

# OAK LEAF

A Newsletter for Members and Friends of the Northern Shenandoah Valley Audubon Society

VOLUME 43

FALL 2019

NO. 2

## *Audubon Arboretum*

By Jim L. Smith

Audubon Arboretum, within Jim Barnett Park in Winchester, Virginia began in 1999 and 2000 with an agreement between the Winchester Parks and Recreation Department (WPRD), and the Northern Shenandoah Valley Audubon Society (NSVAS), to establish and maintain a portion of park property along Pleasant Valley Road for the expressed purpose of protecting a green area that would be a peaceful location where people could appreciate and reflect on nature in general and specifically learn about trees, plants, and shrubs. Today, almost 20 years later and with help from many individuals and businesses, we have over 100 trees planted representing more than 40 species. Our earliest plantings have grown to become beautiful specimens. The 2 Bald Cypress are nearly 30 feet tall. The Red Maple, donated in memory of past Audubon members, has survived severe drought, freezing temperatures, and even some hurricanes. And the Tulip Trees are excellent representations of not only beauty but also of important natural resources. The Oaks are producing acorns, the Crab Apple, Cherries, and Viburnum, when in bloom, add to the Spring flowering, and the Hollies, Magnolias, White Pine, and Arborvitae give us color all year long. All of these trees and plantings quietly contribute to our community in many often forgotten ways.

Currently, NSVAS and WPRD are working with the Winchester Host Lions Club to develop a sensory trail within the Arboretum where tree descriptions will be in braille. And, a Pollination Garden will be planted soon that will add color, assist our insect friends in the important work they do, and provide opportunities for education and learning.

If you would like to plant a tree in memory of a loved one, make a donation, or help out with any of our many conservation projects, please call me at (540)303-3983.

Thank you!  
Jim L. Smith, NSVAS

## *Fall 2019 Programs*

Join us for these programs to learn more about nature in the Shenandoah Valley.



### *Hawk Watch Day*

Saturday, Sept. 21

Abrams Creek Hike – 8:30 AM

Snickers Gap Hawk Site – Noon

Bears Den Hike – 1:00 PM

Abrams Creek Wetlands Preserve – west side of Winchester, VA 22601. Parking is available at Abrams Crossing Shopping Center at 620-630 West Jubal Early Drive (near Children of America). Signs for trail head nearby.

Snickers Gap and Bears Den are both located near Bluemont, VA, at the intersection of Rt. 7 and Rt. 601. Free parking and trail head are nearby.

### *Presentation: Amphibian Issues in the Shenandoah Valley*

Thursday, Oct. 3 at 7:00 PM

LFCC: Science Bldg, Rm. #145

Jointly sponsored with Lord Fairfax Community College and Trout Unlimited.



Main Campus Address:

173 Skirmisher Lane, Middletown, VA 22645-1745

Campus Map: <https://lfcc.edu/why-lfcc/campus-maps/>

### *Presentation: Virginia Society of Ornithology Kestrel Project*

Thursday, Nov. 7 at 7:00 PM

Shenandoah University: Mary M. Henkel Hall

Jointly sponsored with Shenandoah University Environmental Studies and VSO

Main Campus Address:

1460 University Dr., Winchester VA, 22601

On campus: Wade Miller Drive, next to Health & Life Sciences Bldg.

Campus Map: <https://www.su.edu/campus-maps/#/>



# Sky Meadow's Sensory Explorers' Trail

by Posie Beam

In 2017, at a meeting of the Shenandoah Chapter of the Virginia Master Naturalists, the idea to create a “sensory trail” at Sky Meadows State Park was embraced.

The popular 1,862-acre park already offers beautiful trails for hikers, bikers and horseback riders as well as other recreational activities. This sensory trail, however, would be specifically designed for everyone, for people of all ages and abilities, including the blind and visually impaired, to explore the serenity and beauty of nature in multiple ways.

Partnering with the Park staff and the Friends of Sky Meadows State Park, an excellent site was identified and a plan outlined for what was to be officially and aptly named, The Sensory Explorers' Trail. Over the last year and a half, the Master Naturalist team mapped out in detail and raised funds for this exciting project. In March, with the research and plans filling two enormous notebooks, construction of benches, signs and an entry kiosk got underway. On June 10th, construction began on the 3/10ths of a mile loop trail that begins and ends next to the Park's picnic area. The chosen site includes a forested hillside, a seasonal wetland, a diverse community of trees, billion-year-old rocks, dead but life-giving black locust trees and a secluded vernal pool.

During the first week of actual trail construction, the path was laid out and locations for seven Stops were marked. The second week, the trail was graded, gravel laid and the vernal pool excavated. Throughout June and July, volunteers built bridges and boardwalks and a viewing deck overlooking the vernal pool, while The Park staff cleared miscellaneous problematic obstructions. The Park also provided signage, dedicated disability parking and overall guidance. And finally, The State's Youth Conservation Corps did the heavy lifting of setting the kiosk, placing signs and benches and putting in concrete pavers at each Stop.

An important feature of the trail for the visually impaired is this change from gravel to concrete pavers so that they know they have arrived at a Stop. Signs at each Stop also have the number of that Stop in Braille on the lower right-hand corner to link the user to an audio tour.

Another charming feature is on the deck at the vernal pool, Stop 7, where with your fingers, you can explore the

actual sizes and shapes of replicas of 3 mole salamanders and a wood frog that have been attached to the railing.

This unique Sensory Explorer's Trail can be experienced on several levels. A leisurely walk around the loop while opening the senses and tuning in to the natural world is the simplest. Or, take a few minutes to sit and relax on one or more of the benches. With eyes closed, feel the air on your skin. Breathe deeply and inhale the woody aromas. Listen to nature's voices in the songs of birds, the chirps, hums and buzzings of amphibians and insects, and perhaps gurgling water in the spring or the wind rustling leaves in the fall.

For those who want the full experience the trail has to offer, an audio app with detailed narratives describing each Stop can be downloaded onto a cell phone using the izi tour app. Find out how the movement of water and gravity shaped, and continues to shape, the land and how human settlements influenced and changed the course of its natural geology. Learn about the underground fungal network in a tree community. Listen to recordings of nature's voices in the songs of birds and frogs and cicadas. Discover how a fallen tree supports an abundance of new life and be aware that the whole time you are on the trail, you are in the Life Zone of a vernal pool, so critical to the life cycles of amphibians. Put it all together to understand how everything is connected.

The Sensory Explorer's Trail officially opened on August 10, 2019, but the work is not done. Plans are already underway for future adaptations to make the trail ever more accessible to everyone: for children with autism, for the hearing impaired and other special groups. Also in development is a contemplative tour for those needing inspiration or for those who are inclined to meditate and muse.

It is well established that the benefits of time spent in nature are profound. The creators of the Sensory Explorer's Trail and all those who contributed, “believe that this is an important project for the park, our community, and for the thousands who journey here to experience the open skies, meadows and forests of the Sky Meadows State Park.”

# Membership News

by Dave Borger

We would like to welcome the following new members:

- Krista Jo Brooks
- Cathryn Lynch
- Constance R. Cermak
- Tim Farmer
- Rodney and Lynn Buck

All memberships (new and renewed memberships) will be valid for one year beginning on the date that membership payments are received. Individual membership time-frames will be specified in thank you letters sent to new and renewed members upon receipt of membership payments. The membership form is included in this and all newsletters. The membership form is also available on our website at [www.audubon-nsvas.org](http://www.audubon-nsvas.org).

We welcome all new and renewed members to our chapter. It is our hope and desire to continue the efforts of our chapter and further our goal to conserve and restore natural ecosystems, focusing on birds, other wildlife, and their habitats, for the benefit of humanity and the Earth's biological diversity.

*Thank you for your contributions and efforts toward achieving our goal.*

## Shenandoah Audubon

### BOARD OF DIRECTORS OFFICERS

President .....	Jim Smith
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At-Large.....	Glenny Comer
At-Large.....	Gabriel Ricketts
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### COMMITTEE CHAIRS

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Education.....	Open
Field Trips.....	Open
Finance.....	Kaycee Lichliter
Membership.....	David Borger
Webmaster.....	Jeannie Senter
Programs/Public Relations	Mark Burns
	<a href="mailto:markbruns3@gmail.com">markbruns3@gmail.com</a>

New to Shenandoah Audubon is Angie Schwarzkopf as Newsletter Assistant. Angie received her BA from Maryland Institute, College of Art and her MA from the University of Baltimore. Though her first love is fine art, she works as a graphic designer for a greeting card company. Angie became involved with NSVAS after volunteering for the Bluebird Monitoring program.

## SUPPORT US

*Together we can promote conservation and appreciation of this beautiful place we call home.*

NAME: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CITY/STATE/ZIP: \_\_\_\_\_

EMAIL: \_\_\_\_\_

PHONE: \_\_\_\_\_

*Please check an option below:*

I will view the Newsletter on the website

Mail my Newsletter to me

New Memberships, Renewals and Donation payments may be made with PayPal at our website: [www.audubon-nsvas.org](http://www.audubon-nsvas.org)

Is your payment a RENEWAL or a NEW MEMBERSHIP?  
(Please circle one.)

MEMBERSHIP ( 1 YEAR) \$15.00  
(Membership is good for one year beginning the date payment is received.)

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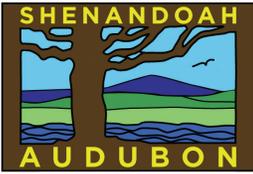
TOTAL ENCLOSED \_\_\_\_\_

CHECK NUMBER \_\_\_\_\_

Kindly remit payment to:

**Shenandoah Audubon**  
**c/o Kaycee Lichliter, Treasurer**  
**1346 Sulphur Springs Road**  
**Middletown, VA 22645**

Shenandoah Audubon is a 501(c)(3) nonprofit organization. Membership dues and donations help support local Bluebird trails at Blandy Experimental Farm and Shenandoah River State Park, the Purple Martin Colony at the Virginia State Arboretum, the annual Christmas Bird Count, as well as educational programs and student scholarships. **Thank you for your support.**



P.O. Box 2693  
Winchester, VA 22604



For information about NSVAS, please visit our Facebook page or website: [www.audubon-nsvas.org](http://www.audubon-nsvas.org)

## THE BLUE JAY

By Gabriel Ricketts

Have you noticed a large, noisy, bright blue bird with a prominent crest flying around in your neighborhood or around a woodland edge? Does your bird have black and white wing bars, a pale gray belly, and a bold, black necklace? If so, your bird is probably a Blue Jay (*Cyanocitta cristata*, for all you Latin geeks like me).

This bold, smart bird can be found throughout eastern and central North America, and a migratory population travels throughout much of the northwest. They migrate by the thousands around the Great Lakes and most of the Atlantic coast. The Blue Jay's habitat is mostly woods and woodland edges, but they are not as common in deep woods. They are also found in neighborhoods (so long as they have enough trees) but they are found more commonly in areas with oak trees. The Blue Jay is often found in flocks, and they can usually be detected by their noisy calls before they are actually seen.

### SOME INTERESTING FACTS ABOUT THE BLUE JAY:

Blue Jays mimic the calls of hawks and other birds, and they often use the hawk cries to scare away other birds from a bird feeder, so that they may have the feeder all to themselves, they also may use this to test if there is a predator around. One individual in my neighborhood, went so far as to make a Red-tailed

Hawk cry and then scream wildly while flying down really fast and thrashing around the leaves on the ground – seemingly making it look like a hawk was attacking. All the birds scattered and he had the feeders to himself for a couple minutes. What a smart bully!

Blue Jays are omnivorous, and one thing that has hurt the reputation of the Blue Jay is that they sometimes eat the eggs and nestlings of other birds. The Blue Jay is actually largely vegetarian, eating a variety of nuts, seeds, and berries, but they do eat small creatures like caterpillars, grasshoppers, and beetles and a variety of other small animals, and will only rarely eat nestling birds and eggs.

One way you may attract Blue Jays to your area, is to put up a bird feeder. Blue Jays prefer eating on platform feeders and the ground and suet feeders but may eat on hopper feeders as well. Try filling the feeders with peanuts, sunflowers, and cracked corn.

Overall, I think Blue Jays are a delight to the eyes. They are colorful, bold, and fun to watch, and I do not think I will ever tire of looking at one. How about you?



Visit our web site: [www.audubon-nsvas.org](http://www.audubon-nsvas.org)



# Shenandoah River Fish Kills and the Search for Causes (A Brief Time-line)

*This is part three in a series of articles examining the potential impact of human activity on the Shenandoah River. This issue presents a brief time-line of fish kills occurring within the Shenandoah River and subsequent research to find the cause.*

by David Borger

Over the span of three years, an estimated 80% loss of adult smallmouth bass and redbreast sunfish had been discovered in over 75 miles of the North Fork of the Shenandoah River (2004), in over 100 miles of the South Fork of the Shenandoah River (2005), and again in over 30 miles of the South Fork of the Shenandoah River (2006). The mortality of other species was documented during 2006. At the time, it was thought that agricultural runoff may have played a role in the fish kills, though further study was needed to confirm or dismiss agricultural runoff influences on fish mortality<sup>1</sup>. “The most widespread fish kill – throughout the Shenandoah River watershed – took place in 2007 and affected fish of all ages.”<sup>2</sup>

A Virginia Tech DVM report on fish kills on the South Fork of the Shenandoah River using 2005 fish data found that fish died from a depression of the immune system caused by secondary bacterial and fungal skin infections. It was further found that these infections may have been the result of changing water and environmental temperatures. A James Madison University study of 2005-2006 river temperatures, compared with earlier temperatures, found increases in both annual and January-June temperatures. The latter coinciding with spawning times for smallmouth bass. The observed fish kills occurred within the reaches of the river wherein observed temperatures increased.<sup>3</sup>

A 2007 workshop by Amy Bergdale and Sue Norton, both of the U.S. Environmental Protection Agency, presented analyzed fish kill data from the “Shenandoah River or South Branch of the Potomac River since 2002”, but, specifically, 2006 fish kills. They looked at various potential causes compared to data presented from those episodes and considered various causal relationships. They narrowed the possible causes to the following:

- **Gill damage from ammonia, high pH or other mechanism prevents fish from taking up oxygen**
- **Altered blood chemistry from nitrite exposure prevents fish from using oxygen**
- **Viral, bacterial, parasitic, or fungal infections**
- **Unspecified toxic substances**<sup>4</sup>

Studies in 2006 and 2007 resulted in a 2008 report entitled, “USING BENTHIC MACROINVERTEBRATES TO IDENTIFY CAUSES OF FISH KILLS IN THE SHENANDOAH RIVER” by the Department of Entomology and the Department of Fisheries and Wildlife Sciences, both at Virginia Tech, concluded:

• “...the results of our benthic macroinvertebrate assemblage analyses at large river sites suggest that macroinvertebrate assemblages are not experiencing any influences similar to fishes. These results lend support to the hypothesis that the fish kills are primarily being caused by a factor specific to fish, probably a biological pathogen.”

• “results of fish pathology studies seem to indicate a diverse array of fish health problems, including parasites such as trematodes. Some trematodes use snails as intermediate hosts, and snails are one of the taxa whose density has increased greatly and is strongly related to increased nutrients.”<sup>5</sup>

A 2009 study by Virginia Tech’s Department of Fisheries and Wildlife Sciences and Department of Entomology produced a report for the Virginia Department of Game and Inland Fisheries entitled “Investigation into Smallmouth Bass Mortality in Virginia’s Rivers”. Their findings were based on one year of field studies. They concluded that:

• **nutrient (including nitrate and phosphate) concentrations were high in areas where fish kills occurred, though these were not likely to have caused the fish kills.**

• “...estrogenic activity measured at the fish kill sites was high enough to cause biological effects in fish.”

• “Incidence of gill hyperplasia (enlargement of the gills) were high, suggestive of contaminants and/or high suspended sediment, and were significantly higher at fish kill sites in the pre-kill sampling period. Smallmouth bass from the North Fork Shenandoah site had the highest incidence of organ pathologies and female smallmouth bass had higher incidence of pathologies than males.”

• “Smallmouth bass showed significant changes white blood cell differential from pre-kill to kill periods, suggestive of infection. These same fish have more severe skin and fin lesions and ulcerations.”<sup>6</sup>

At the November 2016 Chesapeake Bay Watershed Project’s meeting, Dr. Vicki Blazer of the USGS National Fish Health Research Laboratory in Kearneysville, WV, discussed the health of fish in the Chesapeake Bay watershed. She highlighted three areas of concern related to fish in the Shenandoah River: Some fish in that river still have skin lesions, there is a high level of springtime mortality among adult fish, and, in areas of high mortality, intersex fish are common. Although there does not appear to be any single cause of the 2005 fish kill, some findings include:

•“A high percentage of fish tested had multiple bacterial pathogens — often with heavy parasite infestations and some with opportunistic fungal infections.”

•“...pesticides also seem to be the cause of the high prevalence of intersex fish.”

•“Strong correlations were found between the presence of diseased fish with the percentage of agricultural land use, confined animal feeding operations and agricultural herbicides and pesticides.”

•There was no relationship between estrogen compounds in the water and water from wastewater treatment plants. <sup>7</sup>

A summary by the USGS (“Science Summary-Skin Lesions and Mortality of Fishes in the Chesapeake Bay Watershed”) compiled findings from investigations related to fish kills in the South Branch of the Potomac River (2002), the North Fork (2004) and South Fork (2005) of the Shenandoah River and the Monocacy River (2009). <sup>8</sup>

Among those findings were the following:

•“A variety of lesion types (ulcers/erosions, raised pale lesions, raised inflamed areas) and various external parasites (leeches, grubs) are observed on affected fishes. Microscopic examination and culture demonstrated bacterial infections (*Aeromonas hydrophila* and other motile *Aeromonads*, *Aeromonas salmonicida*, *Flavobacterium columnare*), largemouth bass virus, and heavy internal parasite loads, indicating mixed infections. No pathogen or parasite was consistently identified as a single cause of the mortalities at all sites.” <sup>9</sup>

•“Pathological signs of environmental stress and contaminant exposure, including gill lesions, tissue damage, and a high prevalence of feminized male smallmouth bass [exhibiting intersex (testicular oocytes) and plasma vitellogenin] were also observed. The co-occurrence of skin lesions, mortalities, and signs of endocrine disruption provides additional evidence that exposure to chemical contaminants and other stressors may contribute to the reduced health of these populations.” <sup>9</sup>

•“Estrogenic contaminants, known to induce intersex and vitellogenin in male fishes, also modulate the immune response <sup>(10)</sup> and certain disease resistance factors, such as hepcidin.” <sup>11</sup>

•“Arsenic concentrations, particularly in the skin and anterior kidney, increased significantly from March to May, the time period when skin lesions and mortality of adult smallmouth bass occur.” <sup>9</sup>

•“The parasites most commonly observed in affected bass were trematodes and myxozoans, two groups that have complex life cycles involving snails (trematodes)

or benthic worms (myxozoans). Nutrients, estrogens, atrazine, and other contaminants can lead to increases in these intermediate hosts.” <sup>9</sup>

•“Two new species of myxozoan parasites, *Myxobolus branchiarum* and *M. micropteri*, from the gills of smallmouth bass were described. Cysts of *M. branchiarum* are observed during mortality events, as well as during other times of the year. Parasite intensities were greatest during the spring; this may be an additional stress to infected bass.” <sup>12</sup>

•“Atrazine has been detected at sites where fish kills have occurred, with the highest concentrations detected in the spring.” <sup>13,14</sup>

To date, the exact cause of fish kills within the Shenandoah River remains unknown. Researchers suspect that infections, diseases and mortality may be linked to such environmental changes as, <sup>(1)</sup> poor water quality (overabundance of nutrients, sediment, and toxic contaminants); <sup>(2)</sup> degrading stream habitats (caused by changes in flow and temperature, for example); <sup>(3)</sup> introduction of non-native species; and <sup>(4)</sup> altered food webs.” <sup>8</sup> As within any ecosystem, how these changing components interact with each other may hold a clue to a possible cause of these and other detrimental effects within the Shenandoah and other waterways. In the meantime, researchers continue to investigate.



#### SOURCES

- (1) [https://dep.wv.gov/WWE/watershed/wqmonitoring/Documents/Potomac-Intersex/VA\\_DeptGameFisheries\\_ShenadoahFish-Kills2006.pdf](https://dep.wv.gov/WWE/watershed/wqmonitoring/Documents/Potomac-Intersex/VA_DeptGameFisheries_ShenadoahFish-Kills2006.pdf)
- (2) <http://fosr.org/wp-content/uploads/2013/07/WQ-Shenandoah2007.pdf>
- (3) [https://dep.wv.gov/WWE/watershed/wqmonitoring/Documents/Potomac-Intersex/JamesMadisonU\\_EnvConditions\\_Shenandoah-FishKills\\_2006.pdf](https://dep.wv.gov/WWE/watershed/wqmonitoring/Documents/Potomac-Intersex/JamesMadisonU_EnvConditions_Shenandoah-FishKills_2006.pdf)
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- (8) [https://www.usgs.gov/centers/cba/science/science-summary-skin-lesions-and-mortality-fishes-chesapeake-bay-watershed?qt-science\\_center\\_objects=0#qt-science\\_center\\_objects](https://www.usgs.gov/centers/cba/science/science-summary-skin-lesions-and-mortality-fishes-chesapeake-bay-watershed?qt-science_center_objects=0#qt-science_center_objects)
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- (13) <http://pubs.usgs.gov/of/2008/1093/>
- (14) <http://onlinelibrary.wiley.com/doi/10.1897/08-417.1/abstract;jsessionid=0E539383A22FE136D70F8719580C83C9.d03t04>