Virginia Cave Owners' Newsletter

April 2016

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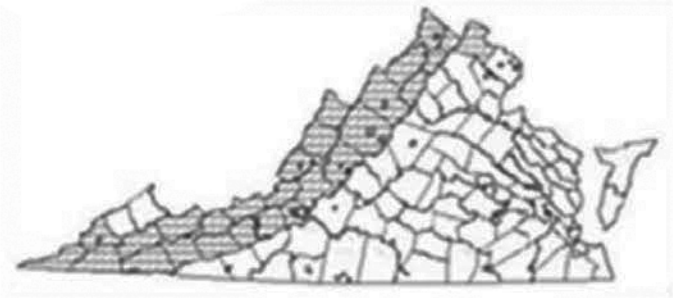

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Thanks to contributors: David Ek, Wil Orndorff, and Meredith Hall Weberg

Due to a generous grant from the Cave Conservancy of the Virginias, the Virginia Cave Board is pleased to continue offering a printed version of the *Virginia Cave Owners' Newsletter*. We hope you enjoy reading it. We'd love to hear from you regarding this issue and ideas for future issues.

Greetings and Goodbye, Virginia Cave Owners!

by Meredith Hall Weberg

I want to introduce you to the new chairman of the Virginia Cave Board, David Ek. He worked for the National Park Service for 30 years, often as a cave specialist. He was involved in cave management in his job there. He has a Masters in Geoscience, with an emphasis on watershed-scale hydro-geochemical karst processes. (You'll have to ask David exactly what that means!)

He now works in Fauquier County as the county environmental planner and water manager. He has caved all over the United States and in China. Last year, he spearheaded the Cave Board's Karst Workshop for the *Environment Virginia Symposium*. As you can see, David is truly an asset to the Cave Board. I believe I am leaving the Cave Board in very capable hands. Please welcome David as the new chairman.

I have been reappointed to the Cave Board for another term, along with Dr. Dan Doctor and John Graves. I consider it an honor to serve and am grateful to have been the chairman for the past four years.

From the Chairman: *David Ek*

Although I am the new Chairman of the Virginia Cave Board, I am fully aware and appreciative of the long history and connection the Board has had with Virginia cave owners. One of the original purposes of the Board was to provide information and support to cave owners and to find ways to address issues and concerns that they feel important. To further these goals, we would like to hear from you so that we may discuss how the Cave Board can assist you on cave- or karst-related matters.

In an effort to address questions or concerns brought up previously, this last year the Board has been busy. A few of the accomplishments include planning Cave Week activities, promotion and improvement of the Virginia Cave and Karst Trail, refinement of Virginia's karst map, the writing of a frequently asked questions (FAQs) document regarding the placement of natural gas pipelines on karst (now posted on the Board's website), and the planning and hosting of a *Building on Karst* workshop.

The *Building on Karst* workshop was an all-day workshop held at the Virginia Military Institute near Lexington on March 31, 2015. The focus of this workshop was to provide practical and applied help to engineers, planners, local governments, and other interested individuals who live or work on karst landscapes. Comments from participants indicate that it was well received and a success. Therefore, the Cave Board is working closely with Virginia's Department of Conservation and Recreation (DCR) staff in the planning a follow-up karst workshop on April 5, 2016.

Some of you may have met or spoken with Larry Smith over the years. For more than two decades, Larry was DCR's liaison to the Cave Board, and the direct means to contact the Board. Larry retired several months ago. The Cave Board was proud to work closely with Larry over the years. We will miss him. His position has been filled; Rob Evans assumed his new responsibilities in January.

I highly encourage you to contact one of the Cave Board members. Only by hearing directly from you may we better understand what your specific cave-related issues, concerns, and questions are, and figure out how we may best provide the service that you deserve. You may contact the Board through DCR's Rob Evans, at Rob.Evans@dcr.virginia.gov, or by phone at 804-371-6205. I look forward to hearing from you.

What's Living in Your Cave?

By Wil Orndorff, Virginia DCR Natural Heritage Program
Photos by Matt Niemiller and Wil Orndorff

When people think of life in caves, invariably three things come to mind: bats, bears, and snakes. Of these three, only bats are regularly encountered in Virginia caves, where they can occur as single individuals or in clusters of a thousand or more. Bears do not typically hibernate in caves in Virginia. Snakes are rare except near rocky, south-facing cave entrances or when accidentally washed into a cave by floodwaters.

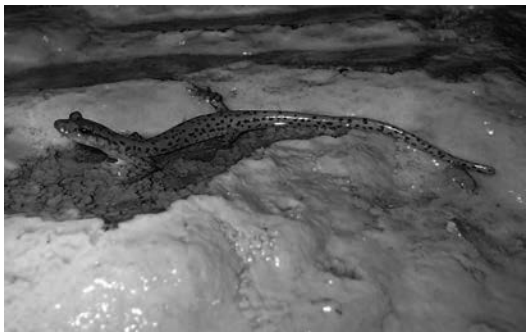
Eight bat species use caves in Virginia during all or part of the year. Three of the most common of these eight species, the little brown bat (*Myotis lucifugus),* the tricolored bat (*Perimyotis subflavus)*, and the Northern bat (*Myotis septentrionalist)*, have suffered over 95 percent declines in population since 2008 as a result of White-Nose Syndrome (WNS), a bat-specific fungal disease thought to have been introduced from abroad by human activity, resulting in one of the most aggressive wildlife epidemics in history. Other species have suffered as well, but to a lesser extent. Fortunately, we still see small numbers of even the most affected species in caves and on the landscape, and there is hope that their populations will recover, albeit slowly since most bat species only give birth to a single "pup" per year. More details on Virginia's bats and WNS can be found online at www.dcr.virginia.gov/natural-heritage/karst-bats, www.dgif.virginia.gov/wildlife/bats/facts/, and www.whitenosesyndrome.org.

A few other mammals are found in caves in Virginia, including Alleghany wood rats (previous column), raccoons, mice, coyotes, and occasionally bobcats. None of these species depend exclusively on caves, and are generally termed trogloxenes or "cave guests." Of these species, Alleghany wood rats are probably the most strongly associated with caves, establishing elaborate nesting areas and food storage caches that have led folks to refer to them as "pack rats." Unfortunately, diseases carried by raccoons are deadly to wood rats, and their numbers have declined as a result.

Birds will commonly nest near cave entrances, and it's hard to find a cave entrance in Virginia that doesn't have an Eastern phoebe nest tucked in a nook on the wall or ceiling. While less common, barn owls will set up shop in rocky cave entrances, sometimes decimating local bat populations.

Though snakes and other reptiles have little use for limestone caves, the same cannot be said of amphibians, especially salamanders. Slimy, spring, seal, dusky, long-tailed, and cave salamanders are all common in Virginia caves, and several other species may be encountered near cave entrances. However, salamander species known from Virginia are neither limited to caves

nor particularly adapted for cave life. But since many will spend their whole life cycle (or most of it) within the cave, biologists refer to them as troglophiles or "cave lovers." (This term could probably apply as well to several members of the Virginia Cave Board!)



Fish are commonly found in cave streams in Virginia, but only surface species that wash in from sinking streams or swim upstream from springheads. The closest populations of blind cave fish occur in central Tennessee and Kentucky.

When it comes to number of species (one way ecologists measure biodiversity), invertebrate species such as insects, millipedes, spiders, and crustaceans rule in the subterranean realm. Dozens of surface-dwelling species like cave crickets, red-headed flies, spiders, and daddy longlegs congregate near cave entrances, but the true biodiversity lies deeper within. A recent publication by former Virginia Cave Board members Dr. John Holsinger, Dave Hubbard, and Dr. Dave Culver; DCR staff Chris Hobson; and this author catalogs 121 cave-limited terrestrial and 47 cave-limited aquatic invertebrate species known from Virginia's caves. Most of these species lack both eyes and pigment, and have a variety of other adaptations for life in a dark environment with limited energy resources. Most of these species are known from a very small area and typically one or a handful of caves; the majority are known only from caves in Virginia.

And the list does not even include several dozen species new to science that have yet to be assigned formal names! Some groups are particularly diverse. For example, 31 different described species, as well as several undescribed species, of cave-adapted beetle are known from Virginia caves.

Ironically, the most well-known cave adapted invertebrates—cave crayfishes—are not known from Virginia. Although crayfishes are common in Virginia cave streams, they are all surface-dwelling species that happen to also use caves. However, other cave-adapted crustaceans, especially amphipods (a.k.a. scuds, photo above) and isopods (sow bugs, photo at top of next column) account for the majority of aquatic biodiversity among Virginia's cave-limited animals.

A great place to learn more about the biodiversity of caves in the Appalachian region, including Virginia, is the website of the US Fish and Wildlife Service's Appalachian Landscape Conservation Cooperative, which recently completed a study of cave and karst biodiversity region-wide. Visit http://applcc.org/research/applcc-funded-projects and click on "Classification and Mapping of Cave and Karst Resources." Here, you will be able to learn more about spelean biodiversity through videos and reports that can be viewed or downloaded to your computer. This project was led by long-time Virginia Cave Board member, Dr. Dave Culver, and current Cave Board member, Dr. Dan Doctor, was a critical part of the research team.

What is likely to have even higher species diversity than the invertebrates are the microbes that live in caves, and that most likely form the base of many aquatic and terrestrial food chains. Pioneering scientists from the western United States, including Dr. Penny Boston of New Mexico Tech, Diana Northrup of the University of New Mexico, and Hazel Barton of the University of Akron are providing some early glimpses into the exciting and exceptionally diverse world of subterranean microorganisms. In Virginia caves, green-yellow and white bacterial "mats" are common on cave walls, and someday soon we hope to better understand the species that comprise them as well as the basis for their symbiotic relationships.

So, back to the question at hand: What's living in your cave? Well, the short answer is "We don't know, but probably a lot." The specifics depend on where the cave is and how closely connected it is to surface water and other nutrients, such as leaves, sticks, et cetera. Also, the nature and extent of cave passages may exert some influences. Different types of animals are found in pools, streams, and deep lakes, for example. Most caves in Virginia have never had a biologist set foot in them, and even those that were visited have not been studied thoroughly. If you're interested in knowing more about the biology of your cave or caves, please contact me at Wil.Orndorff@dcr.virginia.gov or leave your name and phone number with the Virginia Natural Heritage Program at 804-786-7951. I can let you know the contents of any biological records we have for your cave, and if you wish, we can set up a time for me to come and investigate what's living in your cave.

Virginia Cave Week is April 17–23, 2016. See http://vacaveweek.com/index.html for more details. Our theme this year is ***The HOLE Truth About Sinkholes!*** The Virginia Cave Board and the Virginia Region (VAR) of the National Speleological Society Conservation Committee want to know if you have a sinkhole with trash in it that you'd like cleaned out. Please contact Meredith Weberg at merecaver@yahoo.com for more information.

Building on Karst Workshop 2016

For the second year in a row, the Virginia Cave Board and the Virginia Department of Conservation and Recreation (DCR) are sponsoring a *Building on Karst* workshop the day before the 2016 *Environment Virginia Symposium*. Both the workshop and symposium will be held at the Virginia Military Institute in Lexington, Virginia. The Karst Workshop will be from 9 a.m. to 3 p.m. on Tuesday, April 5, 2016.

Speakers range from employees of DCR and the Virginia Department of Mines, Minerals, and Energy to geologists with private firms. All are experts in their fields. Talks range from *Transportation Design and Management Within Karst Terranes of Virginia* to *Characterizing Karst Aquifers*. Two speakers will go over case studies. One speaker will discuss *Karst: Fitting Regulatory Square Pegs Into Round Holes*. All six speakers will participate in a panel discussion at the end of the workshop. There will be plenty of opportunity for audience participation and questions.

As owners of Virginia caves, you might find this workshop valuable. For more information, contact either Meredith Weberg of the Cave Board (merecaver@yahoo.com) or Major Kim Connolly of VMI (connollykv@vmi.edu). Contact Derek Pinkham about registration (pinkhamdj@vmi.edu). The *Environment Virginia Symposium* website is here: http://www.vmi.edu/Content.aspx?id=10737419910.

For more information, please contact the Virginia Department of Conservation and Recreation, Division of Natural Heritage, 16th floor, 600 East Main Street, Richmond, VA 23219, or one of the members of the Virginia Cave Board: Ms. Michele Baird, Mr. Robert Denton, Dr. Daniel H. Doctor, Mr. David Ed, Mr. John Graves, Dr. John Haynes, Mr. Richard Lambert, Mr. Steve Lindeman, Ms. Marian McConnell, Ms. Janet Tinkham, and Ms. Meredith Weberg.

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