

Sap Rises

by Michael Kieffer

In a few short weeks all of the trees in the Bull Run Mountains region will begin to move sap. Red maples are already in full bloom. Outdoor enthusiasts will notice wet spots in winter that did not exist in the growing season, but they may not reflect on why this happens. One key difference, in the winter the plants are not transporting water from the ground to the atmosphere.

Water is abundant, yet a limiting resource for forest productivity. A water molecule is only a temporary resident of a plant cell, as plants continually absorb and lose water. On a warm, sunny day a leaf will typically exchange 100 percent of its water in a single hour. Stand at the base of the largest tree in your neck of the woods—possibly an oak, sycamore, or tulip poplar—and move your gaze slowly up the 100 feet of tree to the end of the highest branch. Water and minerals need to constantly travel that distance without aid of a pump and against gravity. Anyone who has ever had to drain a pool cover using gravity to set up a siphon, can appreciate the movement of water ten times as far uphill.

The polarity of water molecules gives rise to extensive intermolecular attractions called hydrogen bonds. This ability of water to form hydrogen bonds gives rise to its cohesive and adhesive properties. Cohesion refers to the mutual attraction between water molecules that gives water high tensile strength. Adhesion refers to the attraction of water to a solid phase (such as a cell wall) and can be seen in every glass of water as a meniscus.



In a complicated process, water enters the roots and passes into the tree's xylem, or water transporting vessels. Once inside the vessels, the water forms a liquid column of molecules sticking to each other and the vessels' walls, and this column is dragged up the tree by a vacuum force. The vacuum is created as water molecules are continually pulled out of a pore on the leaf surface into the atmosphere. The dramatic difference in water potential between the vessels and the atmosphere drives the movement, while guard cells open and close the pore on the leaf. The result is an organism that transports water from the soil to the atmosphere purely in response to physical forces with no direct energy expenditure.

The rate and flow of water in a plant limits the maximum rate of gas exchange and carbon gain from photosynthesis. The average conduit diameter of a species limits the height the species will reach. Fast growing species have large, efficient conduits that are highly vulnerable to cavitation (when an air bubble is introduced anywhere along the column of water it results in an immediate and permanent collapse of the water column) and perform poorly in drought, but may give the tree the necessary advantage to reach the canopy. Slow growing species have small, inefficient conduits that are very resistant to cavitation and perform better in drought, but may keep a tree from reaching the canopy.



Tradeoffs have driven the evolution of diversity in land plants. Trees that grow tall quickly generally have soft wood. Trees with dense wood are strong but hydraulically inefficient. It could be argued that the construction and size of vessels in each species of plant could in one way or another be linked to every ecological aspect of that plant.

Life requires constant water in a world of limits. Water moves through all plants based on the same physical principles, yet millions of species have evolved. Understanding this legacy of natural selection is pivotal to understanding how the human-altered landscape will respond as the climate changes over the next century.

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

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Your gift on Tuesday, May 4th, 2021, will enable children to participate in meaningful outdoor experiences.

Give during the 24 hours of May 4th, www.givelocalpiedmont.org/brmconservancy



Amphibian Nights

Michael Kieffer

Spring—a rapid and sudden emergence. A burst of life is synonymous with the season. Warm rains and daylight are key ingredients, but it is the amphibians that act as harbingers. Male upland chorus frogs (*Pseudacris triseriata*), pickerel frogs (*Rana palustris*), spring peepers (*Hyla crucifer*), and wood frogs (*Rana sylvatica*) sing their harmonious nuptial displays.

Spotted salamander migrations are one of the most awesome sites in nature. While the event is predictable, it remains weather dependent. Salamander lovers grab your red lights and boots and remain ready. The first warm rains in late winter will begin this migration, the majority of which can occur in just one night and can only last a couple of days. Watch males dance and lure females to pick up their nuptial gifts in one of the many Piedmont vernal pools.



M. Kieffer



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Above: Female wood frog with male attached in amplexus

Left: Male spotted salamander

BRMC Youth Outdoor Naturalist Camps Summer 2021



Registration is open for all camps & workshops at www.brmconservancy.org

We're all trying to feel our way through returning to our lives safely, and BRMC is no exception. So we've established some protocols for our summer campers to make sure everyone stays safe. All participants must take their temperatures each morning of their program week, and stay home if they're not feeling 100%. Also, we are not able to take any participants who have come into contact with someone infected by Covid-19 unless they've gone through at least a 14-day post-contact quarantine.

Finally, we'll keep everyone 6 feet apart during the program, but campers must bring a mask. They won't have to wear it during the hikes unless we encounter another group.

HERPETOLOGY CAMP*

Session I: June 21st-June 22nd, 10a.m.-3 p.m.

Session II: June 24th-25th, 10 a.m.-3 p.m.

To be conducted completely outside.

Herpetology is the study of reptiles and amphibians. BRMC invites your child to spend two days hiking and handling, searching and observing salamanders, frogs, lizards, snakes, and turtles on Hopewell Sanctuary (Private). Marty Martin, a premier mid-Atlantic herpetologist, will be joining both camps. Ages 7-14. *Limited to 10 participants.*

Pre-registration required. Members: \$100/non: \$150

BUDDING NATURALIST CAMP*

July 12th—16th, 10:00am-12:30 pm

To be conducted completely outside and one parent/guardian must accompany their child or children

At this week-long camp, young children will be exposed to the outdoors and wildlife, as they explore life on and around the Bull Run Mountains through a series of discovery hikes, frog and salamander searches, snake viewing, and stream exploration. Ages 4-6. *Limited to 6 participants.*

Pre-registration required. Members: \$125/non: \$175

SUMMER NATURALIST CAMPS*

Session I: July 19th-23rd, 10:00am-3:00pm

Session II: July 26th-30th, 10:00am-3:00pm

To be conducted completely outside.

BRMC invites your child to spend an adventurous week interacting with the natural world. Each day we will focus on different groups of plants and animals on and around the Bull Run Mountains. Campers will add to their understanding of natural systems through hikes, stream walks, frog and salamander catching, bird watching, butterfly and insect collecting, and games. Ages 7-14. *Limited this to 10 participants.*

Pre-registration is required. Members: \$250/non: \$300

**Our host properties will include Hopewell Sanctuary (Private), Leopold's Preserve, and Silver Lake Regional Park. All of these private/public lands are located within 5 miles of each other. Further information on each camp will be provided to participants.*

BRMC reserves the right to cancel a day of any camp due to severe weather. However, we do not anticipate issues with the new time window from adjusting the hours.

BRMC Public Programs & Workshops

Spring 2021



HIKE WITH A NATURALIST

Thursday, April 1st, 10 am (& every first Thursday of the month)

Join a professional naturalist to discover some of the flora and fauna of the local region. This program is free, meets at Leopold's Preserve (16290 Thoroughfare Road, Broad Run, VA 20137) and all are welcome. Please pre-register.

Migratory Bird Walk

Sunday, May 2nd, 7am-10 am

Please join us on a bird walk at North Fork Wetlands. We have seen 60 species, including a variety of warblers and newly arrived migrants in past years. Take advantage of this unique opportunity to enjoy birding on this beautiful property!

Pre-registration is required.

Members: \$15/non: \$20

A DAY IN THE WATERSHED TEACHER WORKSHOP

Wednesday, June 23rd, 10 a.m.—3 p.m. or

Tuesday, June 29th, 10 a.m.—3 p.m.

Thanks to support from the Chesapeake Bay Restoration Fund, **6 spots are available** for each day of this workshop. We will provide a comprehensive overview of Northern Virginia watershed ecology for upland forests that buffer our headwater streams, to stream ecosystems and adjacent vernal pool wetland habitats. It is designed for public, private, and homeschool teachers from 5th-12th grade.

CHESAPEAKE WATERSHED WORKSHOP

August 2nd—August 5th, 10 a.m.—3 p.m.

Thanks to support from the Chesapeake Bay Restoration Fund, **six scholarships are available** for this workshop. Please contact us at info@brmconservancy.org to request an application. This workshop will focus on conserving the rivers and streams that flow into the Chesapeake Bay. We will explore headwater streams on the Bull Run Mountains, go downstream on Little Bull Run, and visit local preserves. At each location students will perform stream monitoring, vegetation analyses, and stream habitat and riparian buffer evaluations. Ages 13-18.

LEOPOLD'S PRESERVE

Monthly Naturalist Walks

BRMC is proud to partner with **The White House Farm Foundation** and its mission to enrich individuals with knowledge of and involvement with our natural ecological systems for monthly naturalist walks on Leopold's Preserve: 16290 Thoroughfare Road, Broad Run, VA 20137.

Spring Schedule

Sunday, April 18th, 10 a.m.--noon—Spring Birds & Blooms

Sunday, May 23rd, 1-3 p.m.—Ferns and Allies

Saturday June 19th, 10 am-noon—Firefly Natural History



WHITE HOUSE
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WITH SUPPORT FROM THE PLEIN FAMILY CHARITABLE TRUST

HOMESCHOOL PROGRAMS

All programs are 10am-12pm. \$5 pp, including adults.

BRMC invites you and your child to spend an adventurous outing interacting with and learning about nature! We meet at Leopold's Preserve, 16290 Thoroughfare Road, Broad Run, VA 20137.

Migratory Birds and Spring Ephemeral Wildflowers

Thursday, April 15th—10am-noon. We will focus on bird migration and spring wildflowers.

Ferns & Allies—May 20th, 10am-12pm Join us for a fern and clubmoss exploration and learn about their lifecycles.

Freshwater Ecology—June 10th, 10am-12p.m. Join us for a stream exploration.

Let's Get Social!



Like, follow us, and share with your friends the latest information on our education programs, as well as partner updates and donor opportunities.

What Doing Things for Others Can Do For You! by Kelsie Ware and Christina Lambacher

Although the beginning of the year is often denoted by resolutions and fresh starts, another great time to begin something is the start of spring. All around us, nature is opening back up and blossoming anew. Why shouldn't we follow suit?

One spring-time resolution to consider making this year is volunteering. Volunteering is the perfect way to gain new experiences and skills, connect with others, and give back to the community. Volunteers help organizations, like ours, charge forward towards their missions and goals. Volunteers ensure that vital programs and resources continue to be available for the greater community. Volunteering can seem daunting at first—spending your own resources, like time and energy; however, there are so many amazing benefits to volunteering that are often overlooked.

Volunteering allows you to gain skills and knowledge for career advancement or changes without making any long-term commitments. You can explore new interests while maintaining your regular routine and responsibilities. If there was ever something you were wanting to try, volunteering is a great way to sample it! It can also help you to stand out to future employers, as volunteering highlights your character, passion, and determination.

Volunteering can also be an opportunity to connect with others! If you're unfamiliar with an area, volunteering is a great way to meet people and learn more about local places and activities. It allows you to build communities with those who share common interests, values, and outlooks.

It is also a creative opportunity to connect with the people right in your own home! There are lots of family-friendly volunteer activities to engage that allow families to spend time together and connect. Not only will you be building memories, you may also be building houses or playgrounds!

For highschool students volunteering also allows you to start developing a diverse portfolio of volunteer work that can often have a positive impact when applying for colleges, while also giving you an idea of what types of work you might enjoy in the future, or areas you may want to major in.

It also provides a unique opportunity for some professional networking. Volunteering can allow you to meet folks in different careers or professions and learn more about that field. Depending on your company, you may also have community service corporate benefits, or contribution matching based on volunteer hours. If you don't have much job experience, volunteering is a great way to accrue both hard and soft skills.



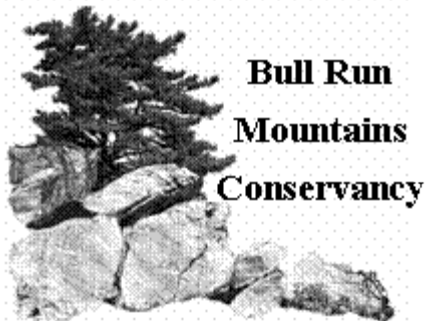
Volunteers removing invasive plants in Leopold's Preserve's Deer Enclosure!

Giving back to the community may be one of the most common reasons people choose to volunteer. When you spend time giving back to the community, you may find yourself more invested in it. Not to mention, volunteering feels good for you as an individual! The National Health Service conducted studies where researchers found statistically significant, positive relationships between volunteering and lower levels of depression. Providing a service, whether it be anything from tutoring or mentoring all the way to trail maintenance, is good for your mind and body. It can provide you with a broader sense of purpose which can give you a boost in motivation.

All in all, volunteering is more than just spending your Saturday cleaning garbage and debris out of an old house (which is one of our volunteer projects this year!). It's an opportunity to grow both individually and professionally and connect with the community around you. There are so many ways to be involved as a volunteer that anyone can be involved in some way.



Halloween Safari Volunteer Trail Guides!



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

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| <input type="checkbox"/> \$35 Family | <input type="checkbox"/> \$75 Group | <input type="checkbox"/> \$100 Sustainer |
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Bull Run Mountains Conservancy, Inc., P.O. Box 210, Broad Run, VA 20137

Bull Run Mountains Conservancy is a donor driven organization.

Become a donor today and support our programs and protect the mountains and region. Your contribution provides BRMC necessary funds to operate and shows our foundation and corporate supporters that the public values and appreciates this resource.

Membership Benefits:

- Support environmental and historical programs for all ages
- Support research on and around the Mountains
- Discounts on all public programs and camps
- Quarterly newsletter including our program calendar