

THE HIGH KNOB HERALD

VALENTINE'S EDITION

The Clinch Coalition
Newsletter

FEBRUARY 2022, ISSUE 14

THIS ARTICLE IS PART OF OUR SERIES ABOUT HIGH KNOB, ONE OF THE MOST DIVERSE BIOSPHERES IN THE COUNTRY.

Discovering the Seasons on High Knob

By Dave Skinner and Wayne Browning

There are many things in life that nearly all people experience. But one that stands out, especially if you like to spend time outdoors, are the seasons. If you happen to be in the tropics, experiencing the seasons is quite different; you have the wet season and the dry season. Since we are in a temperate area of North America, we obviously have the four seasons. We are fortunate to have the more complex, interesting and scenic seasonal "menu". Few will dispute the beauty of a snow covered landscape, spring wildflowers carpeting the forest floor, the beauty of a well-tended summer garden or the kaleidoscope of colors of the autumn forest.

The A. A. Milne character, Winnie-the-Pooh, "discovered" the seasons in a short Disney film that is naturally entitled Winnie the Pooh Discovers the Seasons. As humans, we gradually begin to be aware of the seasons as we grow from infants, toddlers and into children. Generally, we do not think about the seasons much as young children; we just accept them. But eventually we begin to learn about them in school, and through life experiences. Eventually we begin to appreciate or loathe certain seasons.

As we all know, our mountains have weather that is much more complex and variable compared to the plains. High Knob is situated at the transition between the Cumberland Mountains and the Valley & Ridge physiographic provinces. The High Knob Massif, which is capped by the peak of Stone Mountain, is a broad, elevated area which is quite different from the summits of



Photography by Bill Harris

the more linear mountains in our area, such as Clinch Mountain.

Overall, the progression of the seasons on High Knob is mosaic where the seasonal changes in certain pockets occurs more gradually and later than places in the valleys or on mountains with more uniform topography. In some cases it can be possible to experience winter on top of the mountain while spring like weather is occurring in the valleys.

Winter

Since we are currently in the winter season we will start with it. Winter often gets a bad rap due to the chilly temperatures, the piercing wind, but especially because of snow and ice that can make getting around inconvenient at best and unsafe at worst. We are fortunate here in that we have relatively mild winters in the low elevations where most of us live. But if you love winter and snow, you are in luck since winter weather extremes and lots of snow are just a short drive up into the High Knob Massif.

All seasons come and go sometimes with dramatic effect, but on High Knob winter is often melodramatic. With the complexities of topography, aspect, wind, moisture, etc. it's not possible to capture all the vagaries of the seasonal extremes in this article.

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But needless to say, wintertime temperatures in the High Knob Massif are typically colder than the surrounding landscape in the valleys and basins below. Average winter maximum temperatures at the highest elevations of High Knob are in the low to mid 30 degrees Fahrenheit; with prolonged periods of time where below freezing temperatures are common in most winter months.

Average winter minimum temperatures tend to drop into the upper teens to lower 20s. Minimums as cold as 29 degrees below zero have been recorded on Eagle Knob since 1990, with unofficial minimums as cold as -35 being reported in the High Chaparral community during January 1985. The all-time record minimum for Virginia is -30 below recorded at Mountain Lake Biological Station in January 1985.

Under cold air advection (when the wind blows from a region of cold air to one of warmer air), peaks tend to be colder than basins and valleys at night, otherwise, nighttime temperatures are often colder in the upper elevation basins on the massif than on the high ridges. Under prime cooling conditions, the basin floor of Big Cherry can be 20 to 30 degrees colder than the peaks of High Knob and Eagle Knob during the night.

In the future, the floor of the Big Cherry basin is likely to have a new all-time minimum temperature record for the state of Virginia if recording there continues long enough. It is likely that Big Cherry dropped to around or below 30 below zero during February 2015 and February 1996.

Likewise the amount of snow on the High Knob Massif is more impressive than what the lowlands experience. High Knob snowfall data has been collected for more than 30 years. It is typical for maximum winter snow depth to reach 1-2 feet at upper elevations on High Knob, with extreme maximums of 3 to 5 feet. During the past 30 years, 58 inches was the maximum depth observed in wake of the March 1993 Superstorm. In contrast, the Tri-Cities only gets about 9 inches of annual snowfall on average. Locally, it's well known that Wise is the snowiest town in Virginia with an average of about 47 inches per year.

Unlike more northerly latitudes and many locations in the Intermountain West, High Knob does not always develop snowpack. Snowpack is an accumulation of snow and/or rime drop from multiple events over a period of time.

About 3 to 4 feet developed during February 2015 to mark the greatest snowpack observed during the past 10 years. In the 1970s, before snowfall data was being recorded, large and extensive snowpacks certainly developed during winter seasons. In the Robinson Knob community, a depth of 42 inches was measured by Otis Ward (a founding member of TCC) which suggests that mean depth was likely more than 50 inches at higher elevations and on northern slopes.

It is also interesting to consider not only the depth of snow on High Knob, but also the length of time that snowpack persists. Most snowpack data is from the northern slopes in High Knob Lake basin. Some winters do maintain snow cover from beginning to end, but it's becoming less common with climate change and associated decreases in the total snowfall, more rainfall, and somewhat milder temperatures.

The average number of days with 1 inch or more snow depth is 74 days. The 2003-04 winter season had 103 days, but numerous winters prior to this record period would likely have had more days. During the winter of 1976-77, a location in the Head of Powell Valley had continuous snow on the ground for 82 days. Powell Valley typically has only a fraction of the snow compared to higher elevations, so during that winter High Knob would likely have had well over 4 months of snow cover. The following winter during 1977-78 had even more total snowfall and snowpack. More recently, the back-to-back big snowfall winters of 2009-10 and 2010-11, both had snow on the ground from December into March, with a notable part of this time having depths of a foot or more.



Spring

Nothing lasts forever, not even winter on High Knob. But as one might expect, spring does not happen suddenly on High Knob. In most of the surrounding region at lower to middle elevations spring's arrival comes up to a month or more sooner than it does on High Knob.



Above are views looking across the High Knob Lake basin on May 17 and 31, 2020, respectively. In the photo on the left, on May 17, Clinch Mountain and the Great Valley beyond are already at summer green, as was much of the region. In upper elevations of the High Knob Massif, it can be well into June before all trees have mature leaves (especially in basins where cold air pools, and along highest ridges). In the photo on left, trees were still not fully green, especially on the basin floor where cold air is more prevalent at night. No photo is available of the Big Cherry area at this same time, but tree leaf development would be much less along its wetland valleys where colder nights can have temperatures 10 degrees or more lower than at High Knob Lake. Emergence of spring wildflowers in Big Cherry is also slower than on many higher elevation slopes.

Summer

The much later spring to summer transition on High Knob has huge implications ecologically, since flora and fauna have a much shorter period to reproduce and grow before a hard freeze arrives. All biota have to adjust to this shortened growing season. Many cold air basins act to anchor thermal belts just above them. This creates microclimates which influence floral and faunal niches. Elevation, aspect, slope, thermal zones as well as diverse soil types and soil moisture, etc. all play a role in the creation of many microclimates and niches for more species to occur than would be possible without this landscape diversity. As already alluded to, summers are shorter on High Knob, and of course are cooler. Average summer maximums in the upper 60s to lower 70s are common at highest elevations (above 3500 feet), with

temperatures rarely ever rising above 80 degrees.

For example, during the period from November 2016 to present there was only 1 hour and 20-minutes of total time at or above 80 degrees on Eagle Knob (4188 feet elevation) and 11 hours 20-minutes at or above 80 degrees at High Knob Lake (3500 feet elevation). Average summer days at lower elevations (below 2000 feet), are in the 80s with numerous days topping 90 degrees in the Tri-Cities (19 days on average are at or above 90 degrees at Tri-Cities Airport).

In upper elevations, above 3000 feet, summer maximums are highest in open wetlands of Big Cherry basin where time at or above 80 degrees is significantly greater than on the peaks and at High Knob Lake. By contrast, this is balanced by the open floor of Big Cherry having the coolest summer nights. In fact, summer nights can be so much cooler in Big Cherry that the mean summer temperature (average of highs and lows) can be cooler than on the peaks during some summer periods.

Temperatures comparable to the northern Great Lakes, New England and southern Canada are often observed.

Autumn

Just as spring comes late, autumn arrives early to High Knob. It is well known that color changes in tree foliage comes earlier with increasing elevation and increasing latitude. On the High Knob Massif, it is much more complex than what occurs on "a typical mountain" due to its sprawling crest with embedded basins where the formation of cold air at night is enhanced.



Photography by Bill Harris

The Big Cherry Lake basin, High Knob Lake basin, and the high coves of the dual Norton Reservoirs are a few examples of where cold air drains into and/or develops in place (Big Cherry). In autumns of 2020 and 2021, the frost-free period in Big Cherry was 65 and 68 days less, respectively, than that observed within the TriCities (more than 2 months less). Big Cherry basin tends to have the earliest and latest frosts-freezes of any other location known on the High Knob Massif. Leaf color changes can be best appreciated through images below.



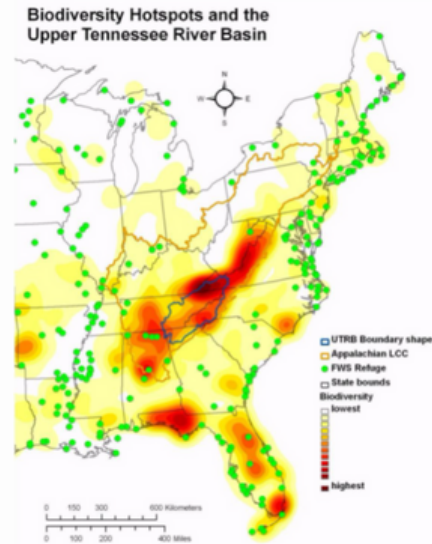
Autumn foliage color contrast of high and lower elevations in the South Fork Gorge and Lower Big Cherry Lake Basin on High Knob Massif. Satellite Image, Early October 2012.



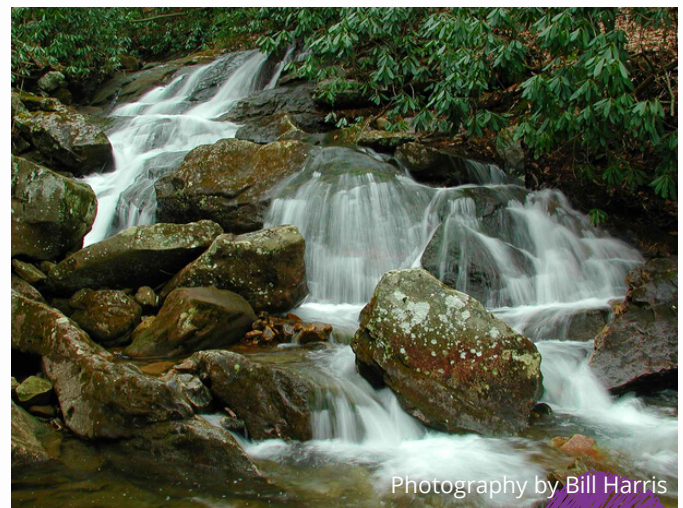
Early autumn color changes at High Knob Lake Basin, High Knob Massif. Wayne Browning Photograph, September 26, 2015

Closing with the autumn season brings us full circle back to where we currently are in the winter season. If you have had your fill of the winter season, you can delight in the fact that the days are already getting longer by about two minutes a day and radiant energy from the sun will gradually begin to overcome the grip winter has on the Northern Hemisphere. If there has been a recurring theme in this article it's that the elevation, aspect, slope, thermal zones, diverse soil types and other factors have a profound influence not only on the weather but also the plants and animals living on High Knob.

Diverse physical features beget a diverse set of biota. High Knob is an important part of our heritage because of its history and culture as well as its rich natural heritage. The High Knob Massif is brimming with many unique and rare plants and animals, and important plant community types. The High Knob Massif Region is not just on the mountain, but also in its caves and rivers that possess species not found anywhere else on planet Earth.



This diagram from a study done on the Upper Tennessee River Basin (above) illustrates the importance of the High Knob's regions biodiversity. Maintaining this biodiversity, a core goal of TCC, is critical to increasing environmental resiliency and stability. We should all be proud that we live in such a special and unique area. We should all strive to spend more time exploring and experiencing the very special place we call High Knob.



Photography by Bill Harris

Activities

What's New on High Knob?

March 3rd: Stargazing with Dr. Lucian Undreiu. Contact Katie Dunn for more information at katied@nortonva.org.

April 18th-22nd: Earth Day Celebrations

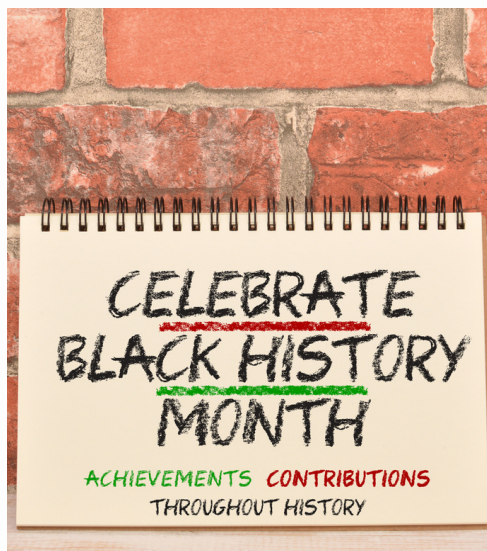
To get involved or learn more information, please reach out to us at info@clinchcoalition.org.

Tree of the Month

Fringe Tree *Chionanthus virginicus*

The Fringe Tree (*Chionanthus virginicus*) is an especially ornamental specimen named for its unusual, fringelike blossoms. Also called old man's beard, the Fringe Tree reaches a height of 12 to 20 feet with an equal spread at maturity. It covers itself in drooping, 6-inch-long clusters of small white, fragrant flowers from May through June, with male and female flowers on separate trees. If you grow both a male and female tree, flowers on the female tree produce small fruits resembling bluish-black olives that attract birds and wildlife.

These trees are incredibly fragrant, native, and absolutely beautiful! Consider planting these for to appreciate its beauty in the coming months.



Celebrating Black History Month

TCC Supports Diversity & Environmental Justice

The Clinch Coalition is committed to creating a welcoming, inclusive, and equitable community. Undergirding this commitment is the conviction that all human beings are interconnected, not just with one another, but with all of nature. We will fulfill this commitment by recognizing and addressing racial inequality, systemic injustices, discrimination in any form, and being a social movement for environmental justice to encourage and allow all people to enjoy our public lands.

If you would like to become a member or make a donation, please visit www.clinchcoalition.org.

