IUCN Conservation Outlook Assessment 2017 **(archived)**
Finalised on 09 November 2017

Please note: this is an archived Conservation Outlook Assessment for Great Smoky Mountains National Park. To access the most up-to-date Conservation Outlook Assessment for this site, please visit https://www.worldheritageoutlook.iucn.org.

Great Smoky Mountains National Park

SITE INFORMATION

Country:
United States of America (USA)
Inscribed in: 1983
Criteria:
(vii) (viii) (ix) (x)

Site description:

Stretching over more than 200,000 ha, this exceptionally beautiful park is home to more than 3,500 plant species, including almost as many trees (130 natural species) as in all of Europe. Many endangered animal species are also found there, including what is probably the greatest variety of salamanders in the world. Since the park is relatively untouched, it gives an idea of temperate flora before the influence of humankind. © UNESCO

SUMMARY

2017 Conservation Outlook

Good with some concerns

The park is well managed despite a number of major challenges and threats that will continue to require attention. External threats, i.e., exotic species, air pollution, long term climate change, and future fiscal funding are hard to predict, but would still seem to pose the biggest risk to the Outstanding Universal Value of the site. Some scenic values have been impacted by Hemlock and Ash die off as a result of Hemlock Woolly Adelgid and the Emerald Ash Borer. Generally speaking however, biodiversity remains high. Strong research and monitoring programs and close partnerships with a range of government and non-government organizations will help park managers understand and mitigate existing and potential threats.

Current state and trend of VALUES

Low Concern
Trend: Stable

Except for the exotic insects that have caused large scale destruction to the Hemlock and Ash stands throughout the park, the assessment is generally positive at the present time. Looking toward the future, fiscal funding, exotic species, air pollution and on-going climate change pose the most serious threats to the park.

Overall THREATS

High Threat

Overall the park resources are effectively managed and protected. However, there are a significant number of current threats that fall into the high threat category. These threats originated or currently come from outside the park, including air pollution and numerous plant and animal invasives (insects, trout, wild pigs etc.).

The threat of the Emerald Ash Borer is rated as high.

Overall PROTECTION and MANAGEMENT

Mostly Effective

Very effective at present. The park has strong relationships with non-profit and volunteer organizations. The park also has very well-developed research and monitoring programs, and good educational and interpretive programs. A large area of the park is managed as wilderness though not yet federally designated as such. The park has successfully responded to air quality issues and worked to address the threat of North Shore Road, will not be constructed. However, there is a real threat that budget cuts will interfere with the effectiveness of park resource management and protection in the future, including education programs.

FULL ASSESSMENT

Description of values

Values

World Heritage values

▶ **Exceptional natural beauty**
Criterion:(vii)

The site is of exceptional natural beauty with scenic vistas of characteristic mist-shrouded (“smoky”) mountains, vast stretches of virgin timber, and clear running streams (WHC website). Great Smoky Mountains National Park is one of the most pristine natural areas in the eastern U.S., offering park visitors breathtaking mountain scenery, including panoramic views of misty peaks, clear flowing mountain streams, and mature hardwood forests stretching to the horizon. The Park encompasses 800 square miles of pristine natural areas with peaks that range from elevations of 875 feet to 6,643 feet, including 16 peaks over 6000 feet in elevation.

▶ **Outstanding example of the diverse Arcto-Tertiary geoflora era**
Criterion:(viii)

Great Smoky Mountains National Park is of world importance as the outstanding example of the diverse Arcto-Tertiary geoflora era, providing an indication of what the late Pleistocene flora looked like before recent human impacts (WHC website). The Great Smoky Mountains are believed to be 200-300 million years old; making them among the oldest mountains in the world. During the last (Pleistocene) ice age, about 10,000 years ago, the glaciers that scoured much of North America allowed for the migration of species into the Smoky Mountains and because of the unique northeast to southwest orientation of the mountains the glaciers did not invade the Smoky

Mountains. This created not only unique mountain features, but also a vast diversity of flora and fauna that we see today. (IUCN 1982)

► Significant example of continuing biological evolution

Criterion:(ix)

Great Smoky Mountains National Park is one of the largest remaining remnants of the diverse Arcto-Tertiary geoflora era in the world, providing a good indication of the appearance of late Pleistocene flora. 30% of the forested landscape of the park is ancient old growth forest.The Park is large enough to be a significant example of continuing biological evolution of this natural system and is of the one of the most ecologically rich and diverse temperate zone protected areas in the world (World Heritage Committee).

► Diversity of Flora and Fauna

Criterion:(x)

The Great Smoky Mountains National Park is one of the most biologically diverse parks in a temperate climate (WH website).
Animals: Research indicates that there are 65 species of mammals, over 200 varieties of birds, 50 native fish species, and more than 80 types of reptiles and amphibians in the Park. The Park is also home to the world’s greatest diversity of salamander species (31) - an important indicator of overall ecosystem health - and is the center of diversity for lungless salamanders, with 24 species.Within the boundaries of the Park there are a number of threatened or endangered species; including 3 mammals, 3 fish, and 1 arthropod. In addition, there are 15 animal species listed as Federal Species of Concern found in the Park (GSMP 2012).
Plants: An average of 85” of rainfall annually, the variations in elevation, temperature, and geology provide ideal habitat for over 1,600 species of flowering plants, including 100 native tree species and over 100 native shrub species - a level of floristic diversity that rivals or exceeds other temperate zone protected areas of similar size In addition the park has a vast number of non-flowering plants, including 450 bryophytes-mosses, liverworts, and a few hornworts. Non-flowering species also include some 50 ferns and fern allies and at least one horsetail. There are three federally listed threatened and endangered plant species, and in addition over 300 species of native

vascular plants are considered rare (GSMP 2012)

Assessment information

Threats

Current Threats

High Threat

Overall the park resources are effectively managed and protected. However, there are a significant number of current threats that fall into the high threat category. Invasive alien species in particular, that of plants and invertebrates (Emerald Ash Borer) pose significant threats to the ecosystem.

▶ **Marine/ Freshwater Aquaculture**

Low Threat
Inside site

Rainbow and Brown Trout, introduced from outside the park are competing with native Brook Trout. (Moore et al. 2005)

▶ **Other Biological Resource Use**

Low Threat
Inside site, scattered(5-15%)

High annual visitation (11.3 million recreational visitors in 2016 (NPS, 2017)) cause impacts to trails, campgrounds, roads, and other park facilities. Current funding does not allow the proper level of personnel to adequately address both front-country and back-country resource and visitor management issues

▶ **Other**

High Threat

Inside site, widespread(15-50%)
Outside site

The high population of wild hogs, which are descended from Russian wild boars introduced outside the park for sport hunting decades ago, in the park creates resource damage, competition with native animals for food, introduces diseases, and creates a potential threat to public safety. However, the adjacent State of Tennessee has recently changed the status of these hogs from a sporting animal to "pest" allowing greater reduction in the population (NPS, 2016).

► Air Pollution

High Threat
Outside site

Air pollutants from power plants, industry, and automobiles outside the park, though reduced by 70% from levels in decades past, continue to cause impacts for scenic views, increasing the pH in high elevation streams and soils, and damaging plants. Some18% of park streams are currently too acidic to support fish and other aquatic life. Air-borne ammonia, from near-by hog farms and cattle feed lots, is adversely affecting aquatic insects, such as dragonflies, and thus enters the food chain (NPS, 2016).

► Invasive Non-Native/ Alien Species

Very High Threat
Inside site, widespread(15-50%)

There are over 380 non-native plant species in the park, 35 of those are aggressive and pose a threat to the park’s ecosystems. At least 8 of these species are prolific in the park (Japanese Grass, Privet, Multiflora Rose, Japanese Honeysuckle, Mimosa Garlic Mustard, Oriental Bittersweet, Musk Thistle), and present a significant threat to the ecosystem (NPS 2004, 2016).

► Fire/ Fire Suppression

High Threat
Inside site, widespread(15-50%)
Outside site

The invasive Hemlock Woolly Adelgids, first identified to be in the park in 2002, killed a large portion of the Eastern Hemlock trees in the park.

However, new growth of hemlocks has begun in these areas of the park. Research is onging to monitor and determine long-term effects of this invasive alien species (NPS, 2016).

► Other

High Threat
Inside site, scattered(5-15%)

The balsam woolly adelgids were first discovered in the Smokies in the early 1960’s, between then and 1990 the park lost over 90% of its mature fir forest from these insects. The park began a study on the surviving trees in 1990 on 36 high elevation peaks to determine the condition and the effects of the adelgids these remaining trees. In recent years some new growth of fir tress has begun in the park (NPS, 2015).

► Invasive Non-Native/ Alien Species

Very High Threat
Inside site, localised(<5%)

The park's population of the endangered Indiana Bat has been reduced by some 80% due to die off caused by white-nose syndrome, a fungus. Heretofore, the park's White Oak Sink cave has been the largest hybernacular for this species on the East coast of the US.

► Tourism/ Recreation Areas

Low Threat
Inside site, scattered(5-15%)

Commercial air tours over national parks are intended to be controlled or prohibited by an Air Tour Management Plan, developed jointed by the NPS and the Federal Aviation Administration. However none exists for this park and such "tours" are a growing concern with helicopters tours advertised locally between Pigeon Forge, TN and Cherokee, NC, crossing the park and adversely affecting natural quiet, and increasing noise intrusion on the visitor experience.

► Invasive Non-Native/ Alien Species

High Threat

Inside site, scattered(5-15%)

Emerald Ash Borer, an invasive insect that creates large scale mortality to all species of Ash, and has begun to kill Ash trees in the Great Smoky Mountains NP on a large scale. Chemical treatment by park staff is benefiting some 20,000 trees per year in old growth stands and in park developed areas.

Potential Threats

Low Threat

Didymosphenia geminata pose a potential threat to the property but is not yet found inside the property and active monitoring protocol is in place. Balsam fir are beginning to recover from the adverse impacts of the woolly adelgids in past years.

► Other

Low Threat
Outside site

Didymosphenia geminata, commonly known as Didymo or “rock snot” is an alga that grows in many North American freshwater streams. Although it is not found in the park at present, there is an active monitoring protocol in place to detect it. Once established in streams it forms extensive mats on stream beds, and chokes out other aquatic life. Didymo is not presently known to be in the Smokies, but is found in all tailwater streams in eastern Tennessee. The alga easily attaches to the felt soles of fisherman’s wading shoes and is readily introduced into other streams.

Protection and management

Assessing Protection and Management

► Relationships with local people

Highly Effective

Key stakeholders, including the Friends of the Smokies, and the Great Smoky Mountain Association, are supportive of the park. The Smokies has one of the highest number of volunteers of any National Park, 2,269 volunteers donated

117,306 hours in Fiscal Year 2016 (NPS, 2017).

▶ Legal framework

Some Concern

The legal framework under which the park operates is highly effective. The existing law enforcement effort is also effective, but current and anticipated budget reductions limit the park’s ability to patrol and enforce laws and regulations, and to protect park resources and visitors. (NPCA 2004)

▶ Enforcement

Some Concern

Cuts on the park's operating budget in recent years have reduced the number of field law enforcement rangers on the park staff, with the result that most patrols are limited to the paved roads of the park, and thus backcountry and boundary encroachment concerns go unmet.

▶ Integration into regional and national planning systems

Highly Effective

Park management has extensive partnerships and close working relationships with County, State and Federal agencies beyond the National Park Service, especially focused on collaborative regional management through the Southern Appalachian Man & the Biosphere Committee (SAMAB)(NPS 2008).

▶ Management system

Highly Effective

Existing Park management system is highly effective.

▶ Management effectiveness

Highly Effective

Park management is highly effective. Park has a large and very active Science and Resource Management Division with active programs in vegetation, wildlife, fisheries, insect, air quality, fire ecology and fire management. Other active programs include All Taxa Biodiversity Inventory, endangered species research and management, invasive species research

and management, and re-introduction programs including the successful re-introductions of river otter, Elk, Peregrine Falcon, and three species of small fish. In addition, the Park also operates the Appalachian Highlands Science Learning Center at Purchase Knob for the promotion of scientific research and education (NPCA 2004, NPS 2008).

▶ Implementation of Committee decisions and recommendations

Highly Effective

Very effective. The State Party was commended for its responsiveness with respect to air quality issues (World Heritage Committee, 2002) as well as for its work to address the threat North Shore Road construction into a wild, undeveloped area of the park (World Heritage Committee, 2006).

▶ Boundaries

Some Concern

Park Boundaries are somewhat well established, even though some sections have never been surveyed; some sections of the boundary may need re-posting. Keeping boundary lines cleared and posted takes a considerable amount of time, but current funding and staffing does not allow for this work to be carried out.

▶ Sustainable finance

Some Concern

Annual budgets rise and fall with different administrations. In the past several years, with the assistance of excellent partners, the Park has generally been able to sufficiently maintain the site’s values. As the federal government seeks to balance its budget, this may become increasingly difficult.
However, the ever shrinking Park budget continues to create management challenges, causing some programs to remain underfunded. While the park cannot collect visitor entrance fees, it does receive and retain funding from backcountry usage and from camping. NPS 2016 Foundation Document (NPCA 2004, NPS 2008)

▶ Staff training and development

Some Concern

Funding provides for all mandatory training, but does not allow adequate training needed to train personnel in all elements of their job; especially where lodging and per diem is required. Consequently most training is provided via on-line instruction, rather than classroom. (NPCA 2004)

▶ Sustainable use

Mostly Effective

Tourism is the largest sustainable use in the park and the surrounding counties. However, lack of funding threatens some of the programs, i.e., education, maintenance, and resource management, and without the present level of support from partner organizations these programs would be threatened for further reduction. (NPS 2008)

▶ Education and interpretation programs

Mostly Effective

As described above, federal funding does not adequately support education and interpretive programs.

▶ Tourism and visitation management

Mostly Effective

The communities surrounding the park consider tourism to be the number one source of economic income; unlike most other US national parks, Great Smoky Mountains NP does not provide commercial services inside the park, rather relying of adjacent communities to provide park visitors with needed services. Education/interpretive programs in the park support economic development by enhancing the visitor experience and extending stays.

▶ Monitoring

Mostly Effective

The park has numerous monitoring programs ongoing. In particular, the park has adopted a "Vital Signs" monitoring protocol, focused on six key factors to indicate park health - acid deposition, vegetative communities, soil quality, water chemistry, freshwater communities, and climate change.

► Research

Mostly Effective

There is a vibrant research program in the park with numerous research permits issued annually. For example, over the past decade, the park's all-taxa biological inventory has identified a total of 19,363 species in the park, including 9187 species new to the park, and 983 species new to science.

Overall assessment of protection and management

Mostly Effective

Very effective at present. The park has strong relationships with non-profit and volunteer organizations. The park also has very well-developed research and monitoring programs, and good educational and interpretive programs. A large area of the park is managed as wilderness though not yet federally designated as such. The park has successfully responded to air quality issues and worked to address the threat of North Shore Road, will not be constructed. However, there is a real threat that budget cuts will interfere with the effectiveness of park resource management and protection in the future, including education programs.

► Assessment of the effectiveness of protection and management in addressing threats outside the site

Some Concern

Assessment of the threats is generally effective, but there are many legal and fiscal restraints that limit the extent of mitigation.

► Best practice examples

There are numerous examples of best management practices in the park. Examples are the Elk Re-introduction program, Restoration of native Brook Trout, prescribed fire management, wild hog reduction program, bear management, education and interpretive programs, and resource and visitor protection programs.

State and trend of values

Assessing the current state and trend of values

World Heritage values

▶ **Exceptional natural beauty**

High Concern
Trend:Improving

Scenic values have been adversely impacted by heavy mortality of Hemlock trees caused by the exotic insect Hemlock Woolly Aldelgid, though some recent rnew growth of hemlocks has been noted, and from visibility impairment caused by fossil fuel plants and automobiles outside the park. Other current major impacts include the Emerald Ash Borer, which has caused high mortality of native ash trees in the park. Current steps are being taken to address pollution from sources outside the park, and the Tennessee Valley Authority will be phasing out some of the higher emission power plants in the region (NPCA 2011).

▶ **Outstanding example of the diverse Arcto-Tertiary geoflora era**

Good
Trend:Stable

Except for occasional rock slides, usually during thawing and rainy periods, these values appear stable.

▶ **Significant example of continuing biological evolution**

Low Concern
Trend:Stable

The 390,500 acres (out of 522,370 acres in the entire park) that Congress recommended be officially designated as Wilderness have not yet been designated by law, but are nonetheless managed in much the same way as an officially designated wilderness area. Now that the North Shore Road will not be built, it is more likely that official Wilderness designation could be revisited. Again, however, budget is a threat in this category. With the high

visitation in the front country requiring more focused management, the backcountry areas will most likely receive a lower priority for management. . Nonetheless, and despite a range of threats, the Park benefits from a high degree of intactness.

▶ **Diversity of Flora and Fauna**

High Concern
Trend:Stable

There is a loss of some native species from poaching (Ginseng, Trillium, and other flowering and medicinal plants), and exotic pests (especially Hemlock Woolly Aldelgid) and other introduced insect pest that may threaten in the future pose a major threat. (NPCA 2004) but biodiversity remains very high in the park.

Summary of the Values

▶ **Assessment of the current state and trend of World Heritage values**

Low Concern

Trend: Stable

Except for the exotic insects that have caused large scale destruction to the Hemlock and Ash stands throughout the park, the assessment is generally positive at the present time. Looking toward the future, fiscal funding, exotic species, air pollution and on-going climate change pose the most serious threats to the park.

Additional information

Benefits

Understanding Benefits

▶ **Outdoor recreation and tourism, Natural beauty and scenery**

This is the most visited National Park in the Nation, and is the key economic stimulus for the local communities.

With 800 miles of trails available to park visitors, the property is a destination for outdoor recreation activities for visitors from across the USA and around the world. The quality of visitor experience is influenced by numerous factors including the extent of air and water pollution, visibility, and crowding. While developed areas of the park are overcrowded in the peak visitor season, backcountry trails are seldom overused, and remain a major attraction for visitors.

► Contribution to education

Education is a key component of the park values, from in-park education/interpretive programs, to higher education and research programs for colleges and universities. In addition, the Great Smoky Mountain Institute at Tremont Institute, a non-profit organization that provides education programs to promote the ecological, cultural, and stewardship of the GSMNP.

► Outdoor recreation and tourism

With about 10 million visitors annually the Smoky Mountains is the most visited National Park in the NPS, it directly and indirectly generates and supports millions of dollars and thousands of jobs for the local and regional economy.

► Importance for research

The park serves as a benchmark for contrasting the character of largely pristine environments and disturbed areas outside the park boundaries, as well as monitoring long term effects, such as air and water quality, exotic pests and climate change.

Projects

Compilation of active conservation projects

№	Organization/ individuals	Project duration	Brief description of Active Projects

1	Park staff	Park Superintendent
2	Park staff	Chief, Science and Resource Management: Division chief, manages all projects concerning science and resource management in the park.
3	Park staff	Chief, Resource Education: Division chief, manages all resource education programs in the park.
4	Park staff	Chief, Resource and Visitor Protection: Division chief, manages all resource and visitor protection issues in the park.

Compilation of potential site needs

№	Site need title	Brief description of potential site needs	Support needed for following years
1	N.A.	Park research needs are listed on the park web page www.nps.gov/grsm/naturescience/science_needs.htm	

REFERENCES

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10	Stephen E. Moore, Matt A. Kulp, John Hammonds, and Bruce Rosenlund (2005) Restoration of Sam’s Creek and an Assessment of Brook Trout Restoration Methods, Great Smoky Mountains National Park. National Park Service U.S. Department of the Interior Water Resources Division, Natural Resource Program Center. Technical Report NPS/NRWRD/NRTR-2005/342 http://www.nature.nps.gov/water/fisheries/assets/reports/gr…
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