimited, New Mexico Wilderness Alliance, Taos Land Trust, Backcountry Hunters & Anglers, and New Mexico Wildlife Federation. They really need our support.

River Source (and Trout Unlimited) out of Santa Fe is doing a lot in schools – teaching kids about our water and fish. And even taking them fishing!



[Visit the River Source Website](#)

House Centipede

Scutigera coleoptrata, the House Centipede, is found throughout the United States. But like the humans that are also found throughout the United States, it came from elsewhere, in its case from the Mediterranean region. Its native range and its English common name are related. It does not deal well with the cold of the north and prefers to stay in warmer, and generally moist, places.

This is one of the species that you may find in your bath or sink, the perfect micro-environment. They are aggressive hunters and eat flies, bedbugs, earwigs, small spiders, silverfish, cockroach nymphs, and moths - not so much humans. They eject venom through their forcipules which are modified front legs. Forcipules are generally too small to easily penetrate a human's skin. When they do manage such a feat, most people will react in a similar way as to a bee sting. It should go without saying, however, that people react to venoms differently so a bite by this, and other, species should be avoided. Forcipules are unique to centipedes; other arthropods do not have them.

There are barbs at the ends of the legs of this species. The barbs enable the centipede to hold its prey. These barbs, and the centipede's faceted eyes, make the House centipede a very effective hunter. Their well developed eyes set them apart from most other centipede species.

House Centipedes modify their hunting behavior based on the prey they encounter. When a wasp is attacked, for instance, the centipede will inject the venom and then back off and wait.

If you have these critters in your house, the best way to rid yourself of them is to get rid of their prey.

The House Centipede is fairly long lived, as long as seven years. They reach sexual maturity in the third year. The mating process is similar to many other species. Male and female approach each other, antennae touch, the male lays its sperm on the ground and then the female uses the sperm to fertilize the eggs.

A female will lay scores of eggs: as many as 151 have been recorded. When the young hatch they will only have four pairs of legs. As they mature and increase in length, they develop more legs with each molt. An adult will have 15 pairs of legs. Their long legs, overall shape, and coloration make this species fairly easy to identify. Note also the three dark lines which run the length of the body and the color-banded legs.

Scutigera coleoptrata is a small creature, usually only an inch and a third in length. It is fast, capable of traveling more than a foot a second. Its size and speed are two reasons that they are seldom seen.

Note the hind legs, which look like antennae. This characteristic is a type of automimicry and is assumed to have developed to confuse potential predators about which end is which.



House Centipede, Scutigera coleoptrata, Hillsboro, New Mexico , during early September.

Economic Development and Natural History - The Soft Path

by Isaac Eastvold

The following is public comment submitted to the Truth or Consequences City Commission by Isaac Eastvold, Chihuahuan Desert Conservancy. It references an article in the Sierra County Sun entitled, "[How sandhill cranes could return to Sierra County](#)" by Andrew Potter, December 2, 2020.

Honorable Mayor Whitehead, City Commissioners, City Manager Madrid, City Attorney Rubin, and City Planning Staff:

As an addition to our City and County's portfolio of economic development plans, right in front of us is development of our unique birthright of natural history to make T or C a renowned destination for bird watching, nature study, low impact recreation, and healing through what the Japanese call "nature bathing." This "soft path" to development is almost always less expensive than the "hard path," and is sustainable for a very low, or even no, cost; but not infrequently it is overlooked.

Andy Potter, in the above attached link to his Opinion Piece for the Sierra County Sun, has an excellent idea to help take us down the "soft path" to economic development. Purchasing as park or open space parcels on the east shore from Rotary Park, besides being relatively inexpensive, would strengthen the Wetlands Element restoration around Rotary Park previously approved by the City Commission in the 2009 Healing Waters Trail Plan. The City Attorney is now pursuing "quiet title" for the Park from the Bureau of Reclamation. Both shores of the Rio Grande in the vicinity of Riverbend and Rotary Park, therefore, would become a potent visitor destination for birdwatchers, natural sciences students, and residents wanting inspiration and to just relax in a quiet natural environment.

In order to better qualify for grant funding for land purchase and wetlands restoration, the T or C City Commission should take two simple actions: 1) add the missing Open Space Element to the Comprehensive Plan, inclusive of the east shore parcels across from Rotary Park; and, 2) reaffirm implementation of the long-overdue Wetlands Element in the Healing Waters Trail Plan of 2009, all of which has been previously approved.

Just protecting both banks of the River in this area would create a highly successful visitor destination and increase the tourism sector of our economy. Users of Riverbend would be delighted, as would Rotary Park users and nearby residents, just as they are now by the occasional sighting of great blue herons and deer across the River.

Were you aware that bat tourism organizations exist world wide, and will direct their members to sites which are protected? Examples of bat tourism exist at Carlsbad Caverns National Park and the Turner Enterprises magnificent bat cave in their Armendaris Range property. These famous bat tourism destinations could guide T or C in sensitively developing their own populations of bats for tourism.

I have observed that large migrating flocks of both swallows and bats spend considerable time up and down river from Rotary Park, flying back and forth low over the river, to re-fuel on the swarms of flying insects. Besides helping to control insect populations, this key re-fueling area helps these animals to put on enough tiny bits of fat sufficient to continue their long migrations up River for breeding, and back down River to Mexico with their juveniles for the winter.

These precious kinds of places along the Rio Grande are essential to prevent the kind of massive bird die-offs we saw this past fall in New Mexico. The carcasses--mostly swallows--gathered at White Sands and sent by USFWS to the USGS lab in California showed that the animals were completely emaciated, and had no fat whatsoever in their tiny bodies. They just starved to death.

Preserving both shores of the River at Rotary Park would be a substantial mitigation helping these animals, and other migratory species, to prepare to continue their long journeys. It would help halt their decline toward listing as rare, threatened, or endangered species, and a substantial upgrade for our partly degraded section of the Rio Grande between Caballo and Elephant Butte dams.

If migrating species of animals along the River do become federally listed, it would place the entire area under strict standards for their recovery. This now can be avoided with economically beneficial mitigation measures such as I have suggested.

Please correct me if wrong, but I believe the east shore across from Rotary Park was at one time used for farming. Putting that use back to provide timely food for the great sandhill cranes, snow geese and Canada geese which Mr. Potter speaks about, would restore that traditional use. World famous wildlife refuges to our north, such as Bosque del Apache, could guide us in this simple restoration.

"Hard path" urban development of the east shore, however, besides being highly expensive, is also incompatible with its partial designation as a flood zone. Extending infrastructure for "leapfrog" development across the River would be an onerous burden on T or C taxpayers. And most T or C residents would oppose it.

Far better, then, to add to our development portfolio this obvious opportunity to use our birthright of natural history for "soft path" development which is both sustainable, inexpensive, and a potential boon to our economy.



Art work by Sharon Eastvold.

Calliope Hummingbirds Bathe on Wet Leaves - by John P. Hubbard

Reprinted from the NMOS Bulletin 11(1):14-15, 1983

On 26 August 1982, I watched as two female-plumaged Calliope Hummingbirds (*Stellula calliope*) bathed on the dew-drenched leaves of common reed (*Phragmites communis*) at Santa Fe, New Mexico. The observations were made between 06:45 and 06:55, at distances of 1-5 m. The temperature was 17°C (56° F), the wind calm, and the sky somewhat cloudy.

When first noticed, one hummingbird was hovering just above a leaf in a clump of the common reeds. The leaves of the plants were largely covered with a sheet of dew, and droplets hung from the pendulous tips. After a moment, the hummingbird dropped onto and clung to the upper surface of the leaf, which measured about 50 mm in width and 600 mm in length. The bird then proceeded to rub its underparts, head and wings on the leaf, obviously soaking up moisture onto the plumage. This observation was made from about 5 m, and it lasted for about 15 seconds.

I approached closer and stood within the edge of the clump of reeds, which measured about 2 m wide and 8 m long and consisted of plants up to 3.5 m tall. At that time, another Calliope Hummingbird appeared, and after a momentary aerial clash, it and the other bird began to repeat the bathing behavior seen earlier--at times within 1 m of each other. In some five additional episodes, the birds lit on wet leaves and soaked their feathers with dew. In most cases the wings were stilled, but hover-and-cling actions took place when the leaves became agitated. Each bout of leaf-bathing lasted 10 to 30 seconds, interspersed with occasional aerial clashes between the two birds.

After several episodes of leaf-bathing, each bird retreated to a nearby twig and began to preen the plumage vigorously--sitting within 1.5 m of each other. At that time the birds were only 1-2 m from me, and the short bill, small size, buffy flanks, and limited rufous and broad aspect of the outer tail feathers confirmed their identity. Another female-plumaged Calliope Hummingbird joined them toward the end of my observations, but I did not see it leaf-bathe.



Calliope Hummingbird with pollen streak on forehead.

In my experience, the Calliope Hummingbird is the most frequent of its family in New Mexico to forage on flowers and arthropods deep within the leafy confines of plants. In our family wildflower garden, this species may at times be lost to sight as it forages among leafy columbines (*Aquilegia* spp.), beardtongues (*Penstemon* spp.), and other plants. One can see from this the ease with which brushes with wet leaves by foraging birds could lead to actual leaf-bathing behavior. While such behavior is more readily discerned and thus more striking when involving common reeds, it may be frequent in conjunction with more typical forage plants.



Some of our viewers act like they have never seen a Bald Eagle. Visit our "[Birds of New Mexico](#)" video portfolio.

Hillsboro Research Institute Announces Major Breakthrough in Quantum Mechanics

On April 1, the Division of Nano Studies, of the Hillsboro Research Institute, announced a major breakthrough in the application of the theories of Quantum Mechanics. The press release provided by their Chief Information Officer reads:

"Hillsboro is not quite at the center of North America. To remedy this problem we have successfully modeled global plate tectonic interactions and will be able to move North America slightly to the east in a short while - this will result in Hillsboro becoming the center of North America. (The move, combined with global warming will submerge Florida resulting in a diminishment of the east-west distance of North America.)

This is appropriate and consistent with our long-term goal of maintaining Hillsboro as the center of the universe. When we first discovered that objects in the universe were traveling away from each other at different speeds (disproportionate expansion) we immediately took steps, using our universal gravitational dynamics matrix, to remedy the situation. Otherwise the center of the universe would have shifted from our house to Jan and Gary's house and then farther astray to Kingston (and then in a northwest direction, reaching Flagstaff, Arizona on June 17, 2023).

Having solved the problem of disproportionate expansion, and now successfully harnessing continental drift, we can rest easy for awhile knowing that the center of all things is where it should be -- there is a constant nagging problem with spatial dimension $Hn2w$ but that is hardly worth concerning ourselves with.

We solved the "temporary priority shift" anomaly a number of years ago. This anomaly occurs because Rebecca, as the absolute center of the universe, travels periodically - sometimes just to the Post Office down the street, sometimes to Portland, sometimes to Oaxaca, etc. -- the issue is the same. But that problem is solved. Whenever I tell her that she is the center of the universe where ever she is, she simply gets flustered -- she is not quite as expert in multi-dimensional spatial physics as I."

Tree Swallows, The Wind, and Climate Change

For the most part, the people of southwestern New Mexico see Tree Swallows only during migration. Although they nest in most of the United States there is a narrow band across the southwest where they do not. They winter a bit farther south. Although it is fairly certain that we will see fewer birds of this species in the future, because of our human-induced climate change, there are two factors which will determine the severity of that decline. First of all, Tree Swallows are modifying their laying and hatching patterns in an attempt to avoid increases in temperature and wind. It is this last point which is often lost in the discussion of climate change. Climate change is not all about increases in temperature. Those increases cause all sorts of other things to

happen; wind patterns change, rainfall patterns change, and vegetation patterns change. All of these changes, in turn, create other changes. Tree Swallows have more difficulty feeding their young when it is windy. There are a number of reasons for this. Most are related to the effect of wind on the insect prey of Tree Swallows. Wind makes it more difficult for all of those little (often biting) things to fly about, and when they are able to fly



their flight becomes more unpredictable -- both meaning that Tree Swallows are less successful in foraging during the wind. Studies in Alaska show that it is changes in windiness and wetness which effect Tree Swallow (successful) reproduction rates the most. (The effect of wind on the ability of many bird species to feed on their breeding grounds may have contributed to the significant emaciation of the birds involved in the die-off which occurred during migration, in New Mexico and other locations in the southwest, last year.) The Tree Swallows have advanced the date of their egg-laying by about a week over the last 32 years in an attempt to combat these climate changes. With fewer Tree Swallows being produced we will see fewer in migration. The second factor which may change the numbers that we see is the possibility that wintering grounds will creep northward. Although I do not know of a study which demonstrates this change for Tree Swallows, it is well documented for other bird species.

Source

["Wind and rain are the primary climate factors driving changing phenology of an aerial insectivore"](#); Irons et al.; Proceedings of the Royal Society B; 26 April 2017

Erratum

We have just noticed that the photograph in the left column of page 26 of our last issue was not attributed. The photograph was taken by Russ Kleinman.

What's The Deal on Capitalizing the Common Names of Species?

Many traditional style guides dictate that the common names of species not be capitalized. All of the authors who contribute to the BRN are aware of that guidance. Some, like the editor, chose to ignore it. We follow the standard rule when material is submitted following that guidance. Likewise, when the author chooses a non-standard approach we allow that as well.

Native Plants Save The Birds

In our last issue we noted the significant die-off of birds migrating through New Mexico during late summer/early fall of last year. A major factor in that die-off was the emaciation of the birds. They were starving, and migration requires a lot of energy, a lot of food. That event led many people to wonder about their role. What could they do to help birds in such dire straits? And from there, what could they do to help birds period.

Our resident birds rely on the native plants of this region for their food, either directly as a source of seed, nectar, and fruit, or indirectly as insect attractors. Migrating birds often stop here to replenish their fat stores.

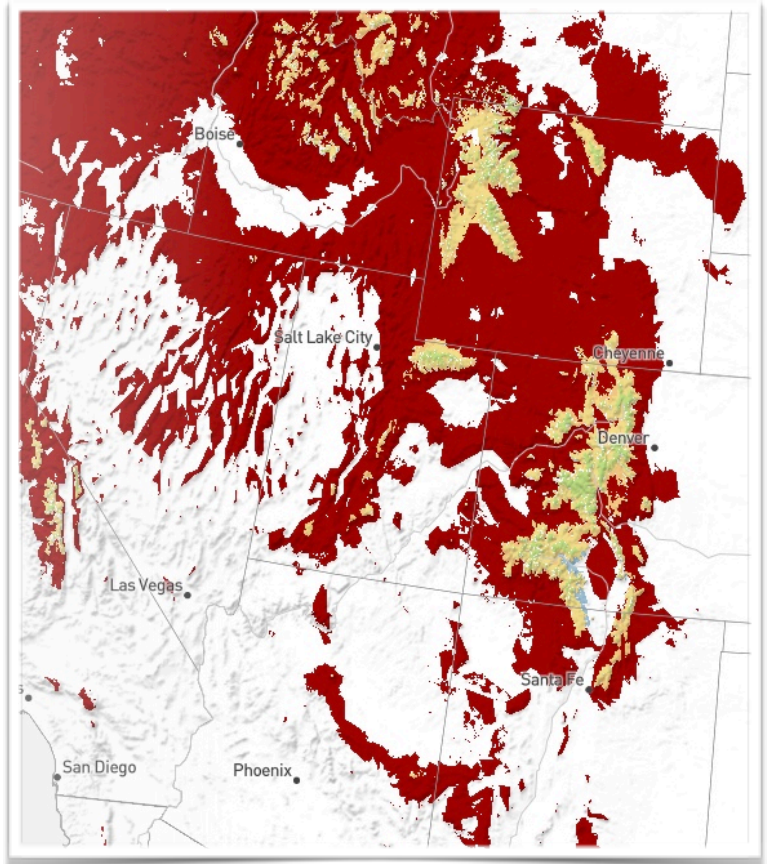
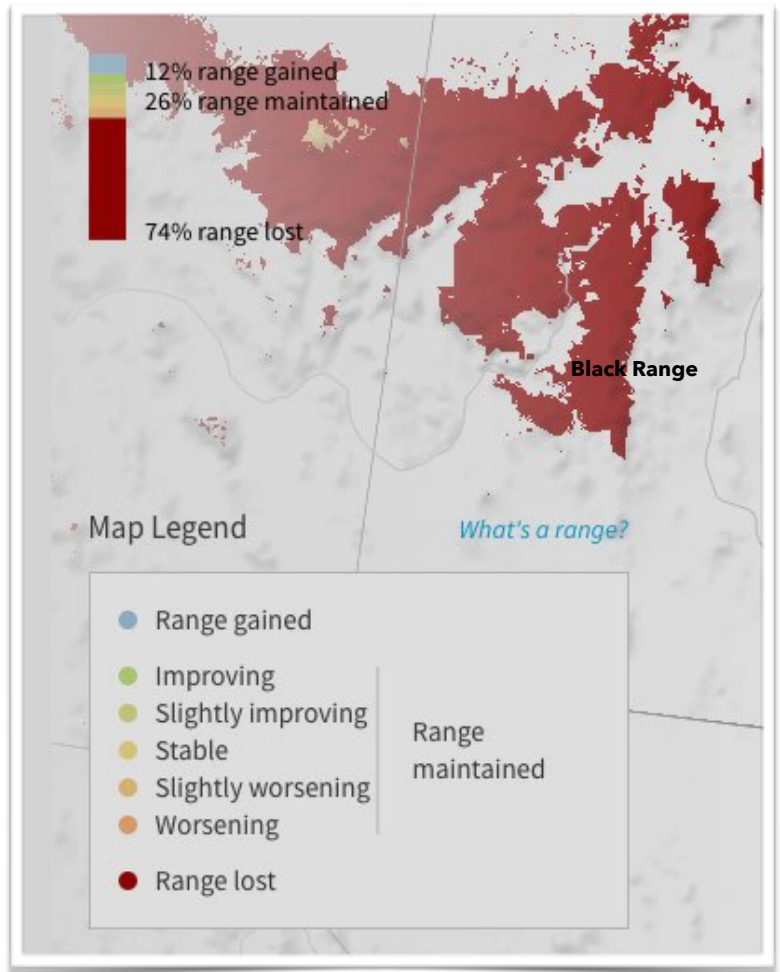
In this issue we provide some ideas about specific acts which you can perform to increase the chances of survival of the bird life of our area (resident and those in passage).

We start with some general resources and proceed with some information about specific plants.

Humans have degraded the natural landscape significantly since arriving on the scene and in particular since the Europeans entered our area. Habitat loss is a major challenge for the bird species that spend time here. The issues associated with habitat loss are fairly well understood, and replenishment of the natural resource is the most commonly espoused solution. The rise in global temperature creates another set of issues entirely. In particular it has changed, and will continue to change, the geographic distribution of plant species at a much more rapid rate than that which occurs through natural (non-human influenced) processes.

One resource which can help us understand the changes to the distribution of plant species is Audubon's "Survival by Degrees" page (audubon.org/climate/survivalbydegrees). Click on the box in the middle of the page to gain access to the tool. Enter your zip code and gain access to the Audubon listing of bird species affected by climate change in your area. You may select between two sets of filters, one for amount of temperature rise, the other for the season. For our assessment we used the two lower "temperature rise" filters, +1.5° C (almost a certain increase at this point) and +2.0° C (a probable increase given the refusal of many individuals and nation states to act responsibly). During summer, at an increase of +1.5° C, one species (the Red-naped Sapsucker) is listed as highly vulnerable, and an additional 43 species are listed as moderately vulnerable at this most certain of increases. At an increase of 2.0° C there are 9 species listed as highly vulnerable (Montezuma Quail, Broad-tailed Hummingbird, Red-naped Sapsucker, Dusky Flycatcher, Pygmy Nuthatch, Townsend's Solitaire, Olive Warbler, Green-tailed Towhee, and Red-faced Warbler), and an additional 46 are listed as moderately vulnerable.

Using the Red-naped Sapsucker as an example, the program indicates that the species loses the vast majority of its summer range in the Black Range, top right. This loss exists in the vast majority of the western United States (lower right).

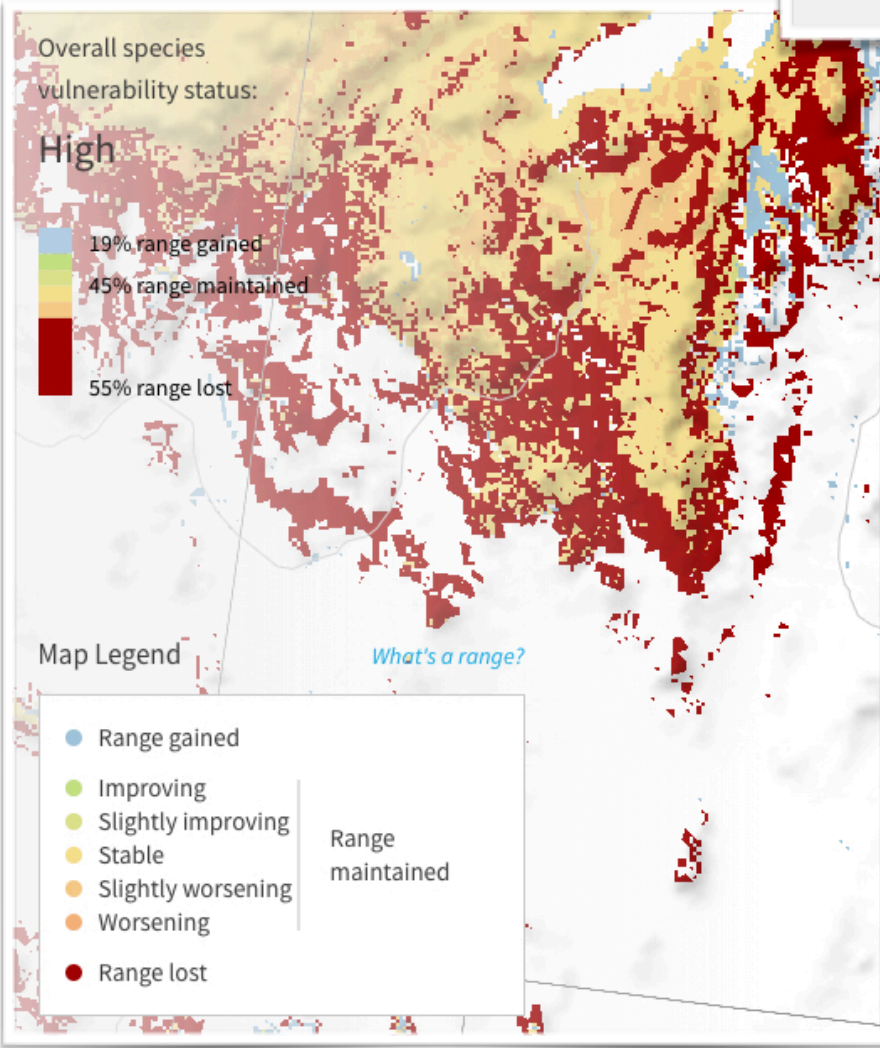
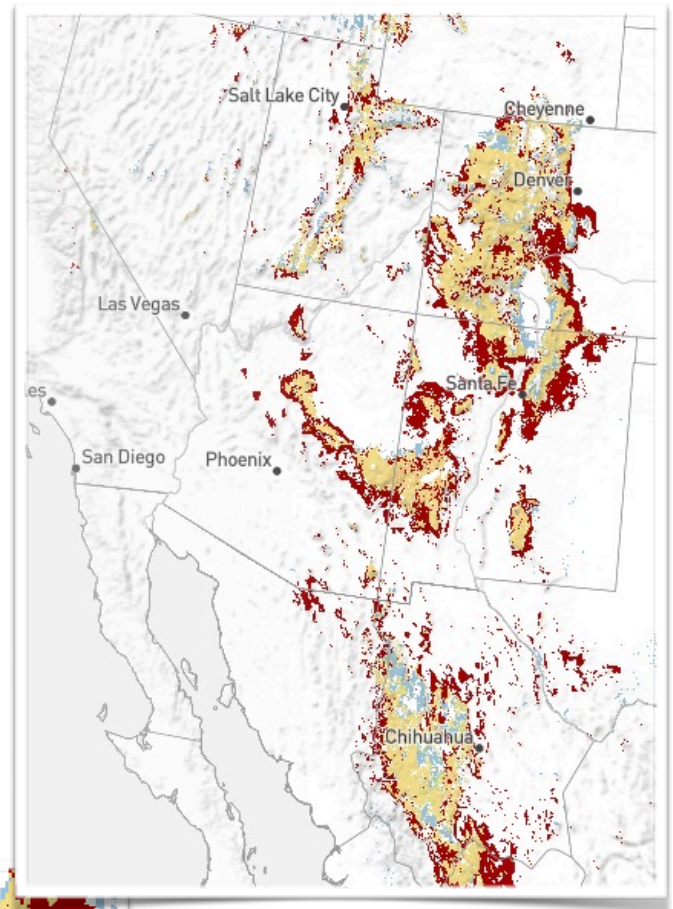


Although there are some small areas of range extension in Colorado, northeastern Utah, and western Wyoming, these increases pale in comparison with the range losses. This species has a significant problem.

Toggleing the filter to the winter season shows a different story. The species would experience a general increase in its range in the western United States, extending northward several hundred miles.

But if you die in the summer, it doesn't matter what your winter range is.

Another example indicates the complexity of the issue. Using the summer filter set at an increase of 2.0° C, the program indicates that the Broad-tailed Hummingbird loses 55% of its current range (while gaining 19% elsewhere) - bottom image. Not only does the species lose most of its summer range, the geographic shape of that range changes. In the area of the Black Range most of the lower elevations lose this species - except that in areas with a bit more moisture there is some range expansion. Because of their dependence on the flowers growing at higher elevations they are most abundant high in the the mountains, where their "bicycle chain sound" is a constant reminder of their presence. Their ability to migrate long distances helps, but they lose or barely maintain range. This pattern is typical of the western U. S., image right.



The loss of range is due to two (interrelated) factors: changes in native flora and the changes in the fauna which has associations with it. If a plant can no longer survive at a locale, under normal circumstances, the insects which are associated with it are affected, as are the birds which eat the insects. Much to-do has been made over the idea of a web of life over the years and with good reason.

Planting strategies are best informed by some idea of the bird species that will be affected. Planting native nectar species, for instance, may help mitigate the range shrinkage of the Broad-tailed Hummingbird by ensuring that its food remains available within its native range.

Audubon also has a tool to identify, broadly speaking, what species of plant may be useful for the purposes discussed here. The "[Native Plants Database](#)" which Audubon maintains will generate a listing of plant species suitable for your zip code. For zip code 88042, it generates a listing of 59 plant species which it indicates are "best results" and 385 for "full results".

These tools will "get you in the ballpark"; they in themselves provide enough information for you to use to make a positive difference. And remember, small bits add up. Your efforts can be part of a larger global effort.

As useful as these tools are, they are more effective when augmented by local knowledge. Who has done what, when, how, in the Black Range. What worked and, just as importantly, what did not.

Create Change With Your Own Backyard Habitat

by Nichole Trushell

In reaction to the losses of migratory birds last fall, the idea emerged to write a series of articles about what we might do as individuals to help migrant and resident birds. And so, this focus on home habitat creation emerged as a topic for the Black Range Naturalist articles.

A backyard habitat is not difficult or expensive to create and maintain. With an ever-changing palette of colors and textures, along with the watchable wildlife you will attract, this garden will be a fantastic landscape addition. It will bring beauty, joy, and provide an island respite for wildlife.

Using native species ensures that your local natural system is supported. Why does it matter? Non-native plants may provide a pleasing look, but ecologically, they are a wasteland in terms of supporting our diverse native species. There is a specific relationship among native plants, animals and other organisms which have adapted to life in the southwest, and to each other. This is at the base of our ecology. A landscape of non-native plants takes up space where habitat used to be.

Many of us live in rural areas and may question the need for creating habitat when surrounded by vast open space. The reality is, even our public lands have heavy agricultural uses; these uses have many impacts on the health of our natural systems and diminish their ecological values.

Key to designing a home habitat, is including a diversity of native plant species and layers of plant structure; that is, include ground cover, grasses, perennials, shrubs and trees. These key elements combine not only to create beauty but will successfully encourage a diversity of life on your property. Also remember that including water is critical.



Steve Morgan and Nichole Trushell's home in Kingston has an entry accented by layered plantings, including *Anisacanthus*, *Rhus*, *Agave*, *Sphaeralcea*, *Ericameria*, *Hesperaloe*, *Echinocereus*, *Heliantus*, *Prosopis*, *Forestiera*, and *Fraxinus*, among others. Except as noted, all photographs in this article are by Nichole Trushell.

Another advantage to maintaining and creating natural diversity: the yard will have very few pests. Allowing natural predators such as spiders, garter snakes, gopher snakes, lizards, praying mantis, native wasps, and also birds, will help maintain a natural, healthy balance.

It is also critical to minimize soil disturbance. Any disturbance of the naturally occurring conditions brings weeds. Where weeds do grow, do hand work to remove them and seed native grasses or perennials in their place. If your soil has been disturbed, adding seeds and a light layer of native chippings or other organic materials will help the area heal and will retain needed moisture for plant establishment.

Avoid the use of pesticides or herbicides of any kind. Pesticides remain in the tissues of insects and rodents. This can unintentionally poison other members of your natural system when these are ingested. Many of these chemicals also remain in your yard and soils and can contaminate you and spread to other areas with rainfall.

Some other important considerations for your Habitat Garden:

- Include perennials with different flowering times (early spring through fall). You will have a lovely array of native insects and will have a great hummingbird population, even without feeders.
- Retain and plant a variety of natural grasses for seed sources and shelter. The flowering stalks with set seed should be left into fall for cover and food for birds. Cut dry grasses down after seeds have dropped and before the spring fire season.
- Buy plants from knowledgeable sources. Local environmental education organizations, the local Native Plant Society or Cooperative Extension are sources of additional information. Many plants are called "native" incorrectly.
- Retain, enhance or create boulder outcrops and rock walls. These act as shelter for reptiles and other small animals. You can support a fantastic population of lizards.
- Retain natural leaf mulch and add other organics - if available, native chippings can be added in a 1" layer. These help plants and also encourage a variety of life including the lizards and their prey. In coniferous zones, retain 1" of needles on top of the natural dark decomposing zone below the needles. This will hold moisture in your soil and discourage erosion. Your trees and shrubs will be much healthier and survive better during dry periods.

- Avoid being too tidy if dead materials are not a fire hazard.
- Typically, fertilizers are not necessary when you plant regional natives. These plants are well adapted to our soils.
- Keep water available for wildlife - this is critical. An irrigation emitter can very simply be secured in a large water dish. This not only provides a water source, but it helps keep wildlife from chewing into your irrigation system to find the water they can smell. Additionally, creating a simple water feature with moving water in a small, recycled design is ideal and will attract a wide variety of birds. Designing for this in a shaded area reduces water loss to evaporation.
- Be aware of the heavy impact that domestic cats and dogs have on our native wildlife. If you have dogs or cats that attack birds and lizards, consider creating your habitat away from spaces where pets reside. Cat yards are a great way to help protect wildlife. In any case, be sure to place water or feeders in areas where domestic cats or dogs cannot easily attack the life you are attracting.

Planting for Birds and Insects

If you wish to help support bird populations, caterpillars are key. Butterflies and moths, members of the insect order *Lepidoptera*, go through a physical change called complete metamorphosis. The caterpillar is a critical anchor in the diet of many birds. These little "hotdogs" give nestlings fats and proteins; additionally, some have carotenoids which are important in feather pigmentation. Moth caterpillars are best; they are the most edible, diverse and very abundant. Young bird food is about



The **Madrean Alligator Lizard**, *Elgaria kingii nobilis*, is one of the species which can be attracted to your yard with proper landscaping. This image is from Hillsboro. (Barnes)



Monarch, Danaus plexippus, on Horsetail Milkweed

90% insects. Insects are critical in the diet of adult birds as well. You can't love birds and not embrace insects!

Moth and butterfly larvae (caterpillars) typically feed on a very specific plant species, their "host" plant. The larval food is also different than that of the winged adult butterfly or moth. Having diverse food sources for different life stages is helpful in survival. Plants for adult nectar feeding are not as species specific, but moths are attracted to plants which have strong evening scents: Brickellia, honeysuckle, primrose, and *Datura* are examples. In this huge group of insects there are many stories. For example, although many adult *Lepidoptera* feed on nectar from flowers,

some feed on scat, carrion, or rotting fruit. Some caterpillars eat fungi and decaying plant materials.

Included here are a number of important native landscape plant species. Most of these are fairly available as nursery stock or from seeds. I have included some notes and a few examples of values as caterpillar hosts and as nectar producers. An * indicates that the plant is not common in the nursery industry, but is excellent to have in your yard. An # indicates that it has a wide range of tolerance from yards in the Desert Scrub to Pinyon-Juniper Woodland areas. Links (in red) are to photo galleries.

Trees

- # **Net-Leaf Hackberry** (*Celtis reticulata*). American snout and **mourning cloak** butterflies find this a wonderful larval food. A variety of birds, including the hermit thrush, robins, flickers, towhees and jays love the fruit of the hackberry. Plants thrive with more available water.
- # **Desert Willow** (*Chilopsis linearis*). Hummingbirds, bumblebees and **two-tailed swallowtail** butterflies visit the showy orchid-like flowers of this tree. A variety of sphinx moth caterpillars will feed on the leaves of the tree. These larvae are excellent bird food.
- # **Arizona Cypress** (*Cupressus arizonica*). A large evergreen tree species. Good for windbreaks and visual screening plus trees provide dense shelter.
- Velvet Ash (*Fraxinus velutina*). This deciduous tree is commonly found in riparian areas of higher elevations. The **two-tailed swallowtail** larva feeds on ash leaves as their host plant. This species should not be planted unless you have access to permanent supplemental irrigation such as a grey water outlet. With supplemental water, these are a hardy, fast growing shade tree for home gardens. Leaves turn a beautiful yellow for fall color as well.
- * **Alligator Juniper** (*Juniperus deppeana*) and other native junipers like Rocky Mountain and one seed junipers. The fleshy cones are a very important source of food for a wide variety of wildlife including coyotes, foxes, jays, squirrels, bears, elk, and more. Juniper cones are often a survival food in very tough times for wildlife. Junipers are also host plants for the tiny, but beautiful, **juniper hairstreak**. In addition to being a food for the caterpillar, adults can be found resting within the dense juniper branches.
- # **Honey Mesquite** (*Prosopis glandulosa*). Plants have lovely delicate foliage and large prickles; flowers are very fragrant. Mesquite has spread with overgrazing, but it is native and a valuable plant. With some additional moisture and pruning, plants can become a lovely, small tree. Host for Hubbard's silkmoth.
- **Chokecherry** (*Prunus virginiana*.) Chokecherry is a host plant for the **two-tail swallowtail** caterpillar. The striking apple-green caterpillar has yellow "eye-spots" on a black-banded hump located toward its head. Chokecherry is also food for the western tiger swallowtail. *Prunus* may become home for tent caterpillars.
- # **Cottonwoods** and Willows (*Populus* and *Salix* spp.) Leaves of these related plants are food for a variety of caterpillars including the **mourning cloak**, the **red-spotted purple** and the viceroy. All three adult butterflies have interesting food preferences. Mourning cloaks feed at mud, sap, and rotting fruit; red-spotted purples come to damp soil, carrion, decaying fruit or wood; and viceroys prefer to eat sap and dung. These are riparian plants only.



From big to small, this listing covers them all (well not all, but it rhymes). Trees like the Alligator Juniper can be beautiful anchor plants for any yard. (Barnes)

- # New Mexico Elderberry (*Sambucus mexicana* var. *cerulea*). This is a fast-growing semi-deciduous large shrub/tree. It grows to 15' or more and is naturally multiple stemmed and wide. Provides showy creamy-white flowers in spring and summer, followed by a profusion of dark purple fruits. Provides excellent nesting sites and cover for birds; they also relish the fruits. A wide variety of pollinators visit flowers. It should be planted where it receives supplemental water.
- * Native Oaks (*Quercus turbinella*, *Q. grisea*, *Q. gambelii*, *Q. emoryi*). Goldfinches, jays, nuthatches, titmice, bushtits, red-naped sapsucker, and Audubon warblers visit for acorns, some for the sap. Arizona sister, Colorado hairstreak, sleepy and mournful duskywing butterfly caterpillars use oaks as host plants. Meridian duskywing caterpillars may also feed on the oaks. Many caterpillars of native moths including the beautiful Cecrops eyed silkmoth feed on oaks. Oaks are excellent as larval food and a general wildlife food as well. If you have a native oak in your yard, keep it.

Shrubs

- # **Anisacanthus** (*Anisacanthus quadrifidus* and others). Plants produce numerous tubular red flowers from summer well into the fall. Plants reproduce readily from seed and will come up in cultivated parts of the landscape. A hummingbird favorite. Plants go dormant in winter with some die-back, but grow rapidly once warm weather arrives.
- # **Big Sage** (*Artemisia tridentata*). Large wind pollinated shrubs with fragrant gray-green foliage; these should be given plenty of room to spread and are not well-suited to pruning. A browse plant for wildlife and provides a good nesting site for birds.
- * **Mountain Mahogany** (*Cercocarpus montanus*). The tiny flowers are very fragrant and attract a variety of bees; these shrubs are great to have near any patio or garden if foraging bees are not an issue to your family. Remember that foraging bees are rarely aggressive.
- # **Apache Plume** (*Fallugia paradoxa*). Honey bees and a variety of native bees feed on the fragrant flowers of this member of the Rose family. Flowers in late spring and early summer; flowers are followed by showy pink seed tails that remain on the shrub for some time. The lesser goldfinches feed on seeds. Host for Neumoegen's buckmoth.
- # **Rabbitbrush** (*Ericameria nauseosa*) A large, vigorous drought tolerant native shrub, rabbitbrush produces a profusion of yellow fall flowers that attract a variety of pollinators. **American lady** butterflies are especially fond of rabbitbrush; it is also visited by a variety of other butterflies including pahaska skippers and **funereal duskywings**. May create new seedlings as it does spread by seed.
- # **Turpentine Bush** (*Ericameria laricifolia*). Blooms in the fall with bright yellow flowers which attract native bees and butterflies. A small, dense evergreen with dark green foliage.
- # **New Mexico Olive** (*Forestiera pubescens*). Lovely smooth grey bark, fragrant tiny yellow flowers, with lime green leaves and dark purple fruits that remain on the plant after leaves fall in autumn. Ripe fruits are particularly relished by robins and hermit thrushes and provide an important fall food source.
- * **Wright Silk Tassel** (*Garrya wrightii*). Plants are dioecious, male and female reproductive parts occur on separate individuals. Watch for purple fruits on the female plants. Hermit thrush, robins and other birds feed on these dark fruits in the fall.
- # **Little-leaf Sumac** (*Rhus microphylla*) and **Three-leaf sumac** (*Rhus trilobata*). Tiny yellow flowers provide an



PLANTS+ OF THE BLACK RANGE
OF NEW MEXICO
VOLUME THREE

Apache Plume was featured on the covers of the third volume of the Black Range Website book series, **Plants+ of the Black Range**. (Barnes)

early nectar source for insects; both plants produce bright red fruit for birds and other wildlife. Ripe fruits are sour but edible for humans also. Little-leaf sumac is a better choice for more xeric situations; it can be planted in deserts and woodlands. Three-leaf sumac can be planted in sun or shade. The emerald moth uses three-leaf sumac as host.

- # **New Mexico Locust** (*Robinia neomexicana*). Foliage is a host for silver-spotted skipper, golden-banded skipper, funereal duskywing, and several moths. Fragrant, purple-pink legume flowers in clusters are produced during late spring. Plants are deciduous. Photo by R. A. Barnes.





Native insects visit *Opuntia phaeacantha* flowers.



Dasyllirion wheeleri planted within a stand of *Wright's Buckwheat*, *Eriogonum wrightii*.

- # Autumn Sage and Texas Blue Sage (*Salvia greggii* and *S. farinacea*) Hummingbirds, hawk moths, bees, carpenter bees, large and small bee flies are attracted. Neither of these species is native here in southern New Mexico, but they are excellent flowering plants for the landscape.

Succulents

- # **Parry Agave** (*Agave parryi*) A striking landscape species that ultimately creates a spectacular flower stalk before the plant dies. Many pollinators visit flowers. Birds relish young flowers and may strip buds before seeds can be produced. It is host for the orange giant skipper
- # **Sotol** (*Dasyllirion wheeleri*). Dioecious plants with showy inflorescences which are attractive to hummingbirds and other pollinators.
- # **Hesperaloe**, Red Yucca (*Hesperaloe parviflora*). A native of Texas and northern Mexico. Hardy plants with a long bloom period. Red flowers are very attractive to hummers. Foliage and internal stem are attractive to a variety of animals including pack rats and gophers!
- # **Beargrass** (*Nolina texana*). A very hardy succulent with the appearance of a large grass. Nice planted in clusters. A variety of insects are attracted to flowers. Unlike *Agave*; *Nolina*, *Yucca* and *sotol* flower frequently. Host for the Sandia hairstreak.
- # **Banana Yucca** (*Yucca baccata*). Succulent plant with upright flowering stalk that can grow as tall as 5'. Large showy, fragrant flowers, followed by large edible fruits. Specific host of a yucca moth.
- # **Palmilla**, **Soaptree Yucca** (*Yucca elata*). A variety of insects nectar on the large showy flowers, seeds are an important food source for wildlife. Host plant for the yucca giant butterfly. Prefers desert locations with well-drained soils. New Mexico State flower.

Note: Native cacti are excellent landscape plants. Heat and drought tolerant, their spectacular flowers are excellent for a wide variety of pollinators. Succulent fruits are relished by wildlife.

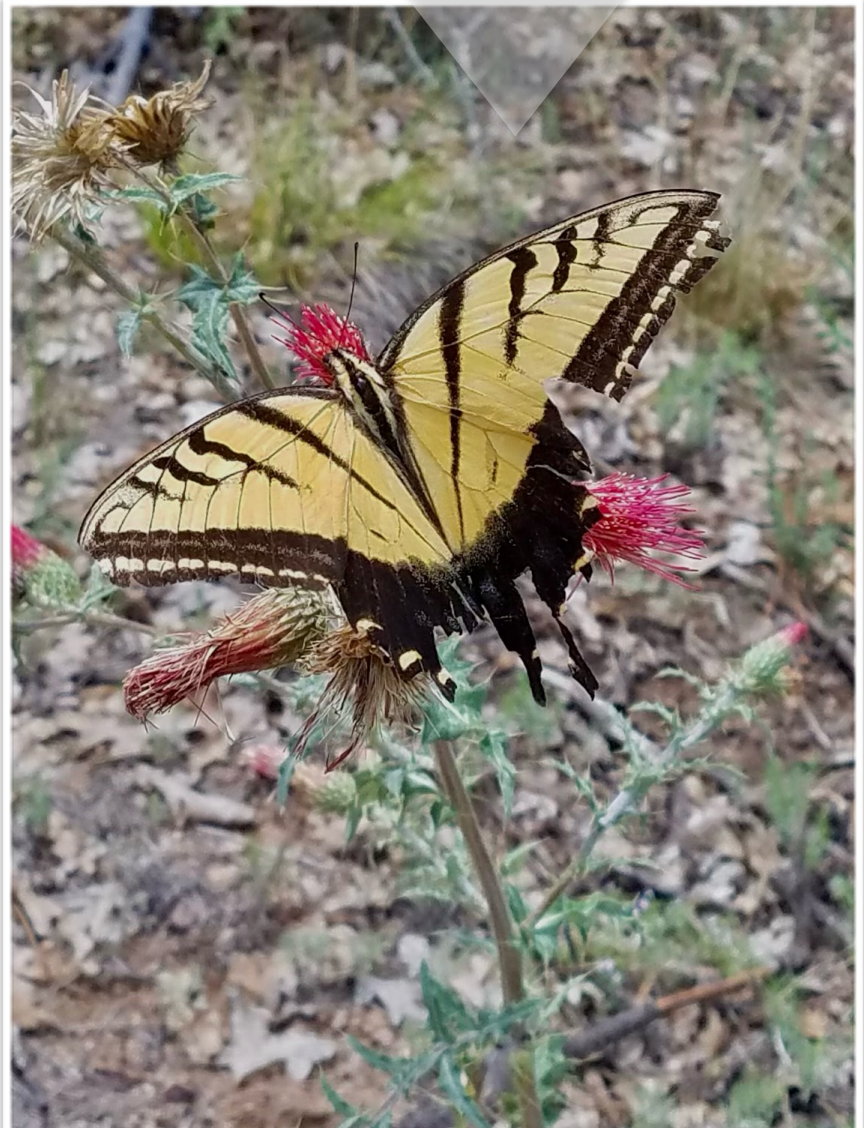
Perennials

It is important to consider flowering time when planning your perennial garden so it will have blooms (and food sources) from spring through fall. This will help provide nectar throughout our warm season for birds and insects. Hummingbirds love red, tubular flowers such as the beard-tongue penstemon, but they will also visit columbine,

desert willow and other flowering plants, so a variety of blooms are important.

Sunflower Family: What you see as one flower in any member of this family is actually a cluster of tiny flowers. (Sometimes there are hundreds.) Most sunflower family members are great for butterflies and bees because these insects love the broad, sunny landing perches. Most species here have a wide range of tolerances:

- **Desert Marigold** (*Baileya multiradiata*). A spring blooming plant for desert locations.
- **Chocolate flower** (*Berlandiera lyrata*). These plants come in and out of bloom from mid-spring to fall. The name describes the fragrance of the flowers!
- ***Arizona Thistle** (*Cirsium arizonicum*). Red flowers are clustered in a tight head, very attractive to hummers, two-tailed swallowtail butterflies and others for nectar.



Two-tailed Swallowtail nectaring on ***Arizona Thistle***, *Cirsium arizonicum*.
Photo Mara Trushell Guerrero

- ***Brickellia** - Flowers of several species of *Brickellia* and the related *Eupatorium* provide nectar sources for night flying moths. The sweet fragrance of the night-blooming flowers can be detected on evening walks. Like many natives, they are seldom available.

- ***New Mexico Thistle** (*Cirsium neomexicanum*). Showy pink flowers, nectar source. Thistles are host plants for **painted lady** butterfly. This widely distributed butterfly uses other native species as well. Native thistles can be found from seed sources.
- ***Fleabane Daisy** (*Erigeron species*). The flat-topped flowers of fleabane daisies make a nice landing platform for nectar-seeking butterflies and bees. Fleabanes are excellent nectar sources and are host plant for the hooded owlet and flower moths. Plantings are sometimes available from seed. Keep these on your property if they are present.
- **Hopi Blanketflower** (*Gallardia pinnatifida*). A variety of tiny native bees and other visitors are attracted to the delicate bright yellow and orange flowerhead.
- ***Pearly Everlasting** (*Gnaphalium wrightii*). This soft, silvery-leafed native perennial may not seem like it is in the sunflower family! Although it is not common in the nursery industry, it can be found in native landscapes in our area. It is a host plant for **American lady** butterfly; the caterpillar is black with yellow cross-bands and light-colored spots.
- ***Annual sunflower** (*Helianthus annuus*). Annual sunflowers are a good nectar source for migrating monarchs. This widespread native sunflower provides an excellent nectar source for a variety of butterflies including monarchs and two-tailed swallowtails. Goldfinches love the seeds and also pick at leaves. Hummingbirds nectar on the flowers.
- **Blackfoot Daisy** (*Melampodium leucanthum*). Early summer bloom. A fragile perennial; it breaks off easily and should be isolated from walkways.
- **Mexican Hat** (*Ratibida columnifera*). A nectar-rich plant particularly for bees.
- **Blackeyed Susan** (*Rudbeckia hirta*). Nectar plants with summer bloom.
- **Plains Zinnia** (*Zinnia grandiflora*). Nectar plants with summer bloom.

Globe Mallow (*Sphaeralcea* species). Delicate, orange mallow flowers provide nectar for butterflies. Globe mallow may also be a host for the common checkerspot; this pretty moth-like butterfly is only about 1" in width across its wings.

***Indian Paintbrush** (*Castilleja* species). These plants are partially parasitic on grama grass with which it grows; they are difficult to start

from seed and should not be transplanted. The flowers provide a nectar source for a variety of insects including checkerspot butterflies. Hummingbirds are attracted by the colored bracts which surround the tiny flowers.

Spring to early summer:

- # **Common Yarrow** (*Achillea millefolium*). This is a valuable nectar plant, it hosts the caterpillars of painted lady butterflies, and it is of special value to native bees.

Penstemons - Arizona and New Mexico are home to dozens of species of *Penstemon*. Some are butterfly host plants, for example, *Penstemon* species host the caterpillars of arachne checkerspot, dotted checkerspot, and the variable checkerspot. The variety of beautiful, tubular or bell-shaped flowers of penstemons are also a nectar source for many insects and hummingbirds.

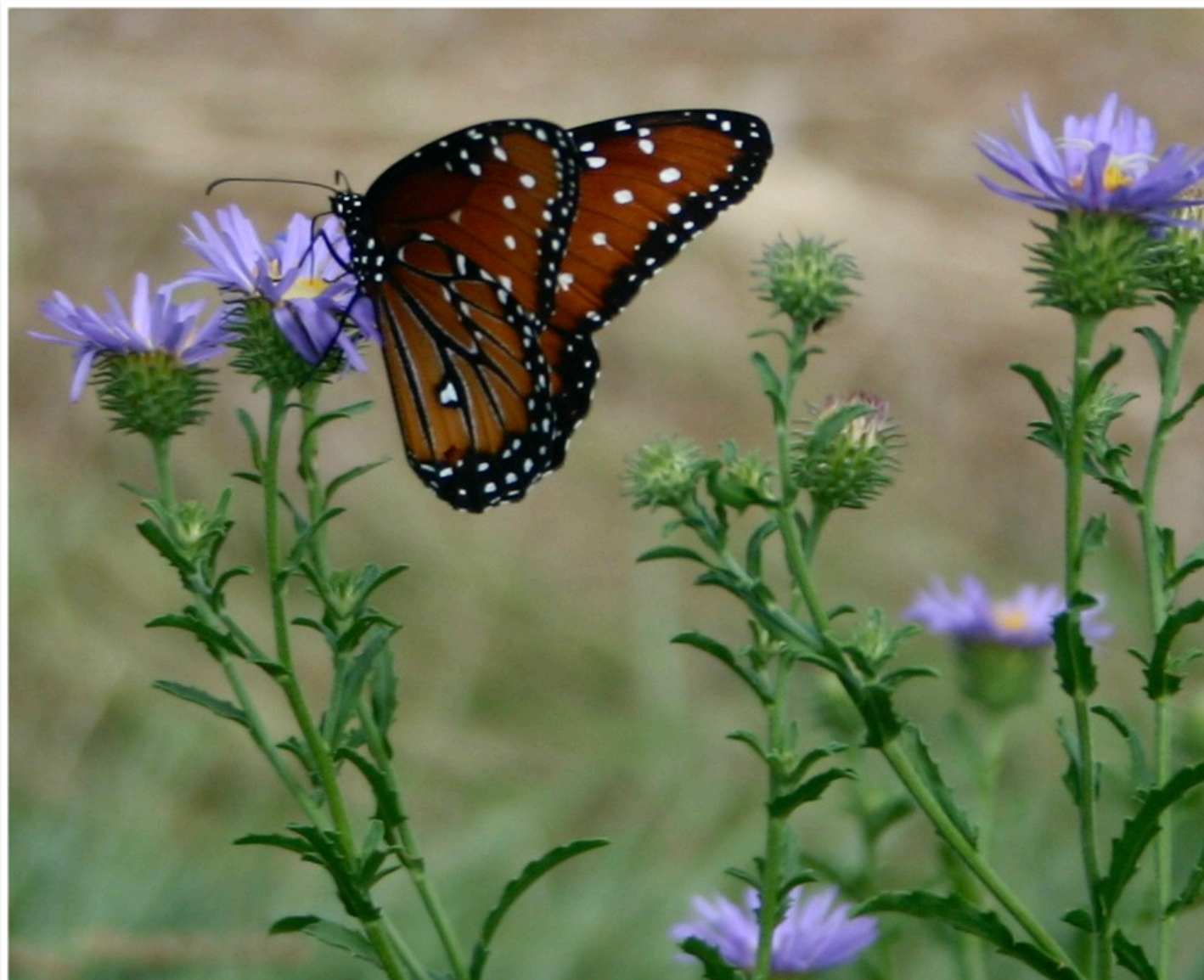
- # **Beard-tongue Penstemon** (*Penstemon barbatus*). Hummingbirds love the red flowers.
- # **Scented Penstemon** (*Penstemon palmeri*). Large bodied bumblebees and carpenter bees are attracted to this broad, open throated, very fragrant flower.
- **Rocky Mountain Penstemon** (*Penstemon strictus*). Hummingbirds come to the blue, spring flowers. Native to higher elevations, it will need more water than other Penstemons.

Summer to Fall

#**Milkweeds**: The complex, beautiful flowers of milkweeds are excellent nectar sources. Milkweeds are also caterpillar host plants for monarch and queen butterflies. These plants contain poisonous chemicals that do not harm the caterpillars and butterflies that feed on them; however, consuming these compounds does make them very distasteful to predators!



Globe mallows require little if any care and come in a variety of hues. (Barnes)



Above: A nectaring **Queen**, *Danaus gilippus*, showing extended proboscis and long antennae. Queens and species like the white angled sulphur, *Anteos clorinde*, on the following page are attracted to Asters like *Dieteria bigelovii*, **Sticky Aster**.

Interestingly another non-toxic butterfly, the viceroy, mimics the coloring of monarchs and queens. The markings of all three species warn predators to stay away. Milkweeds are becoming more common on the market.

- * **Antelope Horns** (*Asclepias asperula*). Showy cream-colored flowers clustered in large umbels, available as seed.
- **Showy Milkweed** (*Asclepias tuberosa*). Showy yellow to orange flowers clustered in umbels. Monarchs and Queen Butterflies visit this and other native milkweeds.
- * **Horsetail Milkweed** (*Asclepias subverticillata*). These are taller plants with delicate leaves and flowers, they provide nectar for a variety of insects, including tarantula hawks, and are host for monarch and queen butterflies. A tough native that is very sun and drought tolerant. If it is on your property, keep it!

Buckwheats: The buckwheat family in the southwest is richly diverse; as a group they are excellent nectar sources and critical as host plants for a number of *Lepidoptera*. One of these is the beautiful Mormon metalmark. Plants bloom summer through fall. Pinkish-brown seeds that follow blooms are showy well into fall as well. **Wright Buckwheat** (*Eriogonum wrightii*) is common. Keep buckwheats if you have them! They are not common in the nursery trade.

Skyrocket Ipomopsis (*Ipomopsis aggregata*). The beautiful tubular red flowers of this species are a favorite of the two-tailed swallowtail butterflies. Hummingbirds also visit them and males can sometimes be found performing swooping aerial displays above the flowers.

* **Four-o'-Clocks** (*Mirabilis species*). The long-tube **Four-O'-Clock** is common at higher elevations and is visited for nectaring by the sphinx moth (a.k.a. hummingbird moth). Caterpillars of sphinx moths also feed on the foliage of various species.



White Angled Sulfur, *Anteos clorinde*, on *Dietaria* in the author's yard in Kingston.

Plants for shadier locations and those that need more water.

Note that you can create habitat for such species and cluster them with water-loving trees. All can be watered with grey water.

- Licorice Mint (*Agastache rupestris*). Flowers attract painted lady and other butterflies and hummingbirds. Flowering is from late summer to fall.
- Golden Columbine (*Aquilegia chrysantha*). Hummingbirds and large lovely moths come to yellow flowers, day and night. A late-spring bloomer, it sometimes has a second bloom in late-summer to fall. Do not select other Columbines that are typically available at nurseries; they do poorly here. This species is native and vigorous. They will reseed plants in some areas.
- Bee Balm or Monarda, (*Monarda menthaefolia* and other species *M. citriodora*, *M. fistulosa*, *M. pectinata*).

Hummingbirds and bees come to these mints. Mints need a moist, shady, protected area.

- Golden Current (*Ribes aureus*). This deciduous shrub has fragrant, tubular yellow flowers in the spring; they are followed by dark edible fruits.

Vines

Note: also for locations where you can provide more water.

- **Virgin's Bower**, Western Clematis (*Clematis ligustifolia*). A delicate vining species with special value to native bees. Plants create dense masses.
- **Canyon Grape** (*Vitis arizonica*). *Vitis* flowers are fragrant and attractive to nectaring insects; it is host to species of sphinx moths. Fruits are relished by a variety of birds.
- **Woodvine** (*Parthenocissus vitacea*). A vigorous climbing and sprawling woody vine with deciduous fall colors of stunning red. Fruits are very poisonous, not good for children's gardens. Host for a variety of sphinx moths.

Night Blooming Perennials

Note: Many bloom early evening and morning also.

- * **Sacred Datura** (*Datura wrightii*). This plant is not available commercially. But if it is present on your property it is beautiful and is nectar source for large hawkmoths and for bees. It is host for some species of hawkmoth caterpillars, which are excellent food for young birds. This is a poisonous plant, so it is not recommended for areas where children play.
- Hooker's Evening Primrose (*Oenothera hookeri*). Hawkmoths and hummingbirds visit these summer-

blooming flowers. Flowers open in evening and early morning. Other primrose species include: *Oenothera biennis*, common evening primrose, host for a number of caterpillars, and *Oenothera speciosa*, pink evening primrose.

- Four-o-Clocks: *Mirabilis longiflora*, *M. multiflora* and *M. albida* and others. Flowers of these plants are visited by white-lined sphinx moths on summer evenings. These moths hover like hummingbirds and sip nectar through their long soda-straw-like proboscis. Their interesting caterpillars, which are hornworms, are found on the plants.

- * Mistletoe. Although poisonous to humans, this plant provides food and nectar for the great blue hairstreak butterfly. Fruits are consumed by a number of birds. It is the only host for the great purple hairstreak butterfly (photo following page).

Native Grasses

Native grasses offer a range of ecological values on your property. Grasses provide excellent soil shading to reduce evaporation, generate significant organic matter each year, and are critical in erosion control. With shallow but dense fibrous root systems, grasses slow down the movement of water so it can infiltrate, rather than rapidly running off, taking your topsoil and the life that water and soil support along with it.

It may be surprising to learn that the grass family is a key group of plants that serve as host

species for the *Lepidoptera*. And of these native grasses, the grama grasses (the genus *Bouteloua*) are at the top. Grasses are host-plants for the caterpillars of a number of beautiful skipper and satyr butterflies. Some, such as our red satyr, lay their eggs on dead, fallen materials, making it difficult to determine host species. In addition to retaining moisture, this is one more good reason to retain organic materials on your soil surface. Grass seeds are also important food source for birds.



Vitis arizonica, Canyon Grape, is a great accent plant. (Barnes)



Great Purple Hairstreak, *Atlides halesus*, nectaring on *Mimosa biuncifera*.

Because moths are active at night, they are often overlooked. But their species numbers are estimated to be twenty to fifty times greater than butterflies, and they too have caterpillars to share with young birds. Some moths are tiny, and although elegant, they are particularly easy to ignore. Other moths are as beautiful as butterflies.

Most of the listed grasses are available from either seed or containers. However, many regional native grasses are not available commercially. So save native grasses on your property if you have them. A partial list below includes some grasses that

do well throughout our area. Check seed companies that specialize in native seed. Be cautious however; a number of grasses available are introduced species and have negative impacts on our ecosystems. Some notable grasses which do well in this area are:

- **Big Bluestem (*Andropogon gerardii*)**. Host for the orange-headed roadside skipper
- **Purple Three Awn (*Aristida purpurea*)**

- Side-oats Grama (*Bouteloua curtipendula*). Host to the orange skipperling and other skippers.
- Buffalograss (*Bouteloua dactyloides*)
- Blue Grama (*Bouteloua gracilis*). Host for a variety of skippers and satyrs.
- Bluebunch Fescue (*Festuca idahoensis*)
- Big Galleta (*Hilaria rigida*)
- Switchgrass (*Panicum virgatum*)
- Bull Grass (*Muhlenbergia emersleyi*)
- Deer Grass (*Muhlenbergia rigens*). Best for areas with some supplemental water.
- Little Bluestem (*Schizachyrium scoparium*)
- Large Spike Bristlegrass (*Setaria macrostachya*)
- Indiangrass (*Sorghastrum nutans*)
- Alkalai Sacaton (*Sporobolus airoides*). Host for the sandhill skipper.
- Sand Dropseed (*Sporobolus cryptandrus*)
- Wright's Sacaton (*Sporobolus wrightii*)
- Little Bluestem (*Schizachyrium scoparium* var. *scoparium*)



The Cecropia-eyed Silkmoth, Automeris cecrops, feeds on oaks.



Black Swallowtail, *Papilio polyxenes* (above and below).



(male butterfly) - Plants in the parsley family, including garden species, are host plants.

In Closure

With the continued stresses on wildlife that the ongoing planetary degradation of ecosystems imposes, we can see that efforts to help with coexistence and stewardship are the responsibility of all of us. Creating backyard habitat does matter. If you want birds or butterflies, feeders and flowers help, but a whole habitat is critical to their survival. If you consider the linkage of such created habitats and the diversity they can support, an encouraging model emerges. Natives support life in an area where non-natives do not; mindful plantings can help heal damaged lands. And finding ways to help, even small individual efforts, can add joy and meaning to life.

This is far from an exhaustive list, but does represent species that are commonly available through nurseries and native plant growers. Much of the above information is based on experience of the author; see the reference list which follows for more information. I would like to thank Margie Gibson for providing some additions to host plant species for this list.

Support Biodiversity at Home - Gardening for Your Ecosystem by Margie Gibson

A few months ago, I saw a presentation that fundamentally changed the way I look at gardening, while also offering a hands-on method to help our planet in my own yard. It was a talk by Douglas Tallamy for the California Native Plant Society. During this time, I was working on an article about Aldo Leopold and found these words of Leopold's particularly crucial: "the oldest task in human history: to live on a piece of land without spoiling it." Tallamy offers a way we can help achieve that task and protect biodiversity.

After watching the presentation, I read Tallamy's most recent book, *Nature's Best Hope: A New Approach to Conservation that Starts in Your Yard*. He, too, is an admirer of Leopold and likewise expresses the need for private landowners to take responsibility for our environment, writing, "None of us has the right to destroy the diversity of life that once thrived on our properties – life that



Female Lesser Goldfinch visiting to feed on native sunflower seeds.

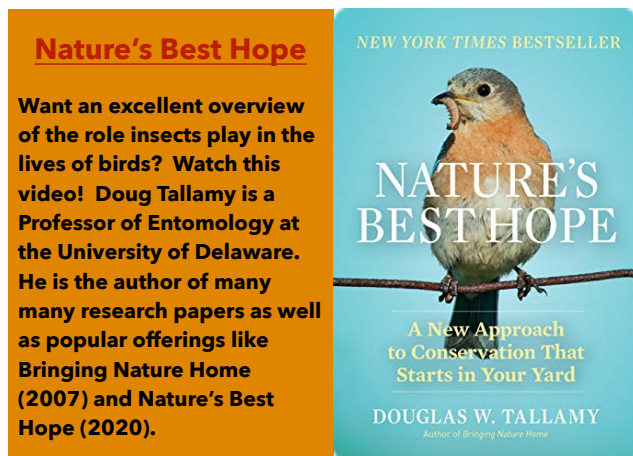
is required to run the ecosystems that keep us and our neighbors alive."

Aren't we all familiar with the negative consequences of human impacts on our planet as we take up more and more of the natural world? We are at the start of the sixth mass extinction in Earth's history, and the rate of extinction is fastest for insects. Tallamy makes a very strong case for something we can do at home that will make a real difference – plant native plants in our yards. As he explains, "Restoring viable habitat within the human-dominated landscapes...is the single most effective thing we can do to stop the steady drain of species from our local ecosystems."

What's in our yards today?

Our homes occupy millions of acres of land in the United States. Tallamy explains how planting lawns and non-native plants began as a cultural status symbol early in our country's history, separating ourselves from nature with the goal of subduing it. This trend continues in the present day as we plant what was familiar to us in our childhood or is growing in our neighborhood. "Now," Tallamy writes, "put on your ecological thinking cap. If your property does not generate all of the ecosystem services you and your family need to live well, you will have to borrow services that were generated somewhere else." On our overpopulated planet, "elsewhere" is gone.

According to NASA, lawns take up 40 million acres of land in our country. Tallamy proposes we turn half of that lawn into productive native plant communities, which he calls "Homegrown National Park." Twenty million acres, he explains, is "bigger than the combined areas of the Everglades, Yellowstone, Yosemite, Grand Teton, Canyonlands, Mount Rainier, North Cascades, Badlands, Olympic, Sequoia, Grand Canyon, Denali, and the Great Smoky Mountains National Parks."



There are other benefits to getting rid of your biodiversity-barren lawn. The Natural Resources Defense Council reports that lawns consume about 3 trillion gallons of water a year, 200 million gallons of gas for mowing, and 70 million pounds of pesticides and herbicides. Lawns steal our time, too!

Why Native Plants?

Ecosystems evolved over thousands of years, and through millions of interactions organisms found ways to cope with each other, developing specialized relationships. Plants evolved physical defenses, such as thorns, as well as chemical defenses, like a bad taste or toxicity, for protection from predators. Through thousands of generations of exposure, a particular insect adapted to a specific plant's defenses, so it could eat the plant. A well-known example of this specificity is the Monarch butterfly, whose larvae eat milkweed. Writes Tallamy, "By far, the most important and abundant specialized relationships on the planet are the relationships among the insects that eat plants and the plants they eat. Most insect herbivores, some 90 percent in fact, are diet specialists – host-plant specialists that are restricted to eating one or just a few plant lineages."

Because of these evolutionary relationships, planting native plants is what is most beneficial to wildlife. The idea that was most eye-opening to me to make my garden beneficial to wildlife – which was something I'd already started – is selecting plants that host caterpillars.



Hyles lineata, White-lined Sphinx, Hillsboro

Caterpillars, the larvae of *Lepidoptera*, the butterflies and moths, are high in protein and fats, soft, and most are relatively large. They are a primary source of food for many birds, particularly to feed nestlings, as well as for other insects, reptiles, and amphibians. Plus, as Tallamy's images illustrate, they come in an incredible array of colors, stripes, spots, spikes, and so on.

Among native plants, there are keystone species that provide vital sources of food and shelter to the largest variety of caterpillars. In regions with a rich diversity of trees, oaks are a keystone species. In my own state of New Mexico, butterfly expert Steven Cary states that native grasses, especially grama grasses, support the highest diversity of caterpillars.

Native plants evolved for their environment. They don't need fertilizer or pesticides and require less water once established. They need less maintenance and are rarely invasive. There are many beautiful native plants, so that is not a limiting factor in designing your garden.

Don't be put off by common names; as Tallamy points out, many native plants have weed in their name; he proposes renaming milkweed (*Asclepias*) as Monarch's Delight! If you've planted the Asian Butterfly bush (*Buddleja davidii*) it does provide nectar, but does not host any caterpillars. By contrast, most states have one or more species of Joe Pye Weed (*Eutrochium*) which, along with being beautiful, attracts butterflies, and can feed 40 species of caterpillars. Native plants can absolutely serve the same purpose as non-natives in garden design, while at the same time enhancing our environment.

Other Lepidoptera Lifecycle Considerations

Caterpillars become pupae, which are a very vulnerable stage of the moth and butterfly lifecycle. Very few stay on the plant that hosted the caterpillar, so a diversity of native shrubs, flowers, and leaf litter provide safe pupation sites. Some species burrow into the soil, and some others into soft wood. Even an otherwise beneficial keystone tree does not support the *Lepidoptera* lifecycle when surrounded by lawn or concrete.

We admire many species of butterflies but may overlook most of the far more abundant and diverse moths. Twilight- and night-flying moths are food for a variety of predators, including bats. Lights at night are detrimental to adult moth survival, from direct death, by causing exhaustion, or making them easier targets for predators. Get rid of night lights, such as security lights, or put a motion detector on them. If that is not an option, using a yellow LED bulb will attract fewer moths.

Bee Kind to Bees

Most of us realize that Honeybees, domesticated and brought from Europe, are declining. We don't know the status of many of our 4,000 species of native bees, but of the 49 species of native Bumblebee, 25 percent are declining and four are close to extinction. Other types of native bees include Mason, Leaf-cutter, Sweat, Blueberry and Squash bees. Most of our native bees are solitary, and Tallamy says, "never aggressively defend a home space ... while foraging at flowers, bees are not aggressive at all. They are focused solely on gathering as much pollen and

nectar as possible.” It is usually a Yellowjacket, which is a wasp, that stings people, Tallamy explains.

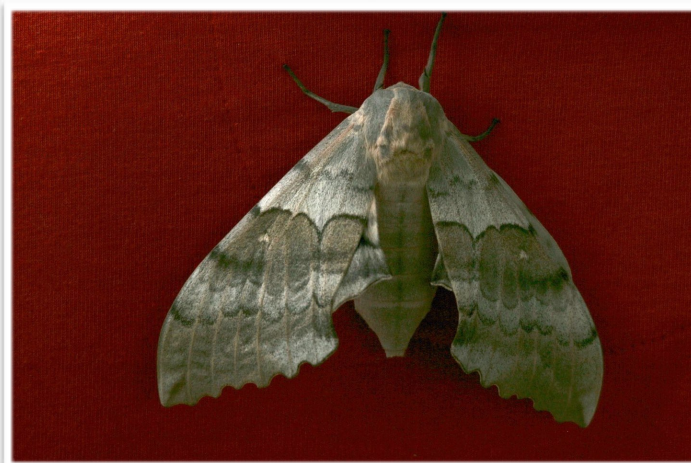
Most native bees nest or overwinter in the ground, but some use soft wood (such as dead branches) while others use plants with pithy (spongy) or hollow stems. Tallamy points out, “many of us work hard to eliminate these valuable resources. Our fall cleanup is particularly hard on bee populations.”

Bee hotels are an easy way to increase the nesting capacity of your yard for native bees, but Tallamy advises that these “hotels” need to be small and scattered around. Large commercial bee hotels are too accessible to predators and make it easier for diseases to spread, making bees more vulnerable.

A final word of advice is to have something blooming when bees are active, which can be much of the year. Tallamy writes, “a landscape that goes through a two- or three-week period with no available blooms is deadly to bees.”

Small Yard or No Yard?

You don’t need half an acre to make a difference. Planting one native keystone tree, some shrubs and a few flowers might be just the rest stop an exhausted migratory bird needs. A few containers of flowering native plants on a balcony can provide food for butterflies and bees. Tallamy encourages us to think of our property as part of a giant jigsaw puzzle. The habitat you create in your yard is one piece; the neighbors’ yards might be others; nearby parks, forests and so on are also pieces. In the process we can learn to appreciate chewed-up leaves over those that are perfect but of little ecological value.



Pachysphinx occidentalis, Big Poplar Sphinx, Hillsboro. The larvae of this species feed on cottonwoods.

If you don’t have any yard, then working to have native plants along roadsides, railroads, airports, golf courses, city centers, and parks in your community can add vital pieces to the puzzle. If you are part of a homeowner’s association, Tallamy suggests working to educate the members, perhaps even by adopting a local endangered species.



Ascalapha odorata, Black Witch Moth, Hillsboro. The larva stage feeds on catclaw.

Personal Benefits

We appreciate that spending time in nature is good for us. Tallamy writes, “The extraordinary health and social benefits we derive from exposure to nature are short-lived and realized only from repeated exposures.” If we create our own natural space, we can enjoy it at any time, alone if desired, and without having to drive somewhere. The children in our lives can develop a sense of stewardship by helping with the planting and discover the natural world at their own pace.

Creating a self-sustaining native plant community will bring wildlife to our yards and joy to our lives. At the same time, the more we get involved in creating Homegrown National Park, the more we will be building healthier ecosystems and stopping the decline of the many species who share our life on Earth.

Resources

Audubon Native Plant Database: This website filters “Best Results” which are the native plants for your zip code that are relatively easy to grow and “locally” available, or “Full Results” which is all of the native plants for your zip code. It shows what types of birds each plant may attract.

The website for **Homegrown National Park** has useful information for starting your piece of the park, and a map showing how many people are participating.

Native plant societies are great sources of information. Every state has at least one native plant society as do most provinces. The **North American Native Plant Society** home page provides links to these important organizations.

National Wildlife Federation **Native Plant Finder:** This site is a work in progress showing native plants for your zip code. It lists plants in the order of how many species of caterpillars a plant family supports. It is valuable for picking keystone species, especially in states along and east of the Mississippi River.

Tallamy, Douglas W.; **Nature’s Best Hope: A New Approach to Conservation that Starts in Your Yard**; Timber Press, 2020.

[Doug Tallamy’s Presentation \(video\)](#)

Bird, Bat, Bee, and Butterfly - Scaping Your Yard - by Kathleen Blair

Probably by now most folks realize that many species of birds, bees, butterflies, and other wild things are facing unprecedented

stress from many directions. Ever-expanding human development of houses, factories, fields, and roads, climate change, chemical contaminants and insecticides, competition from invasive, non-native species and just loss of habitat quality and quantity in general. It seems overwhelming at times and beyond our personal control. Still, many of us would like to know something we can do. Even small positive additions can help, and a patchwork of positive actions can add up when seen at a landscape scale. If you would like to know what you can do even on a small patch with a small budget...keep reading!

As with humans, plants and animals have basic needs for good quality food, water, shelter, and space. These vary, of course, as each species has its own requirements to survive and breed successfully. It is important to realize that no two species are the same. This biological diversity is what defines the fabulous kaleidoscope of life around us. SO many species! SO many ways of making a living! SO many opinions on what is best! Like a huge library filled with cookbooks holding recipes for survival that have been handed down from every great, great, great grandmother all the way back to each species’ beginning! That is what DNA ultimately is...a giant recipe book for life. Where and how to build a nest and find a mate, what to eat and when and how, where to find a tucked-in safe spot in a blizzard, if (and when and how) to migrate, how to avoid a predator - yes, plants do this too! The list is as long, the species which made it are many. As ecologists (and financial planners) know, diversity is strength and long-term resilience. More species of plants means more species of insects and animals and the greater the odds that at least some of them will be happy under any circumstances. Still, there are some fundamental things we can do that make it easier for desirable species to find the solutions to their individual problems whether we have responsibility for a big patch or a small one. Fortunately, you can approach most species as general categories rather than go crazy trying to figure out precisely what each one wants every season of the year. Again, provide a diversity of options and they will choose what they want better than we can.



Even a simple bird bath will be greatly appreciated by the bird life of the area and rare visitors like this Ruddy Ground Dove in Hillsboro.

Here in the Northern Chihuahuan Desert the list of plants and animals that may be interested in inhabiting your yard, or even your flowerpots and vegetable garden is so long. When thinking about all of those possibilities, there are two broad ways of getting organized. One way is to choose a set of species you want to target, like breeding summer songbirds, resident species, pollinators, hummingbirds, or quail, which are likely in your area. Learn what they want in terms of food, shelter, and water, then select plants and water features that will provide that. You will probably need to put in some extra resources, like more water or soil amendments, particularly lots more organic matter, with non-native plants that may be especially attractive to the birds or insects you want. Native species will already be dialed in to our conditions and need less coddling, but you will probably have to look harder to find them in most commercial greenhouses or nurseries, although there are some that specialize in natives. Using non-natives rather than natives is a sort of ecological gentrification, they usually require more maintenance and resources than native species. Sometimes, natives will respond very well to the same care required by non-natives - more water, fertilizer, mulching, and pruning. Trim a creosote up and it will look like a boxwood. It will use half the water plus you get that wonderful desert incense when it rains! You will need to do some research to make sure you have the proper soils, weather, exposure, elevation, maintenance needs and such for your target plants and decide if you can provide for them long-term.

The second way is to choose a habitat you like that is already in your space, generally based on native species, then work to enhance it and see who comes to dinner. Native plants are already able to tolerate local conditions, and wildlife is adapted

to them. In the long run, it is easiest by far to start by looking at what you have, knowing what already likes growing in those conditions, maybe adding a few extras, and then working with that.

What you can help provide:

- A diversity of food and nutrients - weeds, seeds, flowers, and bugs buffet;
- A diversity of shelter - pokey, brushy, thick, under the eaves or a snug hole; and
- Water - shallow, easy to drink or bathe in, and a bit of drip is extra attractive!

Don't let your cats roam outside!

Native species of plants are to be preferred wherever possible, for not only do they require less work and water generally, but they, the birds, insects, and other creatures ARE the local ecosystem, mutually dependent and adapted, for thousands, perhaps millions, of years. Few, if any, species from other places will quite fit in the same way. Be aware that a lot of nurseries will tell you they sell native plants but do not really make a distinction between actual native species and exotic species that are naturalized. Everything is native somewhere, just not necessarily to the Northern Chihuahuan Desert. For example, I do not know how many nurseries have tried to convince me that thornless, upright mesquites are native. They are not. They are from Chile. Only honey and screwbean mesquites are native here, and they are rarely good sellers as they are thorny, so



Winter can be especially stressful for bird species. Species like this Ruby-crowned Kinglet require high-calorie foods when it is especially cold. If you are offering supplemental food, consider providing a variety of food types, including suet.

people don't like them. Yet the same folks will buy pyracantha, which is at least as unpleasant. These 2 native species host a staggering array of native insects, however, and attract numerous birds for nesting, while the thornless Chileans do not so much. The only junipers native (and quite drought resistant) here in the southern Black Range are alligator, one-seed, and rocky mountain. All the rest are domesticated forms of Chinese or common junipers.

Common local bird communities

This article is not intended as an exhaustive list of all birds that frequent the local habitats. Nor does it provide a specific recipe for attracting each, but rather an outline of possibilities and enhancements that will generally be of benefit. However, all animals need the same nutritional basics of proteins, fats, carbohydrates, micronutrients, and water, although each species varies in how they acquire them and which their metabolism can process most efficiently. Most eat a combination of plant parts and insects. Some change their diet seasonally, especially if they need extra nutrition for migration, molting, or breeding. Growing chicks need lots of protein and so eat lots more insects than their parents may. Even hummingbirds do not live by sugar water alone! They eat small insects and arthropods, especially spiders. However, some behaviors are broadly similar. Migration is perhaps the riskiest time in an adult individual's year. When on territories, whether summer breeding or wintering, birds generally settle into a home range based on suitable conditions. These become familiar and they learn where to find the resources they need. During migration - it is a shot in the dark (often literally as many species migrate at night, which is why the windows of tall glass buildings are such a threat). Although most follow a particular flyway, guided either by experience or instinct, there are no guarantees that the habitat they found in a particular place last year will be available today.

Fires, floods, housing developments, agricultural fields all may have appeared and changed conditions, forcing birds to find an alternative before they starve or get caught in bad weather. That is, unfortunately, what occurred in New Mexico this year. An early storm caught large numbers of mostly insect-eating species when their fat reserves were too low. Either they had a hard summer up north, or migration had been unusually difficult, but when they arrived during a winter storm, they did not have the energy reserves to survive the cold and wind, and thousands died of starvation and exhaustion.

Local Habitats - Zone 7A (Kingston) and 7B (Hillsboro)

Climate change has already started and will alter conditions well into the future. Overall projections for our area on the east face of the southern Rocky Mountains are for decreased and more variable precipitation and increased temperatures. Currently we are in Zone 7, which is defined by minimum average winter temperatures between 0 F and 5 F (7a) and 5 F to 10 F (7b), but it is wise in the long run to plan for warming changes in the future. Trees and shrubs planted now can be expected to live for decades, perhaps, and should be selected to tolerate future conditions to meet expectations. It is likely that southern varieties and species may have a better future over time than northern ones.

Rainfall

The average rainfall for the 88042 zip code is supposed to be 13-14 inches but can be quite variable both between years, seasons, and locations. In 2017 for example, there was about 14.6 inches of precipitation in Hillsboro, and I sure had to water even established plants, let alone new planted ones. In 2018 there was about 8.5 inches of rain in Hillsboro while in Kingston, only 9 miles to the west had roughly 16.6 inches of rain. In



Even native species like New Mexican Elder require supplemental water at times. This plant species provides food for many bird species including, Verdin, Phainopepla, and the Bullock's Oriole shown here.

neither year was there a “good monsoon”. Not only is the rainfall projected to diminish in the future, but it is going to become more erratic and less predictable from year to year. Plan for the worst and the best will be such a relief!

Temperature

Elevation, aspect (north or south facing slopes), exposure to direct sun or wind, all create microclimates that make a difference in plant growth and shelter for animals. Shade, humidity, and wind protection can all be important, especially for nest building, egg deposition sites, or night roosts. Keeping these in mind can make a big difference to creatures choosing to use your space or the survival of some plant species.

Surface and Groundwater

The riparian zone is the area along creeks, streams, rivers, and springs where the roots of plants, especially those of trees and shrubs, can contact groundwater to supplement precipitation. Often this is also the floodplain for the stream and has naturally richer soils. The main streets of Kingston and Hillsboro follow Percha creek, with the yards of houses adjacent to the creek in the riparian zone. Few trees have roots that will grow much beyond 20 feet deep, although a few will have anchoring tap roots a bit deeper, but most of their roots for water and nutrient uptake are within the top 2-3 feet of soil.

Foothills desert grasslands (Northern Chihuahuan Desert)

Soils in these areas are generally alkaline, rocky and/or clay dominated. Pockets of heavy clay or stony areas created by local erosion patterns can be locally significant because some plants will grow well in those pockets. Groundwater is beyond the reach of all but honey mesquite in most cases, although washes, gullies, and hollows may harvest precipitation and concentrate moisture somewhat. Native juniper species, sumac, ephedra, currants, scrub oaks, wolfberry, apache plume, catclaw, desert willow, buffalo gourd, and wildflowers rely on precipitation rather than groundwater and may do well especially in pockets with deeper soil or slight runoff catchments. Shade limiting light is not generally a concern but if you want shade or fruit trees you will need to plan on watering them into the future. Fruit trees need to be situated with protection from the wind.

This is the land for grasses, locoweeds, mustards, milkvetch, thistles, composites, mallow, cacti, yucca, and native shrubs, all of which are important for seeds and insect species. The dense thorny shrubs, larger prickly pear, and junipers provide important nesting sites for several species such as cactus wrens, black-throated sparrows, verdins, and thrashers. The fruit of prickly pears is relished by many species. With a little additional care, other native species such as penstemons, sages, milkweeds, barberry, buckwheat, and poppies can make nice beds in addition to the sunflowers, thistles, and asters.

The bird community attracted to this habitat is dominated by seed eaters - especially those that prefer the seeds of grasses and composites, such as asters, thistles, and sunflowers. There are also a few fruit- or nut-producing shrubs that like this habitat, such as wolfberry, sumac, junipers, scrub oak, and cacti, and these can be encouraged with additional care. Birds that like this habitat include several kinds of sparrows, finches, towhees, pyrrhuloxias, grosbeaks, ravens, raptors, quail, and doves. Many of these species are residents, and most seek dense, prickly, or thorny plants for nest sites protected from predators, sun, and wind, although a few, like nighthawks, nest on the ground. This habitat does have insects, especially large ones like grasshoppers, butterflies, moths, and bees, as the latter are also attracted to the composite's flowers. Consequently, some birds attracted to larger insects, such as Say's phoebe and kestrels, are common here. Also present are a few that eat a bit of everything, like wrens and verdins. I recall once in Arizona watching three fledgling verdins trying to manage an Apache cicada nearly as big as they were. Can't say it went well. There is a reason your momma never fed you cicadas, kids!

Wasps and hornets are interested in this habitat and show up occasionally, as the adults are attracted to sweet fruit and nectar (including hummingbird feeders in dry spells) and so are important pollinators; however they are also predators, since they feed their larvae caterpillars, spiders, and other large insects. Most orchardist like having wasps and hornets around, especially paper wasps, as they do an excellent job of controlling several insects

injurious to fruit trees. You should treat them with the same calm and respect as you do honeybees. The calmer you stay, the calmer they will be, as they can scent adrenaline very well and their compound eyes are very sensitive to sudden, jerky movements which agitate them. As a reformed beekeeper, who may yet backslide, I consider it good to remind folks that honeybees are not native to the new world, although they



Feral European Honey Bees will nest in both rock alcoves and plant hollows.

have naturalized and are feral in almost every habitat. They are, however, a mixed blessing. They are critical to the pollination of many crops that came from Europe, such as fruit trees and melons, but often compete with native species, such as bumblebees and solitary bees, for native plant species like berries, squash, and wildflowers. Unfortunately, they are seldom as efficient at pollination for native plants as are the bees and wasps the plants evolved with for millennia. Honeybees will nest in nearly any hole or crack including under rocks or shed roofs so always be aware of them. Most native bees prefer to nest in the ground or in hollow plant stems. It is kinda fun to make a solitary bee house, though, out of hollow stems and a quart milk carton! The composite family and domestic fruit trees are particularly attractive to many bees and butterflies since the open, flat flowers provide a nice place to land and sit while they nectar. Honeybees like open yellow or white flowers with a yellow center best. Bumblebees are more attracted to blue, tubular, snapdragon-type sage, alfalfa, mint, or salvia flowers that open when their heavier weight lands on the lower flower lip or to the large flowers of squash and melons. Cacti are most common in this habitat, too, especially the prickly pear clan (which includes cholla), and their fruit, large flowers, and thorny aspect attract fruit-loving birds, pollenating insects, and birds looking for a safe nest site. Hummingbirds use any habitat with tubular, usually red or yellow, flowers and may even nest in shrubs in these open areas.

On our patch of hilltop, we have year-around resident rufous-crowned sparrows, black-throated sparrows, house finches, lesser goldfinches, Say's phoebes, meadowlarks, towhees, quail, cactus wrens, and curve-billed thrashers, which all like the open, weedy fields with their insects, seeds, and prickly places for nest sites. Several predatory types that are here year-around seeking the birds, mice, rabbits, reptiles, and large insects in open, easy to hunt areas include red-tailed hawks, great horned owls, American kestrels, Chihuahuan ravens, roadrunners, and loggerhead shrikes. The larger falcons or eagles also often pass overhead, as we are close to the mountains and cliffs they seek as nest sites. Still, raptors have huge home ranges and wander widely looking for prey. Without trees, naturally, the woodpecker clan is absent other than an occasional flicker looking for ants.

Summer breeding species that like our upland habitat for feeding, even if their nesting sites may be in nearby areas with trees and shrubs, are kingbirds and flycatchers, blue grosbeaks, orioles, summer tanagers, hummingbirds, nighthawks, swifts and swallows, and lark sparrows. Most of these species are again seed and insect dependent and specialize in taking the latter on the wing, so it is tough to make enough habitat to provide enough insect biomass to help much, as they generally require a lot of area in their home range to meet their needs. However, both the flycatchers and tanagers will take rather large insects nearer the ground, so they are most likely to respond to your efforts. Tanagers even specialize in wasps and bees which you may be trying to attract. Decisions, decisions!

Migratory wintering species that favor the uplands include several species of sparrows often forming mixed flocks of white-crowned, Brewer's, vesper, with occasional Lincoln's, Savannah, or sagebrush sparrows mixed in. Juncos, meadowlarks, goldfinches, and pine siskins also like the open country for seed-hunting, while bluebirds and waxwings often form large

nomadic flocks moving between patches of fruit bearing trees and shrubs (particularly mistletoe).

Migratory, "just passing through" species are some hummingbirds, many warblers, several flycatchers, swifts, and swallows. All of these may pass through on their way south and again north in the spring. There is generally not a lot you can do for these species, as they are not interested in sticking around. If a particular patch has the food or shelter they need for a day, or a week, they will hang out, then be gone again. Many of these are headed for Mexico or even South America, so they do not linger. I recall seeing barn swallows in Brazil one January and wondering if they were the same birds that had a nest under the eaves of the greenhouse in Oklahoma where I had been working the July before.

Foothills Riparian

In riparian zones a different plant community can be sustained, so cottonwoods, willows, hackberries, and oaks give lots of vertical structure, insects, and shade here. Fruit and nut trees, small fruits like blackberries, Mexican elderberry, serviceberry, New Mexico olive, wild grapes, red mulberry, hawthorn, crabapples, currants, barberry, and gooseberry are easier to maintain in this zone. Most trees, including some pines, do well within this zone with some supplemental watering until established. It depends on the species of tree, so check water requirements and temperature tolerances of those that interest you and look for old trees doing well on their own in your neighborhood. Due to occasional floods, nutrient levels are better than in the upper grass and shrublands although shading by trees limits sunlight in these areas, and many of the open, sun-loving, grasses and composites will not grow as well in their shade. However, the slightly cooler, more humid characteristics of this zone make it much easier to maintain diverse wildflower stands, especially native woodland species such as penstemons, gilia, iris, columbines, flax, cardinal flower, mints, and larkspur. In open, sunny patches, yuccas, sages, and bramble type berries can be happy.



One of the common local predators, the Barn Owl, prefers large trees, mine shafts, and structures for roost sites.

Resident birds attracted to the riparian zone include the woodpecker clan, of course, as there are actually trees present, jays, doves, wrens, thrashers, owls both large and small, Cooper's hawk, chickadees and nuthatches, towhees, cardinals, mockingbirds, and a few sparrow species. Many are willing to



Streamside habitats like the lower Animas with its cottonwoods and sycamores can add a splash of color to our habitat in the fall.

take up homesteading in the yard and garden with a little encouragement.

Summer breeders include some of the brighter colored or conspicuous species such as tanagers, orioles, vireos, flycatchers, thrushes, phoebes, buntings, grosbeaks, and a few warblers.

barn swallows do love human eaves and porches for their nests! Insecticide use is thought to be damaging these species' survival due to a lost prey base. The human friendly, once common barn swallow is of particular concern. So yes, they may make a mess on your porch for a few weeks, but they are more than willing to pay you back with mosquito and fly control. Hummingbirds will show up if feeders or enough red, tubular flowers are present such as Texas sage, penstemons, cardinal flowers, or Texas red yucca. They often breed in this habitat although they roam happily up onto the slopes looking for a food source.

Winter brings new species down from areas where snow cover, cold temperatures, and a lack of insect activity make their northern or up-slope territories unsuitable. Robins and other thrushes, kinglets, grosbeaks, finches, bluebirds, phainopepla, waxwings, and song and chipping sparrows move in for the duration. Several of the higher elevation finches, crossbills, and evening grosbeaks, may come down into this habitat some years if the weather is particularly bad in the mountains or irruptions occur. The phainopepla is an unusual species which is often found in this habitat. It breeds on its lowland wintering grounds where it eats mistletoe and small fruit. It leaves the lowlands in the spring and summer, migrating west or upslope to higher elevations where it feeds mostly on insects. It loves nesting in mistletoe bunches.

Migrants are variable from year to year, and between spring and fall. Many warblers, flycatchers, vireos, several swallow and swift species, hummingbirds, and woodland sparrows pass through on their way south or north. They are often dependent



The molt of the Summer Tanager can convince the uninitiated that something extraordinary is happening - and the initiated will know that is true.

Several swallow species are attracted to riparian areas to breed, both for the mud they need for their nests as well as the high insect biomass the moister riparian conditions produce. And

on small flying insects, something we generally do not have enough of to support significant numbers of these birds.

Vegetable garden and orchard

This is a special domestic habitat that nonetheless can be quite attractive to some species of birds, butterflies, and bees. These guys you often want, as they are pollinators, but some charge rent in food for their kids!

Tomato hornworms are the caterpillar of sphinx hawk, or hummingbird moths, and can hit your plants hard sometimes but, hey, I just plant a half wild indeterminant cherry tomato, off to one side just for them! The plant may look raggedy, but I usually still get lots of little tomatoes, and then use bacillus thuringiensis (Bt) on my other, full size fruit varieties. Live and let live! And my chickens adore them for a nice wiggly green snack! Swallowtail caterpillars can really strip your umbellifers (carrots, fennel, dill) but again, maybe throw some old carrot and dill seed in a separate patch for them and use Bt on what you want for yourself. The chickens are NOT impressed by these bright colored caterpillars, though! Some sparrows, especially white-crowns, can really devastate young stands of leafy green vegetables, and there is not much but clothes or netting to keep them off if they discover your garden and decide they are hungry enough. Ours is a strawbale garden set inside a 10x10 chain link dog kennel to keep the javelina and deer out, and netting can be spread over and around the sides. I have not had to do so here in NM, as the white-crowns have mostly left before the seedlings come up, unlike in AZ where the garden was a winter thing and so were the sparrows! Netting there also entangled larger snakes and lizards. Some birds will hit your fruit trees, especially soft fruits like cherries, peaches, and apricots. There is not much you can do unless it is netting, and that poses a risk of the birds becoming entangled and the trees being damaged when the netting is put on or taken off - especially once the trees get taller than you and the wind picks up, which, of course, it never does here. In the orchard (which is in my dog yard to keep the deer out) I do not plan to net any of the trees except, perhaps, a triple grafted dwarf peach that is small enough to be manageable. The rest we will have to work with the way fruit trees, birds, and

humans have always done. Payment for the insect pest control service!

In Conclusion

Hope this information helps anyone looking to work ideas to benefit wildlife and native plant species into their yards and gardens. With every year more acres are lost, eroding both the quantity and quality of habitat for the wild critters and the overall diversity. As a result, any forethought to minimizing harm or increasing assistance can be significant. There is no longer any patch on the planet we have not impacted, and seldom for the good of any but ourselves in the short term. Remember, it is always easier to work with the ecosystem than to try and push it in a direction it does not want to go. Eventually, Mother Nature will have it her way. If you concentrate on native species remember that each is finely tuned to its complex environment. Soil temperature and moisture conditions will change each year within a range of possibilities. Each combination will please different species, so your landscape and gardens and wildlife will also change from year to year, just as they do with the seasons, based on which species requirements are best met. On our place in 2006 and again in 2018 and 2019, conditions favored native grasses and annuals, and they dominated the area. In 2019-2020, patterns of rainfall and temperature favored herbaceous plants, especially perennials, and we saw some for the first time. The wildflowers were great that year. In Death Valley in 2005

there was record rainfall and a warm winter, which produced a "super bloom" of wildflowers, some of which had not been recorded in over 100 years. Yet their seeds had remained, waiting, for just the right conditions. That is all they needed, the right conditions once every 100 years. That is one of the most interesting parts of natural systems - their variability. They are not cookie cutter conveyor belt patches that look the same every year where everything matches. Each year changes and favors different species each time, so no one dominates. You learn to rejoice in each year, each season, as individuals. Diversity creates resilience over time.

More things grow in a garden than the gardener sows.
- Spanish Proverb



Five-spotted Hawkmoth caterpillar (Tomato Hornworm), Manduca quinquemaculata. Photo by Mara Trushell Guerrero

Some Selected References and Sources of Native Plants

Websites

Audubon Native Plant Database: www.audubon.org/native-plants This website filters "Best Results" by zip code that are relatively easy to grow and "locally" available, or "Full Results" which is a more extensive listing of native plants for your zip code. Includes birds each plant may attract.

Butterflies and Moths of North America: www.butterfliesandmoths.org. Excellent source for host plants and other information.

Southwestern Moths: <https://southwesternmoths.com/moths-of-the-gila-nat-forest-nm/> Ron Parry's site focuses on our area. The links page lists many sites specific to the southwest.

Natural History Museum, London, hosts: a Database of the World's Lepidopteran Host plants: www.nhm.ac.uk/our-science/data/hostplants

Ladybird Johnson Wildflower Center: www.wildflower.org An easy to use site with an extensive database of information on native species.

Homegrown National Park site has useful information for starting your piece of the park, and a map showing how many people are participating: www.homegrownnationalpark.com The site also has a link for native plant societies throughout the country.

National Wildlife Federation Native Plant Finder: www.nwf.org/NativePlantFinder This site is a work in progress, but lists native plants by zip code, grouped by "flowers and grasses" and "trees and shrubs" and by how many species of caterpillars a plant family supports.

The Xerces Society for Invertebrate Conservation: www.xerces.org. Has a large amount of information and specific references for New Mexico.

Vascular Plants of the Gila Wilderness is the premier listing for the plants of the Black Range. It is associated with the Western New Mexico University, Department of Natural Sciences and the Dale A. Zimmerman Herbarium.

North American Butterfly Association. This site has a wealth of information on butterflies and their conservation, including their Butterfly Garden and Habitat Program.

Native Plant Society of New Mexico. In addition to offering a wealth of information, chapters often host native plant sales. **Las Cruces Chapter**. **Gila (Silver City) Chapter**. In Silver City, the Gila Chapter manages a botanical garden of native plants.

Black Range Website. Photo galleries for plants of the Black Range as well as galleries for birds and other fauna of the Black Range. Hosted reference material also available for download.

BugGuide. All things bugs, identification aids, taxonomy, host plants...

A few Selected Books

Allen, J. A., J.P. Brock and J. Glassberg. 2005. **Caterpillars in the Field and Garden, A Field Guide to the Butterfly Caterpillars of North America**. Oxford University Press. A practical guide with caterpillar photos and range maps. Includes an index of food plants.

Cary, Stephen J. 2009. **Butterfly Landscapes of New Mexico**. University of NM Press. Organizes butterflies around elements of landscape and habitat. Guide to more than three hundred kinds of butterflies in New Mexico.

Glassberg, Jeffrey. 2001. **Butterflies through Binoculars the West, A Field Guide to the Butterflies of Western North America**. Oxford University Press. Larva hosts are included.

Glassberg, Jeffrey. 2017. **A Swift Guide to Butterflies of North America**. One of the most comprehensive and easiest to use butterfly guides for North American species. Includes habitat and larva host plant information. Princeton University Press.

Morrow, Baker H. 2016. **Best Plants for New Mexico Gardens and Landscapes**. Keyed to Cities and regions in New Mexico.. University of NM Press. Both native & non-native plants are listed.

Phillips, Judith. 1995. **Plants for Natural Gardens and Natural by Design: Beauty and Balance in Southwest Gardens**. Museum of New Mexico Press. Beautiful books with excellent plant and design information.

Tallamy, Douglas W., 2020. **Nature's Best Hope: A New Approach to Conservation that Starts in Your Yard**. Timber Press. An excellent and inspiring resource.

Plants+ of the Black Range. Listing of the plant species found in the Black Range. Free download from www.blackrange.org.

Some Selected Native Seed and Plant Sources

Be cautious. Know a true native. Some sources do not distinguish adapted from native.

Robledo Vista Nursery, Radium Springs, NM: www.robledovista.com Current list of available plants on the website. For a nursery appointment call (915) 203-9385. Plants available at the Farmer's Market in Las Cruces.

High Country Gardens. "Pioneers in Sustainable Gardening" Check out their "Wildflower Seeds" selection.

American Meadows - a commercial site with both bulk and packets of native wildflower and native grass seeds, non-GMO and regionally specific. www.Americanmeadows.com

Plants of the Southwest. A source for a variety of grass, tree, wildflower, and shrub seeds. Plants available at their nurseries.

Lone Mountain Natives: www.lonemountainnatives.com
575-538-4345. Plants available at the Saturday Silver City
Farmers Market and at their nursery (by appointment only) in
Silver City.

Country Girls Nursery: 1950 Highway 180, E St, Silver City, NM.
Some natives available.

New Mexico State Forestry Conservation Seedling Program:
[www.emnrd.state.nm.us/SFD/treepublic/
ConservationSeedlings.html](http://www.emnrd.state.nm.us/SFD/treepublic/ConservationSeedlings.html). Sixty different species of mostly
native seedlings available. Order online. Spring and fall catalogs
available from carol bada@state.nm.us

Granite Seed: www.graniteseed.com Source for a variety of
seeds, grass, wildflowers, trees, shrubs and revegetation mixes.

Native Seeds Search. Although this non-
profit focuses on heirloom food crops,
they also offer an extensive collection of
native wildflower seeds, including
"collections" focused on flowers for birds
and bees. Seed packets for several of the
species mentioned in this issue are also
available.



Desert Survivors. A nonprofit native plant nursery that employs
adults with developmental disabilities. Located in Tucson.

Water for Your Habitat Garden by Steve Morgan

Here in the Southwest, we tend to look at water, or should, as the
precious resource that it is. Look at the contrast between a
heavily wooded riparian corridor and a windswept desert ridge.
The availability of water in the riparian area allows a much
greater range of habitats than exists on the rocky ridge. This
doesn't mean that you won't find an abundance of life in those
lands that look barren to our eyes, but that life is different. So,
depending on where you live, your water needs to create and
maintain wildlife habitat will vary. Now, let us look at how that
precious resource can be best appreciated and utilized in your
own yard.

There are really two options for water: from the sky or from
underground. Here in New Mexico, not many of us have
perennial streams running through our property. If you do, I
suggest you tell your neighbor that their hose has been running
for days. There are perennial streams here, just not in
abundance, and those tend to be well marked with riparian
lushness. Our most common drainage feature is the dry wash.
When it is flowing, we rejoice.



*A variety of above ground water storage systems are available, in many sizes. They range from purely utilitarian to those designed as
accent pieces, like these 55, 90, and 115 gallon ceramic pots.*

What this means to your landscape is that when the rain does embrace our lands, we need to be ready to make the most of that precious moment. The mindset for the last 50-60 years has been to keep that water from doing "damage" to property and to shunt it off. Flexible pipes are attached to the gutter downspout – these empty out onto your driveway or to the street.

What a deplorable waste of a precious resource. Let us dwell instead on how to manage this resource and utilize our pumped groundwater in the most efficient manner as well.

First, we need to talk about the community members who most need this water: wildlife and plantings. Both of those are thoroughly covered in the accompanying articles about habitat. However, once you've decided what you want in your landscape habitat, then you can plan for the watering needs.

A misconception about native plantings is that since they are native, they don't need water. This is totally wrong. When a native plant grows from a seed in the ground, the first thing that the plant focuses on is developing a root system. That all happens underground, and the structure is much larger than the little plant seen above. Once the plant has a good-sized root system in place, drawing in the nutrients and water it needs to grow, the top growth will begin.

A nursery grown plant's root system is defined by the size of the pot it has called home. When you plant it in the ground, that undersized root system has to supply what a full-sized system would. It can't, and so you have to make up the difference by supplemental watering. My experience is that many nursery grown native plants never become fully independent of supplemental water.

Here is a concept though, that can help with this problem: water harvesting. The basic idea here is to direct surface runoff water to the areas you want and need them. If you have a downspout that isn't supplying a rainwater collection tank, the water from that downspout can be piped out to an area that has a series of water bars and water eyebrows. Water bars catch water running downslope and channel them to a point. They handle the runoff in larger areas. Water eyebrows are for individual or small groupings of plants. To explain an eyebrow, let's start with the typical water well that wraps a berm completely around the plant. The problem with this treatment is that when you have rain soaking the ground and creating runoff, the upslope portion of the water well actually diverts the runoff away from the plant. So, take that water well, cut it at the top and open the ring until you have an eyebrow or "welcoming arms." That is, retain the lower half of the water well, but expand it to either side. This catches the upslope runoff and directs it right to the plant. These are important to have around your plantings as they collect and allow the water to soak into the soil, encouraging the roots to grow deeper. The width of the eyebrow should be double the plant's canopy width. If the plant is three feet across, then the eyebrow would stretch three feet out from either side. The plant's active root zone is at the edge of the plant, the drip zone. This supplies water for growth. This is a permanent water supply system that works every time it rains.

Harvesting rainwater off the roof is one of the easiest ways to add natural water in your home landscape. To determine how much water you can harvest off your roof simply multiply the square footage of your roof by .62 by the amount of rain. For

example, if you have a 1500 square foot roof and a half an inch of rain falls, your water harvest is $1500 \times .62 \times .5 = 475$ gallons.

There are many rainwater collection systems available, ranging from a simple 50 gallon barrel with a spigot (hose bib) up to tanks that hold several thousand gallons and have a pumping system. You may be thinking, after looking at the numbers above, that one small storm would overwhelm your 50-gallon barrel! Generally, you want to have enough tank capacity to water for a month. You need to add up the watering need of all your habitat plantings. This gets tricky as soils, plant material, location, exposure, and climate all affect how much a healthy plant will need during the year and when it needs it in that year. The general rule for one-gallon native plantings is one gallon per hour, once a day, every other day for 3 months to get established. Then you can lighten the watering to two times a week until colder temps arrive. Five-gallon plantings, like 2 to 3 gallons for that same schedule. For fifteen-gallon trees, plan on 5 to 6 gallons for the same schedule. Calculate your roof area that you have guttered, look at the plantings you want. From here you can figure out your water collection needs.



Place your storage system on a small pedestal. This will allow you to more easily attach a garden hose to the spigot, and the water head will be sufficient to gravity feed water via the hose. In the winter, decommission ceramic pots by turning them upside down or thoroughly draining and covering them.

Now when you add up the watering requirements of your plantings for a month, you will know roughly the size of storage tanks you need for that one-month supply. As you will always be adding here and there in the garden, I usually buffer by adding 10% to the water needed. Your system should be flexible in allowing more storage as you expand your gardens.

These are very loose guidelines, and by paying attention to new plantings, you can adjust the amount watered since plants will tell you whether they are happy or not. The varying soils, plant species, location and exposure will all affect the amount of water needed.

It is also a good idea to spread out your collection points. If you have a tank at each corner of the house, you are that much closer to the habitat plantings in that portion of the gardens. Then you also can use 3 or 4 smaller tanks instead of one large tank that would require a larger pump and more piping to reach all of the



Water storage systems don't have to take up space. Cisterns of more than a thousand gallons can be buried in the yard. This one is fed by rain water from the roof of a garage. Rain water is best for many plants. It does not have the chemicals often associated with drinking water nor the salts which are often in the ground water.

garden. Your yard also has different aspects and microclimates and so having more tanks gives you more flexibility in watering needs.

For your own enjoyment in the gardens, add a rain chain or two instead of a standard downspout pipe. This brings a pleasing sculptural element into garden design. Direct the rainwater into a beautiful pot which also anchors the chain. Drill a hole in the pot bottom and install a 3" drain grate attached to an underground drainpipe; from there you can direct the water to some thirsty plantings.

It is also important to have several water sources available for wildlife. These can be on the ground or a birdbath style which can be fed by an irrigation emitter. This brings me to the last and most conventional water source - the hose bib and drip irrigation. A simple drip irrigation system, running off a battery-operated timer, is straight-forward and inexpensive to install. This is quite necessary to get your native plantings established. It will provide the consistent, supplemental water needed to encourage roots to grow deep and to get the plant, in a few years, to as near a native situation as possible. This also is an easy way to run wildlife water into a few basins here and there consistently. The consistent re-freshening of the water is important as well.



Many of our beloved creatures like moving water better than just a filled bowl. If you build a simple water feature with a short drop, it will not only add a lovely melody to your garden, it will always be a focal point for wildlife.

You now are aware of some tools to help add that essential ingredient, water, to creating a habitat garden. I have covered these in general terms only to make you aware of them. For more information, go watch the many tutorials that are available on the internet. You can learn much more about each of these tools for water use. One of the best teachers, however, is hands-on experience. You will go through some trial and error until you have found the best solutions for your site.

I hope this article points you in the direction most useful to add water for creating the habitat garden of your wildlife's dreams. We are part of a community of living beings, so when we do our part, the community benefits in many ways. Enjoy your new splash of nature.



The [Homegrown National Park](https://homegrownnationalpark.org/) website has many useful tools for you to access in making, and caring for, your planting decisions.



Pumping water from an underground cistern does not have to involve electricity. It can be quite rustic and involve relatively little labor.

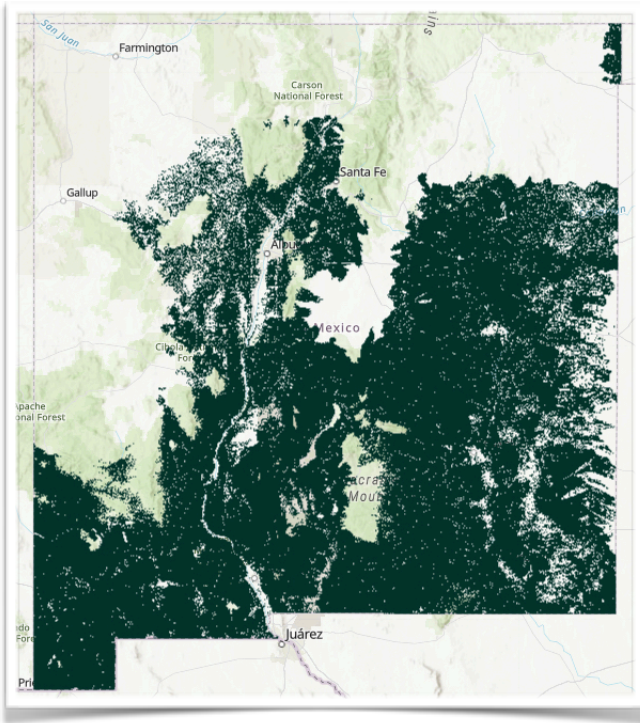
Our Covers

During October 2020, Rebecca Porter of Hillsboro found the Round-tailed Horned Lizard (*Phrynosoma modestum*) skull shown to the right and on the cover of this issue. She was walking in Warm Springs Wash east of Hillsboro when she made the discovery. Randy Gray discussed this species, and the other horned lizard species found in the Black Range, in the [January 2019](#) issue of this magazine.

These are small lizards, generally not more than 4.3" long, including tail, or 2.7" without. The photograph to the right is from the [Black Range](#) website; the range map for the species, shown on the following page, is from the Bison-M program accessed at the link shown. (This data base contains a great deal of information and is one of the better research tools available to us.)

The Loggerhead Shrike on the back cover may have been the individual which harvested the lizard and placed it on a thorn for a later meal. Except to the west, where they are absent, Loggerhead Shrikes are generally found in the areas surrounding the Black Range throughout the year, as shown

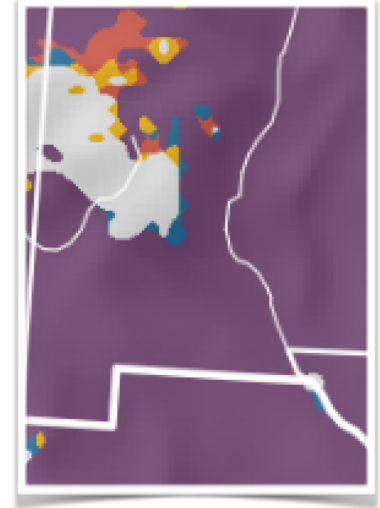




Range of **Round-tailed Horned Lizard** in New Mexico (dark color), mapped accessed via [Bison-M](#) program.

on the [Cornell Lab map](#) below. But as with the ranges of so many species, we are on the edge. Take a look at the detail

(right) from the larger map. If you are in the high foothills, for instance, this species is more likely to be found during the non-breeding season (November - February) - or - if you are a bit farther away from the high mountains, year-round.



[eBird](#) has a significant amount of information on the bird species found in the Black Range. Citizen Science plays an important role in building the data set utilized by eBird. Contributors

document more than 100 million bird sightings a year. New tools are being developed all of the time, like the map below. eBird is managed by the Cornell Lab of Ornithology, Cornell University. It is completely integrated with the [Macaulay Library](#) (also at Cornell) which has been a wildlife media archive since 1929. The Macaulay Library is a resource for maps, photographs, video, and sound recordings for birds around the world. 10,056 bird species and 2,674 species of other faunal groups are covered by the Library, in close to 26 million photos, audio recordings, and videos.

