



National Speleological Society, Inc.
Annual Report
Year 2005

[REVISED 12/31/2005]

What is the NSS?

The National Speleological Society has three goals:

To protect caves and their natural contents;

To advance the study of caves and the science of speleology; and

To promote safety and fellowship among cavers.

The NSS is the largest cave-related organization in the world.

We have over 12,000 members – scientists, conservationists, cave owners, and cave explorers – throughout the United States and abroad. The Society was founded in 1941 and is headquartered in Huntsville, Alabama. The NSS is affiliated with the American Association for the Advancement of Science and the Union Internationale de Spéléologie.

NSS volunteers donate countless hours toward cave conservation, cave science, and safe cave exploration. Membership in the Society is open to anyone who shares our goals.

The NSS is a non-profit corporation and is tax exempt under Section 501(c)(3) of the Internal Revenue Code. Contributions to the Society are tax deductible to the full extent allowed by law.

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Dear Reader,

On behalf of the National Speleological Society (NSS) Board of Governors, I am pleased to present you with the NSS Annual Report. As the examples in this report will show, the Society continues to be very active with the conservation, study, and exploration of caves.

The NSS was chartered in 1941 and has grown to over 12,000 members throughout the United States and abroad. The Society has over 200 local chapters, known as grottos. Our members are tireless advocates for caves and speleology who volunteer countless thousands of hours each year to support the goals of the Society. They conduct cave conservation projects, public education, scientific research, cave surveys, training, and rescues. The NSS membership includes world-renowned speleologists and authors, serious amateurs, recreational cavers, and concerned citizens. Our members come from all types of backgrounds and professions, which gives the Society its unique "flavor."

For more than sixty years, the goals of the Society have remained unchanged; though the means we achieve them have. The NSS and its members strive to protect caves and their natural contents, to educate the public about why caves are fragile and need protection, to study caves and cave science, and to teach safe and ecologically sound ways to visit caves. I'm proud to be a member of the National Speleological Society and to have the opportunity to share with you the information in this report.

Sincerely,

Bill Tozer
President

Protecting Caves and Their Natural Contents

The most visible reasons to protect caves are the delicate and beautiful rock crystal formations (like stalactites and stalagmites) they often contain. Indeed, visitors to commercial caves only see a fraction of the beauty that exists underground.

But caves are also home to unique creatures, including some endangered species. For example, cave-dwelling bats can eat tons of mosquitoes and other pests in a single evening. Scientists are excited about other forms of cave life – even bacteria – which have adapted to survive in extreme conditions, because they may hold the key to the development of new medicines. The survival of all these creatures depends upon maintaining the cave ecosystem.

For individuals and communities in karst regions (where limestone and similar bedrock often forms caves),

cave conservation has a very direct benefit: improved water quality. In karst areas, sinkholes often lead to cave passages, to underground rivers, and into the underground aquifers that supply the drinking water. Polluted runoff into caves is especially dangerous because it frequently leads to drinking water pollution. In these regions, the unexpected collapse of the surface (along with any buildings above) can be triggered by drought and groundwater depletion, or by excessive runoff from over development.

Some caves are important because they preserve evidence of historic or prehistoric visitors – sometimes human and sometimes animal.

For all these reasons and many more, the NSS is working to protect our caves. Sometimes, cave conservation is as straightforward as cleaning trash out of a cave. Just as often, however, the

NSS works to educate land owners and make public officials aware of the importance of the caves under their feet and of how fragile the cave environment is.

Conservation Task Forces

The NSS has chartered Conservation Task Forces specifically to deal with conservation issues in these areas:

- Central Oregon
- Hawaii
- Sloan's Valley, Kentucky
- The Teton Mountains, Idaho and Wyoming
- Klamath Mountains, California
- Daniel Boone National Forest, Kentucky
- Mount Adams region, Washington
- Peppersauce Cave, Arizona

Protecting Caves and Their Natural Contents: Cooperation with States and Private Organizations

State and local governments mirror the federal government's concerns for cave conservation. The NSS offers them its knowledge and expertise to help form and implement sensible policies concerning caves.

The NSS also works hand-in-hand with conservation organizations on a variety of cave conservation activities, both locally and nationwide. We maintain memoranda of understanding with The Nature Conservancy, Bat Conservation International, the American Cave Conservation Association, and the Karst Waters Institute.

State Governments

The NSS's Hawai'i Caves Conservation Task Force worked with the Hawaiian legislature to craft a statute that tried to balance conservation, science, recreation, and the religious beliefs of native Hawaiians.

The Tennessee Wildlife Resources Agency, along with the NSS, the U.S. Fish and Wildlife Service, and The Nature Conservancy, is developing a unique conservation plan to preserve cave-dwelling species (for example, blind fish and insects) before they reach the brink of permanent extinction.

The Arizona Department of Environmental Quality and the U.S. Environmental Protection Agency is working with the NSS to clean up Peppersauce Cave.

Bat Conservation International

The NSS and BCI worked together to study microclimates in Vermont caves which serve as bat hibernacula.

BCI and the NSS together revised their public information brochure, *Bats Need Friends*.

NSS members assisted BCI founder Merlin Tuttle survey the endangered gray bat population in caves in Tennessee and Alabama.

The Nature Conservancy

TNC and the NSS have been partners in cave conservation for decades. TNC owns many important caves which the NSS helps manage. For example, in Tennessee, local NSS chapters help TNC study and manage Hubbards Cave and Yell Cave.

The NSS and the Nature Conservancy, along with the government of Vermont and the federal government, are monitoring microclimates in several Vermont caves which are important bat hibernacula.

Boy and Girl Scouts

NSS members lead countless Scouting trips into caves every year. These trips afford a wonderful opportunity to teach youngsters about caves and cave conservation.

The Society is testing a pilot cave training program with the Boy Scouts and Girl Scouts in Utah and Texas.

Protecting Caves and Their Natural Contents: Cave Restoration and Protection

The front lines of cave conservation are in the sinkholes and caves themselves: cleaning up trash, restoring broken formations, or perhaps installing entrance gates to help regulate human visitation to particularly sensitive caves. NSS members spend countless hours every year working on these projects, which are too numerous to mention. Private cave owners, governments, and conservation organizations all rely upon the NSS's ability to muster dedicated, specialized volunteer help.

Volunteer Training

The NSS conducts workshops and meetings to teach the specialized techniques required to work in caves. A forum on cleaning cave graffiti (without harming stalactites and stalagmites) was held at the NSS's 2002 annual convention in Maine. Restoration workshops are held at most of the Society's Conventions.

Peppersauce Cave, Arizona

Peppersauce Cave in the Coronado National Forest, Arizona, was a pristine underground wilderness with dozens of insect species living inside when a popular 1948 magazine published exact directions to the cave. As a result, this undeveloped, wild cave quickly became one of the most heavily visited -- and most heavily vandalized -- caves in the world.

Using grant money from the State of Arizona and the Environmental Protection Agency, the NSS is working to restore Peppersauce to the extent possible. The Society has donated over \$100,000 worth of volunteer effort to remove graffiti and help decontaminate pools of water in the cave. The NSS is working with the Coronado National Forest to erect an information kiosk nearby.

Designing Bat Cave Gates

A cave-dwelling bat can devour hundreds of mosquitoes and other insects every hour, every night of the summer. But bats are particularly susceptible to human disturbance when they are hibernating or nursing their young in caves. That's one reason why the NSS has embraced the use of gates on the entrances of certain caves to regulate human traffic.

A bat cave gate must be designed precisely. The openings must be small enough that people cannot crawl through, yet big enough for a bat to find using echolocation.

The NSS is part of a nationwide steering group on bat cave gating that includes the federal and several state governments, Bat Conservation International, and other conservation groups. The best sources of information about bat cave gating.

Huccacove Cave, Colorado

Huccacove Cave was Colorado's first commercial cave when it opened to tourists in 1875. When vandals broke into the cave and spray painted the walls in a pristine passage, the Williams Cañon Project of the NSS developed innovative techniques to remove the damage.

Cave Conservation Grants

The NSS supports extraordinary cave conservation projects through a modest grant program. Among the projects supported in the past two fiscal years were:

- a study and inventory of the caves along the proposed route of highway I-66 in Kentucky;
- a cave gate design forum in Texas;
- a study comparing bats' responses to gates at entrances versus gates farther inside caves and mines;
- creation of educational materials about land development on karst terrain;
- a study of public reaction to the designation of underground wilderness areas;
- installation of an information kiosk near a popular lava tube cave in Hawaii.

Cave Restoration and Protection: Shelta Cave, Alabama

The Society's headquarters in Huntsville, Alabama, sits atop Shelta Cave, a particularly important cave because it contains several endangered species. For example, Shelta Cave is the only place in the world where a species of crayfish, *Orconectes sheltae*, lives.

Thirty-five years ago, vandalism and increasing human traffic threatened the cave's ecology. The NSS decided on a radical experiment: it created a cave gate from an old jail cell door and installed it on the entrance in 1968. The vandalism stopped, but the endangered gray bats that had inhabited the cave would not fly through the bars. With the bats gone, their guano no longer supplied food for the other species that lived in the cave, and those other species nearly disappeared. A new gate design in 1981 was supposed to encourage bats to return, but things did not improve. Unlike most bat species, it appears that gray bats are particularly skittish about cave gates.

The NSS used grant money from the U.S. Forest Service and Bat Conservation International to remove the gate and instead erect a fence around the entire sinkhole entrance in its place. A generation ago, Shelta Cave taught the world that bat cave gate design was critical. Now, it may teach us about gray bat habitat.

Protecting Caves and Their Natural Contents: Cooperation with the Federal Government

The NSS is not alone in realizing the importance of cave conservation. But as the largest cave conservation organization in the world, the NSS is unique in its ability to provide knowledge, expertise, and manpower to the federal government and others. Together, we have a track record of successful conservation, restoration, education, and advocacy for caves and the creatures that live in them.

The United States government is an invaluable partner in our work. The federal government owns countless caves, and they are the principal conservator of our nation's wildlife and environment. The NSS maintains memoranda of understanding on common areas of concern with the National Park Service, the U.S. Bureau of Land Management, the U.S. Forest Service, the U.S. Fish and Wildlife Service, and the Tennessee Valley Authority.

U.S. Bureau of Land Management

The NSS provided guest speakers at the BLM's Cave Management Workshop in Carlsbad, New Mexico.

National Park Service

The NSS concluded a unique arrangement with Mammoth Cave National Park in which the NSS removed "improvements" made during the 19th and early 20th century from deep within the cave. The Society is also working with the NPS to decide how to restore microclimates within Mammoth Cave to encourage bats to return to the cave.

The Society worked with National Park Service interpretive rangers in five regions to train NSS volunteers to teach elementary and secondary school classes about caves and karst. Using materials supplied by NPS, the teachers reached thousands of schoolchildren.

The NSS conducted a special cave rescue orientation seminar for Wind Cave National Park, South Dakota.

U.S. Army Corps of Engineers

Along with The Nature Conservancy and other organizations, the NSS helped the Corps in an unprecedented three week campaign to place bat-friendly gates on seven entrances into the Dud/Haile Cave System in Tennessee.

U.S. Forest Service

The Society successfully concluded a years-long struggle to convince USFS land managers from the Deschutes National Forest in Oregon to change their management of Road 18 Caves. Among other problems from over use, cave explorers were disturbing sensitive bat species, and the placement of bolts and use of hand chalk by rock climbers was threatening prehistoric rock art on the cave walls.

In Coronado National Forest in Arizona, NSS members are working to reverse decades of vandalism at Peppersauce Cave.

The NSS conducted a cave conservation seminar for Lincoln National Forest personnel in New Mexico.

U.S. Fish and Wildlife Service

The Society helped the USF&WS, the Nature Conservancy, and the state of Vermont develop a management plan for a Vermont cave that is one of the largest bat hibernacula in New England.

USF&WS was one of many groups with which the NSS formed a task force to study the design of bat cave gates.



Protecting Caves and Their Natural Contents: Educating People about Caves

Public education is a vital part of our cave conservation program. Ignorance about caves and karst geology often leads to groundwater pollution, to inappropriate land use, and to irreparable harm to the cave ecology. By educating the public and those who make the decisions about how to use the land above caves, the NSS hopes to raise awareness of these issues.

Over the past two decades, concerned groups made the public aware of how important wetlands are. The NSS wants to do the same for caves. The Society is trying to make land owners, institutional land managers, schoolchildren, and the public as a whole all aware that caves are not just tourist attractions. Like wetlands, caves are very fragile places that we have to protect if we want clean water and a naturally functioning ecosystem.

Public Outreach

The NSS cooperated with the Smithsonian Museum of Natural History to produce a traveling photo exhibit titled *Caves: A Fragile Wilderness*.

The "learn about caves" page at the NSS's award-winning website, www.caves.org, gets thousands of hits.

The Society's *Discovering Caves* series of brochures are available free of charge in both printed and electronic versions. Titles include *Bats*, *Fragile Underground*, and *Lava Tubes*. Downloads of these brochures are extremely popular, sometimes topping 300 per day.

The NSS booklet, *A Guide to Responsible Caving*, was completely revised and reprinted.

Journey into Amazing Caves

When the leading producer of IMAX films wanted to make a film about caves, the NSS helped to make sure the public got not only accurate information, but a conservation-oriented message as well. The film was *Journey into Amazing Caves*, it is hoped that you were able to see it.

The NSS's involvement has continued as the film tours IMAX theatres across the country. Local NSS chapters answer questions, provide literature, and give demonstrations at showings of the film. Nationally, the Society continues to field requests for information that the film has generated from the public and news media alike.

Project Underground

Project Underground was created seven years ago by the NSS members to train schoolteachers and provide them classroom materials to teach about caves and karst. The Society provides Project Underground with training facilities and financial assistance. With additional support from the National Park Service and the American Cave Conservation Association, Project Underground continues to make a difference in our schools.

National Park Service Cave Education Initiative

The NSS, Project Underground, and the American Cave Conservation Association together received a grant from the National Park Service to train two dozen NSS volunteers in each of five regions (Virginia, Kentucky, Colorado/South Dakota, New Mexico/Arizona, and Oregon/Northern California). The volunteers then spent the 2001-02 school year teaching cave and karst programs for grades K-12.

The NSS also helped the Park Service create an educational children's video about caves.

General Interest Cave Books

The NSS maintains the largest cave bookstore in the world, and it offers the largest selection of cave books available anywhere. The bookstore also distributes free educational literature about caves.

In 2003, the Society published its first children's book, *The Hidden World of Caves*, written by Ronal Kerbo of the National Park Service.

Media Relations

Whether it be questions about Osama Bin Laden's hideouts, a sinkhole that swallowed a building, or the discovery of a cave never before seen by man just outside a major city, the news media rely on the National Speleological Society for accurate information about caves.



Protecting Caves and Their Natural Contents: Encouraging Sensible Public Policy

Where there are threats to caves on a regional scale, the NSS works to educate well-intentioned policymakers who may not realize what a resource they have (quite literally) just under their feet. Even when they know where caves have been found, policymakers often have no idea how important and sensitive those caves may be.

Ebay Auction Policy

The NSS opposes the sale of cave formations (like stalactites and stalagmites) because the market for such formations encourages vandals to deface caves. The Society succeeded in getting Ebay and Yahoo to prohibit the auction of most cave formations. The Society also discourages "rock shops" from handling similar sales.

Kentucky TriModal Transpark

NSS members are working to improve a proposal for a 1200-acre industrial park outside the border of Mammoth Cave National Park in Kentucky. In addition to the industrial park, plans for the "trimodal transpark" call for a new airport, a new highway, and a new rail line. It promises to be an important economic engine for the region.

But the site is sensitive to development because it is pockmarked with sinkholes which lead to caves which are in turn connected to underground aquifer beneath the longest cave in the world, Mammoth Cave. There is a potential that increased

runoff from the development entering and polluting the underground environment. Increased runoff could also cause surface collapses, damaging buildings and other infrastructure.

NSS members on both sides of the controversy are working to assure that, if the transpark is completed, the effect on the caves and on the underground environment is minimized.

Cave Inventories

Where a large development project is proposed in a karst area, NSS members often conduct an inventory of the area's caves and cave resources. Without such an inventory, neither the NSS nor the decision makers can know if underground resources are at risk.

Inventories often go far beyond merely locating caves and cave passages. They typically include mapping the caves and may include studies of the animal and insect populations present in the caves, hydrologic studies to understand where underground water comes from and goes to, and geologic studies.

Sloans Valley Cave, Kentucky

Sloans Valley Cave is 26 miles long and fantastically diverse. For example, among the rare and endangered species in the cave is a large population of blind crayfish that live only in caves.

The NSS formed the Sloans Valley Conservation Task Force to address

several potential threats to the cave from a nearby landfill, a second planned landfill, a water reservoir that backfloods parts of the cave, highway widening overhead, and a rails-to-trails project that will funnel thousands of people past several entrances.

The Task Force is developing a 3-D GIS model of the cave to model water levels, the mixing of cave streams with reservoir water, siltation, landfill runoff routes through the cave, and airflow patterns.

Geo-Caches in Caves

Geo-caching is a relatively new and immensely popular recreational activity similar to orienteering. People get the coordinates of a cache hidden somewhere in the great outdoors from the internet and then use a GPS receiver to find the cache.

The NSS is concerned about the publication of geo cache locations at cave entrances. Often, the only protection a particularly fragile cave might have from human visitors is the fact that its location is unpublished. Increased traffic to caves may also damage delicate landowner relations built up through decades of trust. Some geo cachers may also be encouraged to enter caves without proper training or equipment. The NSS is developing a policy that properly addresses these issues.

Studying Caves and Speleology

Caves remain one of the last frontiers on earth to for man to explore and study. NSS members almost routinely discover places where humans have never set foot before, even just a few hours drive from this country's major metropolitan areas. Part of the NSS's work is to catalog and inventory caves, which helps landowners make intelligent land use decisions.

The scientific study of caves and karst, called speleology, combines the expertise of many different disciplines – biology, geology, hydrology, paleontology, and archeology to name a few. Speleology promises not just academic knowledge, but more direct benefits like cures for human disease and cleaner drinking water. The NSS supports speleological research through grants and publications, and the NSS is closely involved with the federal government's new National Cave and Karst Research Institute.

Protecting Caves and Their Natural Contents: Aid to Cave Owners

Owning a cave brings with it the extra responsibility of caring for the underground resources (like clean water, like mosquito-eating bats, or like a great place to enjoy exploring).

Cave owners have to deal with competing pressures: pressure to develop the surface and potentially harm the cave, pressure to let spelunkers visit the cave, or pressure to avoid the problem by simply bulldozing the entrance.

The NSS tries to make it easier for cave owners – private individuals, government agencies, and conservation organizations – to do the right thing.

Landowner Defense Fund

Several years ago, a generous Tennessee landowner with a long history of letting the public explore her cave was sued when a boy (not an NSS member) fell inside her cave and died. What began as a private collection to help offset the landowner's legal bills has blossomed into the NSS's landowner defense fund. The fund is designed to encourage landowners to allow the public to visit their caves.

Many states have passed landowner liability statutes which say landowners

should not normally be liable for injuries that hunters, hikers, and cave explorers suffer on the landowner's property. The lawsuit against the Tennessee landowner was dismissed because of one of these laws.

Helping Make Cave Acquisitions Possible

The NSS makes modest grants for conservation organizations to acquire important caves. In these two fiscal years, the Society supported the Northeastern Cave Conservancy's purchase of a cave which is hydrologically connected to the Society's own McFails's Cave Nature Preserve in New York, and the purchase by the West Virginia Cave Conservancy of a critical entrance to a 25-mile long cave which is listed as one of the world's top ten endangered karst ecosystems by the Karst Waters Institute.

Cave Management Assistance

The NSS's Central Oregon Caves Task Force has signed an agreement to help the Deschutes National Forest help manage caves in the Bend-Fort Rock Ranger District. The task force has previously helped shape the U.S. Forest

Service's conservation policies toward several significant caves in Oregon.

The Society held the first symposium on cave management for nonprofit organizations at its national convention in Maine.

The NSS's Klamath Mountains Conservation Task Force worked with the Klamath National Forest in Oregon to develop a management plan for Marble Mountain Cave.

Vandalism Deterrence Reward

The Society maintains a standing offer of a reward, up to \$1,000, for information leading to the conviction of anyone for vandalizing a cave. Although no claims were paid in these two fiscal years, several claims are currently pending investigation.

Cave Management Symposia

To help governments and other organizations that own caves, the Society brings together the nation's experts in the field to discuss common issues. In addition to symposia at the NSS's annual convention, the NSS co-sponsored the 17th biennial National Cave Management Symposium in Albany, NY in November 2005.

Promoting Speleological Research: Working with the National Cave and Karst Research Institute

Congress created the National Cave and Karst Research Institute in 1998. Like similar institutions in other nations, and like the NSS, the NCKRI is chartered to coordinate and facilitate the science of speleology, promote speleological education, encourage cave and karst conservation, promote environmentally-sound land management, and serve as a repository of information about caves. The NCKRI is funded by federal government appropriations on a matching basis with other contributions.

Protecting Caves and Their Natural Contents: Cave Ownership and Management

The NSS appreciates the pressures on cave owners because the NSS owns caves, too.

NSS Nature Preserves

The NSS owns or manages twelve extraordinary nature preserves throughout the country. Although none is developed as a "show cave" which caters to tourists, each is important for another reason -- geologically, biologically, paleontologically, historically, or recreationally.

For example, the Donald R. Russell Nature Preserve in Oklahoma was donated to the NSS to help preserve endangered bat species. One cave at the preserve is home to as much as a third of the known population of one such species of bat. Recently, the Sam Noble Museum of Natural History helped study rare fossils of a pleistocene tapir discovered at the preserve.

The Kingston Saltpeter Cave Nature Preserve in Georgia is managed by the NSS for the Felburn Foundation. In the ice ages, animals lived there. (The University of Tennessee houses the cave's fossil collection.) During the Civil War, the cave was mined for Saltpeter. During the Great Depression, the cave was open to tourists. Today, the cave is the focal point of a unique nature preserve, and with help from the Weinman Museum, the NSS makes it

available as a geological classroom for Georgia's school teachers.

The Society's Newest Preserves

During these two fiscal years, the Society added two new nature preserves. Wells Cave Nature Preserve, Kentucky, has been a popular recreational cave but is also geologically and biologically significant. It was generously donated to the Society by Mr. James Helmbold. The second new preserve, Great Expectations Cave in Wyoming, is described in the sidebar.

The Society's Other Preserves

The other NSS Nature Preserves are:

- Mill Creek Sink, Florida
- Barton Hill, New York
- Shelta Cave, Alabama
- John Guilday Caves, West Virginia
- McFails Cave, New York
- Schoharie Cave, New York
- Tytoona Cave, Pennsylvania
- Warren Cave, Florida

Cave Conservancies

The Society charters local cave conservancies throughout the nation. These conservancies own or manage caves for conservation purposes:

- Appalachian Cave Conservancy (Tennessee, Virginia)
- Butler Cave Conservation Society (Virginia)
- Carroll Cave Conservancy (Missouri)
- Great Saltpetre Cave Preserve (Kentucky)
- Cave Conservancy of Hawaii
- Karst Conservancy of Illinois
- Indiana Karst Conservancy
- Mid-Atlantic Karst Conservancy (Pennsylvania, West Virginia)
- New Jersey Cave Conservancy
- Northeastern Cave Conservancy (New York)
- Pennsylvania Cave Conservancy
- Texas Cave Conservancy
- Texas Cave Management Association
- West Virginia Cave Conservancy

In addition, the following cave conservancies are institutional members of the NSS:

- Cave Conservancy of the Virginias (Virginia, West Virginia)
- Michigan Karst Conservancy
- Missouri Cave Conservancy
- Southeastern Cave Conservancy (Alabama, Florida, Georgia, Kentucky, Tennessee, West Virginia)

Cave Ownership and Management: Great Expectations Cave Nature Preserve, Wyoming

The Society acquired Great Expectations Cave in Wyoming by purchase when it became available early in 2003. "Great X" is over 8 miles long and is the third-deepest limestone cave in the United States. It contains an underground room nearly half a mile long and over 100 feet high. The property borders federal land on three sides, including the Bighorn National Forest.

This extraordinary cave and the surrounding area comprise one of the finest examples of alpine karst in the nation. The upper entrance is at an elevation of 8500 feet in the Big Horn Mountains. Trapper Creek sinks into the entrance and emerges again six miles down Trapper Canyon at the Great Exit, which is on land owned by the federal Bureau of Land Management. Cavers making the trip underground must travel through the 1500-foot long "Grim Crawl of Death."

Studying Caves and Speleology: Promoting Speleological Research

Although not a research institution itself, the NSS is keenly interested in promoting the study of speleology by academics and other qualified researchers. (NSS-sponsored cave research directed toward conservation is described elsewhere in this report.)

Journal of Cave and Karst Studies

The NSS publishes its peer-reviewed multidisciplinary scientific journal, the *Journal of Cave and Karst Studies*, three times annually. With an advisory board of world-renown speleologists, the Journal is the premier English language publication concerning cave science. the Journal is indexed in the Thompson ISI Science Citation Index Expanded database, making it an important tool to facilitate cave research.

To encourage an awareness and appreciation for speleological research among cavers outside academia, the NSS distributes the Journal to all regular members of the Society.

In April, 2002, the Journal published a special issue titled *Cave and Karst GIS* describing the use of geographic information systems to model caves and karst regions. In April 2003, the Journal published papers from the Conference on Lava Tubes and Ground Water Pollution held in Hilo, Hawai'i in 2000.

NSS Research Grants

The NSS makes research grants in the natural sciences, social sciences, and humanities. The Society's conservation grant program also sponsors research specifically related to cave conservation. Research grants in these two fiscal years included:

- a comparison of hydrology of karst and non-karst basins in Kentucky;
- cave sedimentation;
- cave use in Malaysia;
- caves in the Grand Canyon;
- mist-netting cave bats in Panama;
- ecology of a cave in Grand Canyon National Park;

- atmospheric CO₂ and the landscape of the South China karst;
- sulfur-based ecosystems in caves;
- micromammal faunas in the northern Urals, Russia;
- biologic effects on mineral formation in sulphidic caves;
- ancient Maya cave use; and
- the west-central Florida aquifer.

Speleological Work in the Arts and Humanities

Although the natural sciences dominate Speleology, the NSS also supports work in the arts and humanities.

The Society has established a Spelean Arts and Letters Award to recognize excellence in cave-related artistic expression, management, or criticism.

NSS Fellowships

The Society awards the Ralph W. Stone Fellowship each year to a graduate student studying cave or karst science.



Studying Caves and Speleology: Exploration and Documentation of Caves

Speleology remains one of the few sciences where laymen routinely add to mankind's knowledge of the world. With only a little training, amateur cavers – who make up the bulk of the NSS's membership – regularly discover and map new caves, discover new cave passages in known caves, and document the animal life and contents of caves around the nation. These projects are too numerous to mention, but without this important work, the professional academics (biologists, geologists, hydrologists, paleontologists, etc.) would be unable to do their work.

NSS Exploration Grants

The NSS makes modest grants for cave exploration, both in the United States (from the Sara Corrie Memorial Fund) and abroad (including grants to study Mexican caves from the former Joe Ivy Fund). During the past two fiscal years, the Society awarded grants for:

- purchase of cave survey gear for use by a Tennessee cave survey group;
- locating and documenting caves in the Cascade Mountains of Washington State;
- an expedition to India;
- exploring Coldwater Cave, the longest cave in Iowa;
- the inventory of caves along a proposed interstate highway route in Kentucky;
- exploration of halite caves in northern Chile;
- exploration of caves in western Mexico and Oaxaca, Mexico; and
- exploration of anoxic caves in Florida.

Fighting Terrorism

When Osama Bin Laden was rumored to be hiding in caves in Afghanistan, the NSS library provided the U.S. military with information about caves in that country. (In fact, most of those "caves" turned out to be man-made tunnels.)

Underwater Cave Exploration

The NSS Cave Diving Section is the largest cave diving organization in the U.S. These highly trained and safety conscious experts expand our knowledge of Florida spings, high altitude sumps in the West, sea caves along both oceans and the great lakes, and the cold, murky sumps deep inside the caves of the Northeast.

NSS Cave Projects

Large, long-term cave exploration and documentation projects may be granted status as an official NSS project. They include:

- studying Lost River Cave, Indiana;
- paleontological studies of Virginia caves;
- studying caves along the canyon of Rio La Venta, Chiapas, Mexico;
- mapping caves on Mona Island, Puerto Rico;
- monitoring and documenting caves formed in the Mount Rainier glacier by volcanic steam vents;
- exploring cave sumps using specialized diving techniques in the Northeast U.S.;
- studying caves in Tabasco, Mexico;
- exploring gypsum caves in the Southwest U.S.;
- exploring and surveying of some of the deepest caves in the hemisphere

in Oaxaca, Mexico, which are approaching a mile in depth;

- surveying the Roppel portion of Mammoth Cave, Kentucky;
- studying Scott Hollow Cave, West Virginia; and
- indexing published cave passage descriptions into a single database.

NSS Cave Surveys

NSS Cave surveys coordinate the systematic exploration and inventory of caves over large geographic areas. Surveys are active in Alabama, Colorado, Georgia, Hawai'i, Idaho, Indiana, western Kentucky, Missouri, Tennessee, Texas, Virginia, and West Virginia. The NSS has documented over 25,000 caves in the United States.

Aerial Survey of Idaho Caves

When a fire cleared overgrowth on a swath of Idaho land controlled by the Bureau of Land Management, a unique opportunity arose to look for caves which were nearly impossible to find otherwise. Bat Conservation International funded an aerial survey of the area by members of the NSS's Idaho Cave Survey. Potential lava tube cave entrances were located using GPS.

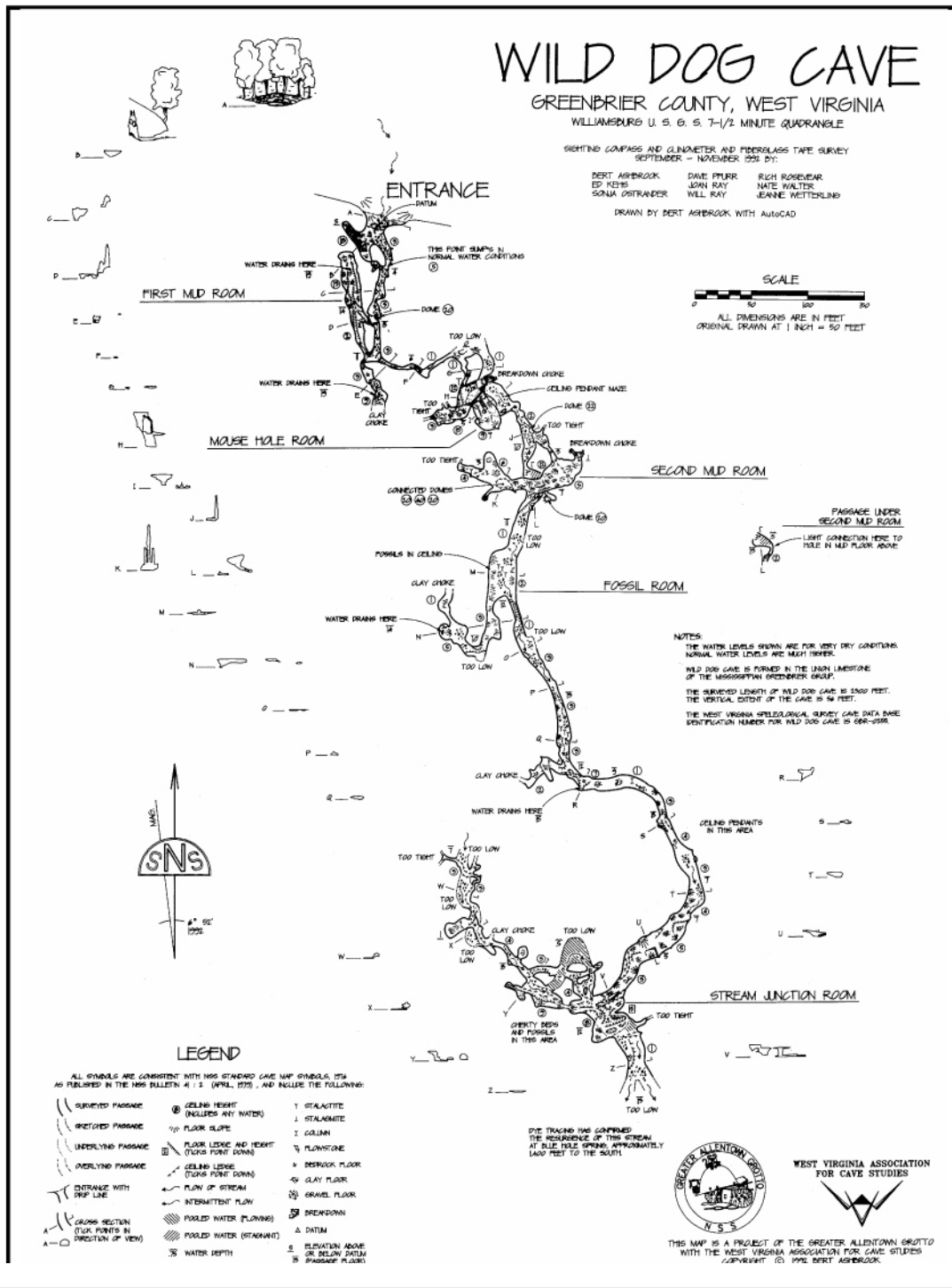
The NSS volunteers then returned on foot and found 43 new caves. Each was surveyed and photographed. Archaeological, paleontological, and biological resources were inventoried. Special attention was paid for evidence of a dwindling species of bat which uses the area. In all, over five miles of cave passage were found.

Exploration and Documentation of Caves: Making Cave Maps

Fictional spelunkers leave bread crumbs or unroll balls of string to avoid getting lost. In real life, cavers use maps to navigate through larger caves. In the United States, NSS members make nearly all of those maps.

No satellite or high-tech equipment can survey a cave; surveyors must manually measure every passage. This specialized skill is valuable because the work is often tedious and uncomfortable. Large caves regularly take decades to survey completely.

Cave maps have other very important uses. They document the location of cave passages relative to the surface. Hydrologists use them to track the flow of water underground. Geologists use them to help understand both the formation of caves and the geology of the surrounding rock. Cavers use them to select the most likely places to search for new passages. If a rescue is ever required, a good cave map may save a life.



Promoting Caver Safety and Fellowship

Although the NSS is largely a membership organization (our 12,000 members make us the largest cave-related organization in the world), we provide important cave-related services, resources, and information for both members and non-members alike.

The NSS provides training for cave rescue services throughout the nation

through its National Cave Rescue Commission.

The Society operates one of the largest cave-related bookstores in the world. We publish a monthly magazine, the *NSS News*.

Annual NSS conventions provide a wealth of opportunities for learning

about and visiting caves. The Society maintains what may be the world's largest cave library, along with a museum and archives of American cave exploration. The NSS also supports joint activities with foreign caving organizations.

Cave Rescue: Bowden Cave, West Virginia

The main entrance to Bowden Cave, West Virginia, is visible from the highway. On Saturday morning, July 28, 2001, two adult youth leaders and five boys left a note on their vehicle saying they would be poking around inside the cave and exiting from another entrance up the hollow. No one had checked the weather forecast.

Once inside, the group slowly headed up a lazy underground stream. Occasionally, the ceiling lowered and they had to crawl. Meanwhile, it started raining outside. They left the stream for a mazy section of the cave that they thought would lead up to the other entrance, but they could not find the way out. Eventually, they turned back to exit from the main entrance. But by then, extremely heavy rains outside had turned the lazy stream into a torrent, and in one of those crawlways, the stream had risen to within just 3 or 4 inches of the ceiling. Now they couldn't get back out the main entrance, and they couldn't find the other entrance. They were trapped.

On Sunday morning, the owner of the campground where the group was staying noticed they hadn't returned. He knew they had gone off caving somewhere, so he called the authorities. Eventually, the search was expanded to include the fire department near Bowden Cave, and they found the group's vehicle and the note. The fire department contacted a local coordinator for the National Cave Rescue Commission, and trained volunteers (mostly NSS members) began to arrive by Sunday evening. The group had already been underground for over 30 hours.

One team of rescuers went in the main entrance and fought their way up the raging river. They had to stop when they found the crawlway filled with water nearly to the ceiling. Meanwhile, a second rescue team hiked up the hollow and entered the cave from the other entrance. This team found the stranded group, who had moved to higher ground, removed most of their wet clothing, and used space blankets to try to keep warm while awaiting either rescue or for the water to recede. With the rescuers' help, they were able to exit the cave from the other entrance under their own power. One boy was hospitalized with hypothermia.

Promoting Caver Safety and Fellowship: Cave Rescue

Visiting caves is safe for trained cavers, but nearly every week, an unlucky or inexperienced spelunker somewhere in the United States requires some sort of help to exit a cave.

The NSS's National Cave Rescue Commission (NCRC) helps fill this need. The NCRC maintains a national curriculum for cave rescue training, trains volunteer rescuers, maintains communications with local, state, and federal rescue squads and agencies, and maintains strategically located caches of specialized equipment designed for cave rescues. The NCRC does not provide rescue services per se; that is done by the thousands of individual volunteers (mostly NSS members) who serve in local rescue squads or cave rescue groups.

Most fire departments and rescue squads have no cave rescue experience – be it finding a lost group somewhere in a twenty-mile long cave, keeping an injured caver warm until more help arrives, or helping move a litter through a tight crawlway. NCRC trained rescuers are available nationwide to help local rescuers conduct underground search and rescue.

On Call

The NSS published the world's foremost treatise on cave rescue, titled *On Call*.

Cave Rescue Training

The NCRC's cave rescue training curriculum includes dozens of weekend orientation seminars organized regionally and week-long "boot camps" for more in-depth training. To date, over 3,000 cavers have been trained by the NCRC. Topics include patient care and stabilization in the underground environment, evacuation techniques for different types of cave passages, rope rescue techniques, underground communications, and incident management. The 2005 national boot camp was held in Somerville, Alabama, and in 2006 the national boot camp will be held in Puerto Rico.

American Caving Accidents

The Society biennially publishes a compilation of reported cave accidents in the United States, *American Cave Accidents*. The publication is intended as a learning tool for novice and experienced cavers alike.

International Technical Rescue Symposium

The NCRC is an annual co-sponsor of the International Technical Rescue Symposium, which was held in Austin, TX .

Underwater Cave Rescue

The NSS Cave Diving Section has trained more than 500 cave diving rescue / recovery specialists. The NSS-CDS cooperates with NCRC, the National Crime Information Center, the National Association for Search and Rescue, and even foreign governments to make underwater cave specialists available 24 hours a day.

The NSS-CDS educates open water divers about the extreme dangers of cave diving, to prevent tragedies in submerged cave passages. In cooperation with the federal government, state and local governments, and other diving organizations, the NSS-CDS has developed a successful "no light" rule for open water divers to discourage them from entering into underwater caves. The NSS-CDS also installs safety and warning signs at some better known underwater caves in the U.S., Mexico, and the Caribbean.



Promoting Caver Safety and Fellowship: Member and Non-Member Services

Membership Services

Each month, members receive our magazine, the *NSS News*. The *News* is full of features on cave exploration, conservation, history, and science. Regular columns cover caving technique and safety, basic principles of cave science, book reviews, and interviews. Each spring, the *News* publishes an issue devoted solely to cave conservation.

Members also receive the Society's peer-reviewed scientific journal, the *Journal of Cave and Karst Science*, an annual *Member's Manual*, and *American Cave Accidents*, which brings home a safety message.

The Society holds a convention annually in different locations throughout the nation. In 2005 it was held in Huntsville, AL and in 2006 it is planned for Bellingham, WA. The convention attracts between 1,000 and 1,800 attendees. The week-long meetings include technical and scientific sessions, presentations, workshops, seminars, field trips, competitions, and salons that cover all areas of the speleological arts and

sciences. For young people, the Junior Speleological Society arranges special activities during the convention, including caving trips and educational programs.

Perhaps the greatest membership benefit is the camaraderie with other cavers. The NSS has over 200 local chapters, called grottos, across the nation which plan regular field trips and conservation projects. In addition, NSS sections are organized around common cave-related interests that cut across geographic boundaries, such as vertical or digging techniques, cave surveying and cartography, cave history, cave conservation, cave management, underground photography, cave diving, cave geology and geography, and more.

Membership in the Society is open to anyone, or any organization, who shares our goals. Minors and students can join at a reduced rate. Visit www.caves.org to join.

The NSS Bookstore

The Society operates one of the largest cave bookstores in the world for both members and non-members. Among the most popular titles is *On*

Rope, the NSS's best selling book on rope climbing and rappelling techniques.

www.caves.org

The NSS's award winning website, www.caves.org, offers information about caves and about the Society, a lively discussion board where anyone can ask questions, and free downloads of some of the NSS's most popular publications. The site is a reference resource for members and non-members alike.

International Cooperation

The NSS provided a challenge grant to create an exchange program with the Polish Mountaineering Association. The Society also supports the Ukrainian-American Youth Caver Exchange Foundation and the China/USA Caves Project's joint exploration of caves in Guizhou Province. The NSS's Caves of Cuba Project develops relationships between cavers through exploration of Cuban caves.



Promoting Caver Safety and Fellowship: NSS Awards

The NSS awards a number of different honors to recognize extraordinary service to the Society or to speleology. The following awards were conferred in fiscal years 2005:

Honorary Member

Yuan Daoxian

William J. Stephenson Outstanding Service Award

Joel Stevenson

Lew Bicking Award

(excellence in cave exploration
and mapping)

Tom Brucker

Victor A. Schmidt Conservation Award

Robert Burnett

Science Award

Francis G. Howarth

Spelean Arts and Letters

Bruce Bannerman

Certificate of Merit

Rocky Parsons
David Culver and William B. White
Kelley Deem

Peter M. Hauer Spelean History Award

Greg Brick

James G. Mitchell Award

(best scientific paper by an NSS
member under age 25)

Lindsay N. Walker

Fellows of the Society

(long-term dedication to the
goals of the Society)

Jerry Atkinson
Jody Bailey
Slim Baxter
Wade Berdeaux
William Birdsall
Jeff Bozanic
Thomas Brucker
Bob "Rune" Burnett
Russ Carter
James Coke IV
Jean DeVries
Ellie Florance
Kim Gentry
Aubrey Golden
Timothy Heaton
Chuck Henson
Barry Horner
Brian Houha
Thomas Illife
Howard Kalnitz
Damon Keys
Berta Kirchman
Tom Malabad
Marian McConnell
Heather McDonald
Aubrey Eugene Melton, III
Walter Meuer
Esty Pape
Scott Parvin
Brian Pease
Garry Petrie
Paula Provencio
Tony Schmidt
Mark Scott
Daniel Snyder
William Stitzel
Doug Strait
Steven Taylor
Dennis Willis
Joe Zokaite

NSS Financial Reports

NSS Financial Reports:

Statement of Financial Position April 30, 2005 (audited¹)

Assets

Current assets		
Cash and cash equivalents	\$	329,764
Accounts receivable		12,684
Inventory		188,410
Prepaid expenses and advances		39,550
Total current assets		\$ 570,408
Non-current assets		
Investments	\$	2,515,562
Land, buildings and equipment (net)		758,192
Total non-current assets		\$3,273,754
TOTAL ASSETS		\$3,844,162

Liabilities and Net Assets

Current liabilities		
Accounts payable	\$	15,831
Deferred revenue		61,818
Accrued expenses		4,923
Current portion of note payable		25,968
Total current liabilities		\$ 108,540
Non-current liabilities		
Deferred revenue	\$	10,008
Note payable		62,136
Total non-current liabilities		\$ 72,144
Net assets		
Unrestricted	\$	241,135
Board designated		1,799,490
Total unrestricted		2,040,625
Temporarily restricted		967,424
Permanently restricted		655,429
Total net assts		3,663,478
TOTAL LIABILITIES AND NET ASSETS		\$ 3,844,162

NSS Financial Reports:

Statement of Activities For the Year Ended April 30, 2005 (audited¹)

Support and revenues

Support:

Contributions	\$106,496
Fundraising	5,489
Government contract	38,010
Investment income	215,151

Total support	\$ 365,146
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Revenues:

Membership dues	\$284,346
Bookstore sales	88,853
Convention	95,333
Cave rescue training fees and income	73,820
Advertising	12,905
Bookstore shipping fees	8,339
Miscellaneous	13,832

Total Revenues	\$ 577,428
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Total Support and revenues	\$ 942,574
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Expenses:

Program Services:

Bookstore and library	\$120,431
Cave Restoration	48,523
Cave rescue training	68,590
Convention	93,238
Publications and website	240,435
Other related expenses	43,196

Total program services	\$614,413
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1. The notes to this statement and the independent auditor's report are an integral part of the audited financial statements. The complete independent auditor's report with accompanying notes is on file at the NSS office.

NSS Financial Reports:**Statement of Cash Flows** For the Year Ended April 30, 2005 (audited¹)

Cash Flows from Operating Activities

Change in net assets	\$ 240,506	
Adjustments to reconcile change in net assets to net cash Provided by operating activities		
Depreciation	4,077	
Unrealized gain on investments	(74,863)	
Accounts receivable	(7,334)	
Inventory	4,066	
Prepaid expenses	(14,613)	
Accounts payable and accrued expenses	9,900	
Deferred revenue	<u>47,418</u>	
Net cash from operating activities		\$ 209,157

Cash Flows from Investing Activities

Donation of property	(28,000)	
Purchase and redemption of securities, net	<u>(160,399)</u>	
Net cash from investing activities		\$ (188,399)

Cash Flows from Financing Activities

Mortgage principal payments		<u>(10,975)</u>
Net increase in cash and cash equivalents		\$ 9,783
Cash and cash equivalents, beginning of year		<u>319,981</u>
Cash and cash equivalents, end of year		\$ 329,764

Supplemental Information

Interest paid	\$ 6,025
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1. The notes to this statement and the independent auditor's report are an integral part of the audited financial statements. The complete independent auditor's report with accompanying notes is on file at the NSS office.

NSS Personnel (as of December, 2005)

NSS Personnel: Directors

Hazel Barton	Highland, Kentucky	Doug Medville	Reston, Virginia
Bill Liebman	Cass, West Virginia	Martha Hendrix Mills	Birmingham, Alabama
Joe Levinson	Stockholm, New Jersey	Gary Moss	Falls Church, Virginia
Cheryl Jones	McLean, Virginia	Philip Moss	Protem, Missouri
J. Kevin Smith	Harvest, Alabama	James Lewis.....	Oak Ridge, Tennessee
Bill Liebman	Cass, West Virginia	Doug Robertson	Bea Branch, Arkansas

NSS Personnel: Officers

President	William Tozer	Indiana
Executive Vice President	Gordon Birkhimer	Virginia
Administrative Vice President	Steve Omeroid	Ohio
Operations Vice President	Tom Rea	Indiana
Secretary-Treasurer	Ted Kayes	Virginia

NSS Personnel: Employees

Operations Manager	Stephanie Searls	Huntsville, Alabama
Office Assistant	Annette Nayman.....	Huntsville, Alabama
Office Assistant.....	Bill Torode	Huntsville, Alabama

NSS Donors

Almost all NSS programs are staffed by unpaid volunteers who together donate countless thousands of hours every year benefiting caves. Donations make this work possible, and every dollar is multiplied many times over by our dedicated volunteers. The National Speleological Society, Inc. is a non-profit corporation and is tax exempt under Section 501(c)(3) of the Internal Revenue Code. Contributions to the Society are deductible to the full extent allowed by law.

The Society's "Stash Your Cash" program allows small monthly credit card gifts that add tremendously to what we can accomplish. A complete list of our donors is published annually.

NSS Donors: The Stephenson Group

The Stephenson Group consists of members of the Society who have made lifetime gifts totaling \$10,000 (*), have designated the Society to receive \$10,000 or more at their death, or have given the Society a 25% interest in a charitable trust. The Stephenson Group (as of March, 2004) includes:

Richard Blenz*	Preston L. Forsythe	Cheryl Kayes	John E. Pearson	Paul J. Stevens
Don Cournoyer	Jeanne Gurnee*	Ted Kayes	Doug Soroka	Mr. Eugene Vehslage*
Robert E. Danielson*	Mr. Russ Gurnee*	Michael R. Kistler	Jack Stellmack	Dogwood City Grotto*
Scott Fee	William Halliday*	Lynn G. Kleina	Mrs. Merle Stephenson*	Richmond Area
Shari J. Forsythe	David W. Hughes	Thomas G. Lera	Lee Stevens	Speleological Society*

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