

Periodic Report - Second Cycle

1. World Heritage Property Data

1.1 - Name of World Heritage Property

Mammoth Cave National Park

1.2 - World Heritage Property Details

State(s) Party(ies)

- United States of America

Type of Property

natural

Identification Number

150

Year of inscription on the World Heritage List

1981

Comment

Type of Property: change to "natural"


1.3 - Geographic Information Table

Name	Coordinates (longitude / latitude)	Property (ha)	Buffer zone (ha)	Total (ha)	Inscription year
Mammoth Cave National Park	37.187 / -86.103	21191	0	21191	1981
Total (ha)		21191	0	21191	

Comment

Since the property was inscribed in 1981, the size of the national park has increased by 205 hectares (just under a 1% increase) from 21,191 hectares in 1981 to 21,396 hectares in 2013. Consequently, the USA may propose a minor boundary modification in accordance with par. 163 and 164 of the Operational Guidelines.

1.4 - Map(s)

Title	Date	Link to source
Mammoth Cave National Park	01/03/2006	

Comment

Under the retrospective inventory process, the park plans to provide an updated map that shows the current boundary of the property.

1.5 - Governmental Institution Responsible for the Property

- Jonathan Putnam
US National Park Service Office of International Affairs
World Heritage Program Officer

1.6 - Property Manager / Coordinator, Local Institution / Agency

- Bruce Powell
Mammoth Cave National Park
Deputy Superintendent

Comment

Sarah Craighead Superintendent Bruce Powell Deputy Superintendent and World Heritage Coordinator Mammoth Cave, KY 42259

Section II-Mammoth Cave National Park

1.7 - Web Address of the Property (if existing)

- [View photos from OUR PLACE the World Heritage collection](#)
- [Mammoth Cave National Park \(U.S. World Heritage\)](#)
- [Mammoth Cave National Park \(U.S. National Park Service\)](#)
- [World Heritage in the United States](#)

Comment

Delete web addresses 1 and 2 since they either have no content or produce an error message.

1.8 - Other designations / Conventions under which the property is protected (if applicable)

Comment

Mammoth Cave National Park is designated as the core of the Mammoth Cave Area International Biosphere Reserve.

2. Statement of Outstanding Universal Value

2.1 - Statement of Outstanding Universal Value / Statement of Significance

Statement of Significance

Mammoth Cave is the most extensive cave system in the world, with over 285 miles (456 km) of surveyed cave passageways within the property (and at least another 80 miles [128 km] outside the property). The park illustrates a number of stages of the Earth's evolutionary history and contains ongoing geological processes and unique wildlife. It is renowned for its size and vast network of extremely large horizontal passages and vertical shafts. Nearly every type of cave formation is known within the site, the product of karst topography. The flora and fauna of Mammoth Cave is the richest cave-dwelling wildlife known, with more than 130 species within the cave system.

Criteria

(vii) Mammoth Cave is the longest cave system in the world. The long passages with huge chambers, vertical shafts, stalagmites and stalactites, splendid forms of beautiful gypsum flowers, delicate gypsum needles, rare mirabilite flowers and other natural features of the cave system are all superlative examples of their type. No other known cave system in the world offers a greater variety of sulfate minerals. (viii) Mammoth Cave exhibits 100 million years of cave-forming action and presents nearly every type of cave formation known. Geological processes involved in their formation continue. Today, this huge and complex network of cave passages provides a clear, complete and accessible record of the world's geomorphic and climatic changes. Outside the cave, the karst topography is superb, with fascinating landscapes and all of the classic features of a karst drainage system: vast recharge area, complex network of underground conduits, sink holes, cracks, fissures, and underground rivers and springs. (x) The flora and fauna of the cave is the richest cavernicolous wildlife known, numbering over 130 species, of which 14 species of troglobites and troglaphiles are known only to exist here.

Comment

The existing Statement of Outstanding Universal Value and Statement of Significance for Mammoth Cave National Park has errors. As part of the retrospective process, the statement of outstanding universal value for Mammoth Cave National Park will be revised. The park plans to work with the Washington Office of the National Park Service, U.S.A. to

make the necessary corrections in conjunction with the review and comments from the World Heritage Centre and IUCN.

2.2 - The criteria (2005 revised version) under which the property was inscribed

(vii)(viii)(x)

2.3 - Attributes expressing the Outstanding Universal Value per criterion

(vii) Mammoth Cave is the longest known cave system in the world and has long passages, large chambers, vertical shafts, stalagmites, stalactites, gypsum flowers and needles, and mirabilite flowers. (viii) Mammoth Cave exhibits 10-15 million years of cave-forming action and provides an impressive record of the world's geomorphic and climatic changes. (x) Mammoth Cave area has a very diverse and well-studied biology, and is one of the highest subterranean bio diversities worldwide.

2.4 - If needed, please provide details of why the Statement of Outstanding Universal Value should be revised

The existing Statement of Outstanding Universal Value and Statement of Significance for Mammoth Cave National Park has errors. As part of the retrospective process, the statement of outstanding universal value for Mammoth Cave National Park will be revised. The park plans to work with the Washington Office of the National Park Service, U.S.A. to make the necessary corrections in conjunction with the review and comments from the World Heritage Centre and IUCN.

2.5 - Comments, conclusions and / or recommendations related to Statement of Outstanding Universal Value

The existing Statement of Outstanding Universal Value and Statement of Significance for Mammoth Cave National Park has errors. As part of the retrospective process, the statement of outstanding universal value for Mammoth Cave National Park will be revised. The park plans to work with the Washington Office of the National Park Service, U.S.A. to make the necessary corrections in conjunction with the review and comments from the World Heritage Centre and IUCN.

3. Factors Affecting the Property

3.14. Other factor(s)

3.14.1 - Other factor(s)

3.15. Factors Summary Table

3.15.1 - Factors summary table

	Name	Impact					Origin	
3.1	Buildings and Development							
3.1.3	Industrial areas							
3.1.4	Major visitor accommodation and associated infrastructure							
3.1.5	Interpretative and visitation facilities							
3.2	Transportation Infrastructure							
3.2.1	Ground transport infrastructure							
3.2.4	Effects arising from use of transportation infrastructure							
3.3	Services Infrastructures							
3.3.1	Water infrastructure							
3.3.2	Renewable energy facilities							
3.3.3	Non-renewable energy facilities							
3.3.4	Localised utilities							
3.3.5	Major linear utilities							
3.4	Pollution							
3.4.2	Ground water pollution							
3.4.3	Surface water pollution							
3.4.4	Air pollution							
3.4.5	Solid waste							
3.4.6	Input of excess energy							
3.5	Biological resource use/modification							
3.5.1	Fishing/collecting aquatic resources							
3.5.3	Land conversion							
3.5.4	Livestock farming / grazing of domesticated animals							
3.5.5	Crop production							
3.5.6	Commercial wild plant collection							
3.5.7	Subsistence wild plant collection							
3.5.8	Commercial hunting							
3.5.9	Subsistence hunting							
3.5.10	Forestry /wood production							
3.6	Physical resource extraction							

Name		Impact					Origin	
3.6.1	Mining							
3.6.2	Quarrying							
3.6.3	Oil and gas							
3.6.4	Water (extraction)							
3.7	Local conditions affecting physical fabric							
3.7.1	Wind							
3.7.2	Relative humidity							
3.7.3	Temperature							
3.7.4	Radiation/light							
3.7.5	Dust							
3.7.6	Water (rain/water table)							
3.7.7	Pests							
3.7.8	Micro-organisms							
3.8	Social/cultural uses of heritage							
3.8.1	Ritual / spiritual / religious and associative uses							
3.8.2	Society's valuing of heritage							
3.8.3	Indigenous hunting, gathering and collecting							
3.8.4	Changes in traditional ways of life and knowledge system							
3.8.5	Identity, social cohesion, changes in local population and community							
3.8.6	Impacts of tourism / visitor / recreation							
3.9	Other human activities							
3.9.1	Illegal activities							
3.9.2	Deliberate destruction of heritage							
3.9.3	Military training							
3.9.5	Terrorism							
3.10	Climate change and severe weather events							
3.10.1	Storms							

	Name	Impact						Origin	
3.10.2	Flooding								
3.10.3	Drought								
3.10.4	Desertification								
3.10.5	Changes to oceanic waters								
3.10.6	Temperature change								
3.10.7	Other climate change impacts								
3.11	Sudden ecological or geological events								
3.11.1	Volcanic eruption								
3.11.2	Earthquake								
3.11.4	Avalanche/ landslide								
3.11.5	Erosion and siltation/ deposition								
3.11.6	Fire (wildfires)								
3.12	Invasive/alien species or hyper-abundant species								
3.12.1	Translocated species								
3.12.2	Invasive/alien terrestrial species								
3.12.3	Invasive / alien freshwater species								
3.12.5	Hyper-abundant species								
3.12.6	Modified genetic material								
3.13	Management and institutional factors								
3.13.1	Low impact research / monitoring activities								
3.13.2	High impact research / monitoring activities								
3.13.3	Management activities								
Legend	Current	Potential	Negative	Positive	Inside	Outside			

3.16. Assessment of current negative factors

3.16.1 - Assessment of current negative factors

	Spatial scale	Temporal scale	Impact	Management response	Trend
3.2	Transportation Infrastructure				
3.2.1	Ground transport infrastructure				

		Spatial scale	Temporal scale	Impact	Management response	Trend
3.2.4	Effects arising from use of transportation infrastructure	restricted	on-going	minor	low capacity	static
3.3	Services Infrastructures					
3.3.1	Water infrastructure	localised	on-going	significant	low capacity	static
3.3.5	Major linear utilities	restricted	on-going	minor	low capacity	static
3.4	Pollution					
3.4.2	Ground water pollution	localised	on-going	significant	low capacity	static
3.4.3	Surface water pollution	localised	on-going	significant	low capacity	static
3.4.4	Air pollution	extensive	on-going	significant	low capacity	static
3.4.5	Solid waste	restricted	on-going	minor	low capacity	static
3.4.6	Input of excess energy	widespread	on-going	significant	low capacity	increasing
3.5	Biological resource use/modification					
3.5.1	Fishing/collecting aquatic resources	restricted	on-going	minor	low capacity	static
3.5.3	Land conversion	restricted	on-going	minor	low capacity	static
3.5.4	Livestock farming / grazing of domesticated animals	localised	on-going	minor	low capacity	static
3.5.5	Crop production	restricted	on-going	insignificant	low capacity	static
3.5.6	Commercial wild plant collection	localised	on-going	significant	low capacity	increasing
3.5.7	Subsistence wild plant collection	localised	on-going	minor	low capacity	increasing
3.5.8	Commercial hunting	restricted	intermittent or sporadic	insignificant	low capacity	static
3.5.10	Forestry /wood production	restricted	on-going	minor	low capacity	static
3.6	Physical resource extraction					
3.6.2	Quarrying	restricted	on-going	minor	low capacity	static
3.6.3	Oil and gas	localised	on-going	minor	low capacity	increasing
3.6.4	Water (extraction)	localised	on-going	significant	low capacity	static
3.7	Local conditions affecting physical fabric					
3.7.5	Dust	restricted	on-going	minor	low capacity	static
3.7.6	Water (rain/water table)	localised	on-going	minor	low capacity	static
3.7.7	Pests	localised	on-going	minor	low capacity	static
3.7.8	Micro-organisms	restricted	on-going	minor	low capacity	static
3.9	Other human activities					
3.9.1	Illegal activities	localised	on-going	significant	low capacity	increasing
3.9.2	Deliberate destruction of heritage	restricted	on-going	minor	low capacity	increasing
3.10	Climate change and severe weather events					
3.10.1	Storms	localised	on-going	significant	low capacity	increasing
3.10.2	Flooding	restricted	frequent	minor	low capacity	increasing
3.10.3	Drought	extensive	on-going	significant	low capacity	increasing
3.11	Sudden ecological or geological events					
3.11.2	Earthquake	widespread	on-going	minor	no capacity and / or resources	static
3.11.4	Avalanche/ landslide	restricted	on-going	minor	low capacity	static
3.11.5	Erosion and siltation/ deposition	restricted	on-going	minor	low capacity	static
3.12	Invasive/alien species or hyper-abundant species					
3.12.1	Translocated species	widespread	on-going	significant	medium capacity	increasing
3.12.2	Invasive/alien terrestrial species	extensive	on-going	significant	medium capacity	static
3.12.3	Invasive / alien freshwater species	restricted	on-going	minor	low capacity	static
3.12.5	Hyper-abundant species	localised	on-going	minor	low capacity	static
3.13	Management and institutional factors					
3.13.2	High impact research / monitoring activities	restricted	intermittent or sporadic	minor	low capacity	static

3.17. Comments, conclusions and / or recommendations related to factors affecting the property

3.17.1 - Comments

4. Protection, Management and Monitoring of the Property

4.1. Boundaries and Buffer Zones

4.1.1 - Buffer zone status

There is **no buffer zone**, and it is not needed

4.1.2 - Are the boundaries of the World Heritage property adequate to maintain the property's Outstanding Universal Value?

The boundaries of the World Heritage property are **adequate** to maintain the property's Outstanding Universal Value

4.1.3 - Are the buffer zone(s) of the World Heritage property adequate to maintain the property's Outstanding Universal Value?

The property had **no buffer zone** at the time of its inscription on the World Heritage List

4.1.4 - Are the boundaries of the World Heritage property known?

The boundaries of the World Heritage property are known by both the management authority and local residents / communities / landowners.

4.1.5 - Are the buffer zones of the World Heritage property known?

The property had **no buffer zone** at the time of its inscription on the World Heritage List

4.1.6 - Comments, conclusions and / or recommendations related to boundaries and buffer zones of the World Heritage property

While the boundary of the World Heritage property is adequate to maintain its outstanding universal values, it must be noted that cave system extends outside the boundary by at least 120 miles. Similarly, the catchment basin for the cave system (approximately 400 square miles) is located primarily outside the boundary of the World Heritage property.

4.2. Protective Measures

4.2.1 - Protective designation (legal, regulatory, contractual, planning, institutional and / or traditional)

The United States Government on behalf of the American public owns Mammoth Cave National Park. It is managed by the National Park Service, a federal agency. As a unit of the National Park System, Mammoth Cave National Park receives the highest level of conservation protection afforded by federal law in the United States.

As an entity of the government of the United States of America, the National Park Service is an agency within the Department of the Interior. Mammoth Cave National Park is operated and managed under the authority of national

government, which has "exclusive federal jurisdiction" over all lands within the park.

Regulations:

The Wilderness Act of 1964

The National Environmental Policy Act of 1969, as amended

The Endangered Species Act of 1973, as amended

The Archeological Resources Protection Act of 1979, as amended

The National Parks Omnibus Management Act of 1998

The Federal Cave Resources Protection Act of 1988

The Redwood National Park Act of 1988

Code of Federal Regulations - Parks, Forests, and Public Property (CFR 36)

Compendium of Regulations - Mammoth Cave National Park - 2003

The National Park Service Management Policies 2001

The National Historic Preservation Act of 1966, as amended

The Native American Graves Protection and Repatriation Act of 1990

Comment

Add the following: The Clean Air Act Amendments of 1970, as amended The Clean Water Act of 1972, as amended Edit/Update the following: Compendium of Regulations - Mammoth Cave National Park - 2012 The National Park Service Management Policies 2006

4.2.2 - Is the legal framework (i.e. legislation and / or regulation) adequate for maintaining the Outstanding Universal Value including conditions of Integrity and / or Authenticity of the property?

The legal framework for the maintenance of the Outstanding Universal Value including conditions of Authenticity and / or Integrity of the World Heritage property provides **an adequate or better basis** for effective management and protection

4.2.3 - Is the legal framework (i.e. legislation and / or regulation) adequate in the buffer zone for maintaining the Outstanding Universal Value including conditions of Integrity and / or Authenticity of the property?

The property had **no buffer zone** at the time of inscription on the World Heritage List

4.2.4 - Is the legal framework (i.e. legislation and / or regulation) adequate in the area surrounding the World Heritage property and buffer zone for maintaining the Outstanding Universal Value including conditions of Integrity and / or Authenticity of the property?

The legal framework for the area surrounding the World Heritage property and the buffer zone provides **an adequate or better basis** for effective management and protection of the property, contributing to the maintenance of its Outstanding Universal Value including conditions of Authenticity and / or Integrity

4.2.5 - Can the legislative framework (i.e. legislation and / or regulation) be enforced?

There is **acceptable** capacity / resources to enforce legislation and / or regulation in the World Heritage property but some deficiencies remain

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4.2.6 - Comments, conclusions and / or recommendations related to protective measures

4.3. Management System / Management Plan

4.3.1 - Management System

The National Park Service, an agency of the United States Government has full management authority over Mammoth Cave National Park. The Park Superintendent oversees management on a day-to-day basis. The Park Superintendent reports to the Southeast Regional Director, who reports to the NPS Director.

By law, general management plans are required for all sites within the National Park System. The General Management Plan for Mammoth Cave National Park was completed in 1983. The purpose of the plan was to set forth a basic management philosophy and provide a long-range framework for management decisions.

Accordingly, the following management objective was established for Mammoth Cave National Park: "The aim of management at Mammoth Cave National Park is to perpetuate the integrity and diversity of geologic features and life systems that are associated with the caves, and the aquatic and terrestrial environments, for these have aesthetic, recreational, educational, and scientific values to man." More specific management objectives in the plan include: (1) To cooperate with various government bodies and other partners. (2) To ensure long-term perpetuation of the cave system, vegetation, wildlife, and other natural resources. (3) To secure adequate information on the park's historical and archeological resources to facilitate their protection and evaluation of their significance and suitability for listing on the National Register of Historic Places. (4) To ensure that park development is adequate for efficient park administration and essential visitor services. (5) To provide commercial facilities and services necessary for visitor use and enjoyment. (6) To facilitate access to and circulation within the park. (7) To foster public awareness and understanding of the cave environment and its environs. (8) To encourage scientific research and collect data on park resources.

In addition to establishing broad goals for Mammoth Cave National Park and specific management objectives, the General Management Plan also affected a number of key decisions. Chiefly, the General Management Plan determined that visitor use facilities would remain in their existing locations (reversing a decision made with the 1976 Master Plan). The General Management Plan also proposed: (1) reopening the New Entrance cave tour route, (2) relocating the Great Onyx Civilian Job Corps Center from Flint Ridge to the northwest part of the park, and (3) promoting additional recreational use of the Hilly Country on the north side of the park. All of these specific management objectives have since been accomplished.

4.3.2 - Management Documents

Comment

General Management Plan for Mammoth Cave National Park (1983)

4.3.3 - How well do the various levels of administration (i.e. national / federal; regional / provincial / state; local / municipal etc.) coordinate in the management of the World Heritage Property ?

There is **excellent coordination** between all bodies / levels involved in the management of the property

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4.3.4 - Is the management system / plan adequate to maintain the property's Outstanding Universal Value ?

The management system / plan is **fully adequate** to maintain the property's Outstanding Universal Value

4.3.5 - Is the management system being implemented?

The management system is being **fully** implemented and monitored

4.3.6 - Is there an annual work / action plan and is it being implemented?

An annual work / action plan exists and **most or all activities** are being implemented and monitored

4.3.7 - Please rate the cooperation / relationship with World Heritage property managers / coordinators / staff of the following

Local communities / residents	Good
Local / Municipal authorities	Good
Indigenous peoples	Fair
Landowners	Good
Visitors	Good
Researchers	Good
Tourism industry	Good
Industry	Fair

4.3.8 - If present, do local communities resident in or near the World Heritage property and / or buffer zone have input in management decisions that maintain the Outstanding Universal Value?

Local communities have **some input** into discussions relating to management but no direct role in management

4.3.9 - If present, do indigenous peoples resident in or regularly using the World Heritage property and / or buffer zone have input in management decisions that maintain the Outstanding Universal Value?

No indigenous peoples are resident in or regularly using the World Heritage property and / or buffer zone

4.3.10 - Is there cooperation with industry (i.e. forestry, mining, agriculture, etc.) regarding the management of the World Heritage property, buffer zone and / or area surrounding the World Heritage property and buffer zone?

There is contact but only **some cooperation** with industry regarding the management of the World Heritage property, buffer zone and / or area surrounding the World Heritage property and buffer zone

4.3.11 - Comments, conclusions and / or recommendations related to human resources, expertise and training

The 1983 General Management Plan for Mammoth Cave National park needs to be updated. The park will be requesting funding to prepare a Foundation Statement and other key management planning documents, such as a Resource Stewardship Strategy and a Long Range Interpretive Plan.

4.3.12 - Please report any significant changes in the legal status and / or contractual / traditional protective measures and management arrangements for the World

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Heritage property since inscription or the last Periodic report

4.4. Financial and Human Resources

4.4.1 - Costs related to conservation, based on the average of last five years (relative percentage of the funding sources)

Multilateral funding (GEF, World Bank, etc)	0%
International donations (NGO's, foundations, etc)	0%
Governmental (National / Federal)	70%
Governmental (Regional / Provincial / State)	0%
Governmental (Local / Municipal)	0%
In country donations (NGO's, foundations, etc)	2%
Individual visitor charges (e.g. entry, parking, camping fees, etc.)	27%
Commercial operator payments (e.g. filming permit, concessions, etc.)	1%
Other grants	0%

4.4.2 - International Assistance received from the World Heritage Fund (USD)

Comment

Mammoth Cave National Park has not received assistance from the World Heritage Fund.

4.4.3 - Is the current budget sufficient to manage the World Heritage property effectively?

The available budget is **inadequate** for basic management needs and presents a serious constraint to the capacity to manage

4.4.4 - Are the existing sources of funding secure and likely to remain so?

The existing sources of funding **are secure** in the medium-term and planning is underway to secure funding in the long-term

4.4.5 - Does the World Heritage property provide economic benefits to local communities (e.g. income, employment)?

There is a **major flow** of economic benefits to local communities from activities in and around the World Heritage property

4.4.6 - Are available resources such as equipment, facilities and infrastructure sufficient to meet management needs?

There are **adequate** equipment and facilities

4.4.7 - Are resources such as equipment, facilities and infrastructure adequately maintained?

There is **basic** maintenance of equipment and facilities

4.4.8 - Comments, conclusion, and / or recommendations related to finance and infrastructure

Funding for Mammoth Cave National Park has been static for over 10 years while costs have increased. Consequently, the available budget is inadequate for basic management needs and presents a serious constraint to the capacity to manage

Section II-Mammoth Cave National Park

4.4.9 - Distribution of employees involved in managing the World Heritage property (% of total)

Full-time	70%
Part-time	30%

4.4.10 - Distribution of employees involved in managing the World Heritage property (% of total)

Permanent	40%
Seasonal	60%

4.4.11 - Distribution of employees involved in managing the World Heritage property (% of total)

Paid	95%
Volunteer	5%

4.4.12 - Are available human resources adequate to manage the World Heritage property?

A range of human resources exist, but these are **below optimum** to manage the World Heritage Property.

4.4.13 - Considering the management needs of the World Heritage property, please rate the availability of professionals in the following disciplines

Research and monitoring	Fair
Promotion	Poor
Community outreach	Fair
Interpretation	Fair
Education	Fair
Visitor management	Fair
Conservation	Poor
Administration	Fair
Risk preparedness	Fair
Tourism	Poor
Enforcement (custodians, police)	Poor

4.4.14 - Please rate the availability of training opportunities for the management of the World Heritage property in the following disciplines

Research and monitoring	Medium
Promotion	Medium
Community outreach	Medium
Interpretation	High
Education	High
Visitor management	High
Conservation	High
Administration	Medium
Risk preparedness	Medium
Tourism	High
Enforcement (custodians, police)	High

4.4.15 - Do the management and conservation programmes at the World Heritage property help develop local expertise?

A capacity development plan or programme is **in place and fully implemented**; all technical skills are being transferred to those managing the property locally, who are assuming leadership in management

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4.4.16 - Comments, conclusions and / or recommendations related to human resources, expertise and training

At Mammoth Cave National Park, a range of human resources exist, but these are below optimum to manage the World Heritage Property. Consequently, the site is not able to take advantage of training opportunities that are available, nor is the site able to fully implement a capacity development plan or to transfer technical skills to those managing the property locally. Question 4.4.15 does not have a response that fits for Mammoth Cave National Park.

4.5. Scientific Studies and Research Projects

4.5.1 - Is there adequate knowledge (scientific or traditional) about the values of the World Heritage property to support planning, management and decision-making to ensure that Outstanding Universal Value is maintained?

Knowledge about the values of the World Heritage property is **sufficient** for most key areas **but there are gaps**

4.5.2 - Is there a planned programme of research at the property which is directed towards management needs and / or improving understanding of Outstanding Universal Value?

There is a **comprehensive, integrated programme of research**, which is relevant to management needs and / or improving understanding of Outstanding Universal Value

4.5.3 - Are results from research programmes disseminated?

Research results are **shared with local participants and some national agencies**

4.5.4 - Please provide details (i.e. authors, title, and web link) of papers published about the World Heritage property since the last Periodic Report

4.5.5 - Comments, conclusions and / or recommendations related to scientific studies and research projects

4.6. Education, Information and Awareness Building

4.6.1 - At how many locations is the World Heritage emblem displayed at the property?

In **one location and easily visible** to visitors

4.6.2 - Please rate the awareness and understanding of the existence and justification for inscription of the World Heritage property amongst the following groups

Local communities / residents	Average
Local / Municipal authorities within or adjacent to the property	Average
Local Indigenous peoples	Not applicable
Local landowners	Average
Visitors	Average
Tourism industry	Average
Local businesses and industries	Average

Section II-Mammoth Cave National Park

4.6.3 - Is there a planned education and awareness programme linked to the values and management of the World Heritage property?

There is a planned education and awareness programme but it only **partly meets the needs** and could be improved

4.6.4 - What role, if any, has designation as a World Heritage property played with respect to education, information and awareness building activities?

World Heritage status has influenced education, information and awareness building activities, **but it could be improved**

4.6.5 - How well is the information on Outstanding Universal Value of the property presented and interpreted?

The Outstanding Universal Value of the property is adequately presented and interpreted **but improvements could be made**

4.6.6 - Please rate the adequacy for education, information and awareness building of the following visitor facilities and services at the World Heritage property

Visitor centre	Adequate
Site museum	Excellent
Information booths	Adequate
Guided tours	Adequate
Trails / routes	Adequate
Information materials	Adequate
Transportation facilities	Poor
Other	Not needed

4.6.7 - Comments, conclusions and / or recommendations related to education, information and awareness building

World Heritage education, information, and awareness building activities continue be emphasized. The park would like to improve and enhance existing efforts to provide education, information, and awareness of World Heritage.

4.7. Visitor Management

4.7.1 - Please provide the trend in annual visitation for the last five years

Last year	Minor Increase
Two years ago	Minor Increase
Three years ago	Minor Increase
Four years ago	Decreasing
Five years ago	Static

4.7.2 - What information sources are used to collect trend data on visitor statistics?

Entry tickets and registries
Accommodation establishments
Transportation services
Tourism industry
Visitor surveys

4.7.3 - Visitor management documents

Comment

Long-Range Interpretive Plan for Mammoth Cave National Park, 2004 General Management Plan for Mammoth Cave National Park, 1983

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4.7.4 - Is there an appropriate visitor use management plan (e.g. specific plan) for the World Heritage property which ensures that its Outstanding Universal Value is maintained?

Visitor use of the World Heritage property is managed but **improvements could be made**

4.7.5 - Does the tourism industry contribute to improving visitor experiences and maintaining the values of the World Heritage property?

There is **excellent co-operation** between those responsible for the World Heritage property and the tourism industry to present the Outstanding Universal Value and increase appreciation

4.7.6 - If fees (i.e. entry charges, permits) are collected, do they contribute to the management of the World Heritage property?

The fee is collected and makes a **substantial contribution** to the management of the World Heritage property

4.7.7 - Comments, conclusions and / or recommendations related to visitor use of the World Heritage property

Visitor use of the world heritage property is effectively managed and does not impact its Outstanding Universal Value. However, improvements are needed (renovation and reconstruction of cave trails, renovation of the elevator, renovation and improvements to surface trails, improvements to the campground and picnic areas, etc.)

4.8. Monitoring

4.8.1 - Is there a monitoring programme at the property which is directed towards management needs and / or improving understanding of Outstanding Universal Value?

There is a **comprehensive, integrated programme** of monitoring, which is relevant to management needs and / or improving understanding of Outstanding Universal Value

4.8.2 - Are key indicators for measuring the state of conservation used to monitor how the Outstanding Universal Value of the property is maintained?

Information on the values of the World Heritage property is **sufficient** for defining and monitoring key indicators for measuring its state of conservation

4.8.3 - Please rate the level of involvement in monitoring of the following groups

World Heritage managers / coordinators and staff	Excellent
Local / Municipal authorities	Non-existent
Local communities	Non-existent
Researchers	Excellent
NGOs	Average
Industry	Non-existent
Local indigenous peoples	Not applicable

4.8.4 - Has the State Party implemented relevant recommendations arising from the World Heritage Committee?

No relevant Committee recommendations to implement

4.8.5 - Please provide comments relevant to the implementation of recommendations from the World Heritage Committee

4.8.6 - Comments, conclusions and / or recommendations related to monitoring

4.9. Identification of Priority Management Needs

4.9.1 - Please select the top 6 managements needs for the property (if more than 6 are listed below)

Please refer to question 5.2

5. Summary and Conclusions

5.1. Summary - Factors affecting the Property

5.1.1 - Summary - Factors affecting the Property

	World Heritage criteria and attributes affected	Actions	Monitoring	Timeframe	Lead agency (and others involved)	More info / comment	
3.4	Pollution						
3.4.4	Air pollution	Air pollution impairment to park natural and cultural resources: visibility; sensitive vegetation species; soil and water resources; cultural resources (Criteria x)	Organic act of 1916; Clean Air Act, as amended in 1977 and 1990, assist the park through various rules and regulations reducing impairment to park natural and cultural resources.	Measure ozone, sulfur dioxide, carbon monoxide, nitric oxide, total oxides of nitrogen, visibility, fine particles, dry deposition, wet deposition, toxic deposition, particle scattering.	on-going	US National Park Service; Kentucky Division for Air Quality; US Environmental Protection Agency	The park also utilizes air pollution effects monitoring to determine impacts to sensitive vegetation; collaborate on air pollution permit reviews with regulatory agencies.
3.4.6	Input of excess energy	Utility corridor impact on natural and cultural landscapes (Criteria x)	Management actions minimize utility corridors impacts within the boundary by using underground utility conduits; allow underground utility corridors to return to natural conditions; above ground utility corridors are monitored/treated.	Monitor and treat above ground utility corridors for invasive/alien species.	on-going	US National Park Service	Utility corridors generally along existing roadways.
3.10	Climate change and severe weather events						
3.10.1	Storms	Change in biodiversity; river/spring/cave stream sedimentation; change in cave temperature; increased frequency and intensity of droughts, severe flooding, and storm events (Criteria x)	Collaborate with climate change and severe weather agencies to develop resource indicator indices for the early detection of climate change. Resource recovery assessments for storm damage.	Monitoring soil moisture and temperature at 5, 10, 20, 50, and 100 centimeters; temperature; precipitation; total solar radiation; wind speed; wind direction; peak wind speed; dry and wet atmospheric deposition.	on-going	US National Park Service; US Natural Resources Conservation Service; US National Oceanic and Atmospheric Administration; US Geological Survey; US National Weather Service	Park continues to explore additional research opportunities on potential impacts to climate change
3.10.3	Drought	Loss of biodiversity; Increase wildfire; loss of wetlands; reduced groundwater levels; wildlife migration; increased stress on endanger species; degradation of soil quality (Criteria x)	Develop strategies to monitor and assess drought conditions	Monitor soil temperature and soil moisture at 5, 10, 20, 50, 100 centimeters; temperature; relative humidity; precipitation; total solar radiation; wind direction; wind speed; atmospheric deposition.	on-going	US National Park Service; US National Oceanic and Atmospheric Administration; US Natural Resources Conservation Service; US Geological Survey; US National Weather Service	Park continues to explore research opportunities on drought impacts to the park.
3.11	Sudden ecological or geological events						
3.11.2	Earthquake	Earthquake impact to natural and cultural resources. (Criteria vii, x)	Monitor and report earthquake activity to lead Federal agency: US Geological Survey. Survey resources for damage assessments.	Observe and report earthquake activity	on-going	National Park Service; US Geological Survey	Earthquakes are relatively infrequent in the park however the park is very close to major active earthquake prone areas.
3.12	Invasive/alien species or hyper-abundant species						
3.12.1	Translocated species	Reduced biodiversity; competition with native species; habitat alteration and degradation (Criteria x)	Actively monitor for invasive/alien species; treat invasive/alien species using prescribed fire plus periodic mechanical and chemical methods. Provide invasive/alien species education opportunities to the region.	Survey open canopy areas, utility corridors, forest edges, trails, visitor service areas, roadways for the presence of invasive/alien species.	ongoing	US National Park Service	Park continues to collaborate with invasive/alien species agencies for early detection and prevention.

5.2. Summary - Management Needs

5.2.2 - Summary - Management Needs

4.4 Financial and Human Resources					
		Actions	Timeframe	Lead agency (and others involved)	More info / comment
4.4.3	The budget is inadequate for management needs	The site has already made many management and program adjustments to continue basic management functions with declining and inadequate funding. Further program and management reviews are already underway to address this ongoing management issue.	Funding allocations are made annually, though the site has prepared a three-year budget cost projection that will be updated periodically.	Mammoth Cave National Park	N/A

5.3. Conclusions on the State of Conservation of the Property

5.3.1 - Current state of Authenticity

Not applicable (for sites inscribed exclusively under criteria vii to x)

5.3.2 - Current state of Integrity

The integrity of the World Heritage property is intact

5.3.3 - Current state of the World Heritage property's Outstanding Universal Value

The World Heritage property's Outstanding Universal Value has been maintained.

5.3.4 - Current state of the property's other values

Other important cultural and / or natural values and the state of conservation of the World Heritage property are predominantly intact

5.4. Additional comments on the State of Conservation of the Property

5.4.1 - Comments

6. World Heritage Status and Conclusions on Periodic Reporting Exercise

6.1 - Please rate the impacts of World Heritage status of the property in relation to the following areas

Conservation	Very positive
Research and monitoring	Very positive
Management effectiveness	No impact
Quality of life for local communities and indigenous peoples	Positive
Recognition	Positive
Education	Positive
Infrastructure development	Positive
Funding for the property	No impact
International cooperation	Very positive
Political support for conservation	Positive
Legal / Policy framework	Positive
Lobbying	Not applicable
Institutional coordination	Positive
Security	Positive
Other (please specify)	Not applicable

6.2 - Comments, conclusions and / or recommendations related to World Heritage status

6.3 - Entities involved in the preparation of this Section of the Periodic Report

Governmental institution responsible for the property
Site Manager/Coordinator/World Heritage property staff

6.4 - Was the Periodic Reporting questionnaire easy to use and clearly understandable?

yes

6.5 - Please provide suggestions for improvement of the Periodic Reporting questionnaire

6.6 - Please rate the level of support for completing the Periodic Report questionnaire from the following entities

UNESCO	Good
State Party Representative	Good
Advisory Body	Fair

6.7 - How accessible was the information required to complete the Periodic Report?

Most of the required information was accessible

6.8 - The Periodic Reporting process has improved the understanding of the following

The property's Outstanding Universal Value
The property's Integrity and / or Authenticity
Managing the property to maintain the Outstanding Universal Value
Monitoring and reporting

6.9 - Please rate the follow-up to conclusions and recommendations from previous Periodic Reporting exercise by the following entities

UNESCO	None
State Party	Satisfactory
Site Managers	Satisfactory
Advisory Bodies	Not Applicable

6.10 - Summary of actions that will require formal consideration by the World Heritage Committee

- Statement of Outstanding Universal Value / Statement of Significance**
Reason for update: The existing Statement of Outstanding Universal Value and Statement of Significance for Mammoth Cave National Park has errors. As part of the retrospective process, the statement of outstanding universal value for Mammoth Cave National Park will be revised. The park plans to work with the Washington Office of the National Park Service, U.S.A. to make the necessary corrections in conjunction with the review and comments from the World Heritage Centre and IUCN.
- Geographic Information Table**
Reason for update: Since the property was inscribed in 1981, the size of the national park has increased by 205 hectares (just under a 1% increase) from 21,191 hectares in 1981 to 21,396 hectares in 2013. Consequently, the USA may propose a minor boundary modification in accordance with par. 163 and 164 of the Operational Guidelines.
- Map(s)**
Reason for update: Under the retrospective inventory process, the park plans to provide an updated map that shows the current boundary of the property.

6.11 - Comments, conclusions and / or recommendations related to the Assessment of the Periodic Reporting exercise