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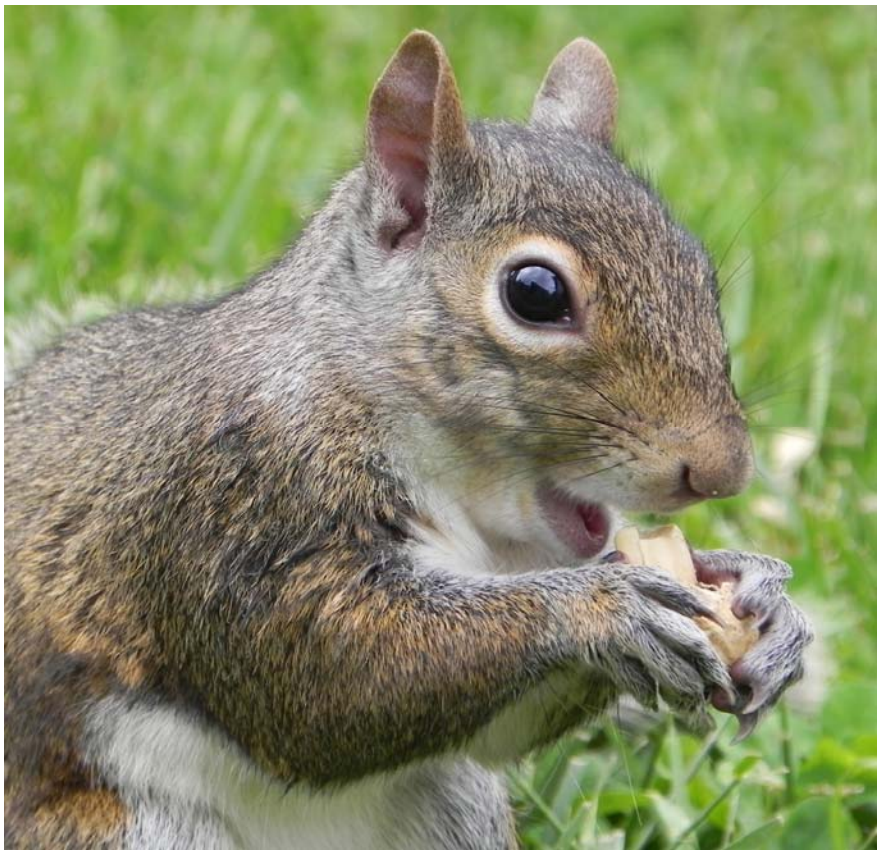
Affiliated Chapters

Arches of the Cumberland Chapter (Slade) meets informally, call President Dell Sasser for details, 606-666-7521 x73559, or (606) 233-8938, or via email (dell.sasser@kctcs.edu)

Falls of the Ohio Chapter (Louisville), 9109 Hawthorne Pointe Drive, Louisville, KY 40272, **meets every 3rd Thursday** of each month except Jan, Jul, Aug, & Dec at 7:00 PM at the Louisville Nature Center, 3745 Illinois Ave, Louisville, 40213. Call President Chris Bidwell at (502) 458-1328, or via email (mabteacher1@yahoo.com).

Wilderness Trail Chapter (Pineville) meets the first Thursday of each month, March through December, at 7:00 p.m., generally at Pine Mountain State Resort Park in the Ray Harm Room, 1050 State Park Road Pineville, KY 40977-0610 (800-325-1712). Call President Tom Toole at (606) 248-3078, or via email (tom.tdtoole@gmail.com).



A *Sciurus carolinensis* Gmelin, 1788 eastern gray squirrel eating a nut in Valley Station, Jefferson County, KY in May, 2011. Photo by Barry Nichols, 2011, Nikon Coolpix P100.

EDITOR'S NOTES

Anissa Florence has left her position of KSNH Treasurer. We thank her for her service to the organization. **Pat Meyer** has now assumed the treasurer's position until the fall elections are held at our 2011 Cumberland Falls Conference. Dues may be sent to her at **10707 Coogle Lane, Fairdale, KY 40118**. For questions you may email her at **treasurer@ksnh.org**.

Some early information about the KSNH Fall 2011 meeting at **Cumberland Falls State Resort Park** will be available in the next newsletter. Stay tuned!

Members are encouraged to show interest in any of the several open board positions (see the front page sidebar) by sending an email to President **Zeb Weese**. Alternatively, you can send postal mail to the address above. The term would run until the end of 2011. Elections for the full 2012-2013 term will be held at the **2011 Fall Conference at Cumberland Falls State Resort Park**. Please express your interest to Zeb for the upcoming term as well.

We now have a yahoo discussion group for KSNH members. To access it, either go to the group page at **http://tech.groups.yahoo.com/group/KSNH/.** We can not sign up anyone on our own. Only you have the ability to sign up while on the page or by sending an email to me and I'll send out an invite. I have to do it this way because it is a closed group. When you get the email you can click to join the group.

You decide whether you just want to read messages online, have them sent to your email individually, or as a daily digest. You can upload photos to a folder of your choosing, create natural history links, and/or post documents.

Odwalla (the drink manufacturer) is planting trees in the US. This is free for you. You can vote (one email=one vote) on their "Plant A Tree" webpage at **http://www.odwalla.com/plantatree/**, or you can also vote via Facebook by **clicking here**. You basically click on the state where you want your tree planted. The program runs from May 30, 2011 to September 1, 2011 or until all trees (80,000) are gone. These trees will be planted in **state parks**. At the time of writing, Kentucky had the 4th largest number of trees being planted with 3,996.

We've been getting the word out for dues renewals and new **members**. Also, please remember that you can save on postage by **paying your dues**, donating to various KSNH efforts like **grants**, and/or paying for merchandise by going to the KSNH website (linked all over the newsletter) to make **paypal payments**. Efforts are also underway to allow **Google Checkout** payments soon.

Please note: The deadline for submissions for the next issue (KNN Fall 2011) is August 1, 2011. –barry

BIRD WALK REPORT FROM THE 2011 KENTUCKY SOCIETY OF NATURAL HISTORY SPRING MEETING AT CARTER CAVES STATE RESORT PARK

by Evelyn Morgan

The bird walk for the Kentucky Society of Natural History's **2011 Spring Meeting at Carter Caves State Resort Park** on Sunday, April 16 was greeted by some hearty souls. The morning was crisp and cool, but we did see some good birds. Most noteworthy was the number of ***Melanerpes erythrocephalus*** (Linnaeus, 1758) or **red headed woodpeckers**. We saw at least 6, including one guarding a hole in scrubby looking oak near the tennis court. The **red headeds** were zipping around in all directions, calling and making quite a show. We also saw ***Melanerpes carolinus*** (Linnaeus, 1758) (**red-bellied woodpeckers**), ***Dryocopus pileatus*** (Linnaeus, 1758) (**pileated woodpeckers**), and ***Picoides pubescens*** (Linnaeus, 1766) (**downy woodpeckers**). The **pileated woodpeckers** appeared to be housekeeping, going in and out of a large hole in an oak tree.

Warblers were slow, but we did get good looks at a ***Dendroica dominica*** (Linnaeus, 1776) (**yellow-throated warbler**), ***Dendroica pinus*** (Wilson, 1811) (**pine warbler**), and ***Dendroica coronata*** (Linnaeus, 1766) (**yellow-rumped warbler**). We heard ***Seiurus aurocapilla*** (Linnaeus, 1766) (**ovenbird**), ***Dendroica virens*** (Gmelin, 1789) (**black-throated green warbler**), ***Polioptila caerulea*** (Linnaeus, 1766) (**blue-gray gnatcatcher**), and ***Vireo olivaceus*** (Linnaeus, 1766) (**red-eyed vireo**).

The group got a good look at a ***Hylocichla mustelina*** (Gmelin, 1789) (**wood thrush**). A very pretty bird, it did not sing, but provided us with a good open view.

We saw several female ***Carpodacus purpureus*** (Gmelin, 1789) (**purple finch)** and saw one male **purple finch**. Late migrants included a few ***Spinus pinus*** (Wilson, 1810) (**pine siskins)**. All the regulars you would expect to find, (**Northern cardinal)**, ***Baeolophus bicolor*** (Linnaeus, 1766) (**tufted titmouse)**, ***Poecile carolinensis*** (Audubon, 1834) (**Carolina chickadee)** and ***Sitta carolinensis*** - Latham, 1790 (**white-breasted nuthatch)** were also seen.

It was a great day! Thanks to all that went with me.

Evelyn Morgan *is an avid birder and works for the* ***Daniel Boone National Forest****. She is also an active member of the* ***East Kentucky Bird Club****.*

NOTES FROM THE NATURE NUT:

SHAWNEE STATE PARK AND FOREST REVISITED

by W. H. (Wally) Roberts

In April of 2010, the **Kentucky Society of Natural History** held its Spring Conference at **Shawnee State Park and Forest** near **Portsmouth, Ohio**, a natural area commonly referred to as "**The Edge of Appalachia**". All members who attended were pleased to find such wonderful **biodiversity**, **cultural history**, **natural beauty**, and fabulous accommodations.

Karen and I were so impressed that we decided to return during the third week of April this year. We made our reservations for five days and four nights, but due to severe flooding on the **Ohio River**, we were forced to reschedule to the first week of May. Meanwhile, our friends and fellow KSNH members, Tom and Doris Mattingly, returned home from wintering in Florida and decided to accompany us.

I feared that we might be late for the spring bloom and migration, but was surprised to find **Shawnee** ten to fourteen days behind the Louisville area. We were able to tally over 100 **wildflowers, shrubs,** and **trees** in bloom and identified 92 species of **birds**.

During last year's Spring Conference, time did not allow us to **visit several areas** recommended by Jeff and Becky Foster, local residents and long-time KSNH members. This trip, we had the time to visit the Amish Colonies near West Union and the Wheat Ridge Road areas, where we ate great food and shopped for handmade Amish crafts from furniture to **bird feeders**.

We, also, had time to visit the Moyer Vineyards and Restaurant downstream from **Shawnee** toward Maysville, and the historic Firehouse Pub and Brewery in nearby downtown **Portsmouth, Ohio**. While in **Portsmouth**, we visited the **historic murals** painted on the downtown **Portsmouth floodwall**. These **paintings** are truly beautiful and amazing. I would highly recommend visiting them if you are ever near the area.

While naturing along the many miles of well-maintained forest service roads, we discovered the largest stand of ***Lonicera sempervirens*** **L., 1753 (trumpet honeysuckle)** that I have ever seen.

Trumpet honeysuckle, also called **coral honeysuckle**, is a beautiful species native to the eastern United States, with **bright red tubular flowers**. This evergreen twining shrubby vine grows to several meters high through shrubs and young trees. **Trumpet Honeysuckle** is pollinated by **hummingbirds** and **insects**. It is, also, a common ornamental plant grown

in gardens and is nationally listed as a top ten plant to attract ***Archilochus colubris*** (Linnaeus, 1758) ruby-throated hummingbirds.

This large patch of trumpet honeysuckle was about 75 yards long on the east side of Shawnee Forest Service Road #9. To reach this site, cross the Ohio River at Maysville and proceed east on U.S. 52 to Friendship, Ohio, and turn left on Ohio 125 at the Shawnee Park entrance sign. Proceed northwest approximately three miles and turn left on Shawnee Forest Service Road #1, also known as Pond Lick Run. Travel west less than one mile and turn left on Shawnee Forest Service Road #9. The patch of honeysuckle is about 150 yards on your left. Remember that blooming times will vary, but early to mid May should offer you an opportunity to view and photograph this display of beautiful red honeysuckle.

Karen and I are looking forward to the 2011 KSNH Fall Conference on September 30, October 1 and 2, at Cumberland Falls State Resort Park and hope to see you there.

Always remember that we have only one natural world, so there is nothing nuts about loving it.

Wally Roberts *was Kentucky Naturalist of the Year 2002. He is a long-time biology instructor, interpretive naturalist, and nature photographer. He graduated with a BS in Biology from Morehead State University, and M.Ed. in Biological Education from the University of Louisville. He's been President of KSNH (three times), former President of the Falls of the Ohio Chapter, and past President of the Board of the Louisville Nature Center. He's currently the* ***Grant Coordinator*** *for KSNH.*

THE IMPORTANCE OF BEES

by Athena Rayne Anderson

THE IMPORTANCE OF INSECT POLLINATION

The importance of insects, especially bees, could not be more obvious than when considered in the context of global food supply. Gordon Allen-Wardell and colleagues stated in a 1998 article in the journal Conservation Biology that "the management and protection of wild pollinators is an issue of paramount importance to our food supply system." The authors reported that many crop failures worldwide in the last several decades resulted from scarcity of wild pollinators. California almond orchards suffered a decline in 1995 due to weather and pollinator loss. The cashew nut crop harvest in north Borneo is consistently suboptimal because the species is native to Brazil and has no native pollinator in the Old World tropics. Unfortunately, the possible effects of pollinator declines on the human food supply are critically under-studied.

A female bee in the Tribe Augochlorini (Order Hymenoptera, Family Halictidae - halictid bees, sweat bees) feeding on *Rudbeckia hirta* L. 1753 (black-eyed Susan). Photo by Athena Rayne Anderson, 2007, Canon Powershot S2 IS. John S. Ascher (American Museum of Natural History Bee Database Project) identified the bee.

Bombus **sp. (Order Hymenoptera, Family Apidae -- bumble bees) feeding on flower. Photo by Athena Rayne Anderson, 2011, Canon Powershot S2 IS.**

Until 1990 it was believed that only a handful of plants feed the **world**, but a paper published that year in **Conservation Biology** by Robert and Christine Prescott-Allen demonstrates otherwise. By examining national food supply data the authors discovered that more than 100 **plant** species provide 90% of the **food** for 146 countries **worldwide**. The authors point out that this new information shows the importance of **conserving plant species** and **genetic diversity** if we are to safeguard our **food supply**.

More than 70% of the plants listed by the Prescott-Allens as crucial to feeding the **world** are **pollinated by insects**. The authors have also documented 60 crop plants crucial to the **North American economy** and their level of dependence on **insect pollinators**. They found that seven crops (**cashew**, **squash**, **mango**, **cardamom**, **cacao**, **cranberry**, and **highbush blueberry**), worth $1.25 billion per year, are dependent on **insect pollination**. The importance of insects to **food plants** is supported by other sources as well. **Dave Roubik**, a tropical **bee** researcher, estimates that 800 species of cultivated plants **worldwide** require **insect pollination**. Of these species 19% are **pollinated by flies**, 5% by **wasps**, 5% by **beetles**, 4% by **butterflies** and **moths**... and 73% are **pollinated** by **bees** alone.

BEES AS POLLINATORS

BEE NATURAL HISTORY-- Several characteristics of **bee anatomy** and **life history** make them ideal as **pollinators**. First, **bees** have fuzzy bodies with finely- branched hairs that increase the surface area to which pollen can cling. Second, many **bee** species have **specialized segments** on their **bodies** for collecting pollen. For example, some **bees** have a **corbiculum**, a modified section on each **hind leg**, into which they **pack pollen**. Other **bees** have specialized hairs on their hind legs or the underside of their **abdomens** in which they **store pollen** (called a **scopa**) . Third, **bees** obtain nutrition entirely from **pollen and nectar** in all their life stages, which makes them intimately linked to a flower's sexual cycle. Fourth, **bees** are members of the **Order Hymenoptera**, a group estimated to contain one out of every ten animals on the planet. There are 25,000 **species of bees** currently described worldwide, and some researchers predict that there might be as many as 40,000 species living today. Approximately 3,500 species of **solitary bees** live in North America alone. Finally, fossils from **Petrified Forest National Park** in Arizona suggest that **bees** evolved around 220 million years ago, more than 100 million years

A female *Andrena* sp. (*A. nasonii*?) bee feeding on *Rosa* sp. (rose) flower. Photo by Athena Rayne Anderson, 2011, Canon Powershot S2 IS. John S. Ascher (American Museum of Natural History Bee Database Project) identified the bee.

before the flowering plants. This indicates that the explosion in flowering plant diversity might have been the result of co-evolution between plants and pollinating bees.

BENEFITS OF BEE POLLINATION-- Many self-fertile plants benefit from cross-pollination by bees. A paper published in 1976 by R.B. Kozin described several crops that benefit from cross-pollination by bees in Russia. Among the plants studied were red clover, long-stemmed flax, and fodder bean, their yields increasing as a result of bee pollination by 400%, 48.8%, and 89%, respectively. Protein content, seed quality, and number of seed pods per plant also increased with cross-pollination. Increases in fruit and seed yield and quality as a result of bee pollination have also been reported in buckwheat, sunflower, and citrus varieties.

In 2006, Sarah Greenleaf and Claire Kremen found that SunGold tomatoes, a variety previously thought to be primarily self-pollinating, increased fruit yield as a result of bee pollination. In fact, fruit production in this crop decreased when pollinators were prevented from visiting flowers, which indicates that tomato yield could be correlated with bee abundance. Experiments with canola show similar benefits of bee visitation. Of particular interest is the discovery that canola on organic farms produced more seeds than that on conventional or genetically modified farms, most likely due to a healthier pollinator population on the former.

***Bombus impatiens* Cresson, 1863 (common Eastern bumble bee) nest in bird house in Valley Station, KY. Photo by Barry Nichols, 2011, Nikon Coolpix P100.**

The benefits of bee pollination translate directly into monetary figures. Insect pollination in the UK, mostly by honey bees and bumble bees, is valued yearly at £202 million. In the U.S., bee pollination has been linked to increased fruit size and number in pears, cranberries, and blueberries, with a combined increase in revenue of more than $4,100 per acre. Alfalfa is another important crop benefiting from bee pollination, and alfalfa- derived products accounted for $12 billion per year in 1990. Alfalfa hay feeds most of the livestock in the U.S., and is alone worth $5 billion yearly.

Bees are important as pollinators for more than our agricultural crops. It is estimated that bees pollinate 16% of the world's 250,000 flowering plant species. Given that this total includes water-, wind-, and animal-pollinated plants, the importance of bees is underestimated by this figure. Interestingly, new research has found that not all bees are equal as

Apis mellifera **Linnaeus, 1758 (European honey bee) feeding on *Solidago* sp. (one of the goldenrods). Photo by Athena Rayne Anderson, 2007, Canon Powershot S2 IS.**

pollinators. Some **bees** are extremely efficient **pollinators** of a small number of plants, while others are moderately efficient at **pollinating** a variety of plants. Until recently, most **pollinator research** focused on **honey bees** and they were thought to be the primary **pollinators** when they were present. We are only beginning to **understand** the importance of other **bees** as **pollinators** of our crops and **unmanaged plants**.

HONEY- MAKING BEES

HISTORICAL INTERACTIONS-- **Honey-making bees** are those which produce large stores of concentrated nectar in the form of honey as their primary food source. Humankind has been pilfering from honey-making **bees** for thousands of years. **Honey bees** figure prominently in the **mythology** of **cultures** as diverse as the **San people** of the **Kalahari Desert** and societies from ancient Romania, India, and Brazil. **Beekeeping** was so important to the ancient Egyptians that they used a bee hieroglyph to represent all of Lower Egypt, where **honey** and **wax** were major economic products. **Egyptian beekeeping** was a model for **bee management** throughout the Mediterranean and influenced the societies of the ancient Greeks and Romans. **Langstroth**'s 1852 invention of the removable hive frame changed **European beekeeping** from a **destructive honey harvest** to productive **colony management**. **Beekeeping** was economically important throughout Europe for **beeswax**, **honey**, and **honey wine** (**mead**). In the **Americas**, the ancient **Mayas** maintained **hives** of ***Melipona beecheii*** Bennett, 1831 (**xunan-kab**) in a tier of **log colonies** protected by thatched roofs. They **valued** their **honey**-making **stingless bees** not only for their **honey** and wax, but also as **crop pollinators**.

A female *Halictus ligatus* Say, 1837, (sweat bee) feeding on *Rudbeckia hirta* L. 1753 (black-eyed Susan) in Valley Station, KY. Photo by Barry Nichols, 2011, Nikon Coolpix P100. John S. Ascher (American Museum of Natural History Bee Database Project) identified the bee.

EUROPEAN HONEY BEES IN NORTH AMERICA-- There are no honey-making (in appreciable quantity) **bees** **native** to North America, a fact which prompted settlers to import ***Apis mellifera*** **Linnaeus**, 1758 (**European honey bee**), to the United States as early as the 1600s. **Gloria DeGrandi-Hoffman** stated in a 2003 publication that "The **history of beekeeping in the United**

States is interwoven with the history of U.S. agriculture." Although honey bees were brought to North America for their honey and wax, their value as pollinators has far surpassed their other contributions to our culture. Stephen Buchman and Gary Nabhan estimated in 1996 that the monetary worth of honey bee pollination services is 50 to 60 times greater than anything else gained from their management. One estimate places the value of pollination services from honey bees in the U.S. at $112 billion per year. In 1988 there were approximately 3.4 million managed honey bee hives in the U.S., maintained by hobbyists and professionals combined.

Sources predict that honey bee colony numbers will decline continually due to Colony Collapse Disorder and other pathogens, and it is becoming clear that honey bees can no longer be relied upon as our primary agricultural pollinator. For instance, if native bees cannot be recruited to pollinate alfalfa, a decline in honey bee colonies could result in a 70% loss in alfalfa crops, costing U.S. agriculture about $315 million per year. Taking all crops into account, a failure on our part to boost native pollinator populations to a level that could replace honey bees could result in an annual loss of $5.7 billion. The message is clear: either we conserve and promote the diversity of our native pollinator populations, or our culture will be faced with a very expensive and uncertain future.

POLLEN BEES

Bees that do not make and store large quantities of honey are known as pollen bees. Unfortunately, the majority of bee research in the last several decades has been devoted to honey bees and we are only recently learning even the basics of pollen bee life history. Although we have identified some pollen bees as highly beneficial for crop pollination, the gaps in our knowledge of this diverse group are astounding.

Bombus impatiens Cresson, 1863 (common Eastern bumble bee) nest in bird house in Valley Station, KY. Photo by Barry Nichols, 2011, Nikon Coolpix P100.

In the case of some crops, pollen bees are essential for facilitating pollination because honey bees are incapable of doing so. Sometimes both pollen- and honey bees are able to pollinate a crop but research has found that the former is more reliable and efficient. The following sections detail the importance of several pollen bee species to crop production and pertinent management practices.

BUMBLE BEES-- Bumble bees (genus *Bombus*) are one of the few groups of pollen bees which can be reared and managed with relative ease. These bees have an annual life cycle, with the colony dying before winter and only mated queens hibernating until spring. A wild bumble bee queen selects an abandoned rodent burrow or grass tussock as a nest site and begins a colony that could eventually contain several hundred members. The workers store small amounts of honey in tiny pots for use in inclement weather, but must obtain pollen and nectar almost daily to survive. Because of this, they are often

active earlier in the year and in worse weather than **honey bees**.

Queens can be encouraged to **nest in manmade structures** such as overturned garden flower pots or **nest boxes** designed for commercial purposes. **Bumble bees** are relatively easy to **manage**, since their hibernation can be interrupted and **colony establishment** can be induced to coincide with crop flowering year-round. In contrast to **honey bees**, **bumble bees** have long tongues that make them better **pollinators** of flowers with long corollas, such as broad bean and red clover.

Bombus impatiens **Cresson, 1863 (common Eastern bumble bee) involucrum. The involucrum is a thin wax cover created to protect and insulate the nest, Valley Station, KY. Photo by Barry Nichols, 2011, Nikon Coolpix P100.**

The large size of **bumble bees** makes them more effective **pollinators** of some crops like **alfalfa** which must be weight-activated to expose their sexual structures. They are one of only a few **bee** groups capable of **buzz pollination** (**sonication**), in which a flower's anthers are vibrated at a certain frequency to release pollen. Plants in the nightshade family, such as **tomatoes**, require **sonication** and **bumble bees** are essential to fruit and seed set in these crops. According to a publication by **Lane Greer** in 1999, **bumble bees** are the only **potato pollinators** in the world. Unlike **honey bees**, **bumble bees** are incapable of recruiting their sisters to flowers, and are therefore more faithful to the crops for which they are **managed**.

A female ***Melissodes*** sp. (solitary **bee**) feeding on ***Rudbeckia hirta*** L. 1753 (**black-eyed Susan**) in Valley Station, KY. Notice the **corbiculum**, specialized area of the back leg with long hairs designed to hold pollen. Photo by Barry Nichols, 2011, Nikon Coolpix P100. John S. Ascher (American Museum of Natural History Bee Database Project) identified the bee.

ALKALI BEES-- ***Nomia melanderi*** (**Cockerell**, 1906), the **alkali bee**, nests in moist **alkaline soils**, hence its common name. Although they are **solitary**, their nests may be found in **congregations** of thousands where **habitat** is suitable. In the 1950s farmers learned that they could attract these valuable **pollinators** by creating appropriate nest sites, and **alkali bees** remain one of the few **solitary species** which have been commercially **managed**. As reported by **Buchmann** and **Nabhan** in 1996, **alkali bees** were essential to **alfalfa production** in the U.S. for several decades. **Alfalfa seed**

alone was worth $115 million in 1990 and the contributions of this crop to the American economy have already been highlighted.

Unfortunately, the importance of alkali bees to alfalfa yield was not realized until it was possibly too late to maintain their populations at a sustainable level. In the 1940s demand for alfalfa seed led farmers to plow more of their land, including alkaline soils where bees were nesting. In the 1950s and '60s pesticides which are toxic to alkali bees were used on alfalfa to control pest insects. Alkali bees are also vulnerable to heavy summer rains, which coincide with their nesting times, and their numbers suffered as a result of this as well. These combined factors killed many of the wild alkali bees in Washington state, and led to a loss in alfalfa revenue of $275,000 in 1973. Alkali bees also suffer from competition between honey bees and alfalfa leaf-cutting bees (described below), which has contributed to their population declines in recent decades.

ALFALFA LEAF-CUTTING BEES-- The alfalfa leafcutting bee, ***Megachile rotundata*** (Fabricius, 1793), was unintentionally introduced to the U.S. from Asia in the late 1930s and is now one of our primary alfalfa pollinators. Alfalfa leafcutting bees have also been found to benefit seed formation in many clover varieties in North America. Rather than nesting in soil like alkali bees, leaf-cutting bees nest in pre-existing holes in wood or stems. Their common name is derived from the habit by female bees of removing circular leaf sections with which to line their brood cells. Leaf-cutting bees have proven more manageable as pollinators than alkali bees because they tolerate a broader range of habitats and readily accept artificial nest sites.

A *Peponapis* sp. (squash bee) in a *Cucurbita pepo* Linnaeus, 1753 (zucchini) blossom. Photo by R. Berg , 2010, Canon Powershot SD 1100 IS.

SQUASH BEES-- Squash bees in the genera ***Peponapis*** and ***Xenoglossa*** feed almost exclusively on nectar and pollen from plants in the family Cucurbitaceae, namely squash, gourds, pumpkins, and cucumbers. They are soil-nesters with an annual life cycle similar to other pollen bees. These bees are extremely effective pollinators of cucurbits and have been found to be more beneficial to these crops than honey bees. A study in Mexico found that it would take 3.3 honey bee visits to facilitate full seed formation in gourds, but only 1.3 visits by a squash bee female. Squash bees are often observed resting, sleeping, and mating inside squash blossoms, pollinating the flowers in the process.

ORCHARD MASON BEES-- Bees in the genus ***Osmia*** are called "masons" because they line their nests with mud or pebbles. Orchard mason bees are also named because they are excellent pollinators of orchard crops such as apples and pears, and they show great potential as blueberry pollinators. These bees are solitary but gregarious, preferring to nest near conspecifics. Females build nests in stems or wood, and readily accept manmade nest sites. Research has found that, like squash bees, orchard mason bees are more effective pollinators on their choice plants than honey bees. Despite these characteristics, orchard mason bee management is not practiced on a large commercial scale. However, recent studies report that successful management of blue orchard bees is increasing, making this species one of a few pollen bees to be commercially maintained.

CHALLENGES AND CONCLUSIONS

The species described above represent only some of North America's commercially valuable pollen bees. As already discussed, these and other bees are declining worldwide, endangering the stability of global biodiversity and our food supply. Bee diversity is very low in agriculturally-intense European countries and plant-pollinator communities as a whole are failing in these areas. Research shows that specialist bees, those that only feed on pollen from a certain group of plants, have lower genetic diversity than generalist bees, putting them and their host plants at greater extinction risk. One possible reason for global bee decline is a loss of plant diversity resulting from habitat destruction and intensive agricultural practices. Buchmann and Nabhan reported in The Forgotten Pollinators that 65% of 258 plant species show incomplete fruit set from lack of pollinator visits. Several authors cite lack of basic natural history and taxonomic information as a major obstacle in conserving global bee fauna.

A female *Megachile* sp. (leaf-cutter bee) feeds on *Heliotropium* sp. flower, Skidaway Island, Chatham County, Georgia. Note the scopa on the ventral side of the abdomen. Photo by Roy Brown Photography, 2011, Nikon D300s, Nikon 105mm macro, no flash, aperture priority, matrix metering, hand-held. John S. Ascher American Museum of Natural History Bee Database Project) **identified the bee.**

We are in the midst of a crisis of alarming scale. In an effort to halt the demise of our most valuable pollinators, researchers are attempting to elucidate ways in which to bolster bee populations. All bees have three basic requirements: nest sites, food, and protection from pesticides. These requirements are species-specific, and must be considered when determining a conservation plan. Bees such as the orchard mason will nest in a variety of conditions, whereas others are very particular. All bees require season-long food plants as well. Several sources have found that allowing agricultural field margins to persist and providing fallow fields near crops will benefit pollen bees. Planting wildflower seed mixtures that bloom when target crops are inactive have proven highly beneficial in maintaining many pollen bee species. Some studies have found that diverse flower mixtures attract the most bees, but that care should be taken to tailor flower mixtures to bee species of interest, as not all bees respond similarly to flower diversity and density.

Studies have also found that proximity to natural areas positively affects bee diversity. Organic farming practices are also beneficial for bees and other pollinators. Organic farms near natural habitats maintain the highest bee diversity, and can have enough native pollinators to provide all necessary pollination. Connectivity of natural habitats can also be important to maintaining pollinator populations, as can increasing diversity of habitats bordering farmlands. Unused land sections, such as power line rights-of-way and highway medians can be extremely valuable for conserving native pollinators.

Athena Rayne Anderson is a self-described naturalist who is currently working on her Ph.D. in Ecology at the Odum School Of Ecology at the University Of Georgia. While she has a broad interest in pollinator community ecology and conservation, her current research focuses on several aspects of bumble bee foraging ecology, including seasonal activity and flower density preference. She is keenly interested in bumble bees due to their importance ecologically for the pollination services they provide (in some cases better than any other bee group!). She has created a new blog (http://www.pollinators.info) about pollinators, designed to provide pollinator-related information, resources, and community outreach.

THE KENTUCKY DIVISION OF FISH & WILDLIFE RESOURCES INVENTORIES AND MANAGES KENTUCKY'S BARN OWLS (*TYTO ALBA*)

by Kate Heyden

Tyto alba **(Scopoli, 1769)**, the barn owl, is a nocturnal raptor found in open habitats where it preys primarily on rodents and other small mammals. Although the species is one of the most widely distributed birds in the world (found on all continents except for Antarctica), in Kentucky, records of nesting barn owls have been quite rare in modern times. The infrequency of barn owl reports in Kentucky is somewhat surprising because much suitable habitat in the form of pastures, hayfields, croplands, reclaimed surface-mine lands, and restored grasslands is present. In fact, 38% of the state is composed of undeveloped, open land. With such an abundance of suitable habitat, it seems Kentucky should host an abundance of barn owls**.**

Barn owls have gained conservation concern throughout most of North America in recent years due to noticeable population changes. Severe declines have been recorded in several Midwestern states. Due to local conservation concern, the barn owl has been listed as a Species of Greatest Conservation Need in Kentucky's State Wildlife Action Plan.

Conservation actions for declining species are usually best implemented when the status of the population is known. In the case of barn owl, so little was known about its status in Kentucky that the Kentucky Department of Fish & Wildlife Resources (KDFWR) decided to conduct a statewide inventory in 2010. The goal of this effort was to document as many resident barn owls as possible.

Twenty-six confirmed barn owl nest locations were documented during the 2010

KDFWR bands rescued or rehabilitated barn owls. Photo by Kate Heyden, 2011.

inventory. Most nests were found on privately owned land, although three were in nest boxes on Wildlife Management Areas (WMAs). Nests were found in a variety of structures including nest boxes, silos, grain bins, barns, hollow trees, chimneys, and even shooting houses. Nests were scattered throughout much of central and western Kentucky, but none were reported in southeastern Kentucky (Figure 1).

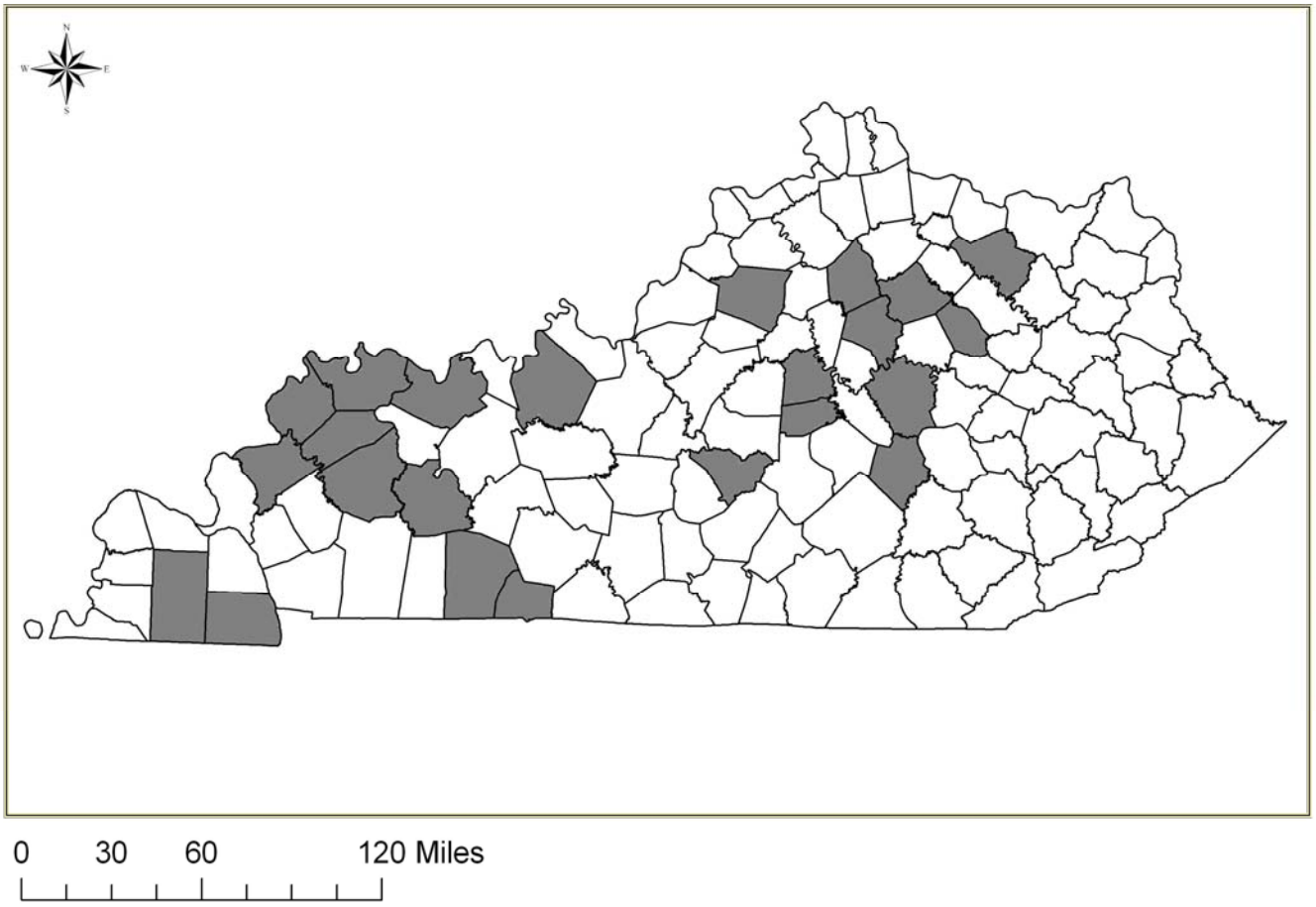


Figure 1. County distribution of known nesting barn owl pairs documented during 2010.

Once located, the productivity of each nest was monitored where possible. Nests contained 2–8 young. Nesting was typically initiated during spring (March–April) and most young fledged by the end of July. Unexpectedly, nesting activity continued into late summer and fall/winter with five nests documented with young after September! Surprisingly, "double-brooding" or attempting to raise two nests of young in one year was documented at two of these late nests which continued into December! This is the first time nesting during fall/winter and double-brooding have been documented in Kentucky.

Suitable nest site availability in the proximity of areas with a large prey base is assumed to be a major limiting factor for barn owl populations. KDFWR established a program to install nest boxes in suitable habitat on WMAs and other public lands in 2006. Since 2006, 37 nest boxes have been installed on public lands. Although several nest boxes on public lands have already become active, in 2010 our nest box efforts switched to maximizing the productivity of existing barn owl nests - whether they are on public or private land. Productivity may be hindered at unreliable nest

sites, perhaps contributing to **barn owl** declines. For example, many nests are discovered when hollow trees are cut down, grain bins are drained, or old barns are demolished. In 2010, KDFWR worked to ensure that all known nesting **barn owl** pairs had a safe and permanent nest site by installing many **nest boxes** on private lands. Overall, since 2006, KDFWR has installed 75 **nest boxes** on public and private lands. It is hoped that these efforts will encourage a more stable **barn owl** nesting population statewide.

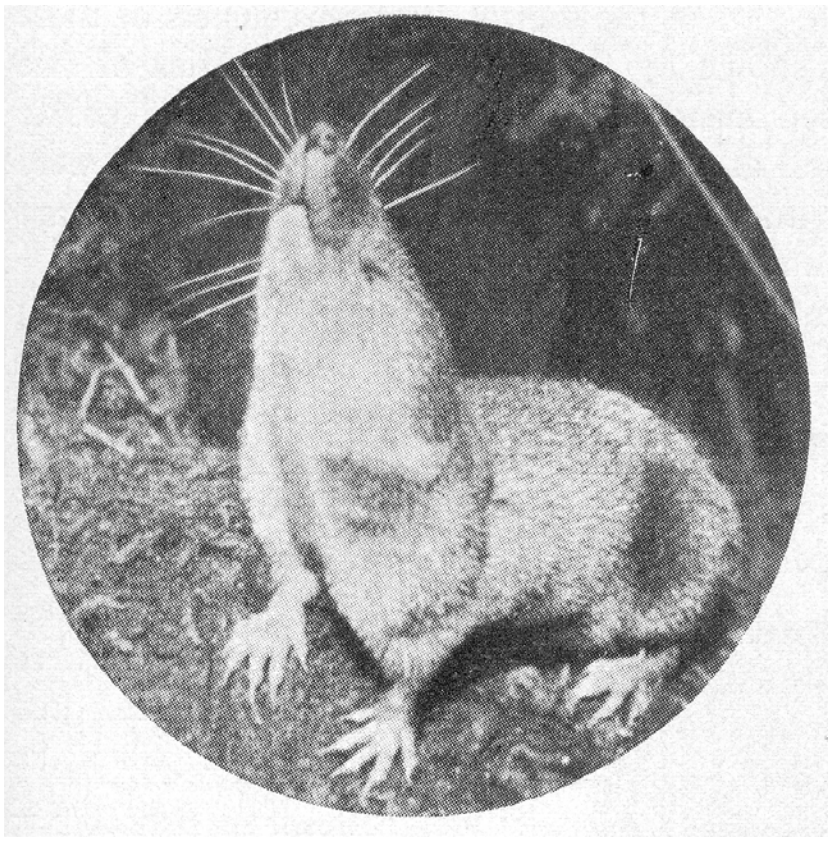
Because most **barn owls** are on private land, the extent of KDFWR's knowledge of and ability to help **Kentucky's barn owls** depends greatly on the public's cooperation in reporting nests. Please report **barn owl** nests by calling **800-858-1549** or e-mailing Kate Heyden at **Kathryn.Heyden@ky.gov**. Interested landowners that would like to install their own **nest box** can find **construction plans** via the internet at: **http://fw.ky.gov/pdf/barnowlboxes2010.pdf**. Private landowners are encouraged to inform KDFWR of any **nest boxes** installed and if they become active. More information on Kentucky **barn owls** will also soon be available at: **http://fw.ky.gov/navigation.aspx?cid=899&navpath=C753C755**.

Kate Heyden *is an avian biologist for the* ***Kentucky Department of Fish & Wildlife Resources****. She specializes in raptors and songbirds. She previously worked on* ***red-cockaded woodpeckers in Louisiana*** *before moving to KY to work with the state a few years ago.*

PRESENTING BLARINA

THE TINY TERROR OF THE WOODS

by A. Brooker Klugh



A CHARACTERISTIC POSE: *Blarina* sniffs the air, while his whiskers feel each breath of wind

BLARINA the Terrible! Who can and does capture and kill nearly twice his weight in **mice**! Who travels through the leaves and humus of the **forest** floor at the rate of a foot a minute! Who escapes the notice of many who believe they have knowledge of all the little folk of the **woodland**!

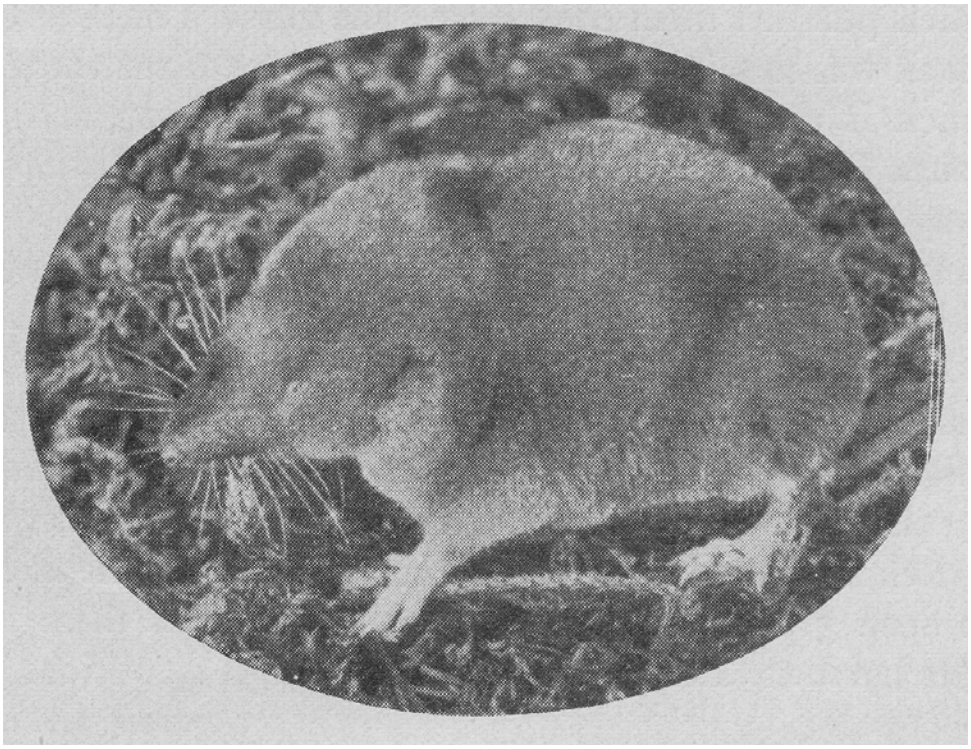
Blarina, whose full name is ***Blarina brevicauda*** Say 1823, is the **Northern short-tailed shrew** common to the **eastern North American forests**. He is more active at night than during the day, and travels about beneath the dead leaf and moss carpet of the woods, rarely exposing himself for more than an instant.

Blarina is about five inches in length, this little fellow, with a tail only an inch long. Dark brownish-gray above, his fine, glossy coat shades to a paler color on the under surface. Not much in the way of ears has he for they are not visible externally. **Blarina**'s eyes are very small, and his snout is long and pointed.

In the case of such an elusive little **mammal** as ***Blarina*** it is doubly difficult to determine

how numerous is his kind. I know, however, that there are few pieces of **woodland** in which one cannot, by prolonged watching, catch a **glimpse** of him. **Seton** estimates that in a wood at Cos Cob, Connecticut, there were certainly fifty of these animals to the acre, and **Shull**, who has made a detailed study of the **species**, estimates that there are at least four of these animals to the acre throughout the **range of the species**.

The **Northern short-tailed shrew** excavates **burrows** which are from an inch to an inch and a quarter in diameter, and which vary in length from five feet to several yards. The **tunnels are usually tortuous**, with several side-branches which often connect with one another, and some portions of the **tunnel** may be as deep as sixteen inches below the surface of the soil. The **tunnels** have two or more openings which go down at a steep angle for some six to eight inches. At some point along the tunnel is placed the **nest**, composed of grass, sedge, or leaves. Here hollow balls from four and a half to six inches in diameter, with walls half an inch to an inch and a quarter in thickness, are hollowed out. As shown by **Shull**, although the **nest** of the **shrew** resembles that of the **meadow mouse**, none of the coarser material of which the nest is composed is shredded by the **shrew** as is done by the other **woodland creature**.



AN ALERT LITTLE BURROWER: *Blarina* travels underground at the rate of a foot in a minute, if conditions are right.

Blarina burrows by strong outward and backward strokes of its front feet and forces its body through the soil -like a wedge. It has been found that in loose soil a **shrew** had no difficulty in burrowing at the rate of a foot in a minute, and I have noticed that when burrowing beneath the mossy carpet in the woods they often progress at a rate of about a yard in fifteen seconds.

Comparatively little is known of the domestic affairs of the **little animal**. **Merriam**, **Seton**, and **Shull** all record finding a pair of this species together at various seasons of the year, so that there is a possibility that they mate for life. Two or three litters of from two to six young are produced in a season, and young have been found from late April until late September.

Both summer and winter are busy times for the **shrew**. In winter it not only burrows about beneath the snow, but makes long journeys over the surface, burrowing down whenever it comes to an elevation which indicates the presence of a log or stump, to **feed**, as is assumed by **Merriam**, on hibernating insects and pupae.

The creature's **voice** is, like that of all **shrews** and hats, high-pitched. Sometimes it utters a **single shrill note**, hut more usually it emits a **continuous twittering sound**. A pair which came into my tent night after night at one of my campsites in northern Ontario kept up a continual **twittering** as musical as the notes of the **American goldfinch**.

Blarina is mainly carnivorous and insectivorous, although at times it eats vegetable food, including **beechnuts**. Its main diet probably consists of large numbers of **insects** which it takes in the adult, larval and pupal stages. **Shull** found that an individual of this **species** required fifteen adult **May beetles** or **June bugs**, as they are often called, as a day's rations. An individual which I kept for a time ate three large specimens of ***Melanoplus bivittatus*** **Say**, 1825, the **two-striped locust**, in five minutes, and this same animal devoured six of these locusts, two crickets, a caterpillar, and forty-five smaller insects, in the course of a day. In capturing the large insects it always seized them by the head, which it crushed eagerly with a loud crunching sound.

ABOUT TO DISAPPEAR: Frightened, ***Blarina*** makes for home, displaying the tiny tail for which he is named.

Mice stand as a close second to insects in the diet of the **short-tailed shrew**, the species most frequently captured being the **meadow mouse**, an **animal** nearly twice the size and weight of the **shrew**. In attacking it exhibits much ferocity, strength and persistence. **Morden**, who was one of the first to describe the habits of this species, says: "Four large meadow mice were procured and placed in the boiler with the mole-**shrew**, which as soon as it met a **mouse** showed fight. The mole-**shrew** did not seem to see very plainly and started round the boiler at a lively rate, reaching and scenting in all directions. The mice seemed terror-stricken, momentarily rising on their hind legs, looking for a place to escape, squeaking in their efforts to keep out of the way of the mole-**shrew**, which pursued them constantly. The **shrew**'s method of attack was to seize the **mouse** in the region of the throat, which it did by turning its head as it sprang at the **mouse**. The mice would strike at it and usually knock it away with their front feet. The **shrew** at last attacked one **mouse** and stayed with it, and in about ten minutes had it killed and commenced eating the eyes and face."

Merriam found a **short-tailed shrew** weighing 11.2 grams could tire out and overcome a vigorous **deer mouse** weighing seventeen grams, the **shrew** taking half an hour to exhaust the **mouse** and another half hour to kill it. It does not seem likely that a **shrew** could catch the mice on open ground, but it undoubtedly captures them in their burrows. The fact that under natural conditions a considerable part of the diet of ***Blarina*** consists of these animals is shown by the finding of the bodies of two freshly-killed **meadow mice** and that of a third partly eaten, as well as several handfuls of

hair in which were mixed tails and legs enough to account for about twenty more, at the nest of a **shrew** investigated by **Shull.**

The items of **food** which rank next to insects and mice in ***Blarina***'s diet are **snails** and **earthworms**, and the relative number of these eaten depends on the locality and the season. **Shull** found that in a tract of low land this species fed very largely on **snails** in winter, the main species eaten being the white-lipped **land snail**. The **snails** were gathered and hoarded in piles. They were moved to the surface, just outside the burrow, when the temperature fell, and back into the burrow when the temperature rose, thus being kept in the coldest place available, and therefore remaining in an immobile condition. **Shull** also found that though empty shells were sometimes brought to the surface, they were not taken down again, and his experiments indicated that the **shrew** distinguished between empty and inhabited shells by odor, or possibly by odor combined with weight. That weight alone was not the means of discrimination was shown by the fact that shells filled with soil until they weighed exactly the same as an inhabited shell were not taken into the burrows. Sometimes the shell was broken to get at the **snail**, but frequently the animal was dragged out without damaging the shell. About one hundred and twenty **snails** formed a month's rations.

In places where **earthworms** are abundant they undoubtedly constitute an important **item** in the menu of ***Blarina***, and **Shull** discovered that when these alone were fed to a **shrew** it required thirty-five **worms**, about two inches long when contracted, to serve for a day.

The **voracious fellow** also eats other animal food, such as sowbugs, and **Merriam** mentions that it hoards and eats **beechnuts**, while Plummer says that a specimen which he had in captivity ate corn and other grain. **Shull** found that it would not touch vegetable material as long as animal food was available, and it is probable that under natural conditions vegetable food is very rarely taken.

Among the enemies of the **short-tailed shrew** are **foxes**; ***Neovison vison*** (**Schreber**, 1777), **minks**; ***Mustela*** species, **weasels**; **hawks**; **owls**; and **snakes**. The three **mammals** mentioned sometimes kill **shrews**, but apparently rarely eat them, probably because of their rank odor, and it seems that they are seized in mistake for a **mouse**. Four species of **snakes** are known to eat **shrews**, but only to a very limited extent. **Hawks** and **owls** are their chief enemies. **Shull** records that a **shrew** which he had in captivity for five weeks became entirely oblivious to sounds, even of considerable intensity, which were often repeated, with the exception of the flutter of the wings of a ***Columba livia*** **Gmelin**, 1789, or **pigeon**, which was kept in the same place. This sound always sent it scurrying to its burrow, and though it must have heard it hundreds of times, it produced as great a disturbance of the **shrew**'s equanimity at the end of the period as it did at the beginning.

The **shrew**'s sense of sight is extremely poor, and serves merely to distinguish light from shadow, as is shown by experiments by **Kennicott**, **Merriam**, **Shull** and myself. Its senses of smell and hearing, however, are acute, and the former sense would seem to be the main one employed in locating food and the latter in escaping from its enemies. Likewise, it is very sensitive to touch, the "whiskers" especially being important organs. The lightest contact, even with a current of air, is responded to immediately.

When out foraging the **short-tailed shrew** runs about with its nose held rather high, investigates every nook and crevice, and smells over any object with which its whiskers come in contact. When out in the daytime it keeps as much as possible in the shade, and the intense light and heat cause it serious discomfort if it is exposed to full sunlight for any length of time.

Such a **ferocious little beast** might reasonably be expected to prove entirely untamable, but I found that an individual I possessed for some time, and handled a good deal, became markedly less savage and ready to **bite** in twenty-four hours, while Plummer kept one which soon became quite tame, taking food from his hand. It learned to come at call and never failed to respond, except when in its nest, and apparently very sound asleep, in the middle of a hot summer day. When running about the **shrew** usually kept close to the wall, or under furniture, but it would come out into the middle

of the room if called. This act of overcoming its natural aversion to open places shows how greatly its mode of behavior had been changed by good treatment.

A curious little fellow-this **shrew**. It would take years to learn all about him, but even a short study will serve to prove him interesting and unusual-the "terrible tyke" of the **woodland floor**.

A. Brooker Klugh, M. A., Ph.D., *who is now Assistant Professor of Biology, Queen's University, Canada, follows the career of Nature photographer only as an avocation. His main* ***interest*** *lies in plant* ***and animal ecology****,-the effect of physical factors of habitats on the forms of life therein. At present, he is devoting most of his attention to light's effects on living organisms. In his hobby, he has developed many new methods for under-water, insect and flower photography, and is Nature editor of American Photography. He is a frequent contributor to Nature and other magazines. {Ed. Note:* ***Alfred Brooker Klugh*** *(1882-1932) died in an accident two years after he wrote this article. See* ***The Canadian Field Naturalist, Volume 46, page 170****]*

This article was reprinted from:
Klugh, Alfred Brooker. 1930. Presenting ***Blarina***: The Tiny Terror of the Woods. Nature Magazine, Washington, DC. April: 241-243. Note: Nature Magazine was published by The American Nature Association. [Ed. Note: Minor modifications made in order to accommodate formatting]

CHAPTER NEWS

Falls of the Ohio Chapter Events (see front cover for regular meeting times and place, field trip times may be found below or are to be determined. Contact Chapter President **Chris Bidwell** at (502) 896-4834 or via email at: mabteacher1@yahoo.com.for more information. You can contact the Photo Contest Coordinator **Susan Wilson** via email at (susanfltrn@yahoo.com).

2011 Dates	Event/Speaker or Leader	Topic / Outing	Photo Contest Topic
September 15	TBD	TBD	Nature Nuts
October 20	Waterfalls - Tom Barnes	TBD	Waterfalls
November 17	The History of Beargrass Creek - Tom Owen	TBD	Urban Mammals
December	**Annual Dinner:** at the Episcopal Home off Westport Road, Louisville, KY	Presentation TBD later.	The cumulative winners of the Falls of the Ohio Chapter year-long photo contests will be announced.

KENTUCKY NATURALISTS' CALENDAR

(added as space and time allow)

2011:

August 27, 2011: Mammoth Cave celebrates International Bat Night @ the Visitor Center, Mammoth Cave National Park, Mammoth Cave, KY 42259. This year has been designated as International Year of the Bat (IYB), and August 27 was designated as International Bat Night. MCNP is home to 13 species of bats. Bat-related activities will be held across the world to focus attention on bats. Daytime activities (8:00 AM to 4:00 PM-CST) include displays, Junior Ranger activities, and more bat information. There will be a bat evening program at the park amphitheatre at 7:30 p.m. From 8:00 to 9:30 p.m., three monitoring stations will be set up between the back door of the visitor center and the Historic Entrance of Mammoth Cave. For more information on the International Year of the Bat go to http://www.yearofthebat.org/about-year-of-the-bat/. For more information about IYB activities at MCNP call (270)758-2192 or visit their website at http://www.nps.gov/maca/parknews/bat-night.htm.

September 3, 2011: Archaeology Day @ Falls of the Ohio State Park Interpretive Center, 201 W. Riverside Drive, Clarksville, Indiana 47129 (9:30 a.m. - 4:00 p.m.). Sponsored by the Falls of the Ohio Archaeology Society. Enjoy educational displays with hands-on activities for the kids including: atlatl throwing, three sisters bracelets, corn grinding, mock dig, pottery making, using stone tools, and more! Adults - archaeologists are available to date your artifacts and explain how they were used. Contact the park at (812) 280-9970, or via email at park@fallsoftheohio.org, or visit their website at http://www.fallsoftheohio.org.

September 16-17, 2011: The Kentucky Association for Environmental Education's 35th Annual Conference @ the Brown Hotel, 335 West Broadway, Louisville, Kentucky 40202. The theme for the 2011 conference is "Environmental Education: Everywhere for Everyone." While environmental education is at home in the forests and fields, it also has a well-established foothold in the cities. Urban gardening, green building design, and cleaner transportation are all considerations in population centers. Wherever people live, there is a need for environmental education. To be successful, we must attract a diverse group of people from different ages, genders, ethnicities, and economic backgrounds. For more information, contact KAEE at PO Box 17494, Louisville, KY 40217-0494 or visit the conference website at http://kaee.org/conference/. For information about the Brown Hotel, contact them at by phone at (502) 583-1234 or (888) 888-5252.

September 17-18, 2011: Falls Fossil Festival @ Falls of the Ohio State Park Interpretive Center, 201 W. Riverside Drive, Clarksville, Indiana 47129 (September 17 from 9:00 a.m. to 6:00 p.m. & September 18 from 10:00 a.m. to 5:00 p.m.). Guided fossil bed hikes, children's activities, fossil dig, mineral dig, fascinating guest speakers on geology topics, free brochures from almost every fossil park in North America, teachers can sign up and win a 50, 75 or 100 piece geology collection for their school, guided outer and Indiana shore fossil bed hikes, vendor booths with fossils, minerals, lapidary arts, jewelry, books, food, drinks, and more. Free rock and fossil identification -- bring in your unknowns! Sponsors: Falls of the Ohio Foundation, Kyana Geological Society, Kentucky Paleontological Society, and Indiana Society for Paleontology. Outdoor activities are free with $2 parking. Regular admission applies for Interpretive Center: $5 adults, $2 children. Contact the park at (812) 280-9970, or via email at park@fallsoftheohio.org, or visit their website at http://www.fallsoftheohio.org.

September 17, 2011: Barren River Trashmasters Classic @ the Stonehaven Room at Barren River Lake State Resort Park lodge, 1149 State Park Road; Lucas KY 42156. Join us, the U.S. Army Corps of Engineers, Friends of Barren River and WBKO 13 for the annual lakeshore cleanup. We will spend the morning collecting trash then meet at the beach for lunch and entertainment. Door prizes will be awarded. Contact park naturalist Lisa Deavers at lisa.deavers@ky.gov, call (270) 646-2151, or visit their website at http://parks.ky.gov/findparks/resortparks/br/.

September 24, 2011: Barren River's Day Canoe Trip @ the Stonehaven Room at Barren River Lake State Resort Park lodge, 1149 State Park Road; Lucas KY 42156. Join us for day outdoors canoeing! We provide all the equipment, training and a box lunch. Leave No Trace Principles will also be taught along the way! Pre-registration is required. This trip is for ages 16 and above. Limited to 14 paddlers. Registration fees apply. Contact Sheila Jones at sheila.jones@ky.gov, call (270) 646-2151, or visit their website at http://parks.ky.gov/findparks/resortparks/br/.

September 30-October 2, 2011: Kentucky Society of Natural History 2011 Fall Meeting @ Cumberland Falls State Resort Park. See upcoming newsletter for details or go to the website at http://www.ksnh.org.

September 30-October 2, 2011: The Kentucky Ornithological Society's Fall Meeting @ Pine Mountain State Resort Park, Henderson, KY. For more information contact KOS at P.O. Box 463, Burlington, KY 41005 or via their website at http://www.biology.eku.edu/kos/birding.htm.

October 21-23, 2011: Fall Color Weekend @ Pine Mountain Settlement School, 36 Highway 510, Pine Mountain, KY 40810. Fall Color Weekend at Pine Mountain Settlement School offers activities for people of all ages. Features include hikes, multi-media presentations, and the opportunity to enjoy some of Kentucky's most beautiful natural areas and stunning autumn foliage. Fee based. Contact the Pine Mountain Settlement School at 606-558-3571 or 606-558-3542 for details. You can also visit their website at http://www.pinemountainsettlementschool.com/.

October 21, 2011: Barren River Lake's Annual Geocaching @ the Stonehaven Room at Barren River Lake State Resort Park lodge, 1149 State Park Road; Lucas KY 42156. Join us for this fun weekend of "caching" on the park. Special caches will be hidden for you to find that are suitable for all types of "cachers", including poker caches. There will be a chili dinner and a spooky night cache hunt as well.. So set that GPS system to Barren River Lake State Park and join us for this fun family event. Download Geocache registration form (pdf file) at http://parks.ky.gov/NR/rdonlyres/68129503-B9E4-497A-B6DF-D00EF0F2437F/0/brgeocachingregistrationform.pdf. Contact park naturalist Lisa Deavers at lisa.deavers@ky.gov, call (270) 646-2151, or visit their website at http://parks.ky.gov/findparks/resortparks/br/.

2012:

April 13-15, 2012: Kentucky Society of Natural History 2012 Spring Meeting @ Shepherdsville Area. See upcoming newsletter for details or go to the website at http://www.ksnh.org.

April 27-29, 2012: The Kentucky Ornithological Society's Spring Meeting @Kentucky Dam Village State Resort Park, Gilbertsville, KY. For more information contact KOS at P.O. Box 463, Burlington, KY 41005 or via their website at http://www.biology.eku.edu/kos/birding.htm.

October 12-14 or 19-21, 2012: Kentucky Society of Natural History 2012 Fall Meeting @ Pine Mountain State Resort Park. See upcoming newsletter for details or go to the website at http://www.ksnh.org.

2013:

April 26-28, 2012: Kentucky Society of Natural History 2012 Spring Meeting @ Pine Mountain State Park. See upcoming newsletter for details or go to the website at http://www.ksnh.org.

The mission of the **Kentucky Society of Natural History (KSNH)** is to actively promote study and interest in Kentucky's rich natural heritage throughout the Commonwealth. Members are typically interested in a broad spectrum of natural sciences and related fields. Among the more prominent activities of the KSNH, are the annual spring and fall Conferences, selection of a "Naturalist of the Year", nature photography contests, research grants, and a variety of knowledgeable speakers and field trips. We invite anyone who shares our interests to **join us**.

For membership information or to submit dues please contact:

Kentucky Society of Natural History, 10707 Coogle Lane, Fairdale, KY 40118,

or visit our website <http://www.ksnh.org> for the membership form. Membership dues are:
Individual $15, Family $25, Full Time Student $7.50, Lifetime: $300.

The Kentucky Society of Natural History is an official 501(c) (3) tax-exempt nonprofit organization which was formed in 1939, and incorporated in 1943 in Louisville, Kentucky. All contributions to THE KENTUCKY SOCIETY OF NATURAL HISTORY are tax-deductible to the full extent of federal and state income tax laws.

Published quarterly, The Kentucky Naturalist News is the official newsletter of KSNH. Unsolicited contributions are encouraged. Please send articles to: **Barry Nichols, KNN Editor, P. O. Box 21182, Louisville, KY 40221**. You can also email newsletter submissions by sending them to kyfauna@iglou.com.

Kentucky Naturalist News Deadlines & Schedule:

Issue	Deadline	Tentative Publish Date
Summer Issue	May 1, 2011	June 1, 2011
Fall Issue	August 1, 2011	September 1, 2011
Winter Issue	November 1, 2011	December 1, 2011
Spring Issue	February 1, 2011	March 1, 2012

For submissions, plan on 0.5-inch margins, 10 pt Arial or Calibri font, and about 2 photos per page. Please leave the photo images in full-size and do not optimize them. Please cite references. To assist, you may use: http://www.lib.ncsu.edu/lobo2/citationbuilder/citationbuilder.php.

Kentucky Society of Natural History
3701 Fenholt Road,
Louisville, Kentucky 40218