NaturePhile

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The Balsam Mountain Trust inspires people to be responsible stewards of the natural and cultural resources of the southern Blue Ridge Mountains through education and conservation leadership.

New Species Alert: Jen alerted Michael to finding a couple of new herb-layer 'wildflowers' on the Preserve very recently and they're not on the approved plant list. We drove to the location and determined that the two are: a poppy cultivar (*Papaver spp.*) and a rocket larkspur (*Delphininium ajacis, Consolida regalis*). Neither are natives nor have been planted here (as far as we know). And while they're both beautiful, they can be problematic for the Preserve. We'll talk about this with the plant committee and see what the feeling is about having them here and we'll report back to you on the results/decision.

Photos by: Jen Knight (left) and Michael Skinner

In this issue: From the Trailhead—Climate thoughts;

From the Trailhead

By Michael Skinner, executive director

Pushing for Pollinators

Everyone sees the forest, but often, we don't see the trees. This is a play on the well-known idiom and is offered here as a way for me to share with you the concerns with which most of us in the nature study industry are faced. Namely, the effects of climate change, in particular as relates to this issue of NaturePhile, pollinators and when nectar sources become available to them.

There is an axiom which states: timing is everything, and the timing of the myriad pollinators' emergence and/or return and their host plants' nectar-licious offerings is becoming more and more problematic. Since records have been kept (for 134 years) the average annual temperatures have steadily increased by almost a whole degree Celsius (1.8 degrees Fahrenheit). The last twenty years have produced the warmest temperatures since records have been kept. What does all of this mean? What I would like to offer is that (the statistics just mentioned not withstanding) the study of our climate is a complex science. Couple that with the fact that there are often biases included in the science itself, by well-meaning but possibly not as well trained (as they might and/or could be) scientists, as well as a few other factors, then the door remains open as to the totality of negative impacts as regards our pollinators' relationships with global climate. What does remain though, is the fact that planet Earth's temperatures are rising steadily and more quickly than we might like.

A Pennsylvania leatherwing beetle (*Chauliognathus pennsylvanicus*) is dining on the nectar and pollen of a common fleabane (*Erigeron annuus*) near the golf course. Temperature variations could alter both when plants flower and when insects are available to pollinate them. A note of interest to us all: honeybees, which pollinate our agricultural crops, get most of their nectar and pollen from wild sources—not cultivated crops.

Photo by Michael Skinner

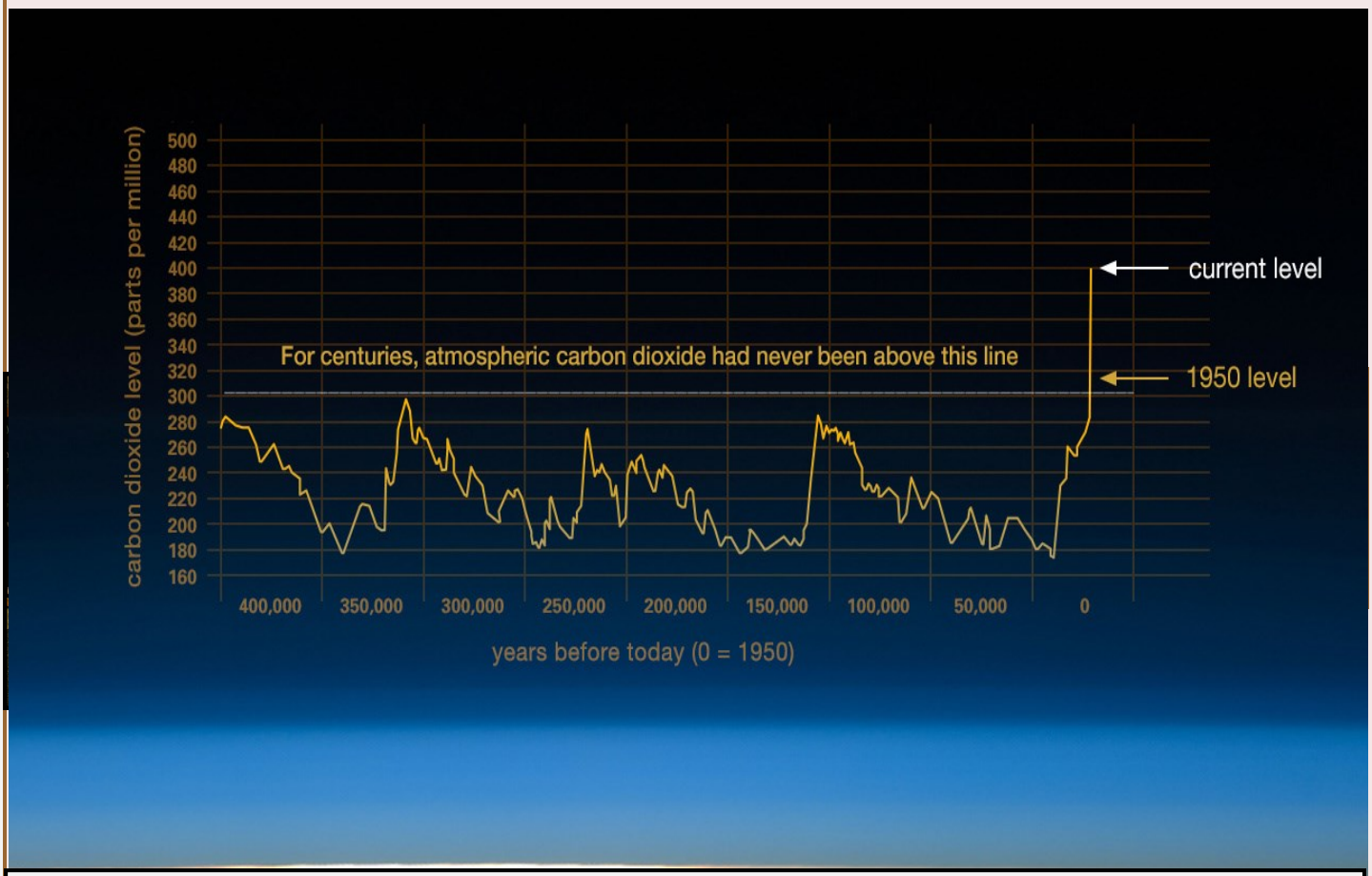
Since so much of our food comes from plants which have been pollinated, it should, inherently, set off some level of warning bells to our species. What we don't fully understand is how relationships between plant-pollinator pairs might be affected by a change in the synchrony of these relationships.

What should be concerning to all of us who eat, is the cause and effect of climate change and how, in nature, once actions are set in motion, it is often difficult to stop, slow or reverse momentum.

Good science dictates that one does follow tried and proven scientific methodology and not rush results in an effort to get published or bring attention to oneself.

So this short essay is meant to have you know that the Trust has its eyes and ears to the ground for your benefit, i.e., we're hear to assist you in the understanding of the world in which you live. We can

do that by having each BMP member engaged in the natural rhythms of your home (both your house and the planet). The more you understand the better you will be at stewarding this amazing place that is the



As stated in the article that climate science is complicated, nevertheless, this graph shows real data illustrating the demonstrative increase in carbon dioxide gas found in the atmosphere from about 400,000 years ago to present day. At a minimum, the data are compelling.

Preserve and planet Earth.

Education Mewsings 1.0: Tick-opedia

By Jen Knight, interim naturalist

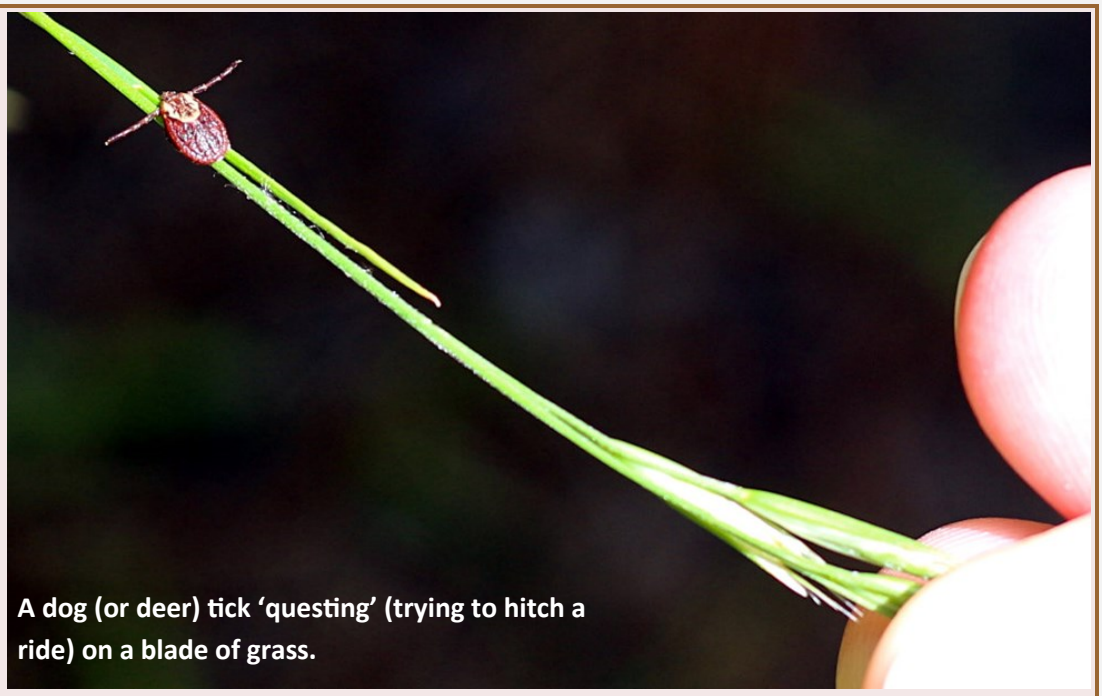
Here at Balsam, we talk a lot about living harmoniously with wildlife but what about the critters you don't want to commune with? Most outdoorsy folks accept ticks, mosquitos, horseflies and other biting, or otherwise annoying, bugs as a part of life, but the press about Zika virus has people thinking about insect-borne diseases with a little more concern.

There have been no locally contracted cases of Zika in the continental United States however it has been a banner year for ticks. The unusually warm winter and wet spring have allowed tick populations to explode in some parts of the country. Here in western North Carolina we are at risk for Lyme disease and Rocky Mountain Spotted Fever (RMSF) but a little prevention can go a long way towards health maintenance.

Prevention starts with a good understanding of ticks and their lifecycle. Most of us on the mountain know that Lyme disease is only spread by the black-legged tick (Ixodes scapularis), also known as the deer tick. However, don't discount the wood, or dog, tick (Dermacentor variabilis); their bites can some-

times lead to rash or, at worst, RMSF.

The tick lifecycle is spread over 2-4 years and is comprised of 4 distinct stages: egg, 6-legged larva, 8-legged nymph and adult. They need at least one blood meal in order to grow and move on to the next stage. Ticks that don't find a meal in time to molt will die. Despite popular thought, ticks do not fall out of trees onto their victims' heads. Rather, they wait at the end of tall grasses and shrubs with their front legs extended, ready to grasp on to the next passer-by – a behavior known as "questing". They can sense vibrations, body heat, breath and body odor and use that data to identify thoroughfares and pathways. Any of our volunteers could tell you about the ticks that wait for us on the bird enclosure doorways.



A dog (or deer) tick 'questing' (trying to hitch a ride) on a blade of grass.

Once they locate and climb onto their target, they may spend 10 minutes to 2 hours crawling around to find a good spot to chow down. The thin skin on the ears and scalp is particularly tempting, though some prefer a secluded or well-hidden spot under clothes. Once they break through the skin, they insert their sucking mouthparts and sometimes secrete analgesic saliva so their host doesn't feel their presence.

This saliva, and the pathogens in it, can enter the blood stream spreading diseases like Lyme. Ticks feed slowly and may stay attached for several days. When the tick is sated, it detaches and drops to the ground to molt or lay eggs depending on its life stage. If they seek a second host, "backwash" from their previous host can also enter the blood stream and spread disease.

It takes time for the bacteria responsible for Lyme disease to move from the tick to the host. According to the Centers for Disease Control, the tick generally needs to stay attached for 36—48 hours in order to transmit the disease. Early detection is therefore critical in disease prevention.

An adult deer tick is only about the size of a sesame seed and nymphs are about the size of a poppy seed. Their small size makes them easy to miss so it's important to do a thorough check using touch, a mirror or a buddy. Pay special attention to the underarms, groin, hairline and spots where clothes are tight against the body like the waistband of your jeans or bra-line.

In addition to an FDA-approved bug spray, be sure to walk in the center of trails and avoid brushing up against shrubs and grasses. Ticks can come in on gear and clothes, so toss everything in the dryer for 10 minutes if you've been out in the deep woods. The heat will kill the bugs and maybe even freshen things up a bit.

If you do get a tick bite, remove the tick carefully by grabbing it as close to the skin as possible with tweezers and pulling in a steady upward motion. Flush the tick down the drain, clean the bite with soap and water and watch for signs of a rash or fever over the next few days. If symptoms develop, be sure to tell your doctor where and when you got the bite.

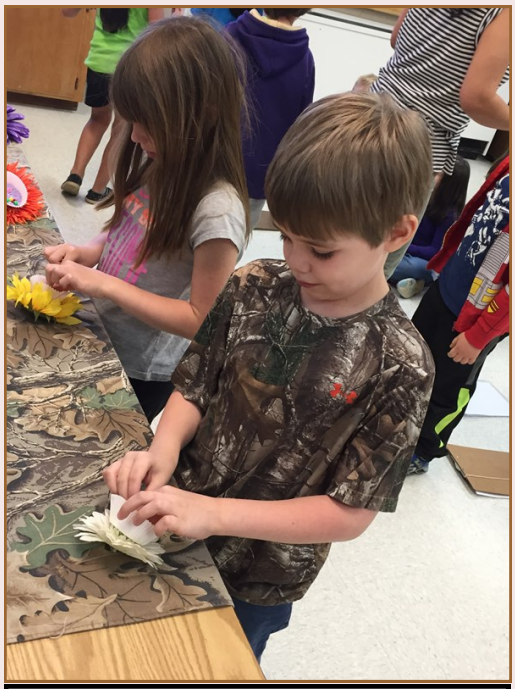
Ticks and mosquitos don't have to ruin your summer fun. Common sense and a little bug spray are all you need to adventure safely with your family. It may have been a good year for ticks, but it can be for you too!

Americorps News: Protecting the Pollinators

By Larissa Lopez, Education Outreach Coordinator, Americorps Service member

One in every third bite of food you consume was brought to you by pollinators. Pollinators are a group of animals, including bees, bats, butterflies, beetles, wasps, flies, moths, hummingbirds and some small mammals, that visit flowers and in doing so, transfer pollen from the male reproductive parts of a flower to the female reproductive parts.

Pollinators play a significant role in the reproduction of around 80% of the world's flowering plants, including over 150 crops contributing to over $1 trillion in agricultural sales worldwide. In the U.S. alone, pollinator crops make up a $24 billion business—$1.5 billion from honeybees alone. Pollinators are also crucial driving forces for the ecosystems they occupy. Animal pollinated plants, their fruits, and seeds are important food sources for wildlife like insects, songbirds and herbivorous mammals. This process of pollination also ensures genetic diversity among plants, which aids in plant adaptation.



1st Grade students at Cullowhee Valley School playing a game to learn how honeybees transfer pollen and make honey.

Starting in the winter of 2006-2007, beekeepers began to report losses of 30-90% of hives, the majority of which targeted the worker bees. The phenomenon was termed "Colony Collapse Disorder" and has since been attributed to a combination of likely environmental stresses that affect other pollinators as well. These factors include pesticide use, poor nutrition, aggressive agricultural practices, e.g., monoculture, etc., viruses, mites, climate change and stress from excessive travel to shelter and food resources because of habitat fragmentation. Fifteen vertebrate pollinator species are listed as endangered in the U.S. alone. Invertebrates are more difficult to track and assess, so the impact is not entirely well known, but population declines in localized surveys have been documented. Four bumblebee (Bombus spp.) species have declined by 96% in the last 20 years and one is believed to have gone extinct in the Pacific Northwest. It is predicted that 20,000 species of flowering plants will disappear in the next few decades. This regression is not solely attributed to the decline in pollinators, but the phenomenon has a direct affect on pollinator populations and those animals that forage on seeds and fruit.

All this being stated, it is no wonder why the Trust has committed to playing a role in pollinator conservation and education in western North Carolina. Since last year, we have been active in monarch conservation efforts and education, a pollinator species drastically affected by habitat fragmentation and the increased use of pesticides. This year, we launched 1st grade Pollinator Programs at Cullowhee Valley School (Jackson County) and Junaluska Elementary School (Haywood County). During the programs, students discover what pollination is; why it is important; start common milkweed (Asclepias syriaca) plants from seed; start a pollinator garden at school and learn about the micro-ecosystem within a garden. Their pollinator gardens are certified Monarch Waystations. Monarch Waystations are nationally occurring sites

The students then start common milkweed (the only known host plant for monarchs) from seed that they cared for in their classrooms and planted in the Monarch Waystations at their schools.

that provide suitable habitat for monarchs along their migration route.

Throughout the summer, we are offering several programs for children and adults to raise awareness about the importance of pollinators and the threats they face. These programs discuss the importance, as well as the decline , of pollinators; ways to get involved in pollinator conservation efforts, gardening tips for attracting pollinators and providing suitable habitat. Pollinators are a diverse group requiring a variety of food sources, complex nesting sites and specific habitat features to sustain their life cycles and promote successive generations.

If you ever have any questions about providing pollinator habitat in your own backyard, give us a call or stop by the nature center to chat with me and pick up some milkweed seeds to get you started!

Education Mewsings, 2.0: Walk for Wildlife Helps Shape the Lives of Local Teens

By Rose Wall, senior naturalist/education coordinator

Yes, it's that time of year again folks! Balsam Mountain Trust's Walk for Wildlife Challenge will kick off Fourth of July weekend. This challenge was unique – made up just for you competitive, social, outdoorsy Balsam Mountain Preserve homeowners! The fact that you could participate from wherever you happened to be in the world made it that much more fitting.

Although we hope you, as participants, had a great time, this pedometer challenge was also about giving back. Part of the Trust mission is to provide regional environmental leadership. The Walk for Wildlife Challenge (and associated grant) are one way we demonstrate our commitment to supporting conservation work on the ground. For every mile walked by a member, the Trust donated 15 cents (up to $1,500). Thanks to you all, we more than doubled our step goal, allowing us to provide the full $1,500 grant.

We received many worthy applicants from local environmental non-profits, scientific researchers, and education facilities. It was a tough decision for us to make, but our grant was ultimately awarded to support Smoky Mountain High's new wildlife class. The

teacher, Amanda Clapp, has innovative ideas to involve her students (many of whom live in rural areas in Jackson County) in project-based learning by way of restoring a wetland system on school grounds. These students are outside for nearly 2 hours every day – that's not something you see at most schools today. And the work environment very much resembles that of the real world – have a question you can't answer? Do some research. Can't find the answer? Contact local experts and get their advice; or better yet, have them train you. Need money? Fundraise or write a grant. Want to have a successful project? Work with your group to set goals and develop an action plan. Want to share your findings? Invite folks to watch you present your work. Mrs. Clapp aptly adds that "Answering multiple choice questions doesn't prepare one for the intricacies of adult life. Participating in project-based learning allowed students to practice adult skills in the lower stakes setting of school. They were very proud of their successes!"

Amanda and her students involved local university professors and regional experts to accomplish their goals in this new wildlife class. Projects centered on an outdoor classroom that had fallen into disrepair. They started by working with local elementary students to choose a specific animal as the "face" of the outdoor classroom they named Wildwatch (the winner was the Downy Woodpecker). Then they set to work making goals for managing the space. The different groups chose to focus on: Bumgarner Branch, the stream running through the area, the pond that had fallen into disrepair; a mammal monitoring project; and an environmental education program with local Fairview Elementary School students.

As we know, projects have multiple steps, and even those that are "complete" need monitoring and management. Students left behind plans for future groups to continue the process. And, they seem dedicated to the final product. At their presentations, students felt proud to have started something; many of them said they will come back and check in on Wildwatch in future years to see what's new and make sure all is well.

Our Trust staff and AmeriCorps member have visited the class multiple times throughout the year to give presentations, to serve as advisors, and to see the student's final presentations. And, we have been nothing short of impressed! Most exciting for me: several students mentioned this class allowed them to realize what college they might want to attend or what type of job they might want to have when they "grow up". These are the types of affects that every teacher hopes for! Other folks are taking notice too. Among the audience at the student's final presentations were the Jackson County School Superintendent and Curriculum Director, County Soil and Water Conservation agents, National Parks Service biologists, and environmental educators from throughout the region. This model has proven so successful that there is interest state-wide in trying to replicate it.

At the Trust, we feel pretty cool that we got to help support Smoky Mountain High's journey! And, we can only hope to support other conservation projects in the future through our Walk for Wildlife Grant!

We hope that YOU will get out and get moving for a good cause by joining our second annual Walk for Wildlife Challenge!

By the numbers:

43 Balsam Mountain Trust members

Greater than 21,000 miles walked – nearly the circumference of the earth!

$1,500 to local conservation

40 teens get hands-on skills for environmental jobs

1 wetland system gets restorative work

"Plans to protect air and water, wilderness and wildlife are in fact plans to protect man."

- Stewart Udall

Letter from the field by Amanda Clapp Smoky Mountain High School

Plans to protect air and water, wilderness and wildlife are in fact plans to protect man.
-- Stewart Udall

What Happened?

This year, we embarked on Project Based Learning (PBL) as a framework for learning, interacting with the community, and making change. PBL is a learning format where students set goals, research the necessary background, and develop a procedure to reach their goals. In this approach, students develop and participate in their learning community, which prepares them for problem solving and critical thinking, important adult skills. The students worked on three different PBL experiences this semester, including preparation for the regional Envirothon competition. The other two experiences centered on an outdoor classroom established twenty years ago and fallen in to disrepair: First, students developed a poster persuading elementary students to choose a specific animal as the "face" of Wildwatch, the outdoor classroom. The students also developed goals for managing Wildwatch as a wild area and as a classroom. The different groups chose to focus on several things: Bumgarner Branch, the stream that runs through the area; the pond that had fallen into disrepair; a mammal monitoring project, and an environmental education program.

What was the impact on the students?

Through Project Based Learning, students worked on 21st century skills, things they will use in adulthood. The expectations were that they made a plan to reach their goal, and worked through the necessary research top scaffold their actions to reach it. They all contacted experts in the field in their planning process, and referred to peer-reviewed journals to inform their decisions. In public education, often there is a focus on performing well on state standardized tests. Answering multiple choice questions often doesn't prepare one for the intricacies of adult life. Participating in project based learning allowed students to practice adult skills in the lower-stakes setting of school. They were very proud of their successes!

What was the impact on the community?

The outdoor classroom provided an opportunity to the students as well as elementary students. One high school group taught an environmental science lesson incorporating science, technology, engineering, and math (STEM) that centered on clean water. The students presented their projects to members of the community June 6th, and their audience included facilities managers from Jackson County Public Schools, as well as the Jackson County Soil and Water conservation agents. They discussed future management of the area for community use. Interaction with adults in the community added value to students' projects, and allowed them to act as experts.

What was the impact on wildlife?

The students established three programs at wildwatch: monitoring, managing, and educating. The monitoring phase was begun in a joint effort with the National Park Service, as students established a terrestrial salamander monitoring plot, using ten cover boards that can be monitored by citizen scientists and school groups. The students also established two

camera trapping plots to monitor mammals and birds. Lastly, they measured water quality using macroinvertebrate, chemical, and fish data, which will continue. The students' projects to restore and enhance the pond and the creek were the beginning of our management plan; students planted native shrubs to shade the creek, and they removed vegetation and increased water levels in the pond to encourage invertebrates and amphibians.

What comes next?

This year we have established a framework for monitoring, managing and learning about wildlife. Using this framework teachers at Smoky Mountain High and at Fairview Elementary schools can incorporate the outdoor classroom in their science instruction. Continuing to monitor the area, and increasing the scope of our management, will complement our growing outreach program. The outreach will incorporate high school students developing and teaching science lessons using the environment for young elementary students. The inclusion of nature in STEM education will produce a generation who loves our world and who know how to manage it.