

The Virginia Cave Board: The First Fifty Years (1966–2015)

Thomas Lera
Past Chairman, Virginia Cave Board
600 East Main Street, 16th Floor
Richmond, VA 23219
(frontier2@erols.com)

Abstract

This paper focuses on the history of the Virginia Cave Protection Act, the Virginia Cave Board, and the activities taken to protect caves and karst resources in Virginia.

The Virginia Cave Protection Act was signed into law in 1966. In December 1978, the Virginia Commission on the Conservation and Use of Caves published a 43-page report with several improvements for the Virginia Cave Protection Act and presented it to the Governor and the General Assembly. Three of these major recommendations were banning speleothem sales, limiting cave owner liability, and establishing a permanent Virginia Cave Commission of 11 members each to serve three-year staggered terms.

In 1979, the Virginia Cave Protection Act was revised based on the report; however, Virginia cave and karst resources continued to be threatened with vandalism, pollution, and poorly planned development. More recently bats hibernating in caves throughout Virginia have become infected with white-nose syndrome (WNS). In order to preserve the unique archeological, biological, economic, educational, geological, historic, recreational, and scientific value of Virginia's caves and karst areas, Cave Board will continue to conserve Virginia's cave resources.

In 1981, John Wilson, the first chairman, stated the goals fall into four broad areas—collecting and maintaining a complete data file on cave resources within the Commonwealth; providing information to the public about caves, their value, and the laws protecting them; advising and assisting public agencies and private landowners making cave management and land use decisions; and studying those aspects of cave ownership and management that are directly affected by public policy” (Wilson, 1981). This statement continues to be the mission of the Virginia Cave Board.

Over the past 50 years, there have been many important court cases in Virginia resulting in countless state and federal actions. The difficulty apprehending and prosecuting cave vandals demonstrates the inadequacy of current penalties. More prosecutions and harsher penalties will invariably serve as a deterrent to future potential vandals. Complex State projects, highway widening, and the construction of new prisons and airports places additional pressures on karst areas.

The Virginia Cave Protection Act

The first Virginia Cave Protection Act became law on March 2, 1966, when House Bill 24 was enacted and became §18.1-175.1 of the 1950 Code of Virginia. It was clear the intention of the legislators was to protect Virginia Cave resources, especially those found in the commercial caverns bringing tourist dollars to the State. With the 1975 recodification of Title 18, the Cave Protection Act was moved to §18.2-142 under “Damaging Caverns or Caves” and contained two parts:

- (a) It shall be unlawful for any person, without the prior permission of the owner, to willfully and knowingly, break off, crack, carve upon, write or otherwise mark upon, or in any manner destroy, mutilate, injure, deface, mar, or harm any natural material found within any cave or

cavern, such as stalactites, stalagmites, helictites, anthodites, gypsum flowers or needles, flowstone, draperies, columns, or other similar crystalline mineral formations or otherwise; to kill, harm or disturb plant or animal life found therein; to discard litter or refuse therein, or; otherwise disturb or alter the natural condition of such cave or cavern; or break, force tamper with, remove, or otherwise disturb a lock, gate, door, or other structure or obstruction designed to prevent entrance to a cave or cavern, without the permission of the owner thereof, whether or not entrance is gained.

(b) Any violation of this section shall be punished as a Class 3 - Misdemeanor. (Changed in 1975 from a full description to a "Class 3 - Misdemeanor" - A fine not exceeding \$500 or confinement in jail not exceeding 12 months.)

By 1975, John Wilson, with the help of Virginia State Delegate Ralph L. "Bill" Axselle, set up a committee to study the problems of cave conservation and the role of the State in dealing with it. The new committee was composed of cavers, a legislator, representatives of several appropriate state agencies and commercial cave owners in Virginia. After two meetings, it became apparent the state agencies were not in favor of taking on additional responsibilities because they felt the General Assembly would not fund anything of this nature.

In January 1978, members of the Virginia Region of the National Speleological Society, alarmed by the accelerating degradation of Virginia's cave resources, again asked the Honorable William Axselle of Richmond to introduce legislation into the Virginia General Assembly to create a commission to study the conservation of cave resources. An amended House Joint Resolution No. 10 was passed and an 11-member Commission on the Conservation of Caves was appointed by Governor John Dalton to "study all problems incidental to cave use, protection, and conservation in Virginia."

The vote in the House was 76 to 7. It was amended by the Senate and passed 40 to 0; the House then passed the Senate's version. Since resolutions do not require the Governor's signature, the Commission was approved on the final day of the 1978 General Assembly Session because Delegate Axselle convinced Chairman John Warren Cook, Speaker of the House and Chairman of the Rules Committee to give the Commission a try (Wilson, 1981).

In December 1978, the Commission completed its study and submitted its findings to the Governor and General Assembly as the 1979 Report of the Virginia Commission on the Conservation of Caves to the Governor and the General Assembly of Virginia, House Document No. 5. This report documented the rapid deterioration of Virginia's caves as unique archeological, biological, economic, educational, geological, historic, recreational, and scientific resources. The Commission recommended 1) an inventory be made of archeological resources in Virginia, 2) a permanent Cave Commission be created, and 3) an improved Cave Protection Act enacted giving broader protection to cave resources, including the banning of speleothem sales and limitations of cave owner liability. (Department of Conservation and Economic Development, 1979)

The 1979 Session of the General Assembly, responding to the recommendations of the Commission on the Conservation of Caves, created the Virginia Cave Commission and enacted a new comprehensive Cave Protection Act with two basic objectives. The first was to protect Virginia cave resources from vandalism and degradation; the second, to protect the cave owner's interest in his property. Violations of the Act were designated as Class 3 - Misdemeanors, punishable by a fine of up to \$500.

Under the provisions of this new law it also became illegal to remove, mar, or otherwise disturb any natural mineral formation or sedimentary deposit in any cave without the owner's express prior, written permission. Although collection of mineral specimens was not completely prohibited, it was the intent of the Commission that future collection be as minimal, selective, and scientific as possible.

The Act was designed to preserve the beauty of Virginia caves and prevent them from being destroyed by indiscriminate collection and/or vandalism. It also became illegal to sell, or export for sale, speleothems

(mineral formations or deposits found in caves). The General Assembly felt by eliminating the market, much of the incentive for theft would also be eliminated.

The Commission's report stressed the uniqueness of caves as natural laboratories for the investigation of biologic processes. Natural organisms found in caves live in fragile environments where even small disturbances by humans can produce major changes in cave ecosystems. Many of the more than 200 animal species found in Virginia caves are restricted to small geographic areas, occur in very small populations, and have been placed on the Endangered Species List. The Cave Protection Act therefore prohibited disturbing or harming any cave organism.

The pollution of groundwater, as a result of the dumping of garbage, sewage, dead farm animals, and toxic wastes into caves and sinkholes, had long been a problem within the State. This now became illegal without the express prior, written permission of the owner.

The new Act protected archeological resources by requiring a permit from the Virginia Historic Landmarks Commission and written permission from the cave owner, before excavating, removing, or disturbing any fossils, historic artifacts, or prehistoric animals. It also made it illegal to break, force open, tamper with or deface any gates, locks, signage, and other barriers installed by cave owners for cave access control. The cave owner was also exempted from liability for any injury sustained in his cave as long as he had not charged an admission fee.

In 1980 the Cave Commission was made a permanent State agency as part of the Department of Conservation and Economic Development. However, since no funding was provided, interested cavers formed the Virginia Cave Conservancy to provide a means of funding to support cave acquisition, management, and research, as well as to assist organizations such as the Virginia Cave Commission.

Legislative History

A brief summary of the legislative history of the Cave Protection Act is:

- House Bill 24 created §18.1-175.1, "Damaging Caverns or Caves," on March 2, 1966
- House Bill No. 1800 introduced by Representative Axselle to create a Virginia Cave Commission (Title 9, Chapter 24.1, §9-152.1 through 152.5) became law on October 28, 1978
- House Bill No. 1220 introduced by Representative Axselle to create the Virginia Cave Protection Act (Title 10, Chapter 12.2, §10-150.11 through 10-150.18) became law on March 15, 1979, and repealed §18.2-142
- House Bill No. 240 introduced by Representatives Murray, Giesen, Axselle, and Michie reestablished the Cave Commission and amended its powers and duties. (January 21, 1980)
- House Bill No. 92, in 1982 introduced by Murray, Axselle and Van Yahres changed the penalties for vandalism, pollution, and the sale of speleothems from a Class 3-Misdemeanor to a Class 1-Misdemeanor and added a section on paleontology. (Class 1-Misdemeanor is a fine not exceeding \$2,500 or confinement in jail not exceeding 12 months, either or both.)
- Name Change from Virginia Cave Commission to Virginia Cave Board, effective July 1, 1985

The Virginia Cave Protection Act was amended several more times, as late as 1989, and now clearly defines the powers and duties of the Cave Board; permit issuance for excavation and scientific investigations; vandalism, pollution, disturbances, sale of speleothems and their penalties; and the liability of land owners. Additional general liability protection for cave owners is afforded through §29.1-509, "Duty of care and liability for damages of landowners to hunters, fishermen, sightseers, etc.," of the Code of Virginia.

The Virginia Cave Board

The Virginia Cave Board (VCB), originally known as the Virginia Cave Commission, was established by the Virginia General Assembly in 1979. The Board is composed of 12 members. Eleven are appointed by the Governor for four-year terms and are selected based on their activities and knowledge of the conservation, exploration, study, and management of caves. The Director of the Virginia Department of Historic Resources (DHR) serves as the twelfth member—*ex-officio*. By agreeing to serve, the members have accepted the responsibility to:

1. Protect the rare, unique, and irreplaceable minerals and archaeological resources found in caves
2. Protect and maintain cave life
3. Protect the natural groundwater flow in caves from water pollution
4. Protect the integrity of caves that have unique characteristics or are exemplary natural community types
5. Make recommendations to interested state agencies concerning any proposed rule, regulation or administrative policy that directly affects the use and conservation of caves in this Commonwealth
6. Study any matters of special concern relating to caves and karst.

(*Code of Virginia §10.1-1002.B* found at [Virginia Cave Protection Act](#))

The VCB and the Virginia Department of Conservation and Recreation (DCR) are active throughout Virginia in the conservation and protection of caves, karst, and cave life and in environmental education. The following are many of their past and current projects.

Enforcement Actions

Vandalism

The Virginia Cave Board (formerly the Cave Commission) has been involved in several court cases regarding vandalism and has worked with various communities to protect cave resources.

In 1981, local students illegally entered the fenced Barterbrook Spring Cave. The owner had the students arrested; however, rather than go to court, their parents paid for a new fence. (Virginia Cave Commission Minutes, March 29, 1981)

In another case, students from James Madison University removed speleothems from Fountain Cave. In their defense, they argued they did not know it was illegal since there was no sign at the cave. They were sentenced to complete a special project at the University to benefit caves that included publication of an article in the JMU newspaper about the new Cave Protection Act and the importance of preventing cave vandalism. (Virginia Cave Commission, December 6, 1981)

In 1984, a man was apprehended inside Perkins Cave after he had damaged the gate and entered the cave without authorization. The judge sentenced him to 10 hours of public service installing cave protection signs in lieu of a \$100 fine. (Virginia Cave Commission, June 2, 1984)

In Southwest Virginia, two students allegedly entered a cave to collect speleothems for a science project. They saw a sign that said in large letters, “THIS” CAVE is protected.” They left, found another cave without a sign and collected their speleothems. Again, the judge sentenced them to community service. As a result of this case, the Virginia Cave Commission changed its signs from “THIS CAVE” to read “ALL CAVES” are protected. (Virginia Cave Commission, June 2, 1984)

In the fall of 1985, there was a break-in at Madison's Saltpetre Cave in Augusta County. The cave owner prosecuted the vandals and they were sentenced to 20 hours of community service. (Virginia Cave Board, May 10, 1986)

Commercial caves have also had their share of vandalism. In 1981, Grand Caverns was closed for two weeks after six Boy Scouts, camping nearby with their troop from Silver Spring, vandalized the Caverns. They were arrested, released on \$500 bond, and sentenced to community service after their hearing. Massanutten Caverns had its steel-plated door smashed in; however, there were no arrests (Collins, 1981).

Many, but not all, of the cases lacked signage to deter vandalism. Even today, only a 100 of 370 significant caves in Virginia have cave protection warning signs.

Project Review

Between 1981 and 1984, the Commission became involved in a lengthy discourse with the Town of Grottoes regarding a proposed water tank and pipeline on Cave Hill. Many concerns arose from the impending blasting and jack hammering, which could potentially cause damage to speleothems in Grand Caverns, the collapse of cavities, pollution and siltation of the Cave Hill aquifer, a change in groundwater flow, and failure of the water storage tank due to site conditions. The number one concern was the potential effect on the Madison Cave Isopod (*Antrolana lira*), which was on the Endangered Species List of the Fish and Wildlife Service. During this same review period, a sinkhole was inadvertently filled and federal funding was delayed. Additional studies were conducted. All concerns of the Cave Commission were addressed by the town and their engineers, and as a result the water tank was built (Shetterly, 1983 and 1984).

Deed Interpretation

In 1985, a group of students and their professor from Lincoln Memorial University (LMU) in Tennessee were photographed removing speleothems at Cudjo's Cave (*Home Daily of the Cumberlands*, Middlesboro, Kentucky, November 18, 1985), resulting in a lengthy legal discussion over exceptions in the property deed.

Initially on April 3, 1947, property had been deeded from LMU to the Commonwealth of Virginia with two relevant exceptions. The first reserved for the grantor (LMU) a parcel of about 10-acres, which included the entrance to Cudjo's Cave. The second exception reserved for LMU the exclusive right to operate and use Cudjo's Cave, even though the cave extended beyond the 10-acre parcel reserved by the first exception.

On May 4, 1950, by a second deed, LMU granted the Commonwealth the 10-acre tract reserved by the first exception to the 1947 deed, and expressly released any further rights, title, and interest of the cave based on its previous title to the reserved tract. However, in giving up its title to the property, LMU reserved the right to "explore, use, occupy, maintain, develop, operate, and exhibit for profit or otherwise," the caves underlying the tract.

Subsequently on December 1, 1953, the Commonwealth deeded the property, subject to LMU's easement, to the United States for inclusion in Cumberland Gap National Historic Park. The easement reserved by LMU was conditioned expressly upon the fact the property was to be included in the National Historic Park. LMU referred to the 1950 deed as a condition of the exclusive right to operate and exhibit the cave. The Commonwealth's 1953 deed to the U.S. included the easement reserved by LMU.

In letters received by the Virginia Cave Board, one attorney stated:

"Applying the ordinary rules of construction to the lease terms in question, it appears that the intent of the parties was to transfer all title and rights to the cave to the Commonwealth, subject to the easement reserved to LMU to explore, use, occupy, maintain, develop, operate and exhibit" the cave.

“The easement, in turn, is limited by the language requiring compliance with all National Park Service (NPS) requirements and regulations, as well as by language indicating a clear intent that the cave be used in a manner consistent with park objectives. Reading the terms together, the lease ensures that LMU’s exclusive rights, as set out therein, are not to be barred by the fact that the cave is on National Park property – e.g. LMU does not have to allow public access, cannot be prevented from entering or using the cave, and need not compete with other concessionaires for the privilege of showing the cave for profit. They cannot, however, undertake those activities in a way that would damage, destroy or deface the caves in a manner contrary to park regulations.

“This is the only interpretation consistent with the fact that the NPS owns the cave, while LMU owns only an easement giving it certain access and use rights. This is not a typical holding case where the original owner retains the fee or other estate in the land. There is nothing in the language of the easement indicating the property owner intended to allow the easement holder to damage or deface its property, and courts will not construe an easement in such fashion absent express language.

“In sum, the deeds construed together require LMU to comply with all NPS cave protection regulations, including 36 C.F.R. § 2.1(a)(1)(iv), which prohibits possessing, destroying, impairing, defacing, removing or disturbing any cave formation or part thereof. The National Park Service has full authority to enforce those regulations against LMU consistent with the term of the deed.” (Personal Correspondence from Timothy G. Hayes, Thomas and Fiske, P.C., March 25, 1986)

Another attorney, Linda Loomis, wrote, “In this opinion, if the language of the deeds is controlling, the National Park Service does not have the authority to prevent resource removal. In brief, the deed granting the land to the United States Government reference specific exemptions benefitting the grantor and former grantors of the property. Among those benefits is the use and exploitation of the cave. The language is broad enough to be interpreted to allow the removal of speleothems.” (Personal Correspondence from Linda Loomis, National Parks and Conservation Association, February 24, 1986)

It was clear to the VCB that, with these exceptions, the land deeded to the United States needed to be clearly understood before the Federal Government and the Commonwealth of Virginia could consider enforcement actions. (Virginia Cave Board, January 18, 1986)

Resource Preservation

Native American Burial Sites

Bull Thistle Cave, the best preserved example of a burial pit cave known in Southwest Virginia and listed in the National Register of Historic Places, was used by Native Americans for the burial of their dead during the Late Woodland Period (A.D. 900–1700) and contained archaeological remains in an excellent state of preservation. At least 11 individuals were represented among the bones exposed on the surface of the cave. The structure of the talus cone below the pit entrance suggested more human remains and artifacts were probably buried there; however, no evidence of previous excavations or disturbances was observed. Further scientific study of the cave deposits yielded important new information about the paleo-demographic characteristics and cultural practices of Virginia Native Americans. The removal of remains from the cave was covered under §10.1-1003 in the archeological section of the Act, and resulted in the development of a management plan. (Virginia Cave Board, September 20, 1986)

In August 2001, there was a break-in at Adams Cave and human remains removed. Local students were apprehended, prosecuted, and each sentenced to 10 hours community service. (Virginia Cave Board, September 8, 2001)

In 2002, Native American remains removed for research purposes from Bone Cave in Lee County were re-interred at a site in Amherst County on land owned by the Monacan Indian Nation. The unexcavated remains are still in the protected Bone Cave. (Virginia Cave Board, November 23, 2002)

Archeological Investigations

The Act protects archeological resources by requiring a permit from the Virginia Historic Landmarks Commission and written permission from the cave owner before excavating, removing or disturbing any fossils, historic artifacts, or prehistoric animals. DHR's position on when a cave permit is necessary is: excavation for the purposes of cave exploration should be permissible without a permit provided that (1) there is no willful intent to recover or disturb archaeological remains or prehistoric or historic features, and (2) all excavation ceases immediately if archaeological remains or prehistoric or historic features are encountered during the excavation, and DCR/DHR should be notified of the discovery. Excavation should not resume until a permit from DCR with DHR comment is obtained and a qualified professional archaeologist is retained to inspect the discovery. If human remains are encountered, other sections of states code, including the Virginia Antiquities Act, must be satisfied. Information can be found at [Virginia Department of Historic Resources](#)

Endangered Species

In 1990, it was discovered that the Thompson Cedar Creek and the Batie Creek watersheds in the Cedars Karst Area in Lee County had been polluted for more than three years with sawdust debris dumped by the Russell Lumber Company. The sawdust had accumulated in immense ridges 20 to 30 feet deep and 200 feet across, and acres of forest were covered with it. The surface and subsurface water resources had become a black viscous flow that was sinking into Thompson Cedar Creek and eventually to the Powell River.

The caves of Lee County host a diverse and abundant fauna of cave-adapted invertebrates. Among them is Thompson Cedar Cave, where, in the 1960s, cave biologists Dr. John Holsinger and Dr. David Culver first discovered the Lee County Cave Isopod (*Lirceus usdagalun*). (Virginia Cave Board, June 9, 1990)

Batie Creek was included on the Environmental Protection Agency's (EPA) §303(d) list of impaired streams and through the combined efforts of DCR: the Virginia Department of Mines, Minerals and Energy; the U.S. Fish and Wildlife Service; the Tennessee Valley Authority; Curtis Russell Lumber Company; and the Cave Conservancy of the Virginias, a recovery plan was developed.

By 2005, the restoration of the Batie Creek Watershed was complete. Accumulations of sawdust that had generated toxic leachate were removed and mixed with lime and fertilizer as a beneficial soil additive on nearby coal mine reclamation projects. Dissolved oxygen levels that had been near zero, returned to normal levels. The Lee County Isopod listed as endangered due to its extirpation from the cave in the late 1980s, also recovered, although not to pre-impairment levels. (Virginia Cave Board, March 19, 2005)

New airport and prison plans were also in development in Lee County. These projects effected significant biological resources including an endemic millipede; several rare cave invertebrates; and plants, including a new species of clover found only in Virginia. The Virginia Cave Board worked with the County Board resulting in the airport expansion but not the construction of the prison.

In June 1993, VCB recommended a change to the proposed right-of-way for Route 58 in the vicinity of Young-Fugate Cave, which had over 5,800 feet of surveyed passages considered to be biologically, geologically and hydrologically significant. A number of rare cave invertebrates, including the trechine beetle (*Pseudanophthalmus holsingeri*), a dipluran (*Litocampa cooki*), two aquatic crustaceans, and the Gray Bat (*Myotis grisescens*) had been noted. The proposed right-of-way could well have led to future subsidence and eventual collapse of the roadbed into the subterranean passages. The result of numerous meetings was a re-routing of the right-of-way. (Virginia Cave Board, June 19, 1993)

Rocky Hollow Cave, located on the west slope of Powell Mountain, and home to the endangered Indiana Bat (*Myotis sodalis*) was vandalized. A gate installed at the cave entrance by the U.S. Forest Service in the late 1990s to protect hibernating Indiana Bat populations was breached via a tunnel near the western end of the cave entrance. Numerous patches of graffiti in pink, white, and orange paint were found inside. Assuming the May 28, 2006, graffiti date was correct; it is unlikely the vandals caused any disruption or negative effect to the Indiana Bat, as it was well past its winter hibernation. The VCB requested the assistance of the Wise County Sheriff in apprehending the perpetrators of these violations.

One individual was apprehended and, based on the recommendation of the VCB, was ordered by the judge to clean up the graffiti, which resulted in 10 hours of community service. It is important to note, when undertaking an enforcement action, the statute of limitations must always be considered. In Virginia this statute is one year. (Virginia Cave Board, March 24, 2007)

In 2011, the VCB and U.S. Fish and Wildlife Service met with the Town of Grottoes to discuss a proposed easement and water line route on the Cave Hill, LLC property that includes Grand Caverns and Madison Cave. The concern was the impact pipe leakage of chlorinated water and other uses resulting from the easement could have on the state and federally protected endangered species in Madison Cave. (Virginia Cave Board, February 11, 2012)

Bats and White-Nose Syndrome

Since 2008 when white-nose syndrome (WNS) was first established in Virginia, the VCB has been participating in the studies, surveys and reporting on this disease which now affects bats in all cave and karst regions of Virginia. Populations of Little Brown bat (*Myotis lucifugus*), Tricolored bat (*Perimyotis subflavus*, formerly known as the Eastern pipistrelle), and Northern Long-eared bat (*Myotis septentrionalis*) have been reduced by over 90 percent. The federally endangered Indiana bat has also been affected, as has the Eastern small-footed bat (*Myotis leibii*), but low population numbers and a lack of pre-WNS data make it nearly impossible to quantify effects.

The Big Brown bat and Virginia Big-eared bat (*Corynorhinus townsendii virginianus*) showed no change in numbers and the Gray bat, which in Virginia is known only in the Upper Tennessee River Basin, was not experiencing die-offs despite several years of exposure to the pathogen.

On October 11, 2011, Dr. David Blehert (microbiologist at the USGS National Wildlife Health Center) has stated: “While our study confirmed that *Geomyces destructans* [now known as *Pseudogymnoascus destructans*] is spread bat-to-bat, it is also important to note that virtually all pathogens, especially spore-producing fungi, are spread by multiple routes. This is the reason that in an effort to further control the spread of white-nose syndrome, resource management agencies have implemented universal precautions, including limiting human access to sensitive environments occupied by bats, decontaminating equipment and clothing moved between these environments, and restricting the movement between sites” (Lorch, et. al., 2011 and News Release, 10/26/2011).

The VCB, the only such State organization to establish statewide procedures, developed new “Virginia Cave Board Recommendations Regarding Caving and White-Nose Syndrome (April 30, 2013),” which are revised as needed, and has posted them online at [White-Nose Syndrome](#). (Virginia Cave Board, November 19, 2011)

Education

Karst Protection

By the early 1990s, it became apparent Virginia needed to protect karst landscapes. Twenty-seven Virginia counties depend heavily on karst aquifers for water supply. Industrial, agribusiness, and rural residential development were placing increasing stress on karst aquifers already affected by traditional agricultural land

use. The problem was convincing governmental agencies and local citizens of the need for karst groundwater protection.

Project Underground

The Virginia-based Project Underground curriculum brought karst issues into primary and secondary school classrooms, as well as to environmental educators at museums, state parks, and Soil and Water Conservation Districts. Numerous presentations and workshops have helped planning district commissions, local governments, and state and federal agencies create new standards and ordinances protecting karst watersheds. Twenty-five years ago most citizens in Virginia's limestone regions had never heard the word "karst." Today, awareness of karst is widespread, and stakeholders are taking concrete steps toward karst protection. (Zokaite, 2003).

Environmental Project Review Process

Caves designated as significant by the Virginia Speleological Survey (VSS) and the VCB, following the provisions of the Virginia Cave Protection Act of 1979, are treated as natural heritage resources during the project review process. In 2000, the Data Committee of the Virginia Cave Board was dissolved and the Board officially delegated maintenance of the Significant Cave list to VSS, which had been a crossover between Cave Board Management and the VSS Directorate. The project review office in the Virginia Heritage Program has screened hundreds of projects over the last two decades for potential effects to caves, karst, and associated biological resources. Successful ongoing implementation of this process depends on a partnership between the Natural Heritage Program and the Virginia Cave Board (Orndorff, et.al., 2005).

Virginia Cave Owners' Newsletter

A publication of the VCB is distributed to over 1,100 landowners in Virginia who have caves on their property. This newsletter's intent is to educate the owners about caves, their contents, and groundwater, especially with regard to contamination of springs and wells, as well as sinkhole contamination in karst regions. To read past newsletters visit [Virginia Cave Owners' Newsletters](#) .

Virginia Cave and Karst Trail

The Virginia Cave and Karst Trail (VCKT) is a collaborative project between VCB and DCR. The goal of the driving and walking trail program is to educate people about these sensitive environments and promote their protection. VCKT features commercial caves and karst landscapes including sinkholes, sinking streams, springs, and caves.

It has more than a dozen stops where visitors can learn about and appreciate outstanding caves and karst features. A Karst Trail was developed as an Eagle Scout project at Skyline Caverns. The Civil War/Karst Interpretive Walking Trail at Hupp's Hill is maintained by local organizations. The 26-mile Cowpasture Karst Trail was developed by VCB Board Member Rick Lambert. In addition, new segments of the Cave and Karst Trail are being considered for the Cedars Natural Area Preserve in Lee County and other locations in western Virginia. Information can be found at [Virginia Cave and Karst Trail](#).

Virginia Cave Week

The VCB responds to various groups and individuals and participates in educational events, such as Virginia Cave Week. Questions from the public are answered and literature is distributed. VCB's [Virginia Cave Week](#) website, hosted by "Friends of the Cave Board", includes information on cave and karst conservation, commercial cave participation, links to cave conservation organizations, and lesson plans with bibliography for use by classroom teachers. Previous Virginia Cave Week and Themes are seen in Table 1 below:

Table 1. Virginia Cave Week and Its Theme

2000	Experience the Wonder–Underground, October 16–22, held in conjunction with Earth Science Week
2001	Experience the Wonder–Underground, October 7–13
2002	Cave Biodiversity, October 13–19
2003	(not held)
2004	The World Beneath Our Feet: Subterranean Life and the Domain Below the Earth, October 10–16
2005	Water (and new State bat featured), October 9–15
2006	Be A Citizen Scientist, October 8–14
2007	(not held)
2008	Karst Resources and Watersheds, April 20–26, now held in conjunction with Earth Day (April 22)
2009	Virginia Show Caves, April 19–25
2010	What’s Killing Our Bats, April 18–24
2011	Bats in the Web of Life, April 17–23
2012	Hike the Karst Trail, April 22–28
2013	Virginia Cave and Karst Trail, April 21–27
2014	On “Hollowed” Ground, April 20–26

Source: Virginia Cave Board Minutes and personal email from Larry Smith, Natural Area Protection, DCR, Natural Heritage Program, March 20, 2014

Professional Consultation

VCB members assist federal and state agencies, local governments, and private groups, such as The Nature Conservancy, on setting conservation priorities for cave and karst ecosystems, and making sound decisions on project sites and compatible development in karst landscapes. They also worked with DCR staff in the revision of the Virginia Stormwater Management Guidelines.

Serving in its role as an advisory board, the VCB consults with various agencies and local governments on Environmental Reviews and has participated in discussions on state regulations regarding the importance of the protection of caves and karst. The Board has worked with the Department of Historic Resources in permitting the excavation and removal of any archaeological, paleontological, prehistoric, and historic features in a cave; the Virginia Department of Game and Inland Fisheries (DGIF), the state agency that owns the most caves in Virginia, on the gating of significant caves where appropriate; and DCR and DGIF on preparing management plans for state-owned caves.

Interpretation of caves, karst and groundwater at commercial caves is conducted by VCB members working with owners, managers, and lead guides in order to improve the manner in which caves and their environmental importance are presented to visitors. VCB members are frequently contacted by media about caves, bats, and the environmental sensitivity of karst, resulting in many news articles and spots on radio, TV, and video productions.

VCB members have presented cave management programs at seminars for land managers from the U.S. National Park System, U.S. Forest Service, and other Federal and State agencies from 1989 to 2014.

Additionally, members of VCB have actively participated in meetings such as the Appalachian Karst Symposium, the International Congress of Speleology, the Natural Areas Association Conference, and many other technical conferences and field trips that have attracted scientists and others from academia, government, and the private consulting sector.

Below are a few of the articles and brochures published by members of the VCB on a variety of related subjects.

- The VCB developed Karst Assessment Guidelines standard practices to assist investigators in conducting comprehensive preliminary assessments in karst landscapes, which will assist jurisdictional regulators and engineers in determining the minimum elements that should be expected in a site evaluation. ([Karst Assessment Guidelines](#))
- *A brief History of Biospeleology in Virginia* by Dr. John Holsinger and *The Invertebrate Cave Fauna of Virginia*, a collaboration by former VCB members Dave Culver (lead author), John Holsinger, and David Hubbard with DCR staff Chris Hobson and Wil Orndorff, was published in *Banisteria*, (The Journal of the Virginia Museum of Natural History, Number 42) in 2013.
- The VCB is concerned with maintaining the natural condition of speleothems within caves to the greatest extent possible. Artificial cave lighting promotes the growth of algae, moss, ferns and other photosynthetic organisms, collectively called “lampenflora.” Recommendations are found at [VCB Lampenflora Abatement](#).
- Since 2007, the VCB has been active in participating in the preparation of the *Virginia Outdoors Plan* that now recognizes the Virginia Cave and Karst Trail.
- The VCB is developing a sinkhole remediation guidance document that will include best management practices used by the Virginia Department of Transportation and the soil and water conservation districts.
- In 1997 the Cave Conservancies of the Virginia, DCR, and VCB developed a *Living on Karst: A Reference Guide for Landowners in Limestone Regions*, edited by Carol Zokaites. ([Living on Karst](#))
- The VCB has worked with the Virginia Living Museum on cave and bat exhibits.

Karst Management Plan

The [Karst Assessment Guidelines](#) help communities and developers in preparing a Karst Management Plan for any sites where there is evidence of karst features (that is, sites upon which karst features are fully or partially located, and/or which drain to offsite sinkholes). The Karst Management Plan should include (but not be limited to) the following elements:

- A. A karst feature inventory showing the areal extent of each structure, and a minimum 100-foot radius buffer area around the feature;
- B. A topographic map prepared at a maximum 2-foot contour interval, with spot elevations sufficient to determine low points or discernable edges;
- C. A plan prepared by a Geotechnical Engineer to ensure structural stability of principal structures proposed within 100 feet of a sinkhole or other significant karst feature. The plan shall identify tests that will be completed to determine subsurface conditions.
- D. Mitigation recommendations for each karst feature requiring this action. All sinkholes identified prior to construction should be either mitigated or separated from construction. Mitigation should be carried out under the careful observation of the karst professional investigator to confirm site conditions are as predicated in the karst assessment study, and

to make necessary modifications to mitigation measures in the event actual site conditions differ from the estimated conditions presented in the study.

The management plan should be reviewed and approved by the county engineering and/or planning staff prior to approval of site development or issuance of plats and use appropriate best management practices for stormwater management.

Other Board Activities

The Virginia Speleological Survey, [VSS Website](#), on behalf of the Cave Board, gathers and maintains an informational and survey database on Virginia caves, and to some degree, karst springs. The definition of a cave varies by states and regions. The definition of the length of a cave varies by county survey. Taking a dual reporting criteria of 5 feet and 30 feet in length (understanding the results are not additive), Virginia has 3,804 caves equal to or greater than 5 feet in length; or 2,990 caves equal or greater than 30 feet in length. Included in this total are 375 significant caves (Futrell, 2014).

In 2003, VCB supported the U.S. Forest Service Significant Cave Listing. Five caves in Virginia were nominated, one of which is in George Washington National Forest. (Virginia Cave Board, May 31 and September 13, 2003)

The VCB proposed the Virginia Big-eared bat as an ideal candidate for the state bat, because of its name and its status as a federally endangered species. Virginia Delegate Jackie T. Stump filed House Bill No. 2579 on January 12, 2005. On February 26, after being approved in both the House of Delegates and the Senate, the bill was signed by the Speaker of the House and the President of the Senate. On March 22, 2005, Governor Mark Warner signed the legislation designating the Virginia Big-eared bat as the official state bat of the Commonwealth of Virginia.

Several new species of insects have been identified and listed on both the Federal and State Endangered Species Lists. VCB members Dr. John Holsinger and Dr. David Culver reported that DCR and the Natural Heritage Program have recommended to the Virginia Department of Agriculture and Consumer Services two species of cave beetle be added to the Virginia Endangered Species List under the Virginia Endangered Plant and Insect Act of 1979. The Board suggested the common name of the Mud-dwelling Cave Beetle be changed to Maddens Cave Beetle, and the common name of the Thin-neck Cave Beetle be changed to Hupp's Hill Cave Beetle. (Virginia Cave Board, September 16, 2006)

The VCB continues to work with various State Departments on Environmental Reviews and has participated in discussions on State Regulations regarding the importance of the protection of caves and karst. The Board has worked with: the Department of Historic Resources in permitting the excavation and removal of any archaeological, paleontological, prehistoric, and historic features in a cave; the Virginia DGIF, the largest manager of State-owned caves, on the gating of significant caves where appropriate; and, Virginia DCR and DGIF on preparing management plans for State-owned caves. (See Table 2)

Table 2. State-Owned Caves

State Agency	Number of Caves Owned
Commonwealth of Virginia	1
Department of Conservation and Recreation	18
Department of Game and Inland Fisheries	92
Department of Transportation	45
Natural Tunnel State Park	9
New Market Battlefield State Historic Park	3
New River Trail State Park	3
Virginia Department of Forestry	2
Total	173

*Source: Virginia Speleological Survey Data Files, March 2014
and Mike Futrell personal email communication of March 12, 2014.*

Virginia Department of Transportation Hazardous Materials Program Manager Ed Wallingford and the EPA Region III Underground Injection Control Program Manager Mark Nelson concurred in correspondence with DCR staff that only sinkholes whose throats had been significantly modified to accept stormwater runoff were to be registered as Class V injection wells by EPA. However, in further conversations with EPA, Underground Injection Control staff revealed Region IV employed a more inclusive definition of Class V injection wells to include any sinkhole to which runoff from converted land has been diverted. (Virginia Cave Board, December 4, 2004)

State funding continues to be available for the various Virginia Agricultural Best Management Practices (BMPs). Efforts are underway to inform Virginia landowners about available cost-share and tax credit opportunities through the programs. The cost-share program is funded through the State Water Quality Improvement Act, and is administered by DCR through local Soil and Water Conservation Districts. The Agricultural Sinkhole Protection BMP (WQ-11) will pay 75% of the cost of debris removal up to \$2,500. In addition to the cost-share payment, the program allows for a tax credit of “25% of the total eligible cost, not to exceed \$17,500.” Sinkholes with streams that flow into them are given priority (Fagan and Orndorff, 2002). (Virginia Cave Board, December 3, 2005)

VCB and the Department of Natural Resources have several on-going monitoring projects including the Lee County Isopod, Madison Cave Isopod, Ellet Valley Cave Millipede, annual bat surveys, and karst hydrology dye tracing studies.

Future of the Virginia Cave Board

It has been 50 years since the 1966 Cave Protection Act became law. Virginia's caves represent a unique, limited, and non-renewable natural resource of unique archeological, biological, economic, educational, geological, historic, recreational, and scientific value. In order to prevent Virginia's spelean wilderness from being destroyed within our lifetime, further immediate steps need to be taken to protect Virginia's significant caves (Wilson, 1981).

Vandalism and pollution are rapidly destroying this resource. The prosecution of vandals and polluters demonstrates the inadequacy of current penalties. The Virginia Cave Protection Act should be amended to allow prosecutors to choose between a misdemeanor and a felony charge, similar to the Federal Cave Resources

Protection Act. More prosecutions and harsher penalties will invariably serve as a deterrent to future potential vandals (Kramer, 2003).

Unfortunately, many cave owners remain unaware of the immense scientific, historic, and economic value of the unique nonrenewable cave resources they own. Virginia cave resources continue to be threatened by poorly planned development and more cave bats became infected with WNS.

As public interest in outdoor recreation continues to grow and land development accelerates, increased pressures will be put on Virginia's limited and fragile cave resources, the Virginia Cave Board remains committed to safeguarding these resources.

Since 1978, a Commission and Board composed of concerned citizens (see Appendix) working in conjunction with other agencies of the Commonwealth, appears to be the most effective vehicle for focusing the attention of both government and the public on this important conservation goal.

Future efforts of the Cave Board to conserve Virginia's cave resources fall primarily into five broad areas:

- Collecting and maintaining records on cave resources within Virginia
- Providing information to the public about caves, their value, and the laws protecting them
- Advising and assisting public agencies and private landowners making cave management and land use decisions
- Studying those aspects of cave ownership and management directly affected by public policy
- Protecting, inventorying, and maintaining cave life

Acknowledgements

I would like to thank Larry Smith, Natural Area Protection DCR, Natural Heritage Program; Meredith Hall Weberg; and Dr. Daniel Doctor for their peer review and comments.

"The Virginia Cave Protection Act: A Review (1966 – 2009)," was published in *The Journal of Cave and Karst Studies*, v. 71, no. 3 (December 2009), p. 204–209 and used with permission of the National Speleological Society (www.caves.org). This paper is a revision and update.

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[Appendix](#): Virginia Cave Commission and Cave Board Members and their terms in office. Source: Virginia Cave Commission and Board Minutes and personal email from Larry Smith, Natural Area Protection DCR, Natural Heritage Program, March 28, 2014.