Taking Fayetteville's Natural Heritage into the Future - since 2003

August, 2014

Newsletter

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Special Edition

Fayetteville Natural Heritage Association Commits to Raise Funds for Kessler Mountain Reserve

As we reported in the Spring 2014, edition of this newsletter, the City of Fayetteville has partnered with the Walton Family Foundation to purchase 376 acres on Kessler Mountain as a nature preserve and a study and recreation area for current and future generations. The property is adjacent to a 200-acre future city regional park for sports activities and to a network of properties that have been designated for conservation and hiking and biking trails.

A crucial part of the purchase agreement for Kessler Mountain was FNHA's commitment to raise an additional $300,000 over three years. This special edition of the *FNHA Newsletter* presents some of the many reasons we think our contribution is a worthy goal and one consistent with our mission and focus.

In this issue, we'll tell you something about:

- Kessler Mountain's history, over the past 310 million years
- Living and growing up on Kessler Mountain
- Kessler's ancient woodlands and their potential as an outdoor laboratory
- Birds and birding opportunities on Kessler Mountain
- A Kessler "bio-blitz" and a more thorough "rapid ecological assessment"
- Some of the ways we'd like FNHA funds to be used, and
- How you can support the Kessler fundraising effort!

Kessler Mountain: A Walk Through 25 Million Years

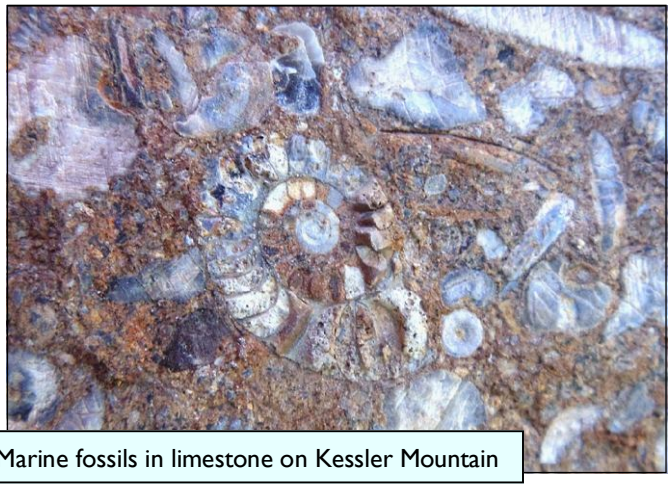
We typically refer to northwest Arkansas as being in the "Ozark Mountains," but geologists prefer "Ozark Dome." True mountains are an anomalously thick section of sedimentary rocks, usually deposited in deep water along the continental margin. These rocks are compressed or folded, with mountains and valleys forming like an accordion as the section is pushed onto the edge of a continent by continental collision, depressing the earth's crust with their weight. In their later history, as erosion removes some of the uplifted section, true mountains experience renewed uplift called isostatic rebound because of the decrease in weight on the crust.

Kessler Mountain is a standing remnant of the weathered ancient terrain on the south flank of the Ozark Dome, which has been uplifted almost vertically by compression, but hasn't exhibited isostatic rebound. Both true mountains and the Ozarks experience weathering and erosion leaving the more resistant beds like sandstone and limestone standing in relief, and shales usually forming valleys.

How ancient is Kessler? Sandstones and shales, called the Atoka Formation atop Kessler were deposited roughly 310 million years ago during the middle phase of the Pennsylvanian Period. At the bottom of the mountain are deposits of black shale, called the Fayetteville Shale, from the Mississippian Period, about 335 million years ago. So all that consolidated mud, sand, and lime was originally deposited layer by layer over roughly 25 million years. The seas came and the seas went. We're walking on what would have been ancient seafloor.

The top of Kessler is capped by sandstone beds overlying the Trace Creek Shale, both of the basal Atoka Formation. It is

(continued on next page)



Marine fossils in limestone on Kessler Mountain

A Walk Through 25 Million Years (continued from page 1)

well exposed in a shale barren with stunted hardwood trees. These are resistant to erosion, which is why they stand above the valley below. These sandstones and shales were likely deposited in a shallow shelf setting not unlike the northern Gulf of Mexico.

Oddly, the Kessler Limestone lies just below the top of Kessler Mountain on the west face only. This is the type locality, the reference exposure, for the Kessler, the highest member of the Bloyd Formation. The rocks here are limestones that readily break into smaller pieces that are the cemented remains of small invertebrate animals that lived in the ancient shallow seas. Most of the fossils, including crinoids, brachiopods, and corals, are broken and abraded reflecting wave activity in shallow marine environments.

The highest point on Kessler is about 1,840 feet in elevation on the south end, near the communication towers. Here, the youngest rocks on the mountain are exposed, but remember it is all relative; young is roughly 310 million years ago. By the time you've walked north, across the shale barren to Rock City and Frank Sharp's place, you've descended more than 300 feet in elevation. Think trail as time machine. In walking north, you've also gone back roughly 25 million years to an even earlier time.

For example, in losing elevation, you pass through a mostly covered interval represented by the Dye Shale and Woolsey Shale Members of the Bloyd Shale, which includes the Baldwin Coal. Yes, real coal formed by the compression and transformation of plants that lived in ancient swamps of the Carboniferous Period, over 315 million years ago. At one time, an exposure of the Baldwin Coal was visible on the east side of Kessler. It is still down in there, even if we can't see it from the trails.

If you keep walking north, you descend in time to the place we call Rock City. Erosion here dramatically exposed remnants of the Prairie Grove Member of the Hale Formation, with sandstone bluffs whose enlarged cracks and rock movement make attractive passage way for the trail. All of these layers were originally deposited in a shallow sea. Walking among those big sandstone blocks, imagine salty water and the ancient creatures who called it home.

On the trail, we walk on ripple-marked sandstones. Yes, these are ancient ripples frozen in sandstone, like those of today. Artistic-looking cross-bedding at Rock City illustrates how currents brought sand and mud over a broad carbonate shelf trying to deposit limestone as sea level rose and fell. And to top things off, here we find more weathered limestone and fantastic consolidations of marine fossils.

Over the course of geological time, sea level changed, and organisms lived and died adding to the layers accumulating on the sea floor, obvious and mind-expanding even during this casual walk across Kessler Mountain.

Article by Joe Neal,
With a review and many helpful comments from Dr Walter Manager,
Department of Geology,
University of Arkansas, Fayetteville.

Ancient trees on Kessler Mountain

Living on Kessler Mountain: Two FNHA Board Members Reminisce

Two members of FNHA's Board of Directors, Doug James and Terri Lane, have lived on Kessler Mountain, coincidentally in the same house, designed by Herb Fowler, who also lived and raised his family on Kessler. Terri's parents bought the house from the James family and Terri's family still owns it.

Doug used the mountain as an outdoor classroom for his ecology, mammalogy and ornithology classes. Terri traces her love of nature to a childhood spent on the slopes of Kessler. Their reminiscences of family life and of teaching students on the mountainside are captured in the following two articles.

One View of Kessler Mountain

When I arrived in Fayetteville in 1953 for my first and only university job, I brought my copy of *The Naturalist's Guide to the Americas,* produced in 1926 by the Ecological Society of America. The book described Kessler Mountain, because of its unique flora, as the only natural entity in northwestern Arkansas that should be preserved in perpetuity. That advice has now been accomplished because of the combined efforts of FNHA, Kessler Greenways, the Walton Family Foundation and the City of Fayetteville.

With the help of the late University of Arkansas architect, Herb Fowler, I built a house on the north end of Kessler where my family lived for ten years from the 1960s into the 1970s. During that period I explored Kessler, camped out with my children at the pond in the shale glade (except when Bull Frogs were chorusing), and took my classes in ecology, mammalogy and ornithology to appropriate locations. My children rode the school bus, so I made a path through the woods directly to the bus stop.

My classes on Kessler began when our cat caught Texas Mice, a rare rodent in Arkansas. Therefore, I had my mammalogy class set live traps on Kessler rock outcroppings and caught many Texas Mice. In a grassy field, the class caught three other species of rodents and two kinds of shrews. We deployed large live traps too to capture larger-sized mammals. We attached numbered ear tags to both large and small mammals to determine recapture rates. This involved removing the critters from traps and fastening the ear tags before releasing them. Among the large mammals caught were Ground Hogs, Striped Skunks, Spotted Skunks, Opossums, and Raccoons. Once when I was removing a rabid Striped Skunk from a trap it bit me, and I was required to have daily anti-rabies inoculations. When I released Spotted Skunks from traps, surprisingly, they scampered up trees with squirrel-like agility.

Using the tree house I built enabled the ecology class to measure ecological conditions in the forest canopy compared to the forest floor. Kessler is nearly 2,000 feet in elevation at the south end, lower at the north end. I have found that 2,000 feet in the Ozarks marks the dividing line between the northern and southern avifauna (birds). It was interesting to learn from the birds that our house was in the transition zone. Some summers, Chuck-wills-widows and Summer Tanagers were there, both southern birds, other years it was Whip-poor-wills and Scarlet Tanagers, equivalent northern species. Swainson's Warblers normally occupy thickets along major waterways. One spent a summer at my house in a young Sugar Maple thicket on a dry Kessler bench. Only in the mountains of West Virginia does this bird sometimes occupy upland thickets.

I also found that the coves draining Kessler Mountain have spectacular early spring floral blooms.

More than 50 years later, I still take students to Kessler Mountain.

— Article by Douglas A. James

Growing Up On Kessler Mountain

Growing up on Kessler, there were no property boundaries to heed, no maps, no network of trails to follow. We explored by landmark, never encountering one another, let alone strangers, sometimes getting lost, always discovering something new, and in my case, using the sound of our sheep calling for their dinner to find my way home before dark. And speaking of dark, it got dark in those days. Before town encroached on Kessler bringing with it noise and light pollution, the stars would make a thick, bright blanket over the trees and Whip-poor-wills ruled the night.

My family moved to Kessler at the far reaches of Finger Road in 1975 when I was five years old. It is still our home today. Frequent solo adventures led me through the woods in all directions, up and over cliffs and ledges and to many special places that I enjoyed discovering over and over again and still do. Places like "the scary woods." You can imagine the skinned-knee tomboy hiking over the ridge behind our farm and toward the old Cummings property, turning over rocks and peering into tree cavities all along the way. This route eventually led me to a sun-scorched and eerie place where the trees grew stunted, gnarly and twisted out of exposed, bare rock.

A few of the current residents of Kessler Mountain

They looked like witches to me and the abrupt change in environment felt hot and uncertain and so I called it "the scary woods." I was more intrigued with "the scary woods" than scared, but I certainly did not linger within reach of the witches for long periods and was happy to survive each visit, crossing back into the cool shade where the forest fairies reigned. *(continued on next page)*

Today, gnarly trails bring people to my gnarly trees and we have learned that "the scary woods" is a unique and sensitive ecosystem called a shale barren. And my witches are over 300 year-old post oak trees whose stunted and twisted forms were not profitable and therefore survived logging. It's amazing to think how these odd creatures also survived at least three centuries of certain storms, ice and drought.

The families of Kessler were as special and unique as the environment was secluded in those days. The home my family purchased was designed and built by Herb Fowler, a well-known and much loved architect and professor at the University of Arkansas. Herb and Judy were our nearest neighbors and they called their home "Deepwood." They became lifelong family friends. Growing up with them as neighbors was like having a worldly aunt and uncle nearby whose home and travels and way of life had a profound influence on my sister and me.

Our father, Dr. Nolan Arthur, was a professor in the college of agriculture and our family raised sheep. We kept the Fowlers' freezer stocked with lamb meat in exchange for fencing and using their pastures. Judy drove slowly up the mountain after work each day, soaking up the sight of the sheep grazing on the hillside. Dad and Herb gardened side by side for decades, sharing a tractor, tools and produce. I looked after the Fowlers dogs when they traveled and they presented us with bundles of "Herb's herbs" and raspberries from their garden. Those years represented a natural and neighborly symbiosis that I fear can never be replicated, but will cherish forever.

Herb designed and built six homes on Kessler, including Deepwood, and our house, which had been built several years prior for another well-known and much loved professor, ornithologist Dr. Doug James. Dr. James and his wife raised their three daughters on the property before moving on and making way for our family in 1975. Over the years, I would sometimes find the markings of their childhood, and a large map was plastered to the entryway wall. My mother covered it for many years with a wall hanging that one of my father's students had brought her from Iran, and as an adult, I have learned from Dr. James that this was a map of U.S. vegetation distribution that he used in his research. Although the map was eventually painted over, the edges are still evident and stand as a reminder of the rich intellectual history of Kessler Mountain.

Just on the other side of Kessler lived yet another well-known and much-loved Fayetteville family, and lifelong friends, the Sharps. We spent many hours at the Sharps' over the years, especially when they decided to try out the "sheep business" and dad became Frank's advisor in the venture. In those days, "Frank's pub" was a barn and I have vivid memories of chasing fireflies and playing flashlight tag with the Sharp kids in their backyard while our parents visited on the porch. The Sharps, like the Fowlers, had a profound influence on my sister, Kim, and me. Their daughter, Molly, and Kim were best friends through school and remain very close today. Their unique home and business, their family heritage on the mountain, and their love of the arts and nature left a lasting mark on our own values.

So when I think of "Kessler" and what it means to me, it is as much about the natural environment as it is about the families and history we shared it with. Kessler is what shaped the person I am today, developing a lifelong passion for conservation. It's the quiet hours I spent alone in its woods for over 30 years that shaped my relationship to a higher power; it's the reason I revere all things great and small and the reason I favor a more hands-off approach for true preservation.

In all honesty, my feelings about the "saving of Kessler Mountain" are somewhat conflicted. I feel a slight cringe in my soul when the preservation of any important wildlife habitat means an influx of human intrusion, especially when the land in question happens to be the "secret garden" of my youth. It holds for me more memories, lessons and encounters than I could possibly share. And while we have cause to celebrate, we should also remain aware that the acreage recently purchased by the city of Fayetteville is only of fraction of Kessler. To keep it whole, we need to preserve more of its land and its rich history.

We have cause to celebrate because this important piece of Kessler is now safe from the consumptive reach of development; because the "saving of Kessler" brought a community together in a powerful and inspiring way; and because we have city leaders and community advocates who will work together to ensure its balanced use and long-term protection. I am one of them, and that is what makes Fayetteville so unique.

So this is the full-circle moment. While it now comes to me in emails with trails mapped out like spaghetti and user groups affecting the fate of my witches and their minions, Kessler put me right where I am today. To help keep it whole, to share its rich heritage, to honor it, and most important, to protect it and other places like it for future skinned-knee tomboys to explore, cherish and hopefully pass it on.

— Article by Terri Lane

Do you want to help FNHA support Kessler Mountain Reserve?

Go to page 12 to see how you can!

Kessler Mountain: Ancient Oak Woodlands

Dr. David Stahle, Distinguished Professor and Director of the Tree-Ring Laboratory at the University of Arkansas commented after assessing the ancient oak woodlands on Kessler Mountain:

The Kessler mountain property supports a diversity of forest environments, including some parcels that have escaped human disturbance and retain ancient presettlement trees of great age. . . .The property would make an exceptional natural laboratory that would enrich the research and educational opportunities for students and faculty at the University of Arkansas.

The property is beautiful and already includes a network of hiking and mountain biking trails. But I was most impressed by the ancient woodlands along the scenic escarpments that are dominated by chinkapin oak (Quercus muehlenbergii) in the 200- to 400- year age class. These escarpment woodlands accent the interesting rock outcrops of Atoka, Trace Creek, and Kessler limestone formations, which weather into a variety of soil chemical and textural properties that result in a high species diversity of vegetation cover. Some of these rugged, elongated parcels were not logged because of the difficult terrain and because the beautiful curvilinear growth forms of the dominate chinkapin oak do not lend themselves to band saw or the production of dimension lumber. But they are one component of the original natural vegetation cover of northwest Arkansas, before heavy human disturbance of historical and modern times.

Coring a 300-year-old post oak

On the steep southeast facing escarpment getting down toward the south end of the property is a nice pocket of uncut ancient forest. It is not large, maybe five acres. But it includes old growth chinkapin oak along the escarpment and a post oak glade with very ancient trees adjacent and uphill. We cored one post oak (44DBH) and dated the inner ring to 1724. It did not include the center ring. We also cored a 70cm DBH chinkapin that had 190 rings, but the core we obtained was not close to the center. We guess that tree to be 250-years old. Alan Edmondson will take pains to get the pith ring in his research so we can be more definitive about tree age.

After now having seen a good fraction of the forests on Kessler they appear to largely represent second growth, but there are old presettlement age trees that escaped cutting distributed pretty much throughout the second growth woodlands. I would refer to these relict trees as 'cull,' and think they escaped logging because they were partly hollow, crooked, or in some other way were not the tree or species of choice. You also have a very few small pockets of uncut old growth as we have described.

But the larger message is that the forests on Kessler Mountain are in very good condition with lots of areas of mature second growth with ancient culls. Some of these so-called culls are super fat and ancient post oak. So I feel more strongly than ever about the conservation of this forest tract.

There are some badly disturbed areas as well and they include the ridgeline from the towers at the south end of the tract up to the vicinity of the pond by the post oak shale glade. The other heavily disturbed area we walked through at lower elevations on the east side of Kessler, where the woods have been butchered and lonicera thickets have taken over. For the most part the mid to upper slopes on both the east and west sides of Kessler Mountain retain fine mature second growth, with cull, and with pockets of uncut presettlement oaks.

FNHA will be raising a total of $300,000 over the next three years to support the preservation and multiple public uses of the Kessler Mountain Reserve. Fundraising efforts will include events such as the Annual Kessler Trail Run*, grants, corporate contributions and individual gifts. For information about the Trail Run and about contributing, see page 12. **For a list of ways that FNHA believes our funds will have the greatest impact, see Chairman's Corner, page 11.**

Thank you for you partnership with us!

(*see page 12 for details)

Kessler Mountain Birds and Birding Opportunities

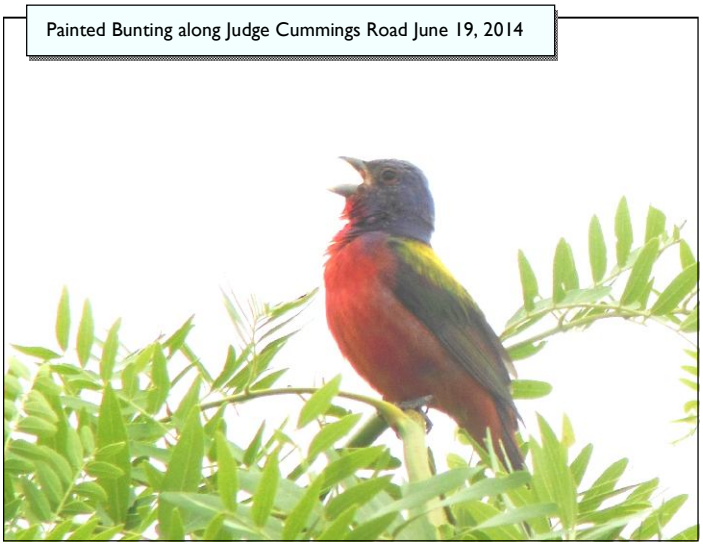
Summer Tanager along Kessler Mountain Road June 19, 2014

Birds are distributed in the landscape according to their ecological needs. While most of Kessler is upland hardwood forest, if you take the parts of Kessler now owned by City of Fayetteville (about 600 acres) with the surrounding private lands not likely to be developed, habitats also include open pastures, old overgrown fields, bottomlands with flowing streams, and a modest amount of development at the urban interface.

Kessler Mountain Park hosts at least 125 bird species. This total will increase with more birding over time:

PERMANENT RESIDENTS are species present in all seasons. These total about 40 species. Examples include Red-tailed Hawk, Red-shouldered Hawk, Great Horned Owl, Eastern Screech-Owl, Pileated and Downy Woodpeckers, Carolina Chickadee, Tufted Titmouse, and House Finch.

Painted Bunting along Judge Cummings Road June 19, 2014



SUMMER RESIDENTS are birds present primarily or exclusively during the nesting season. These total about 43 species. This includes birds like Broad-winged Hawk, Red-eyed and White-eyed Vireos, Wood Thrush, Black-and-white Warbler, Summer and Scarlet Tanagers, Indigo Bunting, Whip-poor-will and Chuck-will's-widow, and Blue-gray Gnatcatcher.

TRANSIENTS include at least 24 species that pass through on their northward and southward migrations, but do not remain for either summer or winter. Examples include Olive-sided Flycatcher, Philadelphia Vireo, Tennessee and Nashville Warblers (and other warblers), Rose-breasted Grosbeak, and Swainson's Thrush.

WINTER RESIDENTS include those birds present here only during cold weather. These total at least 17 species. Examples include Yellow-bellied Sapsucker, Yellow-rumped Warbler, Dark-eyed Junco, White-throated Sparrow and occasional overflights by Bald Eagles.

There are several ways to go birding on Kessler:

Blue-Grey Gnatcatcher on nest near new park entrance, 4-16-2014

BY VEHICLE Public roads like Smoke House Trail, Judge Cummings Road (WC 200 with access to Regional Park) and Kessler Mountain Road (WC 201), all provide views to the mountain and cover habitats in or adjacent to the park. On the west side in the Farmington area, public roads including Holland, Archie Watkins, and Wolfdale all provide a way to find birds on Kessler's lower slopes and in the urban interface. Since examples of all Kessler habitats are visible along these roads, roadside birding makes it possible for those with mobility limitations to enjoy a high percentage of birds that may be found anywhere on the mountain.

ON FOOT The trail system on Kessler as it exists in June 2014 was developed for mountain biking, but these trails are open for all other uses, too. It is possible to use them to walk a loop to include both the mountain top and forested slopes. A birding hike can include crossing the entire top of the mountain from the towers area in the south (off Kessler Mountain Road) through the upland forests of the park and exiting in the north at Rock City, which is private land, but currently open for limited public use. If time is limited, consider visiting Rock City, located on private land. You will need to sign a release form at the trailhead, but this just takes a minute or two, and the birding is always interesting. The regional park with its athletic fields is being developed off Judge Cummings Road. This is an excellent area to seek birds of pastures, hayfields and old fields with thickets and fencerows.

-Prepared by Joe Neal with editing by Doug James, June, 2014

523 Species and Counting: Kessler Mountain Reserve BioBlitz, May 16 and 17, 2014

Two Western Wormsnakes (*Carphophis vermis*) on the Serpentine Trail. These handsome and harmless snakes are rarely seen since they spend their time hunting invertebrates under rocks and leaf litter.

While biodiversity in the tropics grabs news headlines, it is humbling to realize how little we know about the ecosystems in our own backyards. There are a lot of organisms on Earth, and nearly one million of them are insects. For an entomologist, cataloging biodiversity in any ecosystem is a daunting task, but for most of us, there's nothing more exciting than trying. On May 16th and 17th, graduate students from The University of Arkansas Biology and Entomology Departments converged on the Kessler Mountain Reserve to attempt an impossible task: name all of the organisms in the Reserve in a 36-hour period.

While the chilly, wet weather kept many of the animals hidden away, the students braved the weather and, with notebooks in hand, began walking the trails, taking photos, consulting references and making their lists. Ornithologists armed with binoculars and keen hearing sought out birds; herpetologists flipped over rocks in search of snakes, lizards and frogs; mycologists dug through tree stumps and leaf litter looking for mushrooms and slime molds; botanists wielded magnifying loupes in their quest for plants and mosses, and entomologists armed with nets and jars sought out insects and their relatives in every nook and cranny. Within 36 hours, we had found 523 species on Kessler Mountain. Not only had we discovered overwhelming biodiversity in our own backyard, but also that there are many discoveries yet to be made without venturing to tropical locales.

Our knowledge of vertebrate diversity, that is the names and distributions of animals with spines like birds, snakes, deer and ourselves, is thought to be fairly complete. However, these charismatic organisms make up less than 5% of the animals on earth. The vast majority of animals on Earth are invertebrates, the less charismatic worms, slugs, insects and other spineless wonders. Resident bird expert Joe Neal knows of at least 125 birds that call Kessler home at some point during the year. In a mere 36 hours in May, we met nearly half of them. No one yet knows how many insect species live on Kessler Mountain, but in this brief Blitz, we found over 200 species. In addition, there were over 100 species of other arthropods (spiders, mites, millipedes, centipedes and crayfish) present. Only about half of these species could be named by resident experts. In the course of 36 hours on Kessler Mountain, we discovered insects and other arthropods that had never before been described or seen in Arkansas, inspiring in this cohort of graduate students not only novel research directions, but awe and wonder as well. Many of us have been back repeatedly since the Blitz, thrilled that such a remarkable outdoor laboratory is available so close to home.

The Striped Bark Scorpion (*Centruroides vittatus*) is one of the many organisms that prefer the shale barren area. This unique area is also home to the Texas Brown Tarantula (*Aphonopelma hentzi*) and other xeric species.

This brief BioBlitz was a crash course in the potential for Kessler Mountain Reserve to serve as an outdoor classroom and research facility for Fayetteville residents. The incredible biodiversity that we uncovered in this short period is surely just a glimpse of the vast variety of organisms that call Kessler Mountain home. The Biology and Entomology students will conduct another BioBlitz later this summer, and we are all looking forward to meeting more of the remarkable organisms that live in our own magnificent back yard.

— Article by Amber Tripodi

Editor's Note: Amber will finish her PhD this Fall and has accepted a post-doc position with the USDA ARS Logan Bee Lab in Utah working with "the amazing Jamie Strange" on bumble bee pathogens. She has been such an asset to FNHA, and we certainly are going to miss her scientific expertise and unbridled enthusiasm. We wish her well in her new career.

Interim Progress Report: a Rapid Ecological Assessment of Kessler Mountain Reserve

Just before and after the remarkable BioBlitz by University of Arkansas students that Amber Tripodi describes in the preceding article, Theo Witsell, Botanist and Ecologist with the Arkansas Natural Heritage Commission, led three field trips to Kessler Mountain to begin a Rapid Ecological Assessment commissioned by the Fayetteville Natural Heritage Association. The purpose of the assessment is to identify any significant ecological communities and areas of significant flora and fauna before the area is developed further. The ANHC can also provide technical assistance regarding the management of such areas .

Witsell and ANHC staff visited Kessler Mountain on three trips, for a total of seven days, in April, May and June of 2014. They consulted with and were often accompanied by a number of other experts from the University of Arkansas, the City of Fayetteville, FNHA, the Nature Conservancy, NWA Master Naturalists, the Northwest Arkansas Land Trust and others. Their July, 2014, preliminary report, summarized below, will be followed by additional efforts to inventory the site's geological characteristics, plant communities, ecologically significant areas and habitats, and fauna during the Fall/Winter of 2014. A more detailed final report will be submitted in early 2015.

The initial inventory documented 11 natural communities or habitats and more than 350 plant species on Kessler Mountain reserve. It also identified five areas or habitats that are especially ecologically significant to the site and populations of several plant and animal species of state conservation concern.

The preliminary report notes that the reserve is almost entirely forested with the majority of the tract appearing to have been logged in the past but otherwise kept in forest cover. Several areas however, were obviously cleared for agriculture historically and have reverted to forest cover of varying ages. Among the plant species identified, of particular interest are a number of "prairie species" found on the tract, a testament to both the site's proximity to the (former) tallgrass prairies of the Springfield Plateau and the historically more open condition of woodlands on the site. *(Highlights from Theo's interim report on the next page)*

Above, a shale barrens community in a saddle on the main ridge of Kessler Mountain supports prairie grasses including little bluestem (*Schizachyrium scoparium*) and big bluestem (*Andropogon gerardii*), as well as a rich diversity of wildflowers growing under old, stunted post oaks, Shumard oaks, and chinquapin oaks. This area represents one of the most unusual and highest quality natural communities in the reserve, containing post oak trees that are more than 250 years old.

Rapid Ecological Assessment Interim Progress Report (Continued from previous page)

The **preliminary** report identified the following plant communities or habitats at Kessler Mountain Reserve:

1. Shale Barrens
2. Dry Oak Woodland
3. Dry-Mesic Oak-Hickory Forest and Woodland
4. Mesic Hardwood Forest
5. Riparian Forest
6. Old Field/Successional Forest
7. Bluffs
8. Springs & Spring Runs
9. Ponds
10. Pasture/Field
11. Disturbed Areas

Witsell's report also notes five ecologically significant areas or habitats identified during the first phase of field work:
1. Shale Barrens
2. Cliff and Talus
3. Old Growth Post Oak Woodland
4. Riparian Habitat
5. Springs and Seeps

An ecologically significant area or habitat is defined here as an area with relatively intact or high quality natural communities or a habitat that contributes significantly to the overall biological diversity of the site. These areas or habitats may include populations of species of conservation concern, provide habitat for groups of species not found elsewhere on the site, or may simply support relatively intact plant communities with high native species diversity and low levels of non-native invasive species. These may be thought of as those areas of the reserve that are the least altered in terms of their natural condition, and/or the most biologically diverse. These areas and habitats would likely be the most important to restore and maintain in good condition.

The designation of these areas or habitats as ecologically significant is not meant to indicate that other areas of the reserve are not ecologically significant or worthy of protection or management to enhance their natural values.

The following are excerpts from the preliminary report describing the five ecologically significant areas or habitats:

Shale Barrens
Perhaps the most unusual ecological feature on the tract is a shale barrens community located in a shallow saddle on the main north-south trending ridge of Kessler Mountain. The ridgetop of Kessler Mountain is underlain by sandstone of the Atoka Formation, while the saddle has been eroded through this sandstone and into shale of the Trace Creek Member of the Bloyd Formation.

This community is a mosaic of small grassy to rocky openings surrounded by dry oak woodlands. These woodlands range from very open (savanna) to less open along gradients of soil depth and moisture availability. These woodlands are dominated by old post oak (*Quercus stellata*), with scattered individuals of chinquapin oak (*Quercus muehlenbergii*), Shumard oak (*Quercus shumardii*), blackjack oak (*Quercus marilandica*), and white ash (*Fraxinus americana*). Trees are widely spaced and stunted in the areas of thinnest soils and taller and more dense as soils become deeper. A post oak tree in these barrens cored by Alan Edmondson and Dr. David Stahle was more than 250 years old.

Scattered small trees and shrubs include gum-bumelia (*Sideroxylon lanuginosum*), black locust (*Robinia pseudoacacia*), Carolina rose (*Rosa carolina*), redbud (*Cercis canadensis*), dwarf hackberry (*Celtis tenuifolia*), deerberry (*Vaccinium stamineum*), rusty blackhaw (*Viburnum rufidulum*), and serviceberry (*Amelanchier arborea*).

The herbaceous layer (ground flora) is diverse, containing a number of prairie and woodland species. This layer is dominated by little bluestem (*Schizachyrium scoparium*), poverty-ats (*Danthonia spicata*), gumplant (*Grindelia lanceolata*), and wild quinine (*Parthenium integrifolium*). Other species common in the herbaceous layer include woodland sunflower (*Helianthus hirsutus*), prairie aster (*Symphyotrichum turbinellum*), manyray aster (*Symphyotrichum anomalum*), late purple aster (*Symphyotrichum patens*), wand beard-tongue (*Penstemon tubiflorus*), gray goldenrod (*Solidago nemoralis*), elm-leaf goldenrod (*Solidago ulmifolia*), showy goldenrod (*Solidago petiolaris*), wild hyacinth (*Camassia scilloides*), yellow pimpernel (*Taenidia integerrima*), pencil flower (*Stylosanthes biflora*), green-flowered milkweed (*Asclepias viridiflora*), horsetail milkweed (*Asclepias verticillata*), fourleaf milkweed (*Asclepias quadrifolia*), sundrops (*Oenothera fruticosa*), dwarf skullcap (*Scutellaria parvula*), heartleaf skullcap (*Scutellaria ovata*), long-bracted wild indigo (*Baptisia bracteata*), Russell's beebalm (*Monarda russeliana*), violet wood sorrel (*Oxalis violacea*), Ohio spiderwort (*Tradescantia ohiensis*), stiff coreopsis (*Coreopsis palmata*), tall thoroughwort (*Eupatorium altissimum*), whorled milkwort (Polygala verticillata), and many more.

A pond has been dug in this community at the low point of the saddle. Based on the amount of water that accumulates in the trail just west of this pond (where there is no artificial impoundment), this was likely a naturally wet place where water ran off the slopes above and accumulated at the surface of the ground. The impermeable nature of the underlying shale keeps water at the surface for extended periods. Such natural mountaintop depression wetlands (sometimes called "saddle ponds") often support uncommon or rare species of plants, amphibians, and insects. These habitats are rare in the landscape and many examples, like the one at Kessler Mountain, have been heavily impacted by past development as water sources, despite their small watersheds and often ephemeral nature. Remnant wet depressions outside this pond support several species characteristic of ephemeral wetlands including clammy hedge-hyssop (*Gratiola neglecta*), chaffweed (*Anagallis minima*), water starwort (*Callitriche heterophylla*), and several rushes (*Juncus* spp.)

The ANHC is aware of only one other example of a similar shale barrens community in the Arkansas Ozarks, at a site called "The Slatey Place" within the Ponca Wilderness Area in Newton County. There, a very similar plant (continued next page)

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community occurs in an almost identical landscape position (a shallow saddle in a north-south trending ridge with similar geology). This site also has a small pond situated in the lowest point of the saddle, also presumably a naturally wet area. However, aerial photo interpretation and a brief roadside survey indicate that there appears to be (or to have been until recently) another example of a shale barrens community about 2.5 miles north-northeast from the Kessler Mountain site, just east of the intersection of North Mountain Ranch Rd. and Technology Way. Unfortunately, this site was fragmented and partially lost to development in recent years, and the remainder appears to be slated for development in the future. There may also be other small examples of this habitat in the general vicinity.

Bluffs

Bluffs essentially ring Kessler Mountain and are present on the east and west sides of the reserve, occurring on both sandstone and limestone substrates. Bluffs, as broadly defined here, include several different habitats, each with their own characteristic biota: 1) cliff edge, 2) cliff face, 3) ledges, 4) talus slopes, and 5) bluff shelters or rockhouses. Kessler Mountain Reserve includes bluffs on all aspects and includes both dry and mesic bluffs.

Bluffs are often highly biologically diverse, and the ones at Kessler Mountain Reserve are no exception. They occur on several geologic formations but are most prominent on the Brentwood Member of the Bloyd Formation and Prairie Grove and Cane Hill members of the Hale Formation. There are also some low bluffs and ledges on the Kessler Limestone Member of the Bloyd Formation.

Bluffs at Kessler Mountain, while they support a high diversity of native plant species, are heavily encroached by non-native invasive species. The most common invasive species include bush honeysuckle (*Lonicera maackii*), Japanese honeysuckle (*Lonicera japonica*), tree-of-heaven (*Ailanthus altissima*), perfumed cherry (*Prunus mahaleb*), Chinese privet (*Ligustrum sinense*), and multiflora rose (*Rosa multiflora*). Heavy infestations of these invasive woody plants in bluff habitat at Kessler Mountain is likely due to a combination of factors including ice storm damage in recent years opening the tree canopy and heavy use of bluff habitats by fruit-eating bird species (which spread seed of many invasive woody plants). Encroachment by these woody plants is creating dense thickets along and below blufflines and degrading habitat for a number of species that need more open conditions.

Rockhouse habitats along bluffs at Kessler Mountain provide habitat for many native wildlife species including Black Vultures, which were encountered several times while surveying bluff lines in May.

Several springs were found at or near the base of bluffs on the east side of Kessler Mountain at the geologic contact between limestone (above) and shale (below).

Old Growth Post Oak Woodland

An area of old growth post oak woodland was identified on the east side of Kessler Mountain by Alan Edmondson and Dr. David Stahle from the University of Arkansas Tree-Ring Laboratory. This area is mapped based on personal communication with Alan Edmondson and GPS coordinates that he provided. His excellent report summarizing his research mentions that the larger post oaks in the area are in the 200 to 300 year old age class, with one of the oldest looking trees cored estimated to be more than 300 years old. He also mentions that there are other areas of Kessler Mountain that still support pre-settlement trees, including the shale barrens area described above: *There was also evidence of other areas of both relatively pristine and degraded old growth. These areas include a dwarfed post oak glade on the ridge of the mountain next to the pond where a core taken from a post oak was over 250 years old. There are other areas that are considered degraded old growth which appear to have been selectively logged for individual high quality trees. But these degraded old growth forest contain many pre-settlement oaks and hardwoods.*

In addition to supporting a remnant stand of old growth woodland, this area supports a diverse herbaceous layer (ground flora) with many conservative species considered indicators of high-quality sites.

Riparian Habitat

This habitat occurs along the largest stream on the reserve, an unnamed tributary of Cato Springs Branch. This stream flows east along the southeast boundary of the tract. This riparian habitat supports a high diversity of plant species including a number not seen elsewhere on the reserve, which is mostly well-drained upland forest and woodland.

Springs and Seeps

A number of small springs have been found in the reserve. Most of these springs feed small spring runs (groundwater-fed streams or rivulets that receive all or most of their hydrologic input from groundwater). All of the springs and spring runs encountered so far are modest in size and water output but had flow at least into June and support wetland flora and/or fauna, an indication that they are at least semi-permanent. The cool, constant flow of mineral-rich groundwater in spring runs may support species that rarely, if ever, occur on streams without groundwater influence. At least one example of a seep (where groundwater emerges up through the soil over a diffuse area) was located in a powerline right-of-way near the north end of the reserve. Spring runs and seeps at Kessler Mountain Reserve support a number of characteristic plants including spotted jewelweed (*Impatiens capensis*), smartweed (*Persicaria* sp.), fowl manna grass (*Glyceria striata*), bulrush (*Scirpus* sp.), short-tooth mountain-mint (*Pycnanthemum muticum*), winged monkey-flower (*Mimulus alatus*), and a number of wetland sedges (*Carex* spp.) and rushes (*Juncus* spp.).

Several animal species of conservation concern were found in these springs and spring runs including two salamander species and two groundwater crustaceans.

Chairman's Corner

Past Chairmen, Pete Heinzelmann and Bob Caulk, have led the FNHA to an impressive list of accomplishments since 2003, including the preservation of properties like Brooks-Hummel Nature Reserve and Mt. Sequoyah Woods. Over the past decade FNHA has also learned lessons along the way as to how to improve the conservation value of these properties while unlocking the recreational and educational opportunities.

Through FNHA's latest partnership with the City of Fayetteville and the Walton Family Foundation we hope to apply these lessons by using a portion of the $300,000 that FNHA has committed to raising for the Kessler Mountain Reserve in the following ways:

Conservation Easement - FNHA and the City are having active discussions with the Northwest Arkansas Land Trust to place a conservation easement on Kessler Mountain Reserve. A conservation easement is a legal agreement between the landowner and the land trust that limits certain mutually agreed upon uses of the land in order to protect its conservation values. Such an easement will require an initial investment to establish the easement and a stewardship fund to ensure the NWA Land Trust can monitor this land in perpetuity.

Biological & Other Natural Asset Inventories - FNHA has already contracted the Arkansas Natural Heritage Commission for a rapid ecological assessment at Kessler Mountain. This information will prove valuable in developing the baseline for the conservation easement and during the master planning process for Kessler when identifying appropriate areas for new trail construction as well as those areas that need to be avoided. However, this rapid assessment is just the tip of the iceberg when truly understanding what is happening on the Reserve. A more comprehensive assessment of natural assets will fully inform the long-term plan for Kessler and provide valuable information that can be used for future educational purposes.

Habitat Management Plan - As development and continued population growth occur around Kessler Mountain, invasive species will continue to encroach upon the 376-acre area that has been purchased. While ANHC botanist Theo Witsell and others have demonstrated an abundance of habitat on the Reserve, FNHA members are already seeing an assortment of noxious species that threaten the area as well. In order to stave off these threats and keep Kessler in its current state it is critical to develop a Habitat Management Plan for the area and set aside a small management fund to ensure funds are available for implementation of the Plan.

Educational Signage - The recreational opportunities have been well documented and will be a valuable asset to Northwest Arkansas, but it is also anticipated that the biological and natural asset inventories will identify key areas on Kessler that are rich in both geological and cultural assets that are unique to the central region of the United States. It will be important to display this information in a way that can be translated to visitors on Kessler Mountain so they too understand the Reserve's ecological value.

Outdoor Education Structure - One of Kessler Mountain's greatest characteristics is its close proximity to Fayetteville Public Schools and the University of Arkansas. In order to continue the community's passion for preserving natural spaces into the future it is critical that we take advantage of this location to educate Northwest Arkansas' younger generations. FNHA is also committed to this education and would like to partner with the City of Fayetteville and local schools to develop a concept and fundraising plan to make this happen. If it is shown that this idea is viable, FNHA would pursue construction of a structure for this purpose.

Summary - FNHA is committed to raising $300,000 to help cover a portion of the purchase price of Kessler Mountain Reserve. We feel it is vital to address the needs as listed above to better manage Kessler Mountain Reserve into the future and are pursuing applying up to $120,000 of FNHA's $300,000 commitment towards a conservation easement with NWA Land Trust and a stewardship fund for active monitoring, a Habitat Management Plan and a management fund for active management, and educational asset studies along with educational signage. It is our belief that allocating this funding now will help retain Kessler's unique qualities into the future.

Sincerely,

John Coleman, FNHA Chairman

We hope you'll agree that preserving Kessler Mountain Reserve for current and future generations is a worthy project for the Fayetteville Natural Heritage Association. Our all-volunteer organization has *FOUR STRATEGIES*

We think our involvement with Kessler Mountain Reserve fits all four

1. To make natural areas accessible to all
2. To influence public policy
3. To engage the community and young people
4. To take care of what we have

We would like the funds we raise over the next three years to support

- ⇨ a conservation easement that will protect the land in perpetuity
- ⇨ biological and other natural asset inventories
- ⇨ a habitat management plan
- ⇨ educational signage identifying important biological, geological and other sites so visitors can understand the ecological value of the area
- ⇨ an outdoor education structure

Have a question?
Need more info?
Want to comment?
Like to volunteer?

Fill out the contact form at
www.fayettevillenatural.org

OR contact us directly

The Kessler Trail Run is Back

Mark Your Calendars for November 1, 2014

Last year, we had more than 150 runners and this year promises to be even bigger
- Registration fees are $30 and $40 for the 10k and 20k respectively
Proceeds will go toward FNHA's Kessler Mountain Reserve

An AFTER PARTY featuring LOCAL FOOD TRUCKS and LIVE MUSIC will follow immediately after the run

More Info? Register for Run
www.facebook.com/kesslertrailrun

Now that you know why Kessler Mountain Reserve is so important and why FNHA's commitment to raise $300,000 was a crucial part of the purchase agreement, what can YOU do to help?

It's easy! **Make a contribution now**. And, if you can, **make a pledge** to contribute during each of the three years of our fundraising effort. Your contribution will make a difference - now and to future generations in our community who live, play and learn on Kessler Mountain. Thank you.

Did you know ?
You can make your contribution on our website using *PayPal*

Please go to:
www.fayettevillenatural.org/donate.php

Name(s)_____
Address_____
City_____ ST_____ ZIP_____
Phone_____ Email_____
Amount Contributed now $_____ Annual pledge $_____ /per year
Name(s) as you would like them listed in acknowledgements (please let us know if you wish to remain anonymous): _____
Please send checks made out to FNHA to:

Fayetteville Natural Heritage Association
PO Box 3635
Fayetteville, AR 72702-3635

FNHA is a 501(c)(3) non-profit corporation; your contributions will be tax-deductible.