

## Holiday Tea

by Michael Kieffer

It is the time of year to think about other people, cultures, and traditions as we celebrate the holidays. Many will rely on coffee and tea to keep their engines firing through both the fun and stressful times of the season. As winter progresses, warming up with hot cocoa becomes a popular pastime. For us at BRMC, it is also a time to reflect on the past year's successes and the hopes for the upcoming year. As we plan for the future, many cups of coffee and tea will be consumed to power our creative process.

We focus on our newsletter and our articles constantly throughout the year. We are always looking for unique studies that relate directly to the Bull Run Mountains, but at the same time looking at the larger global scale of environmental treasures and issues. Recently, I revisited an article on agricultural research that seems timely as we prepare our hot beverages.

With the global economy, many of us have access to ever finer teas, coffee, and cocoa. Many of the world's best regions for these plants involve growing and harvesting these products where they grow in the optimal conditions. Often these products grow best in mountainous regions where the plants grow on terraced hillsides. This is especially true for both coffee and tea. In the article, the author interviews scientists working to analyze how climate change will affect tea plants. The scientists are studying the effect



that changes in weather patterns driven by a changing climate are having on the taste of tea from southwestern China's Yunnan province, famed for its world-class tea production (Larson, 2015).

The amount of rainfall and its timing is a major factor in both the quality and quantity of tea produced. During the dry part of the growing season, the plant builds up the prized phytochemicals responsible for its taste. When the summer monsoons arrive, which brings 80% of the year's rainfall, the quality of the tea drops within 5 days because of big shifts in the plants' chemistry. Land temperature increases faster than ocean temperatures, and the gradient between the two is what drives the monsoon system. If the gradient increases with higher temperatures on land, it is believed that the summer precipitation will increase, over a shorter time span, with a lengthening of the dry season. This change not only affects our palates, but it directly affects the farmers.

The tea harvested during the dry part of the growing season with the richer taste and antioxidants that are linked to improved health fetches \$200 more per kilogram than the tea harvested during the rainy season. So, for farmers a longer dry season could be a benefit, while more rain could yield more quantity of the less desirable tea. A possible win on both ends as the greater amount of high quality tea, combined with a greater quantity of the less desirable tea, could increase farmers' income. *(continued on pg. 7)*



# Winter Birding

by Anna Ritter

The summer song of the Wood Thrush has flown the bare woods; the small brown and white-speckled bird has departed for its winter migration to Central America. In one night, the thrush will fly over the Gulf of Mexico to its winter grounds, and not until next spring will the males appear again in our woods, followed in a day or two by the females.

This time of year it is the smaller Hermit Thrush in our local woods, and the chickadees and red bellied woodpeckers that appear at our winter bird feeders. Winter is a particularly good time to start paying attention to the birds—the trees are bare of leaves, birds are visible in the canopy, and the cold winter air always seems to magnify calls through the woods. Winter must have always called attention to bird populations, for it was during the winter that hunters would head out for a holiday tradition of competitive bird hunting, a tradition known as the Christmas “Side Hunt,” according to the Audubon Society.



Mike Belknap

Cardinal

On Christmas Day in 1900, however, a new tradition was established by ornithologist Frank M. Chapman—a Christmas Bird Census. Since then, the annual Christmas Bird Count organized by Audubon has become one of the largest citizen scientist efforts, spanning the entire North American continent for over a hundred years. Birds are one of the most reliable reminders of animal life on the landscape, and with just a bit of an introduction, any enthusiastic volunteer can hit the ground running and participate in a count.

This December there are several locally organized Christmas Bird Count circles taking place between December 14th and January 5th. Each circle sends out various groups to cover their respective area and compiles their data at the end of the day to report back to the Audubon Society. Prince William Conservation Alliance will be leading a Nokesville circle; Audubon VA is organizing a Manassas-Bull Run group, and the Plains, Virginia is running a count in Fauquier County as well.

With the data from the last hundred years of Christmas Bird Counts and several other surveys, the Audubon Society has created maps that track the changing patterns and bird populations across the North American continent, with some of these data actually informing the Environmental Protection Agency's 2012 report on climate change. Over the next 50 years, the wood thrush's range is expected to shift further north into Canada, based on current trends, and only the very southern tip of its range still covers Virginia. This is an overall trend seen in many bird population studies. Benjamin Zuckerberg and Karine Prince tracked 38 common species, including blue jays, Carolina wrens, and goldfinches, in a 28-year citizen science project similar to the Christmas Bird Counts and found that these bird populations shifted north by an average of 7 kilometers a year (Cubie 2015).

The manner in which climate change is actually affecting, and has affected, our own Virginian backyards is the topic of Stephen Nash's book, *Virginia Climate Fever*. The ecological flow of species like the wood thrush and blue jays across the State in response to a changing climate is one of the significant changes we will see over the next few decades. In February, Mr. Nash will be speaking at BRMC's Annual Fundraiser and discussing these changes and the reality that climate change will be for us. We hope you will be able to join us for what promises to be an interesting opportunity to learn more about our landscape and backyards.

## References:

“Wood Thrush.” *Cornell Lab of Ornithology*. Cornell University, 2015.

Cubie, Doreen. “Birds Moving North.” *National Wildlife Federation*, 2015.



Abcbirds.org

Wood Thrush

*SHOOTING THE BREEZE*  
is a publication of  
Bull Run Mountains  
Conservancy, Inc.

### Board of Directors

*President*  
Andrea Currier

*Vice-President*  
P. Douglas Fout

*Secretary*  
Marcia Markey

Tim Dunn  
Kathleen Higgins  
Jack Kotz  
David Roos  
Jonathan L. Shurberg

### Counsel

John McBride

### Staff

*Executive Director*  
Michael J. Kieffer

*Research Director*  
Anna Ritter

# Public Programs Winter 2016/2017

---

## HIKE WITH A NATURALIST

**1st Thursday of Every Month at 9 a.m.**

Join a professional naturalist and discover some of the flora and fauna of the local region. We will meet at the Mt. House before carpooling/travelling to nearby preserves & parks for the day's hike. This program is free; all are welcome.

## WINTER NATURE CAMP

**December 22nd & 23rd**

**Thursday & Friday, 9a.m.—4p.m.**

Join BRMC for a winter adventure and learn more about the winter woods. Birds are more easily seen in leafless trees and sounds are magnified in the winter stillness. Dress for the weather—snow makes the day all the more fun. *Appropriate for children ages 7-12.*

**Pre-registration required.**

**Members: \$100/non: \$150**

## VOLUNTEER HOLIDAY PARTY

**December 27th, 2016—Tuesday, 6p.m.-8p.m.**

BRMC invites all our volunteers to a Mountain House Holiday party to celebrate and show our appreciation for all of your efforts. It doesn't matter if you came to one trail workday, or every night of Safari—we want to say thank you! We will provide beverages; please bring your favorite holiday dish to share.

**Please RSVP to [info@brmcconservancy.org](mailto:info@brmcconservancy.org)**

## CULTURAL & NATURAL HISTORY OF BROAD RUN CREEK

**January 14th, 2017—Saturday, 10a.m. –noon**

Join BRMC and Turn the Mill Around Campaign as we delve into the rich history of Broad Run Creek. We will explore its early history winding through Thoroughfare Gap and follow the Creek through time as natural and unnatural features impacted to where it now flows today. We'll also head out into the field and learn about the ecology of this historical stream.

**Pre-registration required.**

**Members: \$15/non: \$20**

## GEOLOGICAL EVOLUTION OF THOROUGHFARE GAP

**January 22nd, 2017—Sunday, 1p.m.-3p.m.**

**Speaker: Charlie Grymes, Prince William Conservation Alliance**

The rocks at the top of Thoroughfare Gap were once an ocean beach. The core of the Blue Ridge was buried as much as five miles underground. Dinosaurs walked on the reddish rocks that lie underneath Haymarket. The dark rocks exposed at The Plains were hot volcanic lava. Join us to learn the stories about what's below our feet and above our heads!

## ORIENTEERING WORKSHOP

**January 28, 2017—Saturday 10a.m.-noon**

Ever looked at a compass and wondered how its north-pointing needle is supposed to help you get home? We'll learn about true versus magnetic north, calculating declination, how to read a topo map, and then of course, how to use the compass to navigate the outdoors.

**Pre-registration required.**

**Members: \$10; non: \$15**

## WINTER BIRDING WORKSHOP

**February 4th, 2017—8a.m.-11a.m.**

Join BRMC and tune up your birding skills with George Wallace, PhD biologist and former Vice President for Oceans and Islands at American Bird Conservancy! George has spent his entire career focusing on the conservation and study of birds, and will be spending the whole morning sharing this knowledge.

**Pre-registration required.**

**Members: \$15/non: \$20**

## OLD HOME SITE EXPLORATION HIKE

**February 18, 2017—Saturday, 9 a.m.–1 p.m.**

Join us in this expansion of our Old Home Site Program with a winter hike to cemeteries and old home sites well off the beaten path and explore the rich history of the local region. Pre-registration required.

**Members: \$20/non: \$25**

## ANNUAL FUNDRAISING EVENT

**February 21st, 2017—Tuesday, 6:30 p.m.**

**Grace Episcopal Church, The Plains, VA**

Join us for drinks, hors d'oeuvres, and lively conversation as we celebrate another year as educators, researchers, and stewards of the Bull Run Mountains. Stephen Nash, author of *Virginia Climate Fever*, will be keynote speaker, discussing how the changing climate is impacting our Virginia landscape.

**Cost: \$50/person**

## BAT SURVEY POST DISCUSSION & RESULTS

**February 25, 2017—3p.m.-5p.m.**

Chris Hobson, biologist with Virginia Department of Natural Heritage, was sponsored by BRMC to conduct a survey of the bat population on the mountains last summer. He will join us to present the results from the survey, including the impact white nose syndrome has had on the population and future conservation priorities. Refreshments will be served

**Pre-registration required.**

**This program is free, donations accepted.**

## HOMESCHOOL PROGRAMS

**Cost: \$5 per participant including adults.**

### Orienteering

**January 19, 2017—Thursday, 10a.m.-12p.m.** Join us to explore the mountains off trail as we navigate the old fashioned way—with a compass and topo map. *Best for ages 7+.*

### Old Homes of the Bull Run Mountains

**February 16, 2017—Thursday, 10a.m.-12p.m.** Humans have always had a relationship with these mountains, from Native Americans crossing the gap, to the Chapmans building their mill. We'll go back through time and visit some of the Preserve's key historic sites as we learn about the mountains' human history. *All ages.*

### Spring Birds

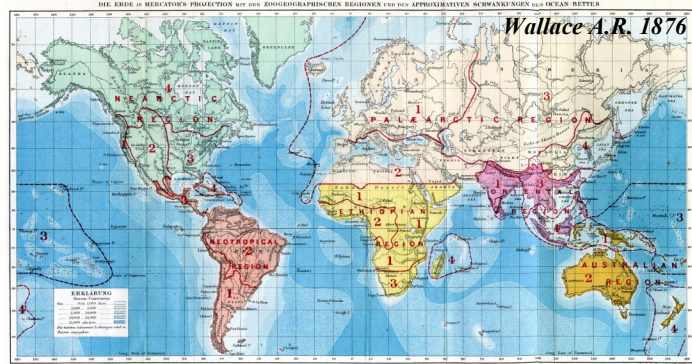
**March 16, 2016—Thursday, 10a.m.-12p.m.** How well do you know your bird calls? We will learn the calls of the most common winter birds you'll find outside this time of year, then head out to see them in their natural habitat! *All ages.*



# Keeper of the Earth's History

by Michael Kieffer

If you ever looked at a plant or animal and wondered how it ended up here, then you have already begun your journey into the science of biogeography. Plants and animals indeed are the most conspicuous and reliable keepers of earth's history. Physicists have been theorizing since Einstein in an attempt to unify general relativity with quantum mechanics. Scores of books, newspaper articles, and media attention have followed and charted their efforts. All while biogeography, the unifying theory of life and earth, has been known and advanced for over 150 years by some of the greatest scientists in history. Yet, it has remained obscure, if not completely unknown, to most people.

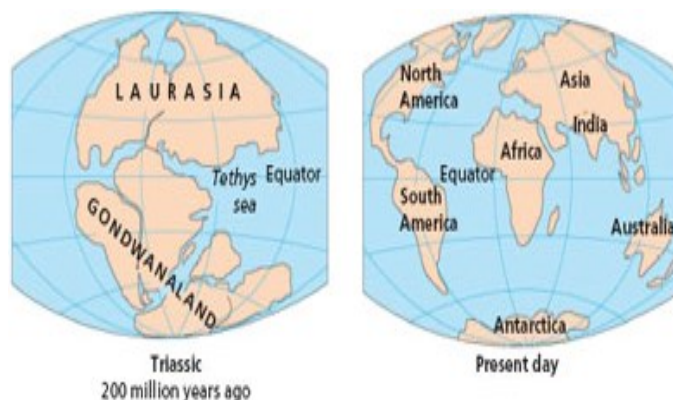


*Biogeography is a branch of biology that deals with the geographical distribution of plants and animals.*

Biogeography unites the theory of life and the geosciences. While the trend in science has been toward specialization, biogeographers swim upstream as they combine many disciplines to explain the distribution of life on earth. The geosciences, including plate tectonics, climatology, and oceanography, explain the physical pressures and limitations to both survival and movement of life on earth, while evolution explains how these pressures resulted in the present plant and animal distributions we see today.

In a paper written by Alfred Russel Wallace in 1858, he postulated the **Sarawak Law**: “Every species has come into existence coincident in both space and time with pre-existing closely allied species.” This paper was truly the beginning of modern biogeography (McCarthy, 2009). The question then became what is the driving force behind this law. The answer had come to Charles Darwin in 1838 and to Alfred Wallace by 1859 after each read Thomas Malthus's “An Essay on the Principles of Population”. In a world of limited resources and constant environmental pressures, those traits that allowed for greater reproductive success would be passed on and those that were deleterious would be pruned. It took to the 1950's and the discovery of DNA to understand how the traits were passed or pruned.

We all have heard of the tree of life, but a better analogy may be looking at life and earth entwined together like a system of roots that in space and time could be followed from any root tip (analogous species) backwards through every junction until you ultimately ended up at the first growth. Within the root matt, each species is most closely related to those directly along its own rootlet. This creeping root mass of gene flow passes over the continents, oceans, and islands. Over time and with careful analysis, this root matt begins to be understood. With genetic analysis, some persistent puzzles start to be solved and an ever-deeper understanding of life on our planet comes together.



Source: <http://pubs.usgs.gov/publications/text/historical.html>

To continue the analogy, at times due to plate movements, the root matt would be torn apart, but continue to grow on separate continents. Effectively isolated from each other, the original ancestors would face different selective pressures leading to speciation. This can be seen looking at the Aplocheiloid or killifish of India, Madagascar, Africa, and South America that were all part of the Gondwana continent 130 million years ago (mya). A volcanic ring (Continued on pg. 5)

## Keepers of the Earth (cont.)

by Michael Kieffer

(Continued from pg. 4) began breaking up Gondwana 125 mya creating the southern ocean ring and marooning Antarctica at the southern pole. As Gondwana separated, the Gondwanan killifish ancestor speciated into the Indo-Malaysian-Madagascar ancestor and the African/South American ancestor. The African/South American ancestor split into the South American ancestor that led to the 7 current species of killifish on South America and the African killifish ancestor. The African killifish ancestor was then split by the Dahomey Gap that separates Africa from east to west leading to 6 current West African species and 6 current East African species. More recently, the Indo-Malaysian-Madagascar ancestor was split into 2 Indo-Malaysian species and 2 Madagascar/Seychelles species. It is interesting to note that genetic analysis of species such as the killifish confirms that even though Madagascar is just off the coast of Africa, its species are more closely related to India. This matches with seafloor analyses that show that the seafloor between Africa and Madagascar is dramatically older than the seafloor of the Indian Ocean.



*Fundulopanchax gardineri*, a killifish from West Africa.  
[nr2009.edublogs.org/petcam/](http://nr2009.edublogs.org/petcam/)

To illustrate the effect geologic processes have on life, one only needs to look at Antarctica. Antarctica was once full of life, but then the volcanic ring created the southern oceans and changed climate patterns leading to the endless march of cold and ice that brutally drove all but the most basic life forms to extinction. As all native mammals, birds, reptiles, and fish went extinct, only the ancestors of the tenacious Emperor Penguin survived, completely alone throughout the dark winter months.

### References:

McCarthy, Dennis, *Here Be Dragons: How The Study of Animal and Plant Distributions Revolutionized Our Views of Life and Earth* (New York: Oxford University Press, 2009).

You Are Invited!

Bull Run Mountains Conservancy

Annual Fundraising Event



M. Belknap

February 21, 2017-6:30p.m.

Grace Episcopal Church, The Plains, VA

Join us for drinks, hors d'oeuvres, and lively conversation as we celebrate another year as educators, researchers, and stewards of the Bull Run Mountains.

We are fortunate this year to have Mr. Stephen Nash, author of *Virginia Climate Fever*, as our keynote speaker.

RSVP online at [www.brmconservancy.org](http://www.brmconservancy.org), \$50/person





## End of the Year Fundraising Drive!



We have **\$10,000** in matching funds through the end of the year, help us reach our goal and meet this match!

Increase your membership level or make an additional donation, and your contribution will be matched!

To all who have already sent in your support, we offer a sincere thank you.

***Send in an additional donation of \$100 or more and receive a copy of BRMC's 22-year retrospective!***



# Holiday Tea

by Michael Kieffer

(Continued from pg. 1) However, if the weather becomes too dry for too long the buds could be drastically reduced and potentially the plants could die. Analyzing this region in a study that links climate, tea quality, and farmer livelihoods is the goal of a U.S. National Science Foundation 4-year project. This study could also have implications for coffee and cocoa, two other holiday treats. For example, coffee is a highland loving plant that, as temperatures rise, can only move upslope, limiting or eliminating suitable territory worldwide.

As you drink a hot beverage curled up on the couch reading or sitting with family and friends, remember how these plants are connected to the landscape, environment, and people's livelihood. It is fascinating how life is linked together and inspiring to learn more about the myriad of connections.

estherwarren.wordpress.com



## References:

Larson, Christina, Reading the tea leaves for effects of climate change. *Science* 348, 953-954 (2015).

*According to the Tea Association of the USA, during the course of 2015 over 80 billion cups of tea were drunk by Americans alone—that's over one half of the US population drinking tea each day.*

To register for a program, fill out the form below and mail with your payment to:

Bull Run Mountains Conservancy, P.O. Box 210, Broad Run, VA 20137

Program registration is also now available online at [www.brmconservancy.org/calendar.html](http://www.brmconservancy.org/calendar.html).

For more information, call us at (703) 753-2631 or visit our web site at

[www.brmconservancy.org](http://www.brmconservancy.org).

Name \_\_\_\_\_

Address \_\_\_\_\_

City/ZIP \_\_\_\_\_

Home phone \_\_\_\_\_

Work phone \_\_\_\_\_

E-mail \_\_\_\_\_

Are you a BRMC member? \_\_\_\_\_

No. of people registering \_\_\_\_\_

Fee \_\_\_\_\_

Amount enclosed \_\_\_\_\_

Name of child[ren] if registering for youth camp

\_\_\_\_\_  
\_\_\_\_\_

### Homeschool Programs

\$5 per participant

Orienteering, Jan. 19

Old Homes, Feb. 16

Spring Birding, March 16

### Winter Nature Camp

December 22 & 23

Members: \$100/non:\$150

### Volunteer Holiday Party

December 27

### History of Broad Run

January 14

Members: \$15/non: \$20

### Geology of the Gap

January 22

TBA

### Orienteering Workshop

January 28

Members: \$10/non: \$15

### Winter Birding Workshop

February 4

Members: \$15/non:\$20

### Old Homes Exploration

February 18

Members \$20/non: \$25

### Annual Fundraiser

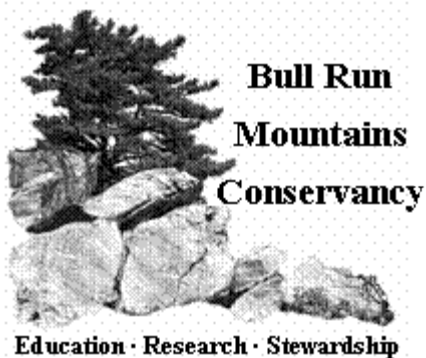
February 21

\$50 per person

### Bat Survey Discussion

February 25

Donations accepted



P.O. Box 210 · Broad Run · Virginia 20137  
(703) 753-2631 · [www.brmcconservancy.org](http://www.brmcconservancy.org)

Yes, I would like to become a member of Bull Run Mountains Conservancy.

Name

Organization

Address

Phone  E-mail

Referred by

- |   |   |   |
|---|---|---|
| <input type="checkbox"/> \$15 Student                 | <input type="checkbox"/> \$20 Senior                | <input type="checkbox"/> \$25 Individual    |
| <input type="checkbox"/> \$35 Family                  | <input type="checkbox"/> \$75 Group                 | <input type="checkbox"/> \$100 Sustainer    |
| <input type="checkbox"/> \$300+ Leadership            | <input type="checkbox"/> \$1,000+ Benefactor        | <input type="checkbox"/> \$1,000+ Corporate |
| <input type="checkbox"/> \$5,000+ Conservation Patron | <input type="checkbox"/> Other <input type="text"/> |   |

Please make your tax-deductible contribution to:

**Bull Run Mountains Conservancy is a  
membership driven organization.**

Become a member today and support our programs and support the public preserve. Your membership provides BRMC necessary funds to operate and shows our foundation and corporate supporters that the public values and appreciates the resource.

**Membership Benefits:**

- Support environmental and historical programs for all ages
- Support research and management of the natural area
- Discounts on all public programs and camps
- Quarterly newsletter including our program calendar

<b>Bull Run Mountains Conservancy</b>	<b>2016/7 Calendar of Events</b>
<b>December 22 &amp; 23</b>	<b>Winter Nature Camp</b>
<b>December 27</b>	<b>Volunteer Holiday Party</b>
<b>January 14</b>	<b>History of Broad Run</b>
<b>January 22</b>	<b>Geological Evolution of Thoroughfare Gap</b>
<b>January 28</b>	<b>Orienteering Workshop</b>
<b>February 4</b>	<b>Winter Birding Workshop</b>
<b>February 18</b>	<b>Old Home Exploration Hike</b>
<b>February 21</b>	<b>Annual Fundraising Event</b>
<b>February 25</b>	<b>Bat Survey Post Discussion</b>
<p><b>Directions:</b> Take I-66 to Haymarket exit. Go south on Rt. 15. Go west on Rt. 55 for 2.7 miles. Turn right on Turner Rd., then left on Beverley Mill Dr. to the Mountain House at 17405 Beverley Mill Drive in Broad Run, VA, across from the Bull Run Mountains State Natural Area Preserve trailhead.</p> <p>Unless otherwise noted, all programs and events will meet at the BRMC Mountain House at 17405 Beverley Mill Drive in Broad Run, VA, across from the Bull Run Mountains State Natural Area Preserve trailhead.</p> <p>For more information or visit our Web site at: <a href="http://www.brmcconservancy.org">www.brmcconservancy.org</a></p>	