



# Natural Bridge Reconnaissance Survey

Rockbridge County, Virginia

September 2013



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# EXECUTIVE SUMMARY

A reconnaissance survey of Natural Bridge, Virginia was conducted by the National Park Service (NPS) at the request of Representative Bob Goodlatte (VA-06). Representative Goodlatte requested that the properties, which are scheduled to be sold in the fall of 2013, be evaluated for the likelihood that its natural, cultural, and recreational resources would meet the criteria for a new national parkland. The Natural Bridge was once owned by Thomas Jefferson, was considered a natural wonder and major tourist destination during the formation of the United States, and was designated a National Historic Landmark in 1998. This reconnaissance survey was undertaken by an interdisciplinary team of NPS and U.S. Geologic Survey (USGS) personnel representing the fields of park management and maintenance, geology, natural resources, archeology, and park planning.

The survey effort evaluated the likelihood that the resources in the reconnaissance survey area would meet the four criteria for new parklands: national significance, suitability, feasibility, and need for NPS management. The conclusions of the survey indicate that the resources associated with Natural Bridge, Virginia would likely meet the criteria for national significance, suitability, and feasibility. The survey was unable to fully assess the need for NPS management due to the uncertainty of the property's future ownership and management.

**National Significance:** A special resource study is likely to find that the resources within the current Natural Bridge properties are nationally significant. The natural bridge is a National Historic Landmark, and the collective properties including the natural bridge and

the associated caverns are likely to meet the criteria for a National Natural Landmark.

**Suitability:** A special resource study is likely to find that the cultural resources within the current Natural Bridge properties are not suitable for inclusion, but that the natural resources are likely to be found suitable because they represent a superlative example of a regionally distinct landform, specifically a relatively undisturbed karst ecosystem including a natural bridge, caverns, and distinct fauna. In total, the resources are likely to be found suitable for inclusion.

**Feasibility:** A special resource study is likely to find that the Natural Bridge properties are a feasible addition to the national park system. The reconnaissance survey team found that virtually all of the existing tracts within the Natural Bridge properties are required to protect the watershed associated with the karst geological features, including both the natural bridge and the caverns. Using current FMSS analysis, the team estimated that the deferred maintenance for the natural bridge and caverns (not including the commercial properties) is \$2,286,000 (\$1.226M for the natural bridge, \$0.474M for the caverns, and \$0.586M for the associated utilities). Operational costs, based on analysis of comparable NPS units of size and complexity, were estimated to be between \$1.186M and \$2.568M per year. The team did not include any land acquisition costs in their evaluation.

**Need for NPS Management:** The reconnaissance survey was unable, due to the limited nature of a reconnaissance survey to make a finding of likelihood for the need for NPS management.

# PART 1: INTRODUCTION & STUDY PROCESS

## Background

On June 13, 2013, the Director of the National Park Service (NPS) received a request from Congressman Bob Goodlatte (VA-06) to undertake a quick study of the resources of Natural Bridge located in Rockbridge County, Virginia due to an impending auction of the property. By approval of the Director, the Northeast Regional Office of the NPS was tasked with undertaking a reconnaissance survey to evaluate Natural Bridge as a potential unit of the national park system.

Because of the need to expedite this survey due to the impending sale, a reconnaissance study team was immediately formed and completed a site visit to Natural Bridge on September 3 – 5, 2013. During the three-day site visit, members of the team met with representatives from Natural Bridge; Cape Leisure Corporation, which provides management services for the site; real estate agents handling the sale of the property; Rockbridge County; Rockbridge Area Conservation Council; and the Valley Conservation Council to collect information about the property.

The reconnaissance team consisted of planning, natural resource, and facilities management staff from the National Park Service's Northeast Regional Office in Philadelphia; a representative of the facilities management staff at Mammoth Cave National Park in Kentucky; and a geologist from the U.S. Geological Survey contributed to this survey.

## Study Objectives and Scope

Areas comprising the present 401 unit national park system are cumulative expressions of a single national heritage. Potential additions to the system should, therefore, contribute in their own special way to a system that fully represents the broad spectrum of natural and cultural resources that characterize our nation. The NPS is responsible for conducting professional studies of potential additions to the national park system when specifically authorized by an Act of Congress, and for making recommendations regarding new areas to the Secretary of the Interior, the President, and Congress.

A reconnaissance study determines whether a resource is likely or unlikely to meet congressionally required criteria for the designation of potential units of the national park system and to recommend if a congressionally authorized special resource study should or should not be considered for authorization by Congress. These criteria include determinations of national significance, suitability, feasibility and need for NPS management. Should a resource be deemed not likely to meet any one of the criteria, the NPS does not normally recommend that a special resource study be authorized.

## Evaluation Criteria

Several laws outline criteria for potential units of the national park system. To receive a favorable recommendation from the NPS, a proposed addition to the national park system must (1) possess nationally significant natural or cultural resources; (2) be a suitable addition to the system; (3) be a feasible addition to the system; and (4) require direct NPS management instead of alternative protection by other public agencies or the private sector. These criteria are designed to ensure that the national park system includes only the most outstanding examples of the nation's natural and cultural resources. They also recognize that there are other alternatives, short of designation as a unit of the national park system, for preserving the nation's outstanding resources.

An area or resource may be considered nationally significant if it is an outstanding example of a particular type of resource; possesses exceptional value or quality in illustrating or interpreting the natural or cultural themes of our nation's heritage; offers superlative opportunities for public enjoyment or for scientific study; and retains a high degree of integrity as a true, accurate, and relatively unspoiled example of a resource. If a reconnaissance survey concludes that a resource is not likely to meet the national significance criterion, the other criteria below are not normally addressed in the survey.

An area may be considered suitable for potential addition to the national park system if it represents a natural or cultural resource type that is not already adequately represented in the system or is not comparably represented and protected for public enjoyment by other federal agencies; tribal, state, or local governments; or the private sector.

To be feasible as a new unit of the national park system, an area must be of sufficient size and appropriate configuration to ensure sustainable resource protection and visitor enjoyment (taking into account current and potential impacts from sources beyond its boundaries), and be capable of efficient administration by the NPS at a reasonable cost.

This report will briefly address the need for NPS management criterion as it relates to Natural Bridge. There are many excellent examples of the successful management of important natural and cultural resources by other public agencies, private conservation organizations, and individuals. The NPS applauds these accomplishments, and actively encourages the expansion of conservation activities by state, local, and private entities, and by other federal agencies. Unless direct NPS management of a studied area is identified as the clearly superior alternative, the service will recommend that one or more of these other entities assume a lead management role, and that the area not be recommended as a potential unit of the national park system.



*Views of the Blue Ridge Mountains from the survey area.*

## Description of the Study Area

The reconnaissance survey area of interest includes over 1,600 acres situated in the Great Valley of Virginia within Rockbridge and Botetourt counties. The survey area contains the Natural Bridge (the Bridge), the Caverns of Natural Bridge (the Caverns), and a large developed area including a hotel, gift shop, wax museum, inn, and a number additional cottages and outbuildings. For the purposes of this reconnaissance survey, the study team has limited its focus to only the Bridge, the Caverns, and other undeveloped areas within the immediate watershed of the Bridge and Caverns. This survey does not consider the developed area of the property for inclusion in the national park system.

Natural Bridge is located along Interstate 81 between Roanoke, 40 miles to the southwest, and Lexington, 16 miles to the northeast. Interstate 81 junctures with Interstate 64 just north of Lexington, providing easy access for those traveling north/south on I-81 and those traveling east/west on I-64. The area is surrounded by the George Washington and Jefferson National Forests to the east and west and is within approximately 15 miles of the Blue Ridge Park-

way and the Appalachian National Scenic Trail.

### *History of the Survey Area*

The Natural Bridge has been used as a path of migration, point of recreation, and artistic and spiritual inspiration for centuries. Prior to the arrival of Europeans, the Great Valley of Virginia had been used as hunting grounds by Native Americans. The Bridge is thought to have been part of the “Great Path” used by Native Americans to migrate through the Appalachian mountain range.

The first written account of Natural Bridge occurred in 1747 as Euro-Americans began to settle and explore lands in western Virginia. The Bridge quickly became one of the nation’s most recognizable natural wonders, drawing a steady stream of interested tourists and artists to the area. Thomas Jefferson was among the first Americans to be drawn to the site and eventually purchased the land from King George III in 1774. According to the 1998 National Historic Landmark Nomination, Jefferson was so fond of the Bridge that he considered it “a public trust and would not allow it to be injured, defaced, or masked from public view.”



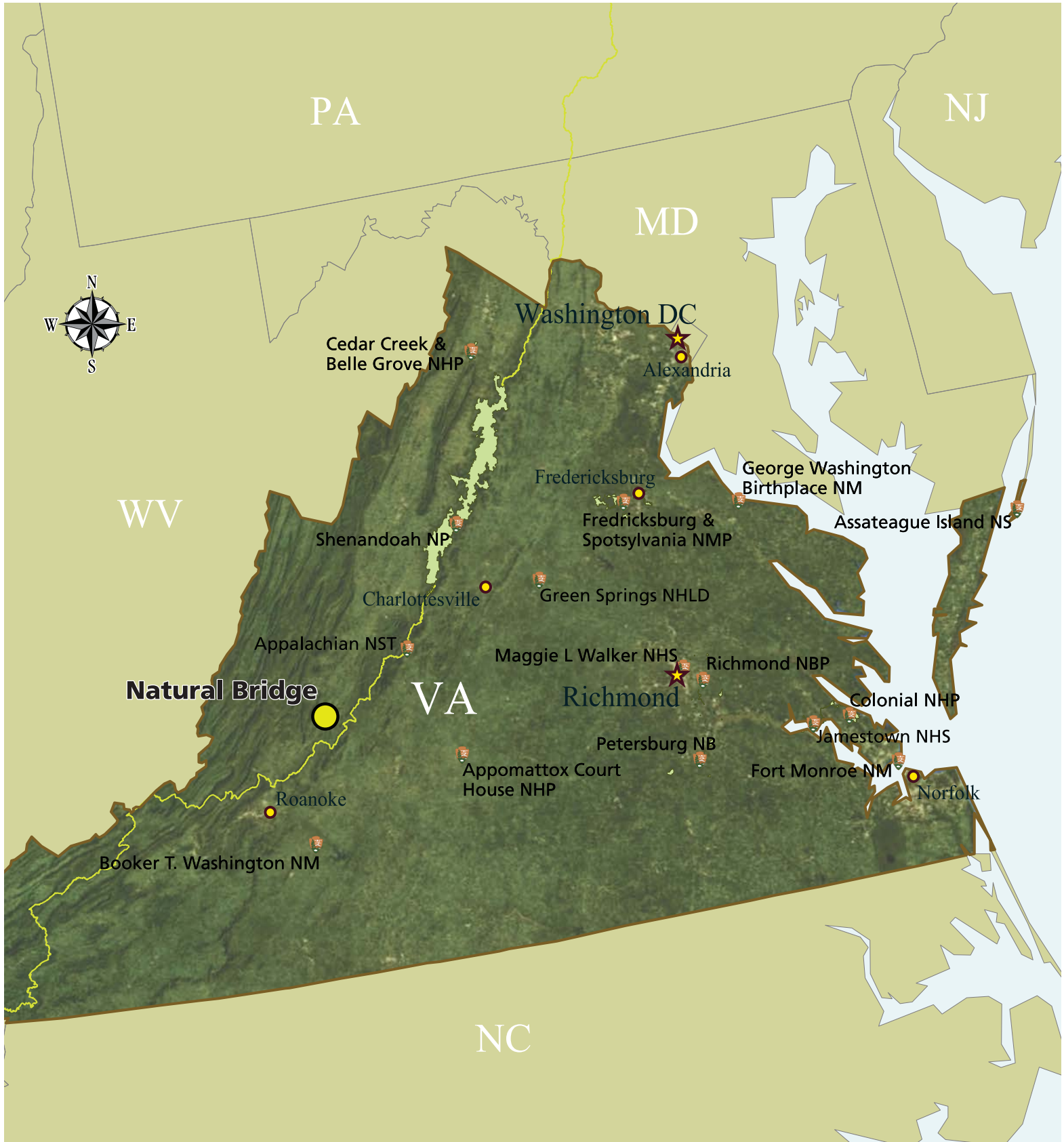
*Etched into the side of the Natural Bridge are the initials G.W. Many believe that George Washington may have surveyed the Bridge, but the report is highly disputed and no definitive evidence has been found to support the claim.*

Jefferson built a small cabin on the property which was used by visitors to the Bridge including Presidents Monroe, Jackson, and Van Buren, as well as John Marshall, Henry Clay, and Sam Houston. It is widely claimed that George Washington surveyed the property and a survey point containing the initials “G.W.” can be found on a stone beneath the bridge. This claim, however, is disputed in the National Bridge National Register Nomination as the property was never listed in *The George Washington Atlas* or in Washington’s diaries. In addition to Jefferson and his guests, countless artists and writers visited the property for artistic inspiration, including Herman Melville who included a reference to the Bridge in *Moby Dick*.

In addition to being used as a tourist destination and place of inspiration, Jefferson leased the Bridge as a shot tower and mined the property’s caves for saltpeter. The property passed out of the Jefferson family in 1835, but would continue to be developed as a major tourist destination with tourism facilities, such as a hotel and tavern, constructed by 1850. Development of the Caverns of Natural Bridge was considered and attempted as early as 1881, but it was not until 1979 that a suitable entrance for the general public was created and the Caverns became part of the tourism experience. The property today has been expanded to include a trail system which passes under the Bridge, a hotel and conference center, wax museum, an inn and cottages, and several gift shops and cafes.



DRAFT Natural Bridge Regional Location



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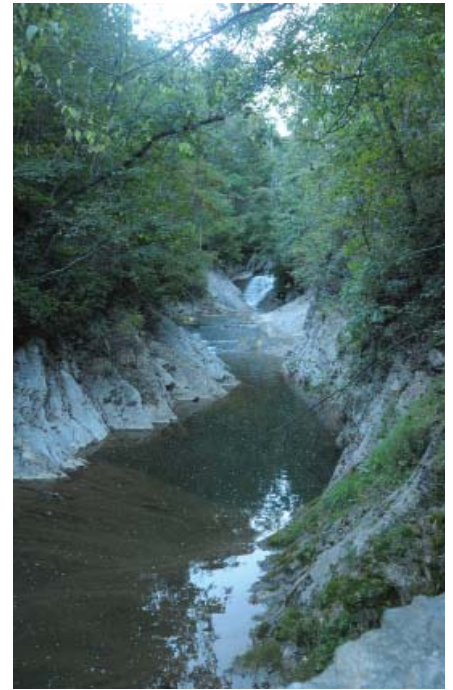
## *Geological Formation of the Natural Bridge*

The study area lies within the Great Valley of the Appalachian Mountains. The Great Valley extends from Tennessee to New York and is underlain mainly by limestone and dolostone, with various ridges held up by more resistant sandstone. This valley was created approximately 300 million years ago, when tectonic forces caused North America and Africa to collide, folding the rock layers in the eastern U.S. to create the Appalachians. Erosion of the landscape since the end of the collision, and the subsequent moving apart of the two continents, has created the ridge and valley landscape we see today.

Natural Bridge is situated within a narrow segment of the Great Valley of Virginia located within the Valley and Ridge province of the Appalachians. This area is bounded by the Blue Ridge province to the east and the Appalachian Plateau province further to the west. The Valley and Ridge province is defined as a karst landscape which is a type of landscape where the dissolving of the bedrock has created sinkholes, sinking streams, caves, springs, and other characteristic features. In general, a typical karst landscape forms when much of the water falling on the surface interacts with and enters the subsurface through cracks, fractures, and holes that have been dissolved into the bedrock. After traveling underground, sometimes for long distances, this water is then discharged from springs, many of which are cave entrances. Geologists believe that Natural Bridge was formed as a result from this type of underground stream.

About 3-1/2 miles northwest of Natural Bridge is a canoe shaped topographic feature called Short Hills which is a double ridge held up by the resistant sandstone. The headwaters of Cedar Creek, the stream that runs beneath Natural Bridge, are within Short Hills. It is thought that Cedar Creek was diverted into a sinkhole at some point, finding its way through an underground cave system to the James River. Over time, the stream would continue to erode the underground cavern away until eventually the cavern roof would give way and collapse into the stream below. What was left of the cavern became the stream bed and steep gorge of Cedar Creek.

As mentioned earlier, the Great Valley of Virginia was created when the Blue Ridge province folded westward over the limestone and dolostone valley floor. One of these folds is a U-shaped fold known as the Natural Bridge syncline. The reason that Natural Bridge exists geologically is probably due to the fact that it is situated in the core of this syncline. While other rocks of the region are folded and faulted in angled or slanted patterns, the dolostone that makes up Natural Bridge are horizontal, leaving them with few fractures that would normally enhance erosion. This pattern can be clearly seen



*The narrow gorge of Cedar Creek as it enters the survey area at Lace Falls.*

within the walls of the Cedar Creek gorge. The stronger, compacted, horizontal rock which composed the Natural Bridge's arch has prevented its collapse while the weaker, fractured rock surrounding the Bridge eventually gave way and collapsed.

### *Condition of the Resources within the Survey Area*

The survey area contains a number of natural, cultural, and recreational features which are all closely interrelated. The Bridge itself is the main focus of the property, but other resources necessary to understanding the cultural and natural history of the property have been incorporated by means of a 1 ¾ mile round-trip walking trail. These additional resources include Cedar Creek, Saltpeter Cave, and the Lost River. The Caverns of Natural Bridge are not accessible from the walking trail, but are easily accessed via automobile less than one mile from the Bridge gift shop.



*This vertical fracture, located just upstream from the Bridge, is thought to be the same fracture found in one of the large rooms of the Caverns of Natural Bridge.*

### **Natural Bridge**

The Bridge is a large span of limestone connecting the uppermost slopes of the Cedar Creek gorge. Because of its irregular shape, a variety of dimensions have been used to describe its size since Thomas Jefferson first recorded its measurements. On average, the height of the Bridge is 200 feet. The span of the Bridge is approximately 90 feet long, 100 feet wide, and 50 feet thick. U.S. Route 11, a two-lane highway, runs along the top of the Bridge and is enclosed on both sides with an eight to ten foot high wooden fence. Also located on the top of the Bridge is an electrical control shed and lighting system used for illumination of the Bridge.

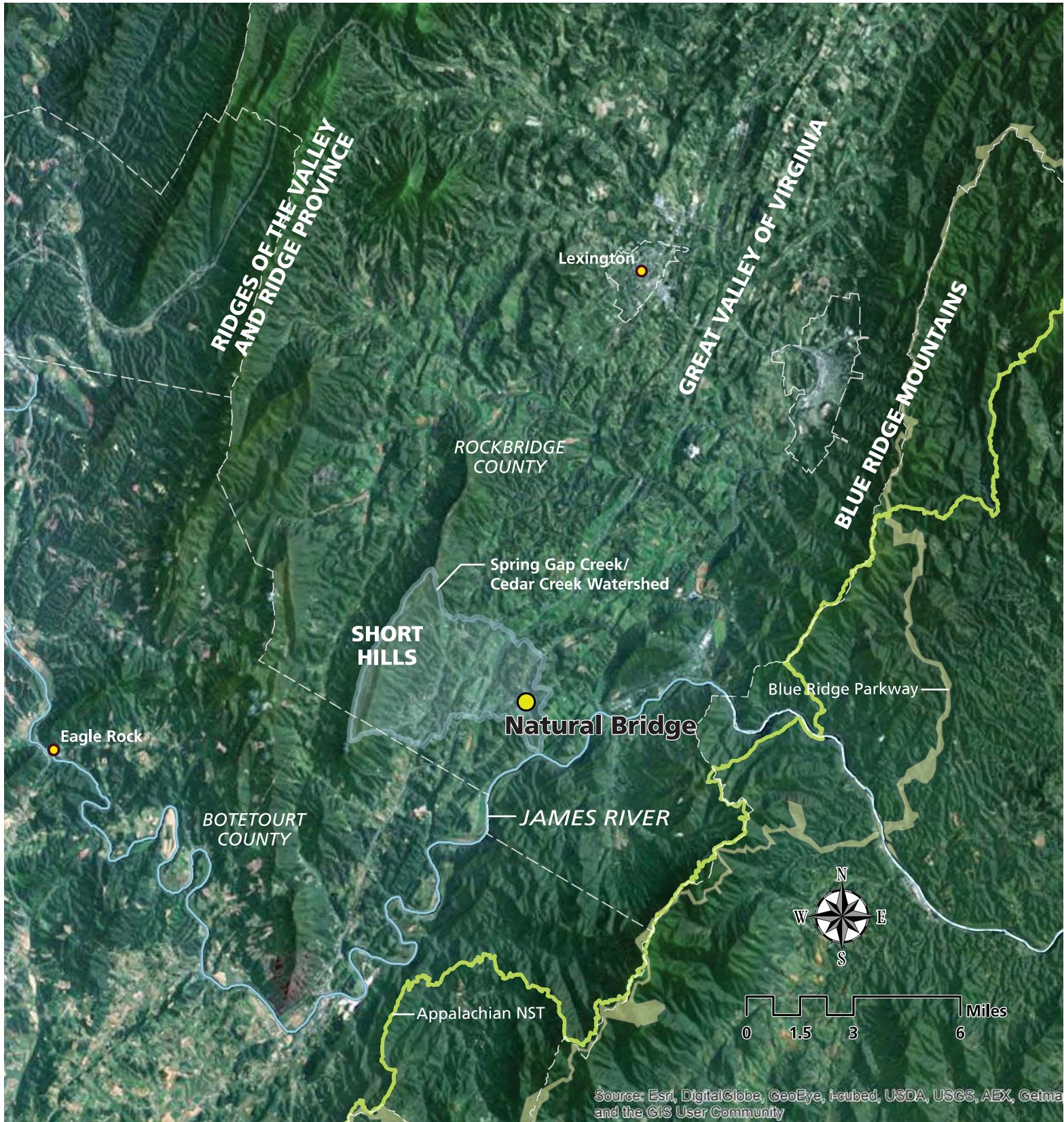
While the top of the Bridge has been altered to accommodate modern conveniences (the highway and lighting system), the historic condition of the underside and walls of the Bridge appear unchanged. The developed area of the property, which includes the hotel, gift shop, and wax museum, are not visible from the bottom of the gorge and do not interfere with historic views. The Cedar Creek bed which runs under the Bridge, however, has been altered to include a pathway, railings, and other improvements which support the needs of the visitor.

### **Cedar Creek**

Cedar Creek is fed through underground streams as it cuts its way through the survey area, under the Bridge, and finally to its terminus at the James River about one mile past the Bridge. Cedar Creek



DRAFT Natural Bridge Region  
within the Vally and Ridge Province of the Appalachian Mountains



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remains relatively unaltered as it flows through the survey area with the exception of the area immediately downstream of the Bridge. A small dam was constructed approximately 100 yards from the Bridge, adjacent to the Summer House – a small structure containing a café, seating area, and restrooms. The dam was designed to create a small, decorative pool for picnickers at the Summer House, but over time the pool has silted in and collected storm debris. Storm debris has also become lodged under several of the walking trail’s bridges, altering water flow of the stream in those immediate areas.

The Virginia Department of Environmental Quality completed a draft water assessment report in 2012 and found Cedar Creek to contain contamination levels higher than those permitted by the U.S. Environmental Protection Agency for streams designated for recreational use. A Total Maximum Daily Load (TMDL) is currently being completed to assist in lowering those contamination levels.

### Salt peter Cave

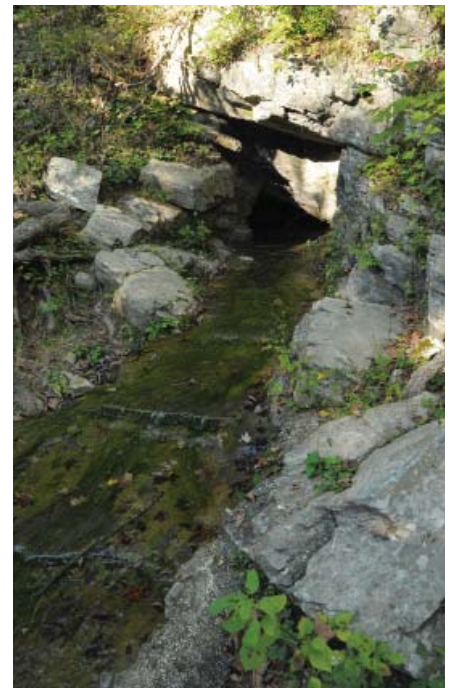
The Salt peter Cave is a tall, but shallow cave found along the banks of Cedar Creek. Thomas Jefferson leased the Salt peter Cave during the War of 1812 and the Civil War for the purpose of mining salt peter which is used to make gun powder.

### The Lost River

The Lost River is an underground stream that can be heard running through the walls of the Cedar Creek gorge wall. A man-made opening in the rocks, created by miners working the Salt peter Cave during the early nineteenth century, allows a portion of the Lost River to flow out of the gorge walls and into Cedar Creek below, but the ultimate path and outfall of the stream have not been determined.

### The Cave System of Natural Bridge

There are 11 caves within the survey area; three of which have been designated as significant under the Virginia Cave Protection Act, including the Caverns of Natural Bridge. Staff from the Virginia Karst Program are currently in the process of surveying the caves found within the survey area and have identified several endemic species including the Natural Bridge cave beetle (*Pseudanophthalmus pontis*), a single cave endemic known only from the Caverns of



*A portion of the Lost River seeps from a man-made opening in the wall of the Cedar Creek gorge. The sound of a waterfall can be heard through the opening.*

## Natural Bridge.

The Caverns of Natural Bridge is the only cave located within the survey area which is open to the public. The cave is said to be the deepest show cave in the Great Valley at 34 stories. The cave is entered through a man-made tunnel which stretches over 500 feet into Buck Hill before crossing paths with the cave's natural entrance. The cave contains approximately 900 linear feet of cave trails; a variety of cave formations, including stalactites, stalagmites, and draperies; and several waterfalls and pools.

## Surrounding Land and Land Use

The majority of land within the survey area is emerging forest with small pockets of residential use. The properties in and surrounding the survey area are primarily zoned for agricultural use and with the exception of the Natural Bridge visitor complex and a few other small tourist attractions, the area is not heavily developed.

# PART 2: PRELIMINARY EVALUATION OF NEW NATIONAL PARKLAND CRITERIA

## Preliminary Evaluation of Significance

National Park Service Management Policies 2006 provide that a resource will be considered nationally significant if it meets all of the following criteria:

1. is an outstanding example of a particular type of resource;
2. possesses exceptional value or quality in illustrating or interpreting the natural or cultural themes of our nation's heritage;
3. offers superlative opportunities for public enjoyment, or for scientific study; and
4. retains a high degree of integrity as a true, accurate, and relatively unspoiled example of a resource.

## Cultural Resources

Cultural resources being considered for possible inclusion in the national park system must satisfy the National Historic Landmark (NHL) criteria contained in 36 CFR Part 65. According to those criteria, national significance is ascribed to districts, sites, buildings, structures and objects that possess:

1. exceptional value or quality in illustrating or interpreting the heritage of the United States in history, architecture, archeology, engineering and culture; and
2. a high degree of integrity of location, design, setting, mate-

rials, workmanship, feeling and association.

In addition, nationally significant sites must meet at least one of the following:

- Criterion 1: Properties that are associated with events that have made a significant contribution to, and are identified with, or that outstandingly represent, the broad national patterns of United States history and from which an understanding and appreciation of those patterns may be gained.
- Criterion 2: Properties that are associated importantly with the lives of persons nationally significant in the history of the United States.
- Criterion 3: Properties that represent some great idea or ideal of the American people.
- Criterion 4: Properties that embody the distinguishing characteristics of an architectural type specimen exceptionally valuable for the study of a period, style or method of construction, or that represent a significant, distinctive and exceptional entity whose components may lack individual distinction.
- Criterion 5: Properties that are composed of integral parts of the environment not sufficiently significant by reason of historical association or artistic merit to warrant individual recognition but collectively compose an entity of exceptional historical or artistic significance, or outstandingly commemorate or illustrate a way of life or culture.
- Criterion 6: Properties that have yielded or may be likely to yield information of major scientific importance by revealing new cultures, or by shedding light upon periods of occupation over large areas of the United States. Such sites are those which have yielded, or which may reasonably be expected to yield, data affecting theories, concepts, and ideas to a major degree.

When evaluating national significance, resources that have already been designated as National Historic Landmarks are considered to already have been determined to be nationally significant and require no further analysis. Resources associated with Natural Bridge were designated a National Historic Landmark by the Secretary of the Interior in 1998 and, therefore, meet the national significance criterion for cultural resources for the reasons identified in its nomination.

### *Natural Resources*

When evaluating natural resources for national significance in a

reconnaissance survey, the following examples of natural resources should be considered in evaluating the significance of a proposal for addition to the national park system:

- An outstanding site that illustrates the characteristics of a wide-spread landform or biotic area;
- A rare remnant natural landscape or biotic area of a type that was once widespread but is now vanishing;
- A landform or biotic area that has always been extremely uncommon;
- A site that possesses exceptional diversity of ecological components or geological features;
- A site that contains biotic species or communities whose natural distribution at that location is unusual;
- A site that harbors a concentrated population of a rare plant or animal species, particularly one officially recognized as threatened or endangered; especially if it is a crucial refuge that is necessary for the continued survival of a species;
- A site that contains rare or unusually abundant fossil deposits;
- An area that has outstanding scenic qualities such as dramatic topographic features, unusual contrasts in landforms or vegetation, spectacular vistas, or other special landscape features;
- A site that has invaluable ecological or geological importance due to an extensive and long-term record of research and scientific discovery.

Natural resources do not have discrete criteria for evaluation of national significance like cultural resources. To help with this suitability analysis, the study team evaluated the natural resources of Natural Bridge by applying the National Natural Landmark criteria contained in 36 CFR Part 62. Within the National Natural Landmarks Program, national significance describes an area that is one of the best examples of a biological or geological feature known to be characteristic of a given natural region. Such features include terrestrial and aquatic ecosystems; geologic structures, exposures and landforms that record active geologic processes or portions of earth history; and fossil evidence of biological evolution.

The NPS uses the following criteria to evaluate the relative quality of areas as examples of regionally characteristic natural features:

#### Primary Criteria:

1. Illustrative character – An area should exhibit a combination of well-developed components that are recognized in the appropriate scientific literature as characteristic of a

particular type of natural feature. Should be unusually illustrative, rather than merely statistically representative.

2. Present condition – An area has been less disturbed by humans than other areas.

#### NNL Secondary Criteria:

1. Diversity – Area contains high quality examples of other biological and/or geological features or processes.
2. Rarity – Area contains rare geological or paleontological feature or biological community or provides high quality habitat for one or more rare, threatened, or endangered species.
3. Value for Science and Education – Area contains known or potential information as a result of its association with significant scientific discovery, concept, or exceptionally extensive and long term record of on-site research and therefore offers unusual opportunities for public interpretation of the natural history of the United States.



*The Natural Bridge is all that remains of a cave which once housed Cedar Creek. Over time, the creek eroded the walls and floor of the cavern away, leaving the roof of the cave unsupported. The Bridge is the only piece of the old cave roof which did not collapse.*

Natural Bridge is the only de-roofed cave known in the eastern U.S. which retains portions of the old cave system as a bridge. The reason that Natural Bridge exists geologically is probably due to the fact that it is situated in the core of the Natural Bridge syncline, a U-shaped fold in the rocks. Although rocks of the region are folded and faulted, the dolostone that makes up Natural Bridge are horizontal leaving them with few fractures that would normally enhance erosion. This geologic formation is clearly illustrated within the Natural Bridge chasm walls. Layers of rock are slanted towards the bridge from both directions before meeting in the horizontal pattern which forms the bridge.

Natural Bridge is one of the few places in the east where a complete cave system is still evident. In addition to the bridge, the site contains eleven caves, three of which are listed as significant under the Virginia Cave Protection Act including the Caverns of Natural Bridge. Biologically, the caverns are known to contain obligate species including the Natural Bridge Cave beetle (*Pseudanophthalmus pontis*), a single cave endemic known only from the Caverns of Natural Bridge. This combination of an entire geologic system within one site can be a great scientific resource for geologists, hydrologists, and biologists studying karst terrains. The geology, hydrology and biology are intertwined and could be studied as an integrated system. The information gleaned from such studies will not only help scientists understand karst resources, but also gives a special opportunity to educate the public.

## *Conclusion: Likelihood of Meeting National Significance Criteria*

Due to its NHL status, Natural Bridge would likely meet the national significance criterion for cultural resources should a special resource study be authorized by Congress. The study team also found that the site would likely meet the national significance criterion for natural resources because of its unique combination of geologic resources as well as educational potential.

## *Preliminary Evaluation of Suitability*

NPS Management Policies 2006 provide that an area is considered suitable for potential addition to the national park system if it represents a natural or cultural resource type that is not already adequately represented in the system, or is not comparably represented and protected for public enjoyment by other federal agencies; tribal, state, or local governments; or the private sector. It is important to reiterate that the suitability analysis is not limited to whether resources are represented in the system, but extends the analysis to similar resources protected by other public entities and the private sector.

A reconnaissance study does not investigate resources for suitability to the degree or level of detail that would be undertaken in a special resource study. Rather, it attempts to identify already protected resources that readily suggest the likelihood of confirming or refuting a likely finding of suitability.

## *Cultural Resources*

In evaluating the suitability of cultural resources within or outside the national park system, the NPS uses its "Thematic Framework" for history and prehistory. The framework is an outline of major themes and concepts that help to conceptualize American history. It is used to assist in the identification of cultural resources that embody America's past and to describe and analyze the multiple layers of history encapsulated within each resource.

Through eight concepts that encompass the multi-faceted and interrelated nature of human experience, the thematic framework reflects an interdisciplinary, less compartmentalized approach to American history. The concepts are:

1. Peopling Places
2. Creating Social Institutions
3. Expressing Cultural Values



*The slanted tilt of the folds leading up to the Bridge (above) are clearly distinguished from the horizontal folds found underneath the Bridge (below).*



4. Shaping the Political Landscape
5. Developing the American Economy
6. Expanding Science and Technology
7. Transforming the Environment
8. Changing Role of the United States in the World Community

The thematic concept applicable to Natural Bridge is Expressing Cultural Values. This theme covers expressions of culture; people's beliefs about themselves and the world they inhabit. This theme also encompasses the ways that people communicate their moral and aesthetic values. Topics that help define this theme include educational and intellectual currents; visual and performing arts; literature; mass media; architecture, landscape architecture, and urban design; and popular and traditional culture. For the purpose of this analysis, the topic of educational and intellectual currents is used as it relates to natural wonders and the New World's establishment of a self-identity. Other theme categories may apply to aspects of Natural Bridge and its history, but for the purpose of the reconnaissance study this topic is readily apparent.

This suitability analysis analyzes other natural wonders which stood as symbols and provided a unique identity for the American people. Although many natural wonders from the American west have also become symbols of America's landscape, this analysis compares Natural Bridge with other sites which were widely known by the general public during the early Colonial era (1740s) through the mid-1800s. The two other natural wonders which appear in literature as heavily visited during that time are Niagara Falls and Mammoth Cave.



*Niagara Falls*

**Niagara Falls State Park (New York)** - Niagara Falls has been a major tourist destination for nearly 200 years and to a large extent epitomizes the evolution of tourism in the U.S. Its fame has been based on being an authentic resource, a geological wonder of overwhelming magnitude. It is unique in North America and is enormously significant as a cultural icon. As a major tourist attraction for early Americans, Niagara Falls lent itself to commercialization and industrialization, and eventually became the centerpiece of the American Grand Tour. Niagara Falls was remarkable for its scale and for the opportunity it offered for man to combine technology and nature.

**Mammoth Cave National Park (Kentucky)** – Native Americans discovered Mammoth Cave about 4,000 years ago and continued to use it for 2,000 years, mining gypsum, selenite, mirabilite, epsomite, and other related minerals. In the late 1790s settlers

“rediscovered” the cave, and during the War of 1812 slaves mined saltpeter from the cave sediments to be used in the manufacture of gunpowder. Tours began in 1816, increasing the cave’s notoriety, and drawing visitors in ever greater numbers. It was then known as Mammoth Cave, but its extent and boundaries were then and still are unknown. This is the world's longest known cave system, with more than 400 miles explored. Early guide Stephen Bishop called the cave a "grand, gloomy and peculiar place," but its vast chambers and complex labyrinths have earned its name.

## Conclusion

During the early Colonial era, Natural Bridge and Niagara Falls were two of America’s most popular tourist attractions. As modes of transportation grew to include railroads, additional tourist destinations, such as Mammoth Cave, became easier to access and contributed to American tourism. These destinations played a large role in creating a new cultural identity for America, separate from the European culture and heritage. American tourist attractions became a symbol of the New World and came to be thought of as sacred places where travelers could go for artistic inspiration or escape from everyday life.

While these three geologic formations are vastly different from one another in character and form, they each played identical roles in helping Americans form a distinct identity which was tied to the unique landscape. It is the study team’s conclusion, based on this minimal sampling of resources representing the theme of Expressing Cultural Values, that resources relating to the creation of an American identity would not likely be viewed in a special resource study as a reason to determine that Natural Bridge would meet the suitability criterion for cultural resources. The existence of Niagara Falls State Park and Mammoth Cave National Park, and their availability to the public, would contribute to a finding that suitability under this theme topic is unlikely.

## Natural Resources

In evaluating natural resources, a comparison is made to other similar types of resources represented in the national park system or protected by other public or private entities. Natural Bridge is composed of solid limestone, spanning approximately 90 feet across Cedar Creek, and measuring an average of approximately 200 feet high. The bridge is what is left of a collapsed cave system which was slowly worn away by underground waterways. The immediate Cedar Creek watershed in which Natural Bridge is lo-



*Mammoth Cave National Park*

cated, contains several other features common in karst topography including a number of caves and sinkholes. The geologic systems present at Natural Bridge, including the bridge and caverns, will be compared to similar cave and karst geologic formations already open for public enjoyment throughout the southern Appalachians.



*Flowstone formation at Mammoth Cave National Park.*

**Mammoth Cave National Park (Kentucky)** – Mammoth Cave National Park preserves the cave system and a part of the Green River valley and hilly country of south central Kentucky. The unique features of karst topography have made Mammoth Cave the longest cave in the world, with more than 360 miles of mapped passages. Above the cave, the surface landscape highlights rare plants and dense forest, a diverse aquatic ecosystem in the Green and Nolin Rivers, and hallmark geologic features of a classic karst terrain. Mammoth Cave was created as rain water seeped downward through cracks in the limestone and began to dissolve and create the labyrinth of passages. As passageways become larger and cross one another, ceilings of passageways collapse, sometimes creating large open rooms. Typical of karst topography, the landscape surrounding Mammoth Cave contains large sinkholes and sinking streams. Visitors can participate in ranger-led cave trips along the park’s 14 miles of developed cave trails and participate in the environmental education programs to learn more about the cave system. On average, 400,000 visitors participate in cave tours at Mammoth Cave National Park each year.

**Natural Tunnel State Park (Virginia State Park)** – Natural Tunnel, located in southwestern Virginia, was formed as an old cave system was deroofed by underground streams, eventually exposing portions of the old cave system. Unlike Natural Bridge where only a small portion of the roof remained, Natural Tunnel retains more than 850 feet of the original cave roof which now forms the 100 foot tall tunnel. Natural Tunnel was historically used as a rail passageway and still contains tracks used by Norfolk Southern today. Also located within Natural Tunnel State Park are two caves which are open to the public for “wild cave” tours. The caves at Natural Tunnel State Park are not commercial caves, meaning that they do not contain infrastructure such as lighting or constructed pathways. Visitors are provided headgear with lamps and are guided through the tunnels by park staff.

**Grand Caverns (Grottoes, Virginia)** – Grand Caverns, owned by and located within the Town of Grottoes, Virginia, is the oldest continuously operating show cave in the U.S. Located 60 miles northeast of Natural Bridge, Grand Caverns was designated a National Natural Landmark in 1973 and is unique because of its cave

shield formations and vertical limestone bedding. Like most karst caves, Grand Caverns was formed by underground streams which disappeared with a lowering groundwater table, leaving behind large underground rooms and tunnels. Grand Caverns is open for visitation year round, with the exception of some holidays, and offers guided tours and school programming.

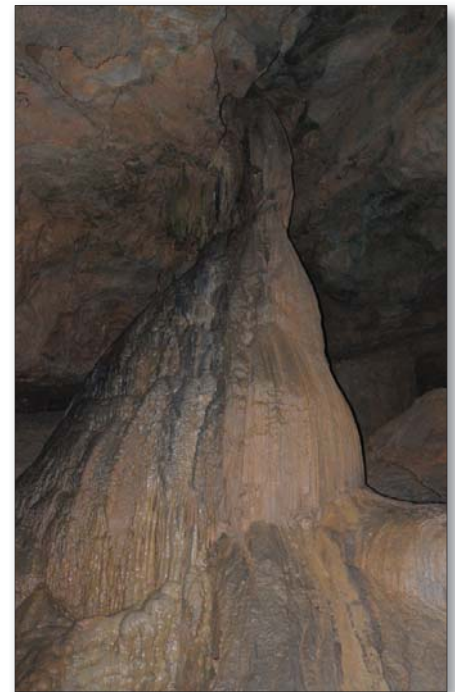
## Conclusion

Cave systems are not uncommon in cave and karst geologic areas and examples of these are already represented and protected within the national park system and by others as shown with Mammoth Cave National Park and Grand Caverns. Deroofed caves, such as Natural Bridge and Natural Tunnel, are less common and these are the only two examples of this magnitude known to exist on the east coast. The caverns located on the Natural Bridge and Natural Tunnel properties would not be likely to meet the suitability criteria on their own, but the combination of cave karst resources – the caverns underground and deroofed cave formations above ground – are only thought to be represented in only these two locations.

Although the geologic processes that formed both Natural Bridge and Natural Tunnel are similar, they represent two different times of development. Natural Bridge is a much more mature feature exposing the last portion of the roof whereas Natural Tunnel still contains 800 feet of the large cave. Another distinguishing characteristic is the presence of Cedar Creek which continues to flow underneath Natural Bridge compared to the dry floor of Natural Tunnel. The presence of the creek within the Natural Bridge chasm provides greater interpretive and educational potential as it continues to illustrate the process which formed the existing bridge and cave system. Additional interpretive and educational potential exists with the exposed chasm walls of Natural Bridge. The lack of vegetative growth along the chasm walls clearly exhibits the underlying limestone formation slanting towards the bridge from both directions until reaching a nearly horizontal formation at the bridge. The slanted limestone shafts which are visible around the bridge are thought to be the same shafts visible from within the Caverns of Natural Bridge. The rarity of the resources found at Natural Bridge, along with its educational potential, do not appear to be adequately represented by the National Park Service or protected and interpreted by other public or private entities.

## *Conclusion: Likelihood of Meeting Suitability Criteria*

This reconnaissance survey found other cultural resources already



*Dome formation in the Caverns of Natural Bridge.*

protected and interpreted by units of the national park system others which adequately represent the theme of *Expressing Cultural Values* through the formation of a national identity and source for artistic inspiration. It is the natural resources present at Natural Bridge, however, which are considered unique and provide educational opportunities not already available within the national park system or by other entities. For this reason, the study team concludes that Natural Bridge would likely be found to be a suitable addition to the national park system in a congressionally authorized special resource study.

## Preliminary Evaluation of Feasibility

NPS Management Policies 2006 states that in order to be feasible as a new unit of the national park system, an area must be:

1. of sufficient size and appropriate configuration to ensure sustainable resource protection and visitor enjoyment (taking into account current and potential impacts from sources beyond proposed park boundaries), and
9. capable of efficient administration by the NPS at a reasonable cost.

In evaluating feasibility, the NPS considers a variety of factors, including: size; boundary configurations; current and potential uses of the study area and surrounding lands; land ownership patterns; public enjoyment potential; costs associated with acquisition, development, restoration, and operation; access; current and potential threats to the resources; existing degradation of resources; staffing requirements; local planning and zoning for the study area; the level of local and general public support; and the economic/socioeconomic impacts of designation as a unit of the national park system. The feasibility evaluation also considers the ability of the National Park Service to undertake new management responsibilities in light of current and projected constraints on funding and personnel.

This reconnaissance survey only assesses the feasibility of the resources likely to be considered nationally significant, including the resources within the Natural Bridge chasm and those resources associated with the Caverns of Natural Bridge. The developed portion of the property, including the hotel/conference center, large gift shop, wax museum, and lodges were not included as part of this survey.

## *Current and Potential Threats to the Resources*

The impending auction of all or portions of the Natural Bridge property pose the greatest threat to the resources. Sale of the property could lead to additional development, degradation of viewsheds and natural resources, and loss of public access to the bridge and caverns. Impacts to the natural resources have already resulted from the impending auction as the property was heavily logged in preparation of the sale.

Development could also lead to additional threats to the Cedar Creek watershed through increased sedimentation loads and groundwater contamination. Recent analysis of Cedar Creek has already indicated high levels of contamination and sedimentation accumulation within Cedar Creek due to an existing dam on the property already poses a threat to the ecological community of the creek. The karst terrain in which the survey area is located, allows for large amounts of underground drainage where precipitation enters the system rapidly through swallets and sinkholes and finds its way into Cedar Creek or one of the survey area's eleven caves. Due to the fact that water enters the karst system rapidly, contaminants can also enter the groundwater system rapidly. Since the underground drainage in karst systems can be complex, groundwater sheds do not often equal surface water sheds and it is not uncommon for groundwater many miles away to cross beneath surface water drainage divides.

In addition to groundwater contamination threats in the caves, the Caverns of Natural Bridge and its biota are threatened due to improper entryways and lighting systems. The lack of an air-tight entryway prevents the cavern from maintain natural temperature and humidity levels and improper lighting systems have encouraged the growth of excessive mold within the cave system.

Route 11, which crosses the top of Natural Bridge, could pose additional threats to the integrity of the geologic formation. Safety fences, which have been constructed alongside Route 11, are clearly visible from the chasm's pedestrian walkway and distract from the historic viewshed. In addition, the Commonwealth of Virginia holds a deeded agreement for rights to the Route 11 right-of-way in order to construct and maintain the road ("solely and only the surface of the land").

## **Conclusion**

The majority of these resource threats are tied to the immediate study area and cannot be fully assessed without knowing the



*Sedimentation and storm debris have collected upstream of one of the property's dams.*



*U.S. Route 11 as it crosses over Natural Bridge.*

outcome of the upcoming auction of those properties. Threats which may result in degradation of the watershed outside of the immediate study would require an evaluation of existing state and local environmental and land use regulations which is beyond the scope of this survey. Despite these resource threats, the majority of the survey area currently consists of emergent woodland and, if continued to mature, could provide an adequate buffer zone in the immediate area of the Bridge and cave system. Additional public education and cooperation with state and local land use and environmental protection agencies could serve to provide additional protection for the entire Cedar Creek watershed. Despite these resource threats, the area is not subject to resource degradation that would preclude management as a unit of the national park system.

### *Size & Boundary Configuration*

As indicated under resource threats above, protection of the Cedar Creek watershed is key to preserving the site's natural resources. The properties owned by Natural Bridge of Virginia Inc. are of sufficient size to protect the immediate watershed which flows under the bridge and through the site's caves. After careful analysis of the threats and properties surrounding Natural Bridge, the study team was able to determine an area which would be necessary to protect the natural and cultural resources of the property which is shown in the Proposed Area of Preservation Figure.

### **Conclusion**

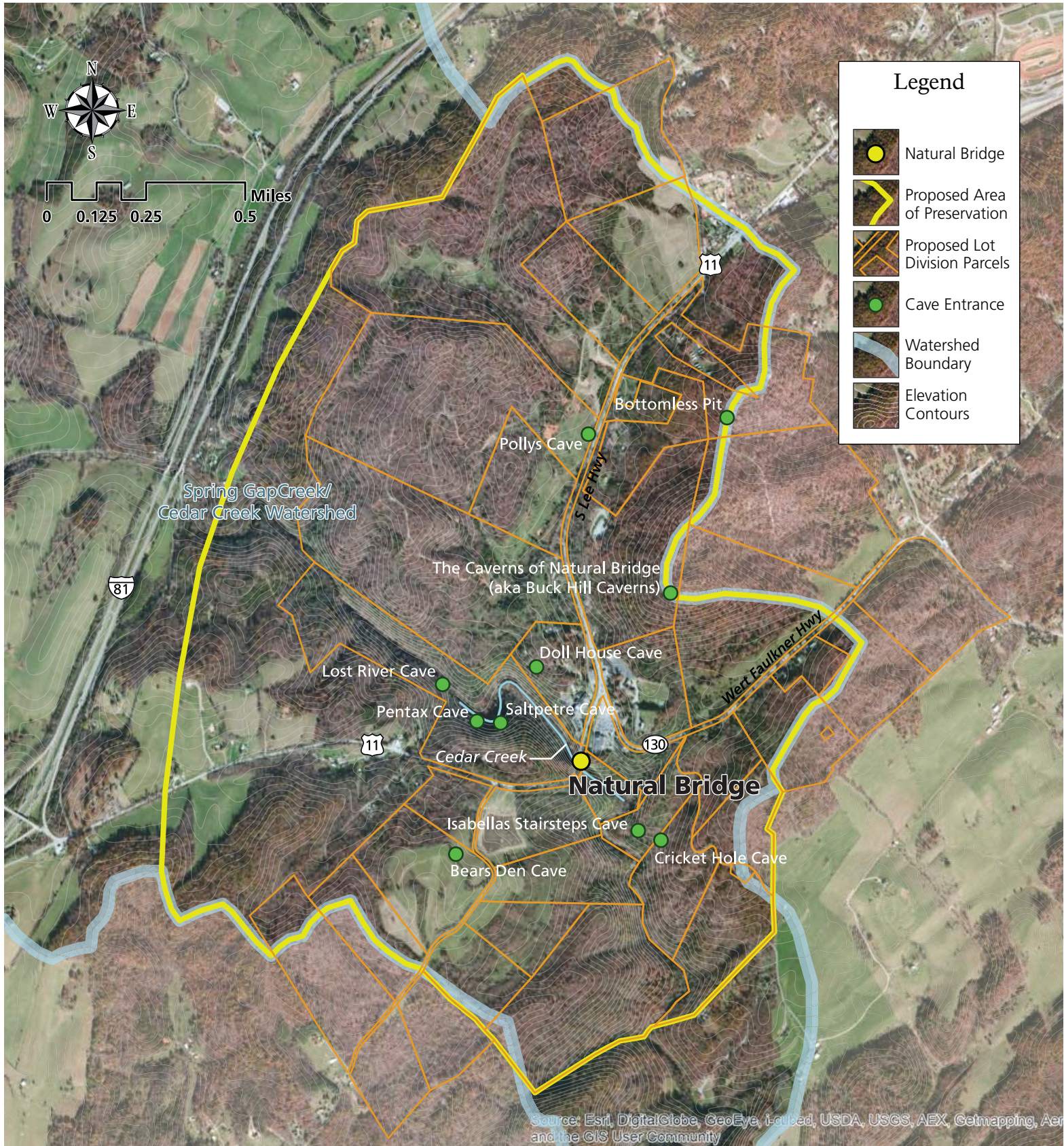
The study team feels that the size and boundary configuration of the properties associated with Natural Bridge would likely be sufficient in protecting the site's resources.

### *Public Enjoyment Potential*

Natural Bridge currently receives approximately 221,000 visitors per year. Under current ownership, the general public pays a general admission fee and experience the bridge through self-guided means. During busy weekends or special events, staff are stationed near the bridge to answer questions, but no regular formal programming exists within the site. The potential of the property to provide additional public enjoyment is high due to the interpretive and educational potential of the resource. Public support for preservation efforts connected with the site have been strong and there is a push by some local groups to place the property within public ownership.



# DRAFT Proposed Area of Preservation



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## Conclusion

There is considerable potential for public access and enjoyment within the survey area. Additionally, the interpretive and educational potential of the site provided added opportunities for public enjoyment of the site.

## Costs

A new unit of the national park system would have start-up and ongoing operational and maintenance costs. For the purposes of this study, the study team developed cost estimates that are based on very broad needs typically associated with the operational requirements of a new park unit (all estimates are provided in 2013 dollars). At a minimum, start-up costs would include acquisition of the property owned by the Natural Bridge of Virginia Inc., whether through donation, exchange, or purchase from willing sellers.

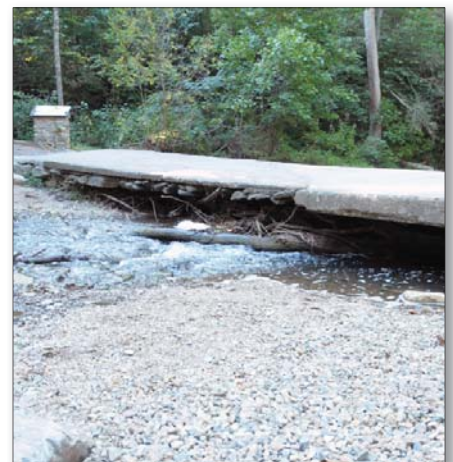
During the September 2013 site visit, the survey team met with maintenance and operations staff from the Natural Bridge to gather data on the resources and gain a better understanding of ongoing maintenance and other operational and visitor facility needs. The objective of this visit was to conduct a comprehensive condition assessment of the site's assets and infrastructure from which the study team was able to forecast the current deferred maintenance and costs required to bring those assets up to current NPS standards. An annual work plan was then created to determine yearly operations and maintenance costs needed to support the property.

## Deferred Maintenance Costs

The study team investigated the immediate work needs of the property in order to bring it up to NPS standards and prevent further deterioration of the resources. Areas of the property which were examined include the facilities at the Natural Bridge, the Caverns of Natural Bridge, the potable water system, and the waste water treatment facility. The total deferred maintenance cost of bringing the resources up to NPS standards is estimated to be \$2.286 million. These deferred maintenance and improvement costs are broken down by area below:

### Natural Bridge

Facilities and infrastructure associated with the Natural Bridge include: the trail leading from the gift shop to the Lace Falls, four



*Flooding within the Cedar Creek gorge has led to pathway wash-outs and the collection of storm debris under bridges.*

trail bridges, the Summer House (concessions and picnic shelter), shuttle roadway leading from the gift shop to the Summer House, two small dams, and the electrical system supporting the light and sound display located at the top of the bridge.

Immediate work needed to repair ongoing maintenance issues in this area would include: replacement of safety fencing along the top of the bridge; repair/replacement of electrical system; replacement of stairs leading down into the chasm; installation of cave gate at Saltpeter Cave; replacement of one failing bridge and reinforce remaining three remaining bridges; and full replacement of shuttle roadway. In addition, Cedar Creek is dammed twice in the vicinity of the Natural Bridge. One dam creates a decorative pool in front of the Summer House while the other, which was not visited by the study team, reportedly serves no function. Due to the heavy siltation created by the dam adjacent to the Summer House, the study team would recommend removing both structures and returning the natural flow of the stream. The total cost for these known deferred maintenance items and improvements is estimated to be \$1.226 million.



*Man-made entrance to the Caverns of Natural Bridge.*

### The Caverns of Natural Bridge

Facilities include: caverns entrance structure, lighting, and trail system; gift shop; picnic area and pavilion; driveway and parking area; and non-potable water system.

Immediate work needed within the caverns includes: installation of and airlock door system, replacement of existing electrical system, repair or replacement of trail surfaces and hand rails, and cleaning of the cave features. Major work associated with the exterior of the caverns would include: resurfacing the parking area, replacement or repair of pavilion and gift shop roofs and siding, installation of water disinfection system. The entrance tunnel to the caverns is not consistent with NPS standards and is in need of repairs. Instead of including costs to repair the structure, the study team included costs for removing the structure and restoring the natural qualities of the area. The total cost of deferred maintenance and improvement needs associated with the Caverns of Natural Bridge is estimated to be \$0.474 million.

### Utilities

Water, waste water, and some general electrical systems were inspected for minimum code requirements and maintenance needs. It should be noted that these utility systems are shared between all areas of the property including the hotel, main gift shop, wax

museum, inn, and lodges. Maintenance work needed on the water system would include replacement of piping in poor condition, replacement of pump system, and inspection of water tower. Maintenance responsibility for the general electric system was unclear during the site visit. Much of the maintenance may be the responsibility of the utility provider. At a minimum, vegetation has encroached on power lines throughout the site and requires removal. The waste water system repairs would be more extensive and would include: replacement of the sludge pumps, commutator, electrical control panels, and back-up generator. Deferred maintenance needs of these systems was estimated to be \$0.586 million

### Operational Expenses

Current operational costs of Natural Bridge and Caverns of Natural Bridge is \$402,498. This cost includes the gift shop associated with the entrance to the caverns, but does not include the Natural Bridge gift shop or Summer House café/restrooms. This operational cost does not reflect a full staff which would be necessary for a unit of the national park system and would probably not support the operational needs of and NPS unit.

Following is a list of NPS units similar in size and current visitation to Natural Bridge. While all sites differ in programming and maintenance needs, this list provides a rough estimate of operational needs and costs for potentially incorporating the bridge and caverns into the national park system.

NPS Unit	NPS Owned Acreage	2012 Visitation	2012 Operating Budget (\$M)	2012 Staff
<b>Appomattox Court House NHP</b>	1,695	320,668	\$1.777	24
<b>Greenbelt Park</b>	1,106	145,552	\$1.219	16 (2010)
<b>Jewel Cave NM</b>	1,274	109,300	\$1.186	26
<b>Lewis &amp; Clark NHP</b>	2,729	201,704	\$1.667	23
<b>Obed Wild &amp; Scenic River</b>	2,632	212,446	\$1.045 (2013)	11
<b>Nez Perce NHP</b>	2,008	233,093	\$2.568	26
<b>War in the Pacific NHP</b>	958	255,923	\$1.546	20

### Conclusion

The cost of necessary deferred maintenance and improvements associated with the property are within reason and would likely contribute positively to a special resource study feasibility analysis. Costs associated with acquisition of the properties have not been

included in this survey.

### ***Conclusion: Likelihood of Meeting Feasibility Criteria***

Despite the current threats to the resources, the land configuration containing the majority of the significant natural and cultural resources is of adequate size to protect the integrity and health of those features and communities. Costs for establishment of a national park unit appear to be feasible, provided that land acquisition, whether through donation, exchange, or purchase from willing sellers, could be arranged. Finally, the high potential for public enjoyment and education lead the study team to conclude that Natural Bridge is likely to meet the feasibility criteria in a full special resource study.

### **Preliminary Evaluation of Need for Direct NPS Management**

This criterion is met if a special resource study concludes that a resource meets other designation criteria and that NPS management is clearly superior to any other available form of management. It may find that the resource is immediately threatened and preservation by the NPS is the only alternative available. The NPS does not normally find that direct management is needed to manage resources already adequately protected by state, local, or private entities.

There are a number of public and private entities who have the ability to manage properties such as the Natural Bridge as tourist destinations. Since Thomas Jefferson first acquired the property in 1774, the property has been open for public enjoyment and protected by many different landowners. The nearly unchanged appearance of the bridge itself, almost 240 years later, is a testament to those preservation efforts. The complexity of the property, consisting of unique and fragile cave and karst formations alongside a highly developed tourist area, may be best managed through partnerships or other collaborative approach in order to fully meet all of the site's needs.

The NPS is a preservation agency whose management practices emphasizes resource protection and visitor enjoyment, as stated in the NPS Organic Act. The Natural Bridge currently lacks coordinated educational and interpretative opportunities which would inform visitors about the significance of resources at Natural Bridge. The NPS is well-known and respected for its expertise in interpretation and education, and could use this expertise on its own or in partnership with other land managers to increase the

level of understanding of Natural Bridge's national significance. In addition, the NPS has a vast knowledge of protecting and preserving natural geologic formations such as natural bridges and cave systems.

### ***Conclusion: Likelihood of Meeting Need for NPS Management Criteria***

The impending auction of the properties associated with Natural Bridge leave the future management of the site unknown. With no clear management path ahead, there is no way to know at this time how the resources will be administered, and under what authorities future plans will be implemented. Until such information is available, it is not possible to determine if the need for direct NPS management would be required, or if the resources would be adequately protected under new management.

NPS management in partnership with other agencies and organizations may be the best option for protecting the property's significant resources, improving the recreational experience, and for providing adequate interpretation and education opportunities for visitors.

### **Reconnaissance Survey Conclusions**

This reconnaissance survey concludes that Natural Bridge is likely to meet the special resource study criteria for national significance for both natural resources and cultural resources. Because the Natural Bridge was previously designated as a National Historic Landmark, its cultural resources were previously determined to meet the national significance criteria. The study team concluded that the unique combination and rarity of the natural resources present within the Natural Bridge properties are also likely to meet the National Natural Landmark's national significance criteria for natural resources.

This study similarly concludes that the resources associated with Natural Bridge are likely to be found to meet the suitability criterion in a special resource study. While the study team does not feel that the cultural resources would likely result in a positive finding of suitability, the combination of natural resources are rare and provide educational and interpretive opportunities which are not already represented within the national park system or through other agencies and organizations.

This survey has determined that the resources are likely to meet the criterion for feasibility as the available parcels are of adequate

size to provide immediate protection for the site's natural features, especially the quality and health of the watershed and its cave system. Finally, the study could not make a definitive conclusion as to the likelihood of meeting the need for NPS management. Due to the upcoming sale of the property, the management direction for Natural Bridge could not be evaluated thoroughly. Based on current management, however, the study team could find potential educational and interpretive benefits to an NPS managed, either solely or in partnership, site.

Based on the analysis contained in this reconnaissance survey, the NPS recommends that Congress consider the authorization for a full special resource study for Natural Bridge.

# APPENDICES

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The survey team wishes to express its appreciation for the information and courtesies provided by all those who contributed to this survey including Dan LeBlanc, Don Henk, Charlie Wade, Boyd Temple, Barbara Walsh, Spencer Suter, Faye Cooper, Lee Merrill, Chris Wise, and Will Orndorff. The team would like to pay a special thanks to Dr. Ed Spencer whose extensive knowledge of the Natural Bridge and Caverns of Natural Bridge was invaluable during this process.

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NPS Geologic Resource Division  
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VA Department of Environmental Quality - Water Division  
<http://www.deq.state.va.us/Programs/Water.aspx>

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**Congress of the United States**  
**House of Representatives**

June 13, 2013

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LIVESTOCK, DAIRY, AND POULTRY

Mr. Jonathan B. Jarvis  
Director  
National Park Service  
1849 C Street, N.W., Suite 3112  
Washington, D.C. 20240

**VIA E-MAIL**

Dear Director Jarvis:

I write to you regarding the pending sale of the Natural Bridge in Natural Bridge, Virginia. A National Historic Landmark, the Natural Bridge is scheduled to be sold at auction in the near future, ending nearly a quarter century of ownership by the Angelo Puglisi family.

The Natural Bridge is millions of years old, formed by the creek that now runs below it and other natural forces. Beyond its geological history, it has significant ties to America's founders. George Washington surveyed the bridge early in his career and Thomas Jefferson once owned it. It's also the basis for the name of the locality in which it stands – Rockbridge County, Virginia.

The sellers of the Natural Bridge have suggested that the National Park Service consider accepting the landmark into the National Park system. They have proposed raising private funds to purchase the bridge and placing a conservation easement on adjoining property in order to protect it for the future. I respectfully request that the Park Service perform a quick study of the Natural Bridge to determine if it would be a suitable national park under such conditions.

I would appreciate your prompt attention to this request and look forward to hearing from you in the very near future.

Very truly yours,

Bob Goodlatte  
Member of Congress

RWG:pl

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United States Department of the Interior – National Park Service