WHC Nomination Documentation

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SITE NAME ("TITLE") Great Smoky Mountains National Park

DATE OF INSCRIPTION ("SUBJECT") 9/12/1983

STATE PARTY ("AUTHOR") UNITED STATES OF AMERICA

CRITERIA ("KEY WORDS") N (i)(ii)(iii)(iv)

DECISION OF THE WORLD HERITAGE COMMITTEE:
The Committee made no statement.

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

1.b. State, province or region: The counties of Cocke, Blount, and Sevier in the State of Tennessee; and the counties of Swain and Haywood in the state of North Carolina

1.d Exact location: Long. 83°45’-84° W ; Lat. 35°26’15»- 35°47’ N

Date Recd : 23.12.82
Id.N° : 259

Convention Concerning the Protection of
the World Cultural and Natural Heritage

WORLD HERITAGE LIST NOMINATION

GREAT SMOKY MOUNTAINS NATIONAL PARK

by

The United States of America

1982

WORLD HERITAGE LIST
Nominating Paper
GREAT SMOKY MOUNTAINS NATIONAL PARK

I. LOCATION:

A. Country: United States of America

B. States and Counties: The counties of Cocke, Blount, and Sevier in the State of Tennessee; and the counties of Swain and Haywood in the State of North Carolina

C. Name of Property: Great Smoky Mountains National Park

D. Exact location on map and geographical coordinates: The park lies along the border between North Carolina and Tennessee. The state line follows the height of land along the mountain range. The park is a roughly elliptical area of 209,000 ha extending between latitudes N 35°26'15" and 35°47'0" and longitudes W 83°45' and 84 0'.

II. JURISDICTION

A. Owner: United States Government, Department of the Interior

B. Legal Status: The Act of May 22, 1926 (44 Stat. 616) provided for establishment of Great Smoky Mountains National Park "for the benefit and enjoyment of the people." In that Act, the park's purpose is further indicated by reference to the Act of August 25, 1916 (39 Stat. 535), which established the National Park Service and which states that the fundamental purpose of national parks is "... to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimparied for the enjoyment of future generations."

The park's purpose is therefore to preserve its exceptionally diverse resources and to provide for public benefit from and enjoyment of those resources in ways which will leave them basically unaltered by modern human influences.

Other acts of the U.S. Congress that affect protection of the environment, preservation of historic properties, and other purposes in the Great Smoky Mountains National Park are as follows:

Fish and Wildlife Coordination Act as amended (16 U.S.C. 1531 et seq)
Wilderness Act (16 U.S.C. 1131 et seq)
Water Resources Planning Act of 1965 (42 U.S.C. 1962 et seq)
Concessions Policy Act of 1965 (16 U.S.C. 20 et seq.)
Solid Waste Disposal Act (P.L. 89-272, October 20, 1965)
National Historic Preservation Act of 1966 (16 U.S.C. 470 as amended by P.L. 96-575)

National Trail System Act (16 U.S.C. 1241 to 1249)
National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq)
Noise Control Act of 1972, as amended (42 U.S.C. 4901 et seq)
Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 U.S.C. 4651 et seq)
Federal Water Pollution Control Act (33 U.S.C. 208, 303, 401, 402. 404, 405, 407, 511, 1288, 1314, 1341, 1342, 1344)
Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq)
Safe Drinking Water Act (42 U.S.C. 300 f-j)
Clean Air Act, as amended (42 U.S.C. 7401 et seq)
Energy Supply and Environmental Coordination Act of 1974 (42 U.S.C. 1857b-1 et seq)
American Indian Religious Freedom Act (42 U.S.C. 1966)
Resource Conservation and Recovery Act of 1976 (codified in scattered sections of 42 U.S.C.)

A complete legal history is included in the enclosed general management plan.

The Great Smoky Mountains National Park is open to the public, including 434 km of highway and 668 km of foot trails throughout the tract.

C. Responsible Administration: Great Smoky Mountains National Park is administered for the National Park Service, United States Department of the Interior, by: Superintendent, Great Smoky Mountains National Park, Gatlinburg, Tennessee 37738.

III. IDENTIFICATION:

A. Description and Inventory:

1. Natural Heritage

The park is in an area that was the major North American refuge for the preglacial warm temperate and temperate zone flora during the Pleistocene glaciation and has one of the nation's richest inventories of such plant groups as fungi, mosses, lichens, and hepatics. The park contains a wide diversity of temperate flora (about 1,450 species of flowering herbaceous plants; 2,200 other plant species), with large numbers of species occurring in the same stands. A similar level of floristic diversity is found in no other temperate zone protected area of comparable size in the world. The park exhibits almost as many kinds of natural tree species (130 species) as does all of Europe. One of its major forest types, the Cove Forest, has 25 to 30 tree species, with six to 12 dominant on any one site. A one-tenth hectare plot may support 40 to 50 species of herbs through the seasons. The list of endangered plants that occur within the park includes 120 species. At present, five species (Glyceria nubigena - Smoky Mountains manna grass; Geum radiatum - spreading avens; Calamagrostis cainii - Cain's reedgrass; Juncus trifidus var. monathos - mountain rush; and Cacelia rugelia - Rugel's ragwort) are included on the Fish and Wildlife Service List of Candidate Endangered Plants (Federal Register 45:82480, December 15, 1980).

A flora highly representative of the Eastern Forest Biotic Province, over continuous gradients in both disturbed and undisturbed ecosystems and over a wide range of elevations and exposures, mantles the park. Those areas previously cut over have been recovering for various periods of time, thus representing diverse successional stages. Also, there are many unusual habitats, such as the grass and heath balds, which are of exceptional ecological interest.

An internationally significant feature is the remnant stand of undisturbed, virgin forest, offering unique primeval vistas of Pleistocene North America. Dominant tree species include Abies fraseri (Fraser fir), Acer rubrum (red maple), Acer saccharum (sugar maple), Aesculus octandra (yellow buckeye), Betula alleghaniensis (B. lutea) (yellow birch), Carya species (hickories), Fagus grandifolia (beech), Picea rubens (red spruce), Halesia carolina var. monticola (silverbell), Liriodendron tulipifera (tulip poplar), Pinus species (pines), Quercus species (oaks), Tilia heterophylla (basswood), and Tsuga canadensis (eastern hemlock). The largest block of virgin red spruce (Picea rubens) forest remaining on earth, and North America's southernmost limit of the range of that and many other northern species, is found in the park. A list of trees, five of which are the largest recorded of their species in the world, is displayed in Table 1.

The park is inhabited by a highly diverse array of animal species; some of them spectacular and appealing to the public (e.g., black bear (Ursus americanus), white-tailed deer (Odocoileus virginianus), wild turkey (Meleagris gallopavo), the rare mountain lion (Felis concolor), and others of special scientific interest).

At least 50 native mammals are known to dwell in the park--about half of them, rodents. The endangered Indiana bat (Myotis sodalis) is known to use at least one of the park's caves as a winter roost. There have been several reported sightings of mountain lions.

Beaver, apparently once common in the park, are reappearing in several of its stream valleys. Several mammals once occurred here and have varying potentials for reintroduction. These include wapiti (elk), bison, timber wolf, fisher, and otter.

Over 200 species of birds have been observed within the park's widely diverse habitats. Permanent residents total more than 60, and at least 100 kinds have been observed in the park and immediate vicinity during the winter.

The engangered peregrin falcon (Falco peregrinus) reportedly nests in the park. The red-cockaded woodpecker(Dendrocopos borealis), also endangered, has also been observed nesting in the park.

Table 1. World Champion Trees, Great Smoky Mountains National Park

Scientific name	Common name	DBH**	Circum-ference	Height	Spread
Prunus pensylvanica	Pin Cherry	55.8 cm	175.26 cm	27.4 m	4.3 m
Tsuga canadensis	Hemlock	193.3 cm	607.06 cm	30.5 m	21.3 m
Magnolia fraseri	Fraser Magnolia	96.3 cm	302.26 cm	25.9 m	17.1 m
Halesia carolina	Silverbell	131.0 cm	411.48 cm	26.2 m	8.5 m
Picea rubens	Red Spruce	133.5 cm	419.1 cm	33.5 m	15.2 m

* Circumference at breast height

**DBH = Diameter at breast height (1.37 m from ground = standard tree measure)

The park's reptile fauna includes seven species of turtles, eight lizards, and 23 species of snakes.

Heavy precipitation and numerous streams make the Great Smoky Mountains the habitat of a large variety of amphibians. Included are approximately 27 species of salamanders, representing the most diverse salamander fauna in the world. The plethodontid or lungless salamanders are believed to have evolved in this terrain, where stream habitat would have selected against buoyant lungs. The red-cheeked salamander (Plethodon jordani) is of exceptional interest since its range appears to be restricted to the park. Two toads and at least 10 species of frogs occur within the park.

A total of over 70 species of native fish live in the park streams. Included is the native eastern brook trout (Salvelinus fontinalis), of which the park's population may be a separate (and rare) subspecies. Several rare or threatened fish species have been reported in the park, including the smoky madtom (Noturus baileyi), yellow fin madtom (Noturus flavipinnis), and stonecat (Noturus flavus). Some of these species may no longer exist in park waters due to perturbations incurred from past logging practices, inundation of reservoirs along portion of southern perimeter of the park, and some fish management practices to extirpate rough fish and introduce a sport fishery for rainbow trout.

In addition to the vertebrate forms mentioned above, the park contains an array of invertebrate animal life, especially land snails, spiders, insects and other anthropods, that is exceptionally diverse and relatively little known. A study of practically any group reveals a complex assortment of forms that includes species endemic to the park and/or new to science. The aquatic insects are extremely diverse in park streams. For example, there are 105 species of stonefiles, including such endemics as Magaloptera williams, Hansonoterla appalachia, several Capnia spp., and Acroneura lycorias (only in Sevier County, TN). Very little research has been done on aquatic insects in the past but a vast undefined diversity is believed to inhabit these waters.

Many plant and animal species which are uncommon, endemic, or exist outside the park only as fragmented populations, are preserved here in perpetuity, thus giving long-term research opportunities not assured elsewhere. They are essentially free from major human interference, interruption by roads, and impairment by such things as housing areas or industrial developments. The value of the gene pools thus protected is beyond estimation.

The park is characterized by unusually rugged topography, with elevations ranging from 260 m above sea level to 2,025 m in a horizontal distance of very few miles and including 16 peaks above 1,800 m.

Numerous watersheds, in which thousands of hectares of roadless terrain feed streams whose purity is unexcelled by streams of comparable flow and accessibility anywhere in the United States, lace the park. Some of these watersheds are unaffected even by hiking trails. Approximately 2,175,000 billion kiloliters of surface water flow from the park each year. Annual rainfall in the park ranges from about 190 cm to 218 cm and at times reaches 256 cm in limited areas.

The park is noted for its ecosystems' stability as a result of protection from excessive human impacts and of the diversity of life forms composing its ecosystems.

2. Cultural Heritage

Although Great Smoky Mountains National Park was created and has been managed primarily as a natural area, and is herein nominated under natural criteria, evidence of human history and prehistory also form part of its resources.

Man has been in the vicinity of the park for approximately 15,000 years, but the prehistoric people apparently used the mountains and stream valleys for hunting and gathering rather than as a permanent residence. Most archeological sites found within the park boundaries support this theory of use. The first contact between whites and Cherokee Indians, who lived south of the present park, occurred in 1566-67, and by the early 1800s the Cherokee had been forced to cede much of their land.

"Civilization" came very slowly to the mountains and as the industrial revolution and other cultural developments swept around it, the region became a preserve for a pioneer way of life. From early settlement days, subsistence farming continued as the traditional lifestyle. Commercial logging began about 1880, stripped the more accessible forests, and left little in the way of a continuing economic resource. The first tourists were a few wealthy "flatlanders" who started coming to the Great Smokies in the mid-19th century to enjoy the cool mountain summers. Logging railroads provided additional access around the turn of the century. Tourism really began to gather momentum when good roads penetrated the region after World War I, and it took on major proportions with the growth of leisure time and affluence after World War II.

Present historical and cultural interpretation at Great Smoky Mountains National Park focuses on the period from the middle 1800s to 1920. Interpretation is based on the structures remaining in the park, on tools and home furnishings recovered from those who once lived there, and on many interviews with and studies of mountain people who lived in the area just before the formation of the park.

When the park was established, there were some 1,200 structures scattered throughout. Some of the more outstanding structures have been moved to sites more accessible to park visitors. Other structures have been sold and removed, destroyed, or allowed to deteriorate, but perhaps the finest collection of pioneer log structures in the United

States remains in the park. The March 1980 Federal Register listing of sites on the National Register of Historic Places includes three historic districts within the park--Cades Cove, Roaring Fork, and the Bud Ogle farm (Junglebrook): in addition, structures at eight other locations have been placed on the National Register. Twenty-eight buildings have been nominated to the National Register, and the Willis Barker cabin near Indian Camp Creek has been determined to be eligible for nomination. The Historic Resources map shows the historic districts and individual structures.

An amendment has been submitted to the keeper of the National Register to redescribe the Cades Cove historic district to include archeological resources. An archeological district at Oconaluftee and three individual sites in the park are being nominated to the National Register, and other sites are under study to determine their eligibility for nomination.

B. Maps and/or Plans

The enclosed General Management Plan for Great Smoky Mountains National Park contains the following maps:

In addition, the following detailed maps are enclosed:

1. Great Smoky Mountains National Park and vicinity, Tenn.-North Car., U.S. Geological Survey (contains interval 100 ft, scale 1:125,000, 10,000 meter Universal Transverse Mercator grid ticks, zone 17)

2. Great Smoky Mountains National Park - Backcountry Trails

C. Photographic Documentation

Photographs illustrating the natural and cultural resources of Great Smoky Mountains National Park are enclosed.

D. History

1. Natural History: The following are excerpts from Jerome Doolittle's book, The Southern Appalachians, which summarize the natural history of the southern Appalachians, the region with the Great Smoky Mountains at its center.

"From the earliest times, travelers in the Southern Appalachians recognized that these green forests sheltered an extraordinary treasury of flowering plants. Generations of botanists have since identified 2,500 trees, shrubs, mosses and lichens. Of these, 1,500 are flowering species—the greatest variety to be found in any comparably sized area in temperate North America.

"One of the reasons for this diversity is the number of plant habitats in the Southern Appalachians, where elevations range from 235 m above sea level to well over 1,985 m. Shaped by runoff waters from rainfall that totals between 148 cm and 256 cm a year, the slopes of the mountains face in every direction--exposing the forests to varying hours of sunlight, holding and losing moisture as a result of evaporation at differing rates and maintaining a great range of temperatures. The rocky underpinnings of the mountains comprise granular dolomite, crumbly sandstone and hard graywacke; and the soils fluctuate across the pH scale from acid to neutral and in consistency from sandy to loamy.

"The product of this complex interaction of conditions is flora that one botanist categorizes into 15 different vegetation communities. Two are found nowhere else on earth- they are called heaths and coves.

"Heaths, which comprise massed displays of rhododendrons, laurels, myrtles and azaleas, occur on the high slopes and in the understory of forests throughout the region. Colors range from a pinkish white to an intense purple, and the shiny, slick leaves provide a green carpet on the mountains throughout the entire year.

"Coves are identified by their dominant form of vegetation: trees, among them, basswoods, oaks, maples and flowering redbuds. The deep, fertile soil of the coves, well watered by streams, also provides an ideal environment for flowering plants. Trumpet honeysuckle, crested dwarf iris, purple fringed orchid, dog hobble and columbine are a few among dozens. Cove wild flowers tend to be early bloomers--beginning in late February, the start of the Appalachian growing season, and lasting only until late May, when the leafy canopy of the trees closes overhead. But the display does not end, it only changes: from then until October other flora of the Southern Appalachians continues to provide the same color and enchantment.

"About 200 species of plants native to the Southern Appalachians, including about 40 wild flowers, are found nowhere else in the world. These are endemics, plants that presumably evolved here and never traveled.

"Endemic plants occur in every wilderness area: given enough time, some microenvironment is bound to breed a unique subspecies. But the Great Smoky Mountains National Park appears to spawn a greater number than usual by virture of the great age of the flora and the diversity of habitats folded within its hills.

"An astonishing distinction of the Great Smoky Mountains National Park flora is the fact that some of its endemic plants have close relatives in Asia. The most popular explanation for this phenomenon . . . is that about 65 million years ago, when North America and Asia were connected by a land bridge across the Bering Strait, there was a great arclike range of similar vegetation that stretched from Southeast Asia through Siberia and Japan into Alaska and thence south and east in a sweeping curve into the Southern Appalachians. After the continents separated, long periods of glaciation scoured the north, and a subsequent drying period created the Great Plains of the Midwest, leaving the two groups of flora isolated half a world apart.

"However, the classic example of biological evolution in isolation is not among the plants but rather among a branch of the amphibian class: salamanders. . . . There are 27 salamander species in the Great Smoky Mountains National Park. Their habitats may be separated by only a few miles--but in those few miles are lowlands where conditions are not right for the salamanders' survival. And thus they have gone their separate evolutionary ways. Some are largely aquatic, other largely terrestrial. Some, including the pygmy salamander, climb tree trunks at night; others remain on the ground throughout their lives."

2. Man-induced Modifications of the Environment

Through the ages man has altered the environment here, although it is impossible to define and measure all of the effects caused by prehistoric peoples. European intercourse with the aboriginal population resulted in more forest clearing for agricultural purposes, and at one period, almost complete decimation of the deer population for the sake of the deerskin trade. Permanent settlement by pioneers of European stock from about 1800 onward caused more agricultural and pastoral clearing in the lower elevations of the park. From about 1890, commercial logging impacted upon various sections of the forest area, until the practice was stopped on establishment of the park (circa 1930).

Once the park was established, a protective cloak was thrown over the area, and nature was allowed to have her way once again. Man-caused changes began to wane and even reverse as forest succes-

sion got underway. Recovery of the disturbed forest prompted the re-emergence and stabilization of the animal populations. Before long, to the untrained eye, it appeared that the Smoky Mountains had never known the hand of civilized man. Now, human interference is minimal except for the lingering legacy of man-introduced pathogens, non-native animals and chemical pollutants.

The General Management Plan of the National Park addresses every existing man-induced modification and threat with specific recommendations for studies and management strategies. Most such issues are considered to be manageable in the long term.

3. History of Conservation: Following the authorization to establish a national park in the Great Smoky Mountains, the first order of business was to provide necessary funding and begin land purchase from the private sector. By the 1940's, the majority of the land was under the control of the National Park Serice and facilities were provided for visitor access. Except for modest space required for visitor, maintenance, and administrative facilities, the park has been allowed to revert to a forest state through natural plant succession processes. The only major exception to this, as noted on the map entitled "Proposed Management Zoning" in the enclosed General Management Plan, is the historic district of Cades Cove (800 ha), which is being retained in pasture and hay fields as a historic district.

A listing of federal legislation affecting resource protection measures appears under Legal Status, section II.B. of this paper. A resources management plan has been prepared for the park and is reviewed annually. Key resource management topics addressed in the plan are as follows:

Air quality
Red-cockaded woodpecker (endangered)
Indiana bat (endangered)
Balds
European wild boar
Brook trout
Pest control - balsam woolly aphid, gypsy moth
Backcountry carrying capacity
Fire
Recreational fisheries
Hazard tree reduction
Black bear
White-tailed deer
Potable water
Illegal killing, collecting, removing, molesting, and/or damaging of park
Biota and natural features
Specimen collecting activity
Park mowing
Use of chemicals on roadways

In addition, park administration includes the Uplands Field Research Laboratory, which conducts research on resource protection problems and maintains comprehensive monitoring programs on a great variety of chemical pollutants and biological communities in the park. The park is monitoring visitor impacts on the environment and adjusts estimates of physical and social carrying capacity accordingly. The laboratory also coordinates all outside research activity in the park. The research and environmental monitoring program in the park has served as a model for Biosphere Reserves in other nations.

Bibliography:

A full bibliography of scientific study of GRSM has been developed and published in:

Southern Appalachian Research/Resources Management Cooperative. 1982. Great Smoky Mountains Biosphere Reserve: A bibliography of scientific study. U.S. MAB Rep. No. 4. Washington, D.C. 51 p.

A review of this material is found in:

Southern Appalachian Research/Resources Management Cooperative. 1982. Great Smoky Mountains Biosphere Reserve: History of Scientific Study. U.S. MAB Rep. No. 5. Washington, D.C. 276 p.

Copies of both documents are appended to this nomination.

General Management Plan - Great Smoky Mountains National Park, North Carolina-Tennessee. 1982. U.S. Department of the Interior, National Park Service, Denver Service Center, Denver, CO. 70 p.

IV. STATE OF PRESERVATION/CONSERVATION

A. Diagnosis

The park is fully protected from development by existing legislation. The park is largely managed as a natural area and the majority of lands are legally designated wilderness, the highest form of protection under U.S. law. The preservation of natural objects, systems, and processes is the dominant objective. Historic management districts, totalling 2,025 ha (1.2 per cent of the park area) are managed for preservation and interpretation of historic landscapes.

Most of the threats to the natural ecosytem described in sections III.D.2. and III.D.3 are considered to be manageable in the long term. Exotic plant and animal populations are difficult to contain, particularly in the case of the European wild boar, but effective methods can be devised and are within the purview of park management. Airborne chemical pollutants present totally different management and resource challenges and are not totally within the competence of the National Park Service to control.

The effect of public use in the park is concentrated in areas of visitor use such as campgrounds and the most popular foot trails. Mitigating measures are being taken to reduce these impacts. The Great Smoky Mountains have been found to have some of the most acidic rain anywhere in the United States. The source of these pollutants is not well understood, but what is becoming more clear is the detrimental impact on aquatic and terrestrial biological communities. Several research projects are ongoing to assess the chemical changes within the hydrologic cycle and their effects on a host of plant and animal species.

B. Agent Responsible for Preservation/Conservation: Resource management decisions are made by the Superintendent, Great Smoky Mountains National Park, Gatlinburg, Tennessee 37738. The Uplands Field Research Laboratory provides scientific perspective on resource management issues, and the Resources Management staff of the park develops and impliments the resources management plan.

C. History of Preservation/Conservation: Carlos C. Campbell has written a book entitled Birth of a National Park in the Great Smoky Mountains, which documents the struggle to establish the park. Historically, this is the biggest conservation story. Once established, early conservation efforts concentrated on fire protection. In the 1970s, a new policy was introduced to reduce the black bear population's habit of eating human food, either by panhandling or rading garbage dumps. Trash cans were made more secure, and panhandling bears were removed to the backcountry. A control program for exotic vined plant, kudzu (Pueraria lobata) has been operating for many years. Control of the European wild boar population has been confined to hunting by Park Rangers on the Tennessee side of the park and trapping by volunteers on the North Carolina side. Most recently, Fraser fir trees were sprayed at key points of visitor attraction to kill populations of balsam woolly aphid. Interpretation of the natural and cultural resources of the park are carried out by a variety of means: maps, publications such as guide books, 80 personalized programs, and three living history demonstration areas.

D. Means for Preservation/Conservation: A complete statement of legislative history, including reference to those statutes relating to resource management, is presented in section II.B. of this paper. The most recent financial statement for the park is as follows:

Great Smoky Mountains National Park
Financial Statement for Fiscal Year 1982

Park Management and Support	$264,400
Park Safety	34,500
Natural Science Research	200,300
Park Administration	234,800
Fee Collection Operations	277,800
Interpretation	390,600
Resources Management	212,400
Park Rangers (Visitor Protection and Resources Management)	929,600
Maintenance	3,068,600
Total	$5,613,000

E. Management Plans: Enclosed find a copy of the General Management Plan as referenced in section III.3.C. of this report. A Resources Management Plan is also available, with key actions summaried in section III.D.3. of this paper.

V. JUSTIFICATION FOR INCLUSION ON THE WORLD HERITAGE LIST

Natural Property:

Great Smoky Mountains National Park is a unique site of outstanding universal value and is nominated to the World Heritage list under Natural Criterion (ii) as an outstanding example representing significant ongoing biological evolution, and under Natural Criterion (iii) as a property which "contains superlative natural phenomena, and features of exceptional natural beauty."

With respect to Criterion (ii), Great Smoky Mountains National Park harbors the largest remaining remnant of the diverse Arcto-Tertiary geoflora era in the world. This primitive angiosperm flora is believed to have spread continuously from Asia through the Bering Strait and North America to Europe when the continents were connected. Temperate forests with these elements flourished 40 to 60 million years ago and have become gradually restricted ever since. Remants are now restricted to eastern North America and Asia. No other existing protected tracts are of comparable size. An internationally significant feature of the park is its permanent stand of undisturbed, virgin forest offering unique primeval vistas of pleistocene North America. The largest block of virgin red spruce forest remaining on earth is within the park.

The Great Smoky Mountains is particularly unique due to the diversity of plant species and the large virgin timber stands still remaining, which provide a unique window into the pre-Columbian past. A total of 130 tree species, about as many as are in all of Europe and 1,450 additional vascular plant species are found in the park. A similar level of floristic diversity is found in no other temperate zone protected area of comparable size in the world. The diversity extends to animals as well, with the world's greatest diversity in salamander species (27), 50 mammal species, and 200 species of birds. The salamander population represents perhaps the most dramatic example of biological evolution. That such numerous and separate evolutionary directions have been followed in such close geographical proximity is of international interest and significance.

The park is of sufficient size to provide self-perpetuating biological opportunities. Twenty-two watersheds are represented in teh park, with elevational ranges from 260 m to 2,025 m. A good example of adequate size is the fact that the black bear population in the park remains stable at 400 to 500 members. The park contains five of the largest recorded trees, of their species, in the world.

With respect to Criterion (iii), the Great Smoky Mountains National Park is world-renowned for the diversity of its plant and animal resources, the beauty of its ancient mountians, and the depth and integrity of the wilderness sactuary within its boundaries. The significance and integrity of those resources is evident in the park's status as the core unit of one of America's international Biosphere Reserves.

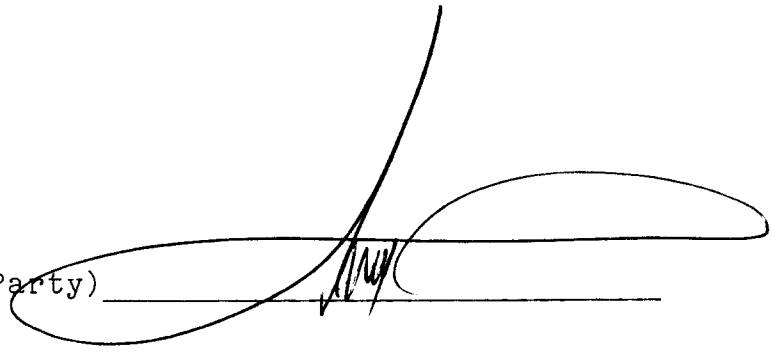
Ranging in elevation from 260 m above sea level to 2,025 m, including 16 peaks above 1,800 m, the park contains 22 major watersheds, 33 clear mountain streams totaling 1,180 km, 123 individual brook trout waters, 10 major waterfalls, lesser falls and cascades that have never been innumerated, and 668 km of foot trails harboring countless vistas of uninterrupted natural beauty.

The park is inhabited by a highly diverse array of animal species, some of them particularly appealing to the public, such as the black bear, white-tailed deer, and wild turkey. As a testimony to the diverse array of ecosystems found in the park, the largest number of salamander species found anywhere in the world are located here.

The centerpiece of natural diversity is the plant community of the park, with 130 species of trees, 1,450 species of flowering herbaceous plants, and 2,200 other plant species, with large numbers occurring in the same stand.

The best testimony of the public appeal of the natural phenomena and beauty is the fact that Great Smoky Mountains National Park receives over 8 million visits per year, the most popular national park in the United States.

The integrity of the natural beauty of the park is sufficiently protected by the size (209,000 ha) and configuration of the park. The headwaters of all 22 major watersheds are part of the park. Only one watershed has a major privately owned inholding at mid-level elevation, and that parcel is scheduled for acquisition.

Signed (on behalf of State Party) 

Full Name G. Ray Arnett

Title Assistant Secretary, United States Department of the Interior

Date December 10, 1982

ORGANISATION DES NATIONS UNIES
POUR L'EDUCATION, LA SCIENCE
ET LA CULTURE

Date de réception : 23.12.82
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Original : anglais

CONVENTION CONCERNANT LA PROTECTION DU PATRIMOINE MONDIAL, CULTUREL ET NATUREL

LISTE DU PATRIMOINE MONDIAL

Proposition d'inscription présentée par
les Etats-Unis d'Amérique

Parc national des Great Smoky Mountains

1. LOCALISATION PRECISE

a) Pays

Etats-Unis d'Amérique

b) Etat, province ou région

Comtés de Cocke, Blount et Sevier dans l'Etat du Tennessee ; comtés de Swain et Haywood dans l'Etat de la Caroline du Nord.

c) Nom du bien

Parc national des Great Smoky Mountains

d) Localisation exacte sur les cartes avec indication des coordonnées géographiques

Le parc est situé de part et d'autre de la frontière entre la Caroline du Nord et le Tennessee, qui suit la ligne de partage des eaux. De forme approximativement elliptique, il occupe une superficie de 209.000 ha, entre les longitudes et les latitudes suivantes : 35°26'15" et 35°47"0" de latitude nord, 83°45' et 84°0' de longitude ouest.

2. DONNEES JURIDIQUES

a) Propriétaire

Gouvernement des Etats-Unis, Ministère de l'intérieur.

b) Statut juridique

La Loi du 22 mai 1926 (44 Stat. 616) prévoyait la création du Parc national des Great Smoky Mountains "pour le bien-être et l'agrément de la population". Dans cette loi, l'objectif du parc est précisé par référence à la Loi du 25 août 1916 (39 Stat. 535), qui a créé le Service des parcs nationaux et qui stipule que l'objet fondamental des parcs nationaux est "... de préserver les paysages, les objets naturels et historiques, la faune et la flore sauvages, et d'en assurer la jouissance de telle sorte et par de tels moyens qu'ils pourront être transmis intacts aux générations futures".

La création du parc a donc pour objet de préserver ses ressources exceptionnellement variées et de permettre au public d'en jouir d'une manière telle que l'influence de l'homme les laissera fondamentalement intactes.

Le Parc national des Great Smoky Mountains est ouvert au public, et il comprend 434 km de routes et 668 km de sentiers de randonnée.

c) Administration responsable

Le Parc national des Great Smoky Mountains est administré pour le compte du Service des parcs nationaux du Ministère de l'intérieur des Etats-Unis par le Directeur du Parc national des Great Smoky Mountains, Gatlinburg, Tennessee 37738.

3. IDENTIFICATION

a) Description et inventaire

1. Patrimoine naturel

Le parc est situé dans une région qui a été, au cours de la glaciation du Pléistocène, le principal refuge d'Amérique du Nord pour la flore de la zone tempérée chaude et de la zone tempérée préglaciaires et il possède certains groupes de plantes qui constituent l'un des ensembles les plus riches du pays, tels que champignons, mousses, lichens et hépatiques. Il possède une flore de la zone tempérée très diverse (près de 1.450 espèces de plantes herbacées à fleurs et 2.200 espèces d'autres végétaux), de nombreuses espèces se trouvant dans les mêmes peuplements. Il n'existe dans le monde aucune autre région protégée de la zone tempérée d'une superficie comparable présentant une telle diversité floristique.

On trouve dans le parc presque autant d'espèces indigènes d'arbres (130) que dans toute l'Europe. Dans l'un des principaux types de forêt, la Forêt de Cove, il y a 25 à 30 espèces d'arbres sur un seul site, dont 6 à 12 sont dominantes. Sur une superficie d'un dixième d'hectare, on peut trouver de 40 à 50 espèces de plantes herbacées en toute saison. La liste des végétaux en danger que l'on trouve dans le parc inclut 120 espèces.

Une flore tout à fait représentative de la province biotique de la forêt orientale recouvre le parc ; elle est régulièrement répartie entre des écosystèmes modifiés et non modifiés et elle occupe des altitudes et des expositions très diverses. Les zones antérieurement déboisées se sont régénérées au cours de périodes de durée variable et elles représentent ainsi divers stades de succession. En outre, il existe de nombreux habitats inhabituels, tels que les "balds" à graminées et bruyère, qui ont un intérêt écologique exceptionnel.

Le parc présente une caractéristique importante d'un point de vue international : le peuplement relictuel d'une forêt vierge non modifiée qui offre une vision unique en son genre de l'Amérique du nord telle qu'elle était au Pléistocène. On trouve dans ce parc le plus grand massif existant au monde de forêt vierge à Picea rubens ; d'autre part, c'est également dans le parc que se trouve la limite la plus méridionale (en Amérique du Nord) de l'aire de cette espèce et de nombreuses autres espèces septentrionnales.

Des espèces animales très diverses vivent dans le parc ; certaines d'entre elles sont spectaculaires et plaisent au public (par exemple l'ours noir (Ursus americanus), le cerf à queue blanche (Odocoileus virginianus), le dindon sauvage (Meleagris gallopavo), le puma (Felis concolor) qui est devenu rare) et d'autres espèces présentent un grand intérêt scientifique.

On sait qu'au moins 50 espèces indigènes de mammifères se trouvent dans le parc, dont près de la moitié sont des rongeurs. On sait également que la chauve-souris de l'Indiana (Myotis sodalis), qui est en danger, utilise au moins une des grottes du parc comme abri d'hiver. Des pumas ont été aperçus plusieurs fois dans le parc.

Les castors, qui autrefois étaient apparemment très nombreux, font leur réapparition dans plusieurs vallées de ruisseaux. Plusieurs espèces de mammifères vivaient autrefois dans le parc et ils présentent diverses possibilités de réintroduction. On peut citer le wapiti (élan), le bison, le loup gris, la martre et la loutre.

Plus de 200 espèces d'oiseaux ont été observées dans les habitats largement diversifiés du parc. Plus de 60 espèces y vivent en permanence et au moins 100 espèces ont été observées dans le parc et dans son voisinage immédiat au cours de l'hiver.

On a signalé que le faucon pélerin (Falco peregrinus), qui est en danger, niche dans le parc. Le pic à cocarde rouge (Dendrocopos borealis), également en danger, a été observé.

La faune reptilienne comprend plusieurs espèces de tortues (7), de lézards (8) et de serpents (23).

En raison des fortes précipitations et du grand nombre de ruisseaux, les Great Smoky Mountains sont l'habitat d'une grande variété d'amphibiens. On y trouve approximativement 27 espèces de salamandres, ce qui constitue la faune de salamandres la plus variée du monde. On pense que les Pléthodontidés ou salamandres apneumones ont évolué dans ce terrain où l'habitat de ruisseau aurait opéré une sélection défavorable aux espèces pulmonées. La salamandre "red-cheeked" (Plethodon jordani) présente un intérêt exceptionnel car il semble que son territoire soit restreint aux limites du parc. On trouve également dans le parc deux espèces de crapauds et au moins dix espèces de grenouilles.

Au total plus de 70 espèces de poissons indigènes vivent dans les ruisseaux du parc. Il se peut que certaines de ces espèces n'existent plus dans les eaux du parc en raison de diverses perturbations provoquées par les anciennes pratiques de déboisement, l'inondation des réservoirs le long d'une partie de la limite méridionale du parc et de certaines pratiques d'élevage visant à supprimer les poissons communs et à introduire la pêche sportive de la truite arc-en-ciel.

En plus des vertébrés mentionnés ci-dessus, le parc contient de nombreux invertébrés, spécialement escargots, araignées, insectes et autres anthropodes, échantillon exceptionnellement varié et relativement peu connu. L'étude de presque tous les groupes révèle un ensemble complexe de formes qui inclut des espèces endémiques dans le parc et/ou nouvelles pour la science. Les insectes aquatiques vivant dans les rivières du parc sont extrêmement variés. Par exemple, il existe 105 espèces de "stoneflies", dont certaines sont endémiques telles Magaloptera williams, Hansonoterla appalachia, plusieurs Capnia spp. et Acroneura lycorias (uniquement dans le comté de Sevier, Tennessee). Très peu de recherches ont été effectuées dans le passé sur les insectes aquatiques mais on pense qu'il existe dans les eaux du parc une grande diversité d'espèces dont les limites sont encore mal définies.

De nombreuses espèces végétales et animales peu courantes, endémiques ou qui n'existent qu'à l'extérieur du parc, comme populations segmentées, y sont préservées à perpétuité, ce qui donne aux recherches à long terme des possibilités inconnues ailleurs. Pour l'essentiel, ces espèces n'ont souffert d'aucune atteinte importante due aux activités humaines (construction de routes, de zones d'habitation ou création d'industries). La valeur des réserves génétiques ainsi protégées est donc inestimable.

Le parc se caractérise par une topographie exceptionnellement accidentée avec des élévations comprises entre 260 m au-dessus du niveau de la mer et 2.025 m sur une distance horizontale de quelques miles, avec 16 sommets dépassant 1.800 m.

Il existe dans le parc un réseau très dense de bassins versants répartis sur plusieurs milliers d'hectares dépourvus de routes et qui alimentent des rivières dont l'eau est d'une pureté très supérieure à celle de cours d'eau d'un débit et d'une accessibilité comparables dans n'importe quelle région des Etats-Unis. Certains de ces bassins sont restés à l'état naturel et il n'y existe même aucun sentier de randonnée. Près de 2.175.000 milliards de mètres cubes d'eau de surface s'écoulent du parc chaque année. Les précipitations annuelles sont comprises entre 180 cm et 218 cm et, à certaines époques, elles atteignent même 256 cm dans certaines zones.

Le parc est réputé pour la stabilité de ses écosystèmes due à la protection dont il bénéficie à l'égard des impacts humains excessifs et à la diversité des formes biologiques qui composent ses écosystèmes.

2. Patrimoine culturel

Bien que le Parc national des Great Smoky Mountains ait été créé, qu'il soit géré principalement en tant que zone naturelle, et que son inscription sur la Liste du Patrimoine mondial soit proposée en vertu de critères naturels, les témoignages de l'histoire et de la préhistoire humaines sont aussi un élément de ses ressources.

Dans le Parc national des Great Smoky Mountains, l'information historique et culturelle actuelle met l'accent sur la période comprise entre le milieu du XIXe siècle et 1920. Elle prend comme point de départ les constructions qui subsistent dans le parc, les outils et les objets d'ameublement laissés par les anciens habitants, ainsi que les nombreux entretiens avec les montagnards (et les études qui leur ont été consacrées) qui vivaient dans la région juste avant la création du parc.

A cette époque, environ 1.200 constructions étaient dispersées sur tout le territoire du parc. Certaines des plus remarquables ont été transférées sur des sites plus accessibles aux visiteurs. D'autres ont été vendues et enlevées, détruites ou laissées à l'abandon, mais l'ensemble de constructions en bois du temps des pionniers qui subsiste dans le parc est peut-être le plus remarquable que l'on puisse trouver aux Etats-Unis.

b) Cartes et/ou plans

Voir annexe.

c) Documentation photographique et/ou cinématographique

Voir annexe

d) Historique

1. Histoire naturelle : On trouvera ci-dessous des extraits de l'ouvrage de Jerome Doolittle, The Southern Appalachians qui résument l'histoire naturelle des Appalaches du sud, région au centre de laquelle se trouvent les Great Smoky Mountains.

"Depuis les temps les plus reculés, les voyageurs qui traversaient les Appalaches du sud découvraient que ces forêts verdoyantes abritaient un trésor extraordinaire de plantes à fleurs. Plusieurs générations de botanistes ont par la suite identifié 2.500 espèces d'arbres, de buissons, de mousses et de lichens, dont 1.500 sont des espèces à fleurs, ce qui constitue la plus grande diversité végétale que l'on puisse trouver dans une région de superficie comparable en Amérique du nord tempérée.

"L'une des raisons de cette diversité est le nombre d'habitats végétaux des Appalaches du sud où les altitudes vont de 235 m au-dessus du niveau de la mer à plus de 1.985 m. Sculptées par les eaux de ruissellement (les précipitations atteignent au total entre 148 cm et 256 cm par an) les pentes de la montagne sont orientées dans toutes les directions et les forêts sont ainsi exposées à des heures variables d'ensoleillement, retiennent et perdent leur humidité selon des rythmes différents d'évaporation et conservent des températures très diverses. La base rocheuse des montagnes est composée de dolomites granulaires, de grès friable et de grauwacke dur, et les sols sont variés tant en ce qui concerne l'échelle du pH (acides à neutres) que la consistance (de sableux à limoneux).

"Le produit de cette complexe interaction de conditions est une flore qu'un botaniste a pu classer en 15 communautés végétales différentes. Deux n'existent nulle part ailleurs sur la Terre ; elles ont reçu le nom de "heaths" et de "coves".

"Les "heaths" qui comprennent des peuplements denses de rhododendrons, lauriers, myrtes et azalées, occupent les pentes élevées et les sous-bois dans toute la région.

"Les "coves" sont identifiées par la forme dominante de végétation : arbres, parmi lesquels tilleuls, chênes, érables et Cercis canadensis (arbres de Judée).

"Quelques 200 espèces de plantes indigènes des Appalaches du Sud, dont près de 40 espèces de fleurs sauvages, ne se trouvent nulle part ailleurs dans le monde. Ce sont des endémiques, c'est-à-dire des plantes qui ont probablement évolué sur place et ne se sont jamais propagées."

2. Modifications de l'environnement provoquées par l'homme : Au cours des âges, l'homme a modifié l'environnement dans cette région, encore qu'il soit impossible de déterminer et de mesurer toutes les conséquences de l'action des hommes de la préhistoire. Les échanges entre l'Europe et la population aborigène ont eu pour résultat l'intensification du déboisement à des fins

agricoles, et, à une certaine époque, l'extinction presque complète de la population de cerfs dont les peaux faisaient l'objet d'un commerce. L'établissement permanent de pionniers d'origine européenne à partir de 1800 a provoqué un déboisement accru à des fins agricoles et pastorales dans les régions du parc les moins élevées. A partir de 1890, l'exploitation commerciale du bois a eu des répercussions sur divers secteurs de la forêt jusqu'au moment où cette pratique a été stoppée lors de la création du parc (vers 1930).

Actuellement, l'impact des activités humaines est minime ; il n'en subsiste que quelques vestiges qui témoignent d'une présence humaine : germes pathogènes, animaux non indigènes et polluants chimiques.

3. Historique de la conservation : Après que l'autorisation eut été donnée de créer un parc national dans les Great Smoky Mountains, la première chose à faire consistait à trouver le financement nécessaire et à commencer les achats de terrains appartenant à des propriétaires privés. Vers les années 40, la plupart des terrains étaient sous le contrôle du Service des parcs nationaux et des installations avaient été créées pour permettre l'accès des visiteurs. A l'exception de superficies assez réduites nécessaires aux installations pour l'accueil des visiteurs, l'entretien et l'administration, on a laissé le parc revenir à l'état de forêt par le jeu des processus naturels de succession végétale. La seule exception majeure, comme il est indiqué sur la carte intitulée "zones de gestion proposées" jointe au plan de gestion général, est le district historique de Cades Cove (800 ha) qui est conservé à l'état de pâturage et de prairie de fauche en tant que district historique.

En outre, les services du parc administrent également le laboratoire d'Uplands Field qui fait des recherches sur les problèmes de protection des ressources et exécute un vaste programme de surveillance portant sur un très grand nombre de polluants chimiques et de communautés biologiques dans le parc. Les services du parc contrôlent en permanence l'impact des visiteurs sur l'environnement et adaptent en conséquence les estimations relatives à la capacité de charge physique et sociale. Le laboratoire coordonne également toutes les activités de recherche extérieure concernant le parc. Le programme de recherche et de surveillance de l'environnement a servi de modèle pour les réserves de la biosphère dans d'autres pays.

e) Bibliographie

Une bibliographie complète des études scientifiques conduites par le GRSM a été établie et publiée dans :

Southern Appalachian Research/Resources Management Cooperative. 1982. Great Smoky Mountains Biosphere Reserve : bibliographie des études scientifiques. U.S. MAB Rep. n° 4. Washington, D.C. 51 p.

Voir aussi l'annexe.

4. ETAT DE PRESERVATION/DE CONSERVATION

a) Diagnostic

Au terme de la législation actuelle, le parc bénéficie d'une protection totale contre les opérations de développement. Il est en grande partie géré comme une zone naturelle et la majorité des terres sont légalement désignées comme zone à préserver, ce qui constitue le degré de protection le plus élevé aux termes de la loi américaine.

La plupart des menaces qui pèsent sur l'écosystème naturel sont considérées comme maîtrisables à long terme. Les populations de plantes exotiques et d'animaux sont difficiles à contrôler, particulièrement dans le cas du sanglier européen mais des méthodes efficaces peuvent être imaginées et elles sont du ressort des autorités chargées de la gestion. Les polluants chimiques transportés par voie aérienne constituent les problèmes de gestion et de ressource totalement différents et ils ne relèvent pas entièrement de la compétence du Service des parcs nationaux.

On a constaté que c'est dans les Great Smoky Mountains que les précipitations sont les plus acides des Etats-Unis. L'origine de cette pollution n'est pas très bien comprise mais ce qui est évident ce sont les conséquences défavorables qu'elles ont sur les communautés biologiques aquatiques et terrestres. Plusieurs projets de recherche se poursuivent actuellement pour évaluer les modifications chimiques du cycle hydrologique et leurs conséquences sur diverses espèces animales et végétales.

b) Agent responsable de la préservation ou de la conservation

Les décisions relatives à la gestion des ressources sont prises par le directeur du Parc national des Great Smoky Mountains, à Gatlinburg, Tennessee 37738. Le Laboratoire de recherche d'Uplands Field donne une dimension scientifique aux questions de gestion des ressources et le personnel chargé de la gestion des ressources élabore et exécute le plan de gestion.

c) Historique de la préservation ou de la conservation

Dans un ouvrage intitulé Birth of a National Park in the Great Smoky Mountains, Carlos C. Campbell a retracé les efforts qui ont été déployés pour créer le parc. D'un point de vue historique, il s'agit de l'histoire la plus examplaire en matière de conservation. Après la création du parc, les efforts ont été concentrés sur la lutte contre les incendies. Dans les années 70, une nouvelle politique a été adoptée pour s'efforcer de limiter la tendance des ours noirs à consommer de la nourriture humaine qu'ils quémandent aux visiteurs ou qu'ils prennent dans les dépôts d'ordures. Les récipients réservés à la collecte des détritus ont été fixés plus solidement et les ours ont été transférés dans l'arrière-pays. Un programme visant à empêcher la prolifération d'une plante grimpante exotique, le kudzu (Pueraria lobata), fonctionne depuis plusieurs années. Des mesures ont été prises pour limiter la population de sangliers européens : chasse par les gardes du parc du côté Tennessee et piégeage par des volontaires du côté Caroline du Nord. Plus récemment, des sapins de Fraser ont été arrosés d'insecticides à des emplacements stratégiques fréquentés par les visiteurs pour détruire les populations de pucerons lanigère du sapin baumier.

Les ressources naturelles et culturelles du parc sont illustrées par divers moyens : cartes, publications (par exemple des guides), 80 programmes personnalisés, et trois zones de démonstration d'histoire vivante.

d) Moyens de préservation ou de conservation

Voir section 2.b.

e) Plans de gestion

Le plan général de gestion est présenté en annexe.

5. JUSTIFICATION DE L'INSCRIPTION SUR LA LISTE DU PATRIMOINE MONDIAL

b) Bien naturel

Le Parc national des Great Smoky Mountains est un site ayant une valeur universelle exceptionnelle et son inscription sur la Liste du Patrimoine mondial est proposée au titre du critère (ii), exemple éminemment représentatif de l'évolution biologique en cours, et du critère (iii), en tant que bien qui "représente des phénomènes naturels éminemment remarquables et des traits naturels d'une beauté exceptionnelle".

En ce qui concerne le critère (ii), le parc abrite les reliques les plus considérables de la géoflore du Tertiaire Arctique que l'on trouve dans le monde. On pense que cette flore primitive à angiospermes s'est propagée continuellement depuis l'Asie par le Détroit de Béring et l'Amérique du nord jusqu'en Europe lorsque les continents étaient reliés. Les forêts tempérées contenant ces éléments étaient immenses il y a 40 à 60 millions d'années et elles n'ont cessé de se réduire progressivement depuis cette époque. Les reliques qui subsistent sont actuellement situées à l'est de l'Amérique du nord et en Asie. Il n'existe aucun espace protégé d'une superficie comparable. Une caractéristique du parc ayant une certaine importance du point de vue international est son peuplement permanent de forêt vierge non modifiée qui donne un aperçu unique de l'Amérique du nord au Pléistocène. Le plus grand massif forestier d'épicéa rouge subsistant dans le monde se trouve dans le parc.

Le parc des Great Smoky Mountains est tout à fait exceptionnel en raison de la diversité des espèces végétales et des grands peuplements de forêts vierges qui représentent une relique exceptionnelle du passé précolombien. Il existe au total 130 espèces d'arbres, presque autant que dans toute l'Europe et 1.450 espèces de plantes vasculaires. Une telle diversité floristique n'existe dans aucun autre espace protégé de la zone tempérée de superficie comparable. Cette diversité concerne également les espèces animales ; c'est la plus grande du monde pour les salamandres (27 espèces), les mammifères (50 espèces) et les oiseaux (200 espèces). La population de salamandres représente peut-être l'exemple le plus remarquable de l'évolution biologique. Le fait que des évolutions si nombreuses et séparées se soient manifestées dans un espace géographique aussi restreint présente beaucoup d'intérêt et d'importance sur le plan international.

Le parc a une superficie suffisante pour offrir des possibilités biologiques qui se perpétuent. Vingt-deux bassins versants sont représentés, dont les altitudes varient entre 260 et 2.025 m. Le fait que la population des ours noirs reste stable (400 à 500 individus) prouve que la superficie du parc

est suffisante. Il contient cinq des plus grands arbres de leur espèce existant dans le monde.

En ce qui concerne le critère (iii), le Parc national des Great Smoky Mountains est mondialement connu pour la diversité de ses ressources végétales et animales, la beauté de ses montagnes anciennes, la profondeur et l'intégrité du refuge de la vie sauvage qui se trouve à l'intérieur de ses limites. Le fait que le parc constitue l'aire centrale de l'une des réserves de la biosphère internationales des Etats-Unis témoigne de l'importance et de l'intégrité de ses ressources.

Avec des élévations comprises entre 260 m au-dessus du niveau de la mer et 2.025 m (16 sommets dépassent 1.800 m), le parc contient 22 grands bassins versants, 33 ruisseaux de montagne limpides totalisant 1.180 km, 123 bassins à truites mouchetées, 10 grandes chutes d'eau, d'autres chutes et cascades de moindre importance qui n'ont jamais été dénombrées, et 668 km de sentiers de randonnée offrant d'innombrables points de vue d'une beauté exceptionnelle.

Le parc abrite une très grande diversité d'espèces animales dont certaines plaisent particulièrement au public, telles que l'ours noir, le cerf à queue blanche et la dinde sauvage.

La communauté de plantes que l'on y trouve est l'élément essentiel de cette diversité naturelle : 130 espèces d'arbres, 1.450 espèces de plantes herbacées à fleurs et 2.200 autres espèces de plantes dont un grand nombre se trouvent dans le même peuplement.

La meilleure preuve de l'intérêt manifesté par le public pour les phénomènes et la beauté naturels réside dans le fait que le Parc national des Great Smoky Mountains reçoit plus de 8 millions de visiteurs par an, ce qui en fait le parc national le plus populaire des Etats-Unis.

L'intégrité de la beauté naturelle du parc est suffisamment protégée par sa superficie (209.000 ha) et par sa configuration. La partie supérieure des 22 grands bassins versants se trouve dans le parc. Dans un seul bassin versant, il existe une grande propriété privée située à une altitude moyenne et son acquisition est prévue.

Signature (au nom de l'Etat partie)_____

Nom et prénom : G. Ray Arnett

Titre : Secrétaire adjoint, Département de l'intérieur

Date : 10 décembre 1982

Annexe

Documentation soumise à l'appui de la proposition d'inscription du Parc national des Great Smoky Mountains

Le Secrétariat a reçu des Etats-Unis d'Amérique, à l'appui de la présente proposition d'inscription, les documents dont la liste figure ci-dessous. Ces documents peuvent être consultés à la Division des Sciences écologiques de l'Unesco. Ils seront mis à la disposition des participants lors des réunions du Bureau du Comité du Patrimoine mondial et du Comité lui-même.

1. 4 photos noir et blanc

2. Livre: Great Smoky Mountains, Aerial Photography Services Inc., 1981.

3. Livre: Great Smoky Mountains Biosphere Reserve : A Bibliography of Scientific Studies. U.S. Man and the Biosphere Program, U.S. MAB Rep. n° 4. 1982.

4. Livre : Great Smoky Mountains Biosphere Reserve : History of Scientific Study. U.S. Man and the Biosphere Program, U.S. MAB Rep. n° 5, 1982.

5. General Management Plan. Great Smoky Mountains National Park. U.S. Dept. of Interior, 1981.

6. Final Environmental Impact Statement, General Management Plan. Great Smoky Mountains National Park. U.S. Dept. of Interior, 1982.

WORLD HERITAGE NOMINATION

IUCN TECHNICAL REVIEW

1. IDENTIFICATION NUMBER AND NAME 259 GREAT SMOKY MOUNTAINS NATIONAL PARK

2. LOCATION: Situated between latitudes 35° 26' 15"N and 35° 47' N, and longitudes 83° 45' and 84° 0' W.

3. NOMINATED BY: Department of the Interior, United States Government

4. DOCUMENTATION:

(i) Nomination form, maps and plans
(ii) Supplementary documentation (IUCN)

a) Consultations: Tom Thomas; Robert Milne; Sue Wells; Brian Groombridge.

b) Southern Appalachian Research/Resources Management Cooperative. 1982. Great Smoky Mountains Biosphere Reserve: A bibliography of scientific study. US MAB Rep. No. 4. Washington, D.C. 51 pp.

c) Southern Appalachian Research/Resources Management Cooperative. 1982. Great Smoky Mountains Biosphere Reserve: History of Scientific Study. US MAB Rep. No. 5. Washington, D.C. 276 pp.

c) General Management Plan - Great Smoky Mountains National Park, North Carolina-Tennessee. 1982. US Dept. of the Interior, National Park Service, Denver Service Center, Denver, CO. 70 p.

5. BACKGROUND AND SUMMARY

Great Smoky Mountains National Park (209,000 ha) is the most important natural area in the eastern US, and is of world importance as an example of temperate deciduous hardwood forest. It was the major North American Pleistocene refuge for temperate flora and fauna, so has a large number of endemic species as well as an extremely rich species composition. with over 3,500 plant species, its floristic diversity is unmatched in any other protected area of its size in the temperate world; with 130 natural species of trees, it has almost as many trees as all of Europe. It harbours many endangered species of animals, and has possibly the greatest diversity of salamanders in the world; it is a centre of endemism for North American molluscs. (See attached data sheet for further details).

6. INTEGRITY

The area is large enough to ensure the ecological viability of the species found in the site; it may be serving as a modern counterpart of a "Pleistocene refuge." As the premier protected area in the eastern US, the site is visited by millions of visitors each year, so over-exploitation on behalf of tourists is a matter of some concern; however, the US National Park Service has addressed this problem explicitly by encouraging camping grounds, trailer parks, hotels, and other tourist infrastructure to be constructed outside the park, thus reducing pressure on the park itself while also bringing economic benefits to surrounding people. The park has a general management plan and a series of sectoral management plans.

The site is a Biosphere Reserve, and a considerable amount of research has been conducted in the site; the Bibliography of Scientific Studies published in 1982 listed over 600 items. However, relatively little of this research is specifically oriented toward management issues, and a monitoring system would help ensure the continuing integrity of the area.

7. COMPARISON WITH OTHER AREAS

The Eastern Forest biogeographic province contains 37 protected areas, covering over 1.1 million ha; Great Smoky comprises about 25 percent of the total area protected. Two other sites of particular importance occur in this biogeographic province. Shenandoah National Park (84,921 ha) is less than a third as large as Great Smoky, has received considerably more human impact in the past, and has much lower species diversity. The Upper Mississippi National Wildlife Refuge (78,975 ha) is also much smaller and less diverse than Great Smoky; as a Wildlife Refuge, it has a lesser degree of legal protection than a National Park.

8. EVALUATION

Great Smoky Mountains National Park is of world importance as the outstanding example of of the diverse Arcto-Tertiary geoflora era, providing an indication of what the late Pleistocene flora looked like before Recent human impacts (criteria i). It is large enough to be a significant example of continuing biological evolution of this natural system (criteria ii). The site is also of exceptional natural beauty, with scenic forests, clear running streams, and well-maintained trails (criteria iii), and a number of world-record tree species (criteria iv).

9. RECOMMENDATION

Great Smoky Mountains National Park meets all four criteria so it should be inscribed on the World Heritage List.

International Union for Conservation of Nature and Natural Resources

15 April 1983

NAME Great Smoky Mountains National Park

MANAGEMENT CATEGORY II & IX (National Park and Biosphere Reserve)

Proposed World Heritage Site (Criteria: i, ii)

BIOGEOGRAPHICAL PROVINCE 1.5.5 (Eastern Forest)

LEGAL PROTECTION Total. No removal of natural resources permitted except for certain fish excluding brook trout.

DATE ESTABLISHED 22 May 1926 as a National Park (44 Stat. 616) and June 1976 as a Biosphere Reserve

GEOGRAPHICAL LOCATION Southern end of the Appalachian Mountains in eastern Tennessee and western North Carolina, bounded by the Little Tennessee River in the south, the French Broad River to the north and the Pigeon River in the east. Surrounded by parts of several National Forests, an Indian reservation, and a Tennessee Valley Authority lake. Gatlinburg (Tennessee) lies close to the north entrance and Cherokee (North Carolina) the south entrance. 35°26'-47'N, 83°45'-84°00'W.

ALTITUDE 260-2,025m

AREA 209,000ha. The Park comprises about 25% of the total area protected in the Eastern Forest biogeographic province.

LAND TENURE Federal government

PHYSICAL FEATURES The dominant topographic feature of the Park is the range of the Great Smoky Mountains with 16 peaks over 1,829m. Lesser ridges form radiating spurs from the central ridgeline. In broad aspect, the topography of the Park consists of moderately sharp-crested, steep-sided ridges separated by deep V-shaped valleys. Many of the mountain ridges branch and subdivide creating a complex of drainage systems with many fast-flowing clear mountain streams. The Park contains 22 major watersheds and the water table is near the surface in almost all sections. Precambrian metamorphic rocks consisting of gneisses and schists, and sedimentary rocks of the Precambrian OCOEE series are predominant, while sedimentary rocks in the Appalachian Valley are the youngest. Mean annual temperature for Gatlinburg is 13.7°C, but the average temperature is 5-10° cooler higher up. Warm humid summers and relatively mild winters. Precipitation averages 1,626mm annually, but differences in average annual precipitation of more than 635mm have been recorded between a peak and valley only 16km apart. Snow accumulations may reach 1.2m at 1,500m, but are negligible below 1,000m.

VEGETATION The area is a pleistocene refuge and thus an outstanding example of the diverse Arcto-Tertiary geoflora era, having a high number of temperate species (1,450 species of flowering plants and 2,200 others including 130 trees) with some rich mixed stands. Some 30% of the Park is virgin forest and areas previously logged have been recovering for varied periods of time presenting a range of successional stages. Deciduous broad-leaved and needle-leaved evergreen conifer forests predominate with smaller areas of treeless grass and heath balds, open wet meadows and cliffs. The vegetation changes continuously with elevation, slope aspect and soil moisture patterns, notable types being: cove hardwood and hemlock forests dominated by 25-30

diverse tree species including Liriodendron tulipifera, Halesia carolina var. monticola, Tilia heterophylla, Quercus rubra, Fraxinus americana, Acer saccharum, Betula lutea, and Tsuga canadensis, 6-12 species being co-dominant at any one site, with diverse herbaceous understoreys with vernal peak flowering; a one-tenth hectare plot may support 40-50 species through the year. Forest areas include northern hardwood forest Fagus grandifolia, B. lutea, Acer saccharum, Aesculus octandra; spruce-fir forest of Picea rubens, Abies fraseri, B. lutea, Sorbus americana (the block of virgin red spruce is the largest left on earth, and over 40% of southern Appalachian spruce-fir occurs in the Park); mixed oak forest of Quercus alba, Q. rubra, Q. prinus and formerly Castanea dentata; and pine-oak forest of Pinus rigida, P. pungens, P. virginiana, Quercus coccinea, Nyssa sylvatica and Oxydendrum arboreum. On mesic sites, cove forest grades with elevation into northern hardwoods and finally spruce-fir forest, the transition occuring at ca. 1,700m. At mid and lower elevations, along a gradient from mesic to xeric sites, cove forest is replaced by mixed oak and then by pine-oak. Heath balds represent the xeric extreme at higher elevations and evergreen broadleaved shrubs dominate including Rhododendron minus, R. catawbiense, Kalmia latifolia, Leiophyllum buxifolium. Grass balds, cliffs, landslide scars and upper elevation forests support the growth of rare southern Appalachian endemics. 5 species are officially listed as endangered on the Fish and Wildlife Service List of Candidate Endangered Plants (Federal Register 45: 82480, 1980): Smoky Mountains manna grass Glyceria nubigena, spreading avens Geum radiatum, Cain's reedgrass Calamagrostis cainii, mountain rush Juncus trifidus var. Monathos and Rugel's ragwort Cacelia rugelia, but an additional 120 threatened species occur.

NOTEWORTHY FAUNA A diverse fauna occurs including at least 50 native animals, reflecting the richness of the flora. With the exception of the black bear Ursus americanus and white-tailed deer Odocoileus virginianus, large mammals are seldom seen though red fox Vulpes fulva, gray fox Urocyon cinereoargenteus, racoon Procyon lotor, opossum Didelphis marsupialis, woodchuck Marmota monax and bobcat Lynx rufus range throughout the Park. Other mammals include the red squirrel Tamiasciurus hudsonicus, grey squirrel Sciurus carolinensis, muskrat Ondatra zibethicus, cottontail rabbit Sylvilagus floridanus, several species of mice, moles and shrews, long-tailed weasel Mustela frenata, mink M. vison, and skunks. Several species of bats inhabit the park. The threatened Indiana bat Myotis sodalis (V) is known to use at least one of the Park's caves as a winter roost. There have been several recent, but unconfirmed, sightings of mountain lions Felis concolor. Beaver Castor canadensis, apparently once common here, are reappearing in several valleys. Bison Bison bison, wapiti Cervus elaphus, timber wolf Canis lupus (V), fisher Martes pennanti and otter Lutra canadensis once occurred here and could possibly be reintroduced. Over 200 species of birds have been observed with over 60 permanent residents including robin Turdus migratorius, cardinal Cardinalis cardinalis, song sparrow Melospiza melodia and wild turkey Meleagris gallopavo, and some 100 species have been observed in the Park and immediate vicinity during the winter. The peregrine falcon Falco peregrinus (V) once nested, but this species is rarely seen here now; the red-cockaded woodpecker Picoides borealis (V) has also been observed nesting, but the population is sparse and the species seldom seen. Reptile species include 7 turtle, 8 lizard and 23 snake. Heavy precipitation and numerous streams make the mountains ideal for a wide variety of amphibian species including about 27 salamander (the red-cheeked salamander Plethodon jordani appears to be endemic to the Park), 2 toads and at least 10 frogs. Over 70 species of native fish inhabit the streams including the eastern brook trout Salvelinus fontinalis (the Park's population may be a separate and threatened subspecies). Other theatened fish species reported include the smoky madtom Noturus baileyi, yellow-fin madtom N. flavipinnis (V) and stonecat N. flavus (though some of

these may no longer exist in Park waters). Over 20 minnow species and several kinds of darter, sucker, sunfish, bass, bullhead and catfish are also found. The Park also contains a diversity of invertebrates, especially land snails, spiders, insects and other arthropods, that is not well known. 105 species of stonefly including endemics such as Magaloptera williams, Hansonoterla appalachia, several Capnia spp. and Acroneura lycorias (found only in Sevier County). Most groups reveal a complex assortment of forms that often include species endemic to the Park and/or new to science.

CULTURAL HERITAGE Archaeological sites support the theory that prehistoric people (15,000 years ago) were hunters and gatherers. Present historical and cultural interpretation in the Park is based mainly on the structures dating from the middle 1800's to 1920 including the finest collection of log buildings in the U.S.A. The National Register of Historic Places includes 3 historic districts, 8 structures and 28 buildings.

ZONING Natural zone 92%; Historic zone 1%; Development zone 7%.

CONSERVATION MANAGEMENTS A limited area contains visitor, maintenance and administrative facilities and the Park also contains the historic district of Cades Cove. The remaining area has been allowed to revert to a forest state through natural plant succession processes and much management effort is directed at keeping human impact to a minimum. The Park has a general management plan and a series of sectoral management plans.

DISTURBANCES OR DEFICIENCIES Several road systems pass through the Park as well as over 1,280km of horse and foot trails which dissect the high country. The 3 historical zones have open fields of grass and Cades Cove supports a cattle operation. Subsistence farming and commercial logging have been practised in the past, and logging railroads were built. Some of the 1,200 structures in the Park when it was established have been removed, destroyed or allowed to deteriorate. Exotic species of plant and animal in particular wild boar Sus scrofa and 2 trout species are a disturbance and are removed regularily. Other threats include plant pests such as balsam woolly aphid, air pollution and visitor impact.

TOURISM 680,000 visitors each year. Camping grounds, trailer parks, hotels and other infrastructure are now encouraged outside the Park. Facilities within the Park include 9 campgrounds (3 primitive), 2 visitor centres and 18 shelters along the Appalachian Trail and other back country trails (668km)

SCIENTIFIC RESEARCH Research funded by the NPS is mainly directed at monitoring impacts and developing methods for reducing, eliminating, or compensating for them. Much effort is being made to conduct and coordinate research under the guidance of scientists based at the Uplands Field Research Laboratory. The laboratory maintains comprehensive monitoring programmes on a variety of chemical pollutants and biological communities.

SPECIAL SCIENTIFIC FACILITIES Uplands Field Research Laboratory offering both research and accomodation facilities.

PRINCIPAL REFERENCE MATERIAL
The Park library and Uplands laboratory have numerous reference documents, and there are about 600 publications relating to the Park. A full bibligraphy of scientific study has been published by the Southern Appalachian Research/ Resources Management Cooperative and Western Carolina University (1982, US MAB Report No. 4, Washington DC) who also published a history of scientific study in the area (1982, US MAB Report No. 5, Washington, DC).

Carlos C. Campbell Birth of a National park in the Great Smoky Mountains.

General Management Plan - Great Smoky Mountains National Park, North Carolina-Tennessee. (1982) US Department of the Interior, National Park Service, Denver Service Center, Denver, CO. 70p

Maps: 1:125,000 Great Smoky Mountains National Park and Vicinity, US Geological Survey.

Biosphere Reserve nomination submitted to Unesco

STAFF 105 permanent and 200 temporary and full-time employees

BUDGET The financial statement for 1982 totalled US$5,613,000

LOCAL PARK OR RESERVE ADMINISTRATION Superintendent, Great Smoky Mountains National Park, Gatlinburg, Tennessee 37738, U.S.A.

DATE August 1982

UNITED STATES OF AMERICA-Great Smoky Mountains National Park

UNITED STATES OF AMERICA - Tennessee

NAME Great Smoky Mountains National Park

MANAGEMENT CATEGORY II (National Park)
IX (Biosphere Reserve)
X (World Heritage Site - Criteria: i, ii)

BIOGEOGRAPHICAL PROVINCE 1.05.05 (Eastern Forest)

GEOGRAPHICAL LOCATION Southern end of the Appalachian Mountains in eastern Tennessee and western North Carolina, bounded by the Little Tennessee River in the south, the French Broad River to the north and the Pigeon River in the east. Surrounded by parts of several national forests, an Indian reservation, a Tennessee Valley Authority lake and numerous private holdings. Gatlinburg (Tennessee) lies close to the north entrance and Cherokee (North Carolina), the south entrance. 35°26'-35°47'N, 83°45'-84°00'W

DATE AND HISTORY OF ESTABLISHMENT 22 May 1926 as a national park (44 Stat. 616) and June 1976 as a biosphere reserve

AREA The biosphere reserve covers an area of 209,000ha. The park comprises about 25% of the total area protected in the Eastern Forest biogeographic province.

LAND TENURE Federal government

ALTITUDE 259m-2,025m

PHYSICAL FEATURES The dominant topographic feature of the park is the range of the Great Smoky Mountains with peaks over 1,818m. Lesser ridges form radiating spurs from the central ridgeline. In broad aspect, the topography of the park consists of moderately sharp-crested, steep-sided ridges separated by deep V-shaped valleys. Many of the mountain ridges branch and subdivide creating a complex of drainage systems with 3,057km of fast-flowing clear mountain streams. The park contains 45 watersheds and the water table is near the surface in almost all sections. Precambrian metamorphic rocks consisting of gneisses and schists, and sedimentary rocks of the Precambrian Ocoee series are predominant, while sedimentary rocks in the Appalachian Valley are the youngest.

CLIMATE Mean annual temperature for Gatlinburg is 13.7°C, but the average temperature is 5°-10° cooler at higher altitudes, with warm humid summers and relatively mild winters. Precipitation averages 1625mm annually, but differences in average annual precipitation of more than 600mm have been recorded between a peak and valley only 15km apart. Snow accumulations may reach 1.2m at 1,500m, but are negligible below 1,000m.

VEGETATION The deeply dissected landscape present at the southern end of

the Appalachian chain provided a refuge for a host of temperate and boreal species during Pleistocene glaciation. This has resulted in a rich vegetation mosaic comprising approximately 1,500 species of flowering plants, including 130 trees, and an estimated 2,200 cryptogamous taxa.

Some 30% of the park's forest is high in 'virgin' attributes. Areas which were farmed or logged have been recovering for varying periods of time and therefore present a range of successional stages. Deciduous broad-leaved and evergreen coniferous forests predominate but treeless grass and heath balds,
open wet meadows and cliffs communities also occur. Vegetation changes continuously with elevation, slope, aspect and topographic position. Fourteen major forest types are currently recognised within the park. On mesic sites, low and mid-elevation cove hardwood (mixed mesophytic) and hemlock-hardwood forest grade, with increasing elevation, into northern hardwoods and finally, at about 1,500m, into spruce-fir. On a gradient from mesic to xeric, the cove hardwoods are replaced by mixed oak, xeric oak, and oak-pine. Heath balds represent the xeric extreme at the upper elevations and are dominated by ericaceous shrubs such as Rhododenron catawbiense, R. minus, Kalmia latifolia and Leiophyllum buxfolium. Perhaps the most notable are the cove hardwood and spruce-fir. Cove hardwoods may contain upwards of 20 different species in the canopy at any one site. Dominants often include Liriodendron tulipifera, Halesia carolina, Acer saccharum, Aesculus octandra and Prunus serotina. A single tenth-hectare plot may support in excess of 50 species throughout the year. The spruce-fir forest type occurs only at the highest elevations and contains the largest contiguous block of virgin Picea rubens on earth. Fully 75% of all Southern Appalachian spruce-fir occurs within the park. Additionally, grass balds, ridges, cliffs and landslide scars within thses high elevation forest support the growth of rare regional endemics. Fifteen plants are listed as candidates for federal protection as threatened or endangered speceis. Moreover, 120 species are recognised as rare enough to be of managerial concern. A similar number of bryophytes, lichens and fungi are also considered rare at the regional, national, or global level.

FAUNA Reflecting the richness of the flora, the diverse fauna includes at least 50 native animals. With the exception of black bear Ursus americanus and white-tailed deer Odocoileus virginianus, large mammals are not encountered. However, ranging throughout the park are many medium sized mammals including red fox Vulpes fulva (sometimes considered as one species, Vulpes vulpes, along with old world red fox), grey fox Urocyon cinereoargenteus, racoon Procyon lotor, opossum Didelphis marsupialis, woodchuck Marmota monax and bobcat Lynx rufus. Several squirrels are seen including eastern chipmunk Tamias striatus, red squirrel Tamiasciurus hudsonicus, grey squirrel Sciurus carolinensis and two types of flying squirrel, the southern Glaucomys volans and the northern endangered subspecies Glaucomys sabrinus coloratus. Other smaller mammals include muskrat Ondatra zibethicus, cottontail rabbit Sylvilagus floridanus, several species of mice, moles and shrews. Beaver Castor canadensis, apparently once common here, are begining to reappear in several valleys. Mustelids include long-tailed weasel Mustela frenata, mink M. vision, and skunks. River otter Lutra canadensis has been successfully reintroduced.

Infobase produced by WCMC, January 1992

Several species of bats inhabit the park. The threatened Indiana bat Myotis sodalis (V) is known to use at least three of the park's caves as a winter roost. There have been several recent, but unconfirmed, sightings of puma Felis concolor. Bison Bison bison and wapiti Cervus elaphus show little promise of reintroduction due to disease problems and visitor safety. Wolf Canis lupus (V), and possibly Canis rufus, and fisher Martes pennanti have occurred here and possibly may be reintroduced. Since the 1950s, control efforts have been exercised against the exotic European wild boar Sus scrofa. Recently coyote Canis latrans has migrated naturally to the park.

Over 200 species of birds have been observed, including many species of warblers, flycatchers and other migratory songbirds. Over 60 permanent residents including ruffed grouse Bonasa umbellus and wild turkey Meleagris gallopavo, can be seen year round. Peregrine falcon Falco peregrinus (V) has been reintroduced. Red-cockaded woodpecker Picoides borealis has been observed nesting, but none has been seen recently.

Reptile species include seven turtles, eight lizards and 23 snakes. Heavy precipitation and numerous streams make the mountains ideal for a wide variety of amphibian species including about 27 salamander (red-cheeked salamander Plethodon jordani appears to be endemic to the park), two toads and at least ten frogs. Over 40 species of native fish inhabit the streams, including eastern brook trout Salvelinus fontalis (the park's population may be a separate and threatened subspecies). Other theatened fish species include smoky madtom Noturus baileyi, yellow-fin madtom N. flavipinnis (V) and spotfin chub Hybopsis nonacha, which are currently being reintroduced into the park.

The park also contains a diversity of invertebrates, especially land snails, spiders, insects and other arthropods, that is not well known. Over 100 species of caddisflies and stoneflies are found in the park, including stonefly endemics such as Megaloptera williamsi, Hansonoperla appalachia, several Capnia species and Acroneuria lycorias (found only in Sevier County). Over 800 Lepidopteran species have been recorded. Most groups reveal a complex assortment of forms that often include species endemic to the park and/or new to science.

CULTURAL HERITAGE Archaeological sites support the theory that prehistoric people (15,000 years ago) were hunters and gatherers. Present historical and cultural interpretation in the park is based mainly on structures dating from the middle 1800s to 1920, including the finest collection of log buildings in the United States. The National Register of Historic Places includes three historic districts, eight structures and 28 buildings.

LOCAL HUMAN POPULATION No information

VISITORS AND VISITOR FACILITIES The park records about 8.8 million recreational visits each year and is the most visited national park in the country. Use of camping grounds, trailer parks, hotels and other infrastructure are now encouraged outside the park. Facilities within the

park include three visitor centres, 10 campgrounds (three primitive), and 18 shelters along the Appalachian Trail and other back country trails (668km), 10 picnic areas, numerous backcountry campsites and over 1,448km of trails. The parks conducts an active visitor services programme which primarily interprets the natural and cultural resources of the area and provides visitor information. There are six amphitheatres and one campfire circle. A wide variety of publications and interpretive literature about the park is made available by the Great Smoky Mountains Natural History Association. This association also operates the Great Smoky Mountains Institute, which is a live-in facility that accommodates 120 people and offers environmental education programmes for school groups, teacher workshops, adult programmes, elderhostels etc.

SCIENTIFIC RESEARCH AND FACILITIES Research funded by the NPS is mainly directed at monitoring impacts and developing methods for reducing, eliminating, or compensating for them. Research is conducted and coordinated under the guidance of scientists based at Uplands Field Research Laboratory. A wide range of research projects is conducted in the general topics of sociology, wildlife surveys, fisheries, stream chemistry and watersheds, air quality monitoring and biological effects of pollution, geography, rare species and natural heritage, introduced, exotic and disease species, and long term ecological research.

CONSERVATION MANAGEMENT The park is particualarly valued by visitors for the seemingly endless vistas of forested mountains. A limited area contains visitor, maintenance and administrative facilities and the park also contains
Cades Cove, Noah Ogle and Roaring Forks historic districts and Oconaluftee archaeological district. The remaining area has been allowed to revert to a forest state through natural plant succession processes and much management effort is directed at keeping human impact to a minimum. The park has a general management plan and a resource management plan supported by a variety of natural resource action plans developed to mitigate specific threats to the park's resources. The system of zoning comprises natural zone (92%), historic zone (1%) and development zone (7%). No removal of natural resources is permitted except for certain fish excluding brook trout.

MANAGEMENT PROBLEMS Several road systems pass through the park as well as over 1,280km of horse and foot trails which dissect the high country. The three historical zones have open fields of grass and Cades Cove supports a cattle operation. Subsistence farming and commercial logging have been practised in the past, and logging railroads were built. Some of the 1,200 structures in the park when it was established have been removed, destroyed or allowed to deteriorate. Several non-native plant and animal species are known to cause significant impacts to natural resources. Management strategies for exotic plants have been applied, in some instances dating from the early 1940s, while strategies are currently being developed for several other non-native species. Wild boar Sus scrofa, has been recognised as needing control efforts since the mid-1950s and is removed regularly. In order to protect and perpetuate rapidly declining native brook trout populations, control efforts have been conducted against two

competitve non-native trout species. Continuing problems include visitor abuse of backcountry resources; poaching of wildlife , particulary native brook trout, deer and black bear; and woodland arson. Vandalism and wilful destruction of historic structure are common. Other threats include air pollution and several forest pests and diseases, such as balsam wooly adelgid, southern pine beetle, dogwood anthracnose, butternut canker, and chestnut blight. Since inception of park management, total suppression of all wild fires has accounted for unnatural accummulation of fuels and changes in the forest mosaic that do not favour fire-dependent plant species.

STAFF 255 (214 full-time, and part-time employees and 41 temporary employess)

BUDGET The financial statement for 1989 was approximately US$6.7 million.

LOCAL ADMINISTRATION Superintendent, Great Smoky Mountains National Park, Gatlinburg, Tennessee 37738

REFERENCES

The park library and Uplands laboratory have numerous reference documents, and there are numerous publications relating to the park. A full bibliography of scientific study has been published by the Southern Appalachian Research/ Resources Management Cooperative and Western Carolina University (1982, US MAB Report No. 4, Washington DC) which also published a history of scientific study in the area (1982, US MAB Report No. 5, Washington, DC).

Campbell, C.C. (1960). Birth of a National park in the Great Smoky Mountains.

General Management Plan - Great Smoky Mountains National Park, North Carolina-Tennessee. (1982) US Department of the Interior, National Park Service, Denver Service Center, Denver, CO. 70pp.

Maps: 1:125,000 Great Smoky Mountains National Park and Vicinity, US Geological Survey.

National Park Service (1977 to present). Research/Resource Management Report Series. National Park Service, Southeast Region, US Department of the Interior.

DATE August 1982, revised August 1986 and May 1990

0097U

UNITED STATES OF AMERICA-Mammoth Cave

UNITED STATES OF AMERICA - Kentucky

NAME Mammoth Cave Area Biosphere Reserve

IUCN MANAGEMENT CATEGORY II (National Park)
X (World Heritage Site: Criteria i, ii, iii, iv)
IX (Biosphere Reserve)

Infobase produced by WCMC, January 1992

BIOGEOGRAPHICAL PROVINCE 1.05.05 (Eastern Forest)

GEOGRAPHICAL LOCATION Situated in Barren, Edmonson and Hart counties, South Central Kentucky near Park City, which lies within the transition area. 37°07'-37°17'N, 86°00'-86°17'W

DATE AND HISTORY OF ESTABLISHMENT The area was declared a national park on 1 July 1941, under enabling legislation of US Congress (44 Statute 635) of 25 May 1926. Kentucky ceded cxclusive jurisdiction over park lands by an act of legislature approved on 22 March 1930 and this was accepted by the Secretary of the Interior on 1 May 1944 by authority of the act of 5 June 1942 (56 Statute 317). Exclusive jurisdiction over the remainder of the land was accepted on 1 May 1965. Certain roads through the park are legally open to the public under Deed No.262 of 18 June 1945. Part of the area is endorsed by the Barren River Area Development District resolution of 24 October 1988. Big Woods Old-growth Forest is designated a state natural area by the state of Kentucky. Green River is designated a wild and scenic river and Green River and Mammoth Cave subsurface streams are designated outstanding resource waters by this state. Accepted as a World Heritage site in 1981 and as a biosphere reserve in 1990.

AREA National park 21,191ha; the area included in the biosphere reserve is 21,217ha, comprising a core area of 20,917ha and buffer zones of 300ha; an additional transition zone covers 62,160ha.

LAND TENURE The national park (core area) is federally owned

ALTITUDE 180-231m

PHYSICAL FEATURES The park is situated in an area known as the Mammoth Cave Plateau and contains an internationally important karst area. The core area is a dissected plateau known as the Chester Upland, formed of sandstone-capped ridges separated by karstified valleys containing sinkholes. It also contains the longest cave system in the world, with known passages extending for over 532km. Most types of limestone cave formation are found here, including long passages with huge chambers, vertical shafts, stalagmites, stalactites and gypsum 'flowers' and 'needles'. On the surface there is a superb karst topography with largely subsurface drainage, sinkholes, cracks, fissures and springs. Groundwater flows from the extensive recharge areas on the plateaux to the southwest through the park's cave system to springs that discharge into the Green River. The erosion by the Green River and its tributaries which formed this system began over 25 million years ago and these rivers are now meandering and deeply incised. The limestone rocks of Upper Mississippian age are highly soluble and include contain fossils throughout, including brachiopods, crinoids and corals. The main series in which the cave systems and karst landscape have developed are the St Louis, St Genevieve and Paoli limestones of the Meramecian. The Chester Upland is capped by sandstones of the Upper Mississippian-Lower Pennsylvania periods. Structural dip in the north-west is about 5m/km. The major soil types are those developed from limestone residuum and are either alfisols or

ultisols. To the east, south and west of the park (included in the transition zone) is the Pennyroyal Plateau which is separated from the Chester Upland by an escarpment.

CLIMATE Conditions are humid temperate. Mean annual precipitation is 1118mm at an altitude of 205m and practically all of it is in the form of rain as temperatures are generally above freezing during the day. Mean annual temperature is 13.6°C with a summer mean of 26.6°C and a winter mean of 1.7°C.

VEGETATION There is a luxuriant surface vegetation, including 84 tree species, 28 shrubs and vines, 29 species of fern, 209 flower species, 67 species of algae, 27 species of fungi and seven species of mosses. An inventory of the flora is included in the biosphere reserve nomination. Big Woods is reputed to be one of the largest and best remaining examples of the ancient forest of eastern North America that once covered Kentucky. This is temperate deciduous oak-hickory forest dominated by oaks including Quercus alba, Q. velutina, Q. prinus and hickories including Carya glabra and C. tomentosa with some beech Fagus sp., maples Acer spp. polpar Liriodendron sp., ash Fraxinus sp. and cedar Juniperus virginiana.

FAUNA Over 200 species are indigenous to the cave system. On the surface are 41 species of mammals, 203 species of birds, 18 species of reptiles and 15 species of amphibians. A faunal list is included in the biosphere reserve nomination. The age of the geological formations has contributed to species richness in the cave fauna, the cave system being old enough to have communities from three karst regions and covering an area large enough for speciation to have occurred. Nowhere else do blind fish Amblyopsis spelaea (V), Typhlichthus subterraneus and their spring cave-dwelling relative Chologaster agassizi co-exist. Resident animal species listed as federally endangered include freshwater mussels Obovaria retusa (I), Hemistena lata (E), Pleurobema plenum (E) and Lampsilis orbiculata (E), Indiana bat Myotis sodalis (V), grey bat M. grisescens and Kentucky cave shrimp Plaemonias ganteri. There have been successful reintroductions of wild turkey, beaver and deer.

CULTURAL HERITAGE The park contains evidence of four pre-Columbian Indian cultures: Mississippian, Woodland, Archaic and Paleo-Indian. The early Woodland culture period is of special archaeological importance because it shows the first evidence of organised horticulture in North America, with primitive agriculture on river floodplains. These indians used the caves for shelters and chipped gypsum and mirabilite off the walls; more than 150 archaeological sites have been identified within the national park. Saltpetre deposits were discovered on the cave walls and this valuable nitrate was removed and sent to be processed in gunpowder factories between 1809 and 1819. After the 1812-1815 war Mammoth Cave became a national and international tourist attraction. Three churches and fourteen cemeteries still exist in the park and are used by the public.

LOCAL HUMAN POPULATION There are no permanent inhabitants in the core area. About 240 people live in the buffer zones with a further 1500 in the transition area, including about 600 in Park City. Population density in

the region surrounding the park is low (30 per sq.km) and has remained stable for the past 20 years. Only 25% of the population is considered urban and no significant increase in urbanisation is expected in the near future. Most people are engaged in agriculture, tourism or service industries.

VISITORS AND VISITOR FACILITIES Since a peak in 1979 of 1.6 million visitors, numbers remained stable near this level into the 1980s with an increase occurring in recent years to about 2 million per annum. The summer months of June, July and August account for over 60% of the annual total. Park headquarters are located at the historic entrance to Mammoth Cave and there is a visitors' centre here, but this is very small. Guided tours are offered of the underground portion of the park and there are commercial boat trips on Green River. There are 155km of roads within the park and many hiking trails
including over 45 miles in the remote section of the park but there are only two small ferries across the Green River so that resources in much of the remoter hilly areas of the park remain untapped. Access is good and it is estimated that a third of all visitors do no more than drive through the park. There are about 110 rooms in a hotel, lodge and various cottages and restaurant and shopping facilities in the buffer zone but a further 2,000 motel rooms and over 7,500 campsite places are located within easy distance of the park.

SCIENTIFIC RESEARCH AND FACILITIES Long-term hydrological and ecological research into karst systems is being carried out in the Mammoth Cave area, including the effects of water quality on the cave's biota. In particular, research into groundwater flow-pulse rates and modelling has been applied to the development of instrumentation packages for monitoring the physical and chemical properties of groundwater. Preliminary discussions of the international applications of this have been initiated. Much research into a variety of aspects has already been carried out. A research facility and laboratory are available to visiting researchers. The US Geological Survey plans to further delineate groundwater basins in the area and the Agricultural Stabilisation and Conservation Service will be studying the effects of agriculture on groundwater in the transition zone. There are cooperative agreements with Western Kentucky University, Eastern Kentucky University, the Cave Research Foundation and the American Cave Conservation Association for research and education or training opportunities.

CONSERVATION VALUE The Mammoth Cave area is an internationally important karst area. It contains the longest cave system in the world, with known passages extending for over 532km. Most types of limestone cave formation occur here. Over 200 species of animal are indigenous to the cave system including several endangered species of blind fish, shrimp, bat and freshwater mussel. Surface features are also important and Big Woods, a temperate deciduous oak-hickory dominated forest, is reputed to be one of the largest and best remaining examples of the ancient forest of eastern North America that once covered Kentucky. Archaeological sites in the area show evidence of four pre-Columbian Indian cultures.

CONSERVATION MANAGEMENT The core area (Mammoth Cave National Park) is

managed by the National Park Service. The transition zone falls within Barren River Development District of which three counties are within the Mammoth Cave system recharge area. The Biosphere Reserve Cooperative Subcommittee of the Natural Resources Council of the Barren River Area Development District will coordinate biosphere reserve functions. The general management plan for the national park (1983) states that the management aims at Mammoth Cave National Park are to perpetuate the integrity and diversity of geological features and life systems associated with the caves and preserve aquatic and terrestrial environments for their aesthetic, recreational, educational and scientific values. Within the core the management plan identifies separate natural zones and historic zones and it classifies caves into six types according to the access approved. A resource management plan has been compiled (Anon., 1988), which includes natural and cultural resource management programmes. The oak-hickory woods of the national park are being allowed to return to their natural state. Some of the oak and poplar forests are currently managed but there are no plantations. As well as public recreation, authorised fishing and hunting is permitted in the core area. Narrow corridors along roads within the core zone have been designated as zones of managed use and concentrate tourist developments, administrative and recreational facilities. A transition zone for the biosphere reserve has also been designated to the south and east of the core area to curtail groundwater pollution as this is
where much of the rainwater which flows through the cave systems of the park falls. Federal, state and local authorities have cooperated to develop a regional sewer system in this area, surrounding Park City, to stop pollutants reaching the groundwater.

MANAGEMENT CONSTRAINTS Damage to irreplacable cave features occurred during the early periods of cave use, including smoke deposits from torches and fires and graffiti. The use of electric lighting for cave tours has also led to the introduction and growth of mosses, fungi and algae in the caves and may eventually spoil the natural beauty of some of the unique formations. At least 130 cave entrances have been identified as needing some level of monitoring for illegal entry. Several cave gates are in need of repair. Oil and gas wells were also drilled in this area and although those inside the park were abandoned when it was established they still pose a threat to human safety and environmental quality as many have been insufficiently plugged. In adjacent areas, oil and gas exploration has increased recently and with this, the risks of spillages into the park's groundwater system including that of injected dyes. About half of the Mammoth Cave system actually lies outside the national park boundaries but management of these areas should be improved by the designation of a transitional zone to the biosphere reserve. Commercial freshwater mussel fishing outside the park has destroyed the natural mussel beds there and illegal operations have expanded into the park, resulting in conviction of the operators.

A wide variety of arable and animal farming occurs in the transition zone and this area is now increasing its light industry. However, solution of the existing pollution problems should provide a basis for increased opportunities to attract sustainable economic development compatible with

the karst terrain. Of major environmental concern is the extensive sinkhole plain to the south and east of the Park. Run-off from this area flows via underground streams into the Green River and includes effluent from Park City. There has also been illegal dumping of wastes into sink holes in the transition zone. Any changes in quality or quantity of water would adversely affect the unique aquatic life in the underground streams and alter natural cave development but this problem is now being addressed (see previous section).

STAFF The biosphere reserve has a staff of 94. Of these, 20 are involved in administration, control and resource management within the core area and 17 are university educated. There are 12 staff for education and training purposes and three involved in research who have a technical support of up to ten personnel.

BUDGET US$ 3,500,000 annually

LOCAL ADDRESSES Mammoth Cave National Park, Mammoth Cave, Kentucky 42259

REFERENCES

Anon. (1983). General management plan, Mammoth Cave National Park, Kentucky.
Denver Service Center.

Anon. (1988). Resource Management Plan for Mammoth Cave National Park. Draft.

MAB USA (1990). Mammoth Cave Area biosphere reserve. Biosphere Reserve nomination form.

DATE July 1981, revised October 1989 and September 1990

DOCUMENT 0359U

Infobase produced by WCMC, January 1992

PATRIMOINE MONDIAL: CANDIDATURE

EXAMEN TECHNIQUE PAR L'UICN

1. NUMERO D'IDENTIFICATION ET NOM: 259 PARC NATIONAL DES GREAT SMOKY MOUNTAINS

2. SITUATION GEOGRAPHIQUE: Entre 35°26'15" et 35°47' de latitude nord et 83°45' et 84° de longitude ouest.

3. CANDIDATURE PROPOSEE PAR: Ministère de l'intérieur, Gouvernement des Etats-Unis.

4. DOCUMENTATION:

(i) Formulaire de candidature, cartes et plans
(ii) Documentation supplémentaire (UICN)

a) Consultants: Tom Thomas, Robert Milne, Sue Wells, Brian Groombridge.

b) Southern Appalachian Research/Resources, Management Cooperative. 1982. Great Smoky Mountains Biosphere Reserve: A bibliography of scientific study. US MAB Rep. No. 4. Washington, D.C. 51 p.

c) Southern Appalachian Research/Resources, Management Cooperative. 1982. Great Smoky Mountains Biosphere Reserve: History of scientific study. US MAB Rep. No. 5. Washington, D.C. 276 p.

d) Plan général de gestion - Parc national des Great Smoky Mountains, Caroline du Nord - Tennessee. 1982. US Dept. of the Interior, National Park Service, Denver Service Center, Denver, CO. 70 p.

5. DESCRIPTION ET RESUME

Le Parc national des Great Smoky Mountains (209 000 ha) est la région naturelle la plus vaste de l'est des Etats-Unis. Il joue un rôle important sur le plan mondial dans la mesure où il constitue un exemple de forêt tempérée à feuilles caduques. Au pléistocène, il fut le principal refuge de la flore et de la faune tempérées et c'est pourquoi il contient un grand nombre d'espèces endémiques ainsi qu'un ensemble d'espèces extrêmement riche. Avec plus de 3 500 espèces végétales, il a une diversité floristique qui n'existe dans aucune autre région protégée à climat tempéré de même superficie. En outre, il y pousse presque autant d'arbres que dans toute l'Europe (130 espèces naturelles). Il abrite de nombreuses espèces animales en danger et l'on y trouve probablement la plus grande variété de salamandres au monde. Il constitue également un centre d'endémicité pour certains mollusques d'Amérique du Nord. (Pour plus de détails, voir la fiche descriptive ci-jointe)

6. INTEGRITE

La région est suffisamment vaste pour garantir la viabilité écologique des espèces qui y vivent. Elle peut constituer l'équivalent moderne d'un "refuge du pléistocène". En tant que première zone protégée de l'est des Etats-Unis, le site est visité chaque année par des millions de touristes et il fait ainsi l'objet d'une surexploitation qui suscite une certaine inquiétude. Toutefois, le National Park Service des Etats-Unis a cherché à résoudre directement le problème en encourageant la création, hors du Parc, de terrains de camping, de camps de caravanage, d'hôtels et d'autres infrastructures touristiques de

manière à réduire les contraintes qui pèsent sur le Parc, tout en permettant à la population environnante d'en tirer les avantages économiques. En matière de gestion, le Parc est soumis à un plan général ainsi qu'à un ensemble de plans sectoriels.

Le site est une réserve de la biosphère, et l'on y a mené un très grand nombre de recherches. La Bibliography of Scientific Studies publiée en 1982 compte plus de 600 articles. Toutefois, une partie relativement limitée de ces recherches est spécifiquement orientée vers les questions de gestion, et l'on estime qu'un système de contrôle contribuerait à garantir, à l'avenir, l'intégrité de la région.

7. COMPARAISON AVEC D'AUTRES REGIONS

Le domaine biogéographique de la forêt orientale comporte 37 régions protégées qui couvrent plus de 1,1 million d'hectares. Les Great Smoky Mountains s'étendent sur quelque 25% de l'ensemble de la zone protégée. Deux autres sites présentant un intérêt particulier se trouvent également dans ce domaine biogéographique. Le Parc national de Shenandoah (84 921 ha), dont la superficie est égale à moins d'un tiers de celle du Parc national des Great Smoky Mountains, a subi, dans le passé, l'influence de l'homme de façon nettement plus prononcée, et il abrite beaucoup moins d'espèces. Le refuge national de la flore et de la faune sauvages de la région du Mississipi supérieur (78 975 ha) est également beaucoup plus petit et moins diversifié que le Parc des Great Smoky Mountains. En tant que refuge de la flore et de la faune sauvages, il est juridiquement moins protégé qu'un parc national.

8. EVALUATION

Le Parc national des Great Smoky Mountains joue un rôle important sur le plan mondial en ce sens qu'il constitue un témoignage exceptionnel des diverses manifestations de la flore arcto-tertiaire. Il donne en effet une indication de ce que pouvait être la flore à la fin du pléistocène, avant l'influence récente de l'homme (critère i). Il est suffisamment vaste pour constituer un exemple important de la poursuite de l'évolution biologique de ce système naturel (critère ii). Le site est également d'une beauté exceptionnelle, avec ses forêts pittoresques, ses courants limpides, ses sentiers bien entretenus (critère iii) et un certain nombre d'espèces d'arbres détenteurs de records mondiaux (critère iv).

9. RECOMMANDATION

Le Parc national des Great Smoky Mountains satisfait aux quatre critères et devrait être inscrit sur la Liste du patrimoine mondial.

Union internationale pour la conservation
de la nature et de ses ressources

15 juin 1983

NAME Great Smoky Mountains National Park

MANAGEMENT CATEGORY II & IX (National Park and Biosphere Reserve)

Proposed World Heritage Site (Criteria: i, ii)

BIOGEOGRAPHICAL PROVINCE 1.5.5 (Eastern Forest)

LEGAL PROTECTION Total. No removal of natural resources permitted except for certain fish excluding brook trout.

DATE ESTABLISHED 22 May 1926 as a National Park (44 Stat. 616) and June 1976 as a Biosphere Reserve

GEOGRAPHICAL LOCATION Southern end of the Appalachian Mountains in eastern Tennessee and western North Carolina, bounded by the Little Tennessee River in the south, the French Broad River to the north and the Pigeon River in the east. Surrounded by parts of several National Forests, an Indian reservation, and a Tennessee Valley Authority lake. Gatlinburg (Tennessee) lies close to the north entrance and Cherokee (North Carolina) the south entrance. 35°26'-47'N, 83°45'-84°00'W.

ALTITUDE 260-2,025m

AREA 209,000ha. The Park comprises about 25% of the total area protected in the Eastern Forest biogeographic province.

LAND TENURE Federal government

PHYSICAL FEATURES The dominant topographic feature of the Park is the range of the Great Smoky Mountains with 16 peaks over 1,829m. Lesser ridges form radiating spurs from the central ridgeline. In broad aspect, the topography of the Park consists of moderately sharp-crested, steep-sided ridges separated by deep V-shaped valleys. Many of the mountain ridges branch and subdivide creating a complex of drainage systems with many fast-flowing clear mountain streams. The Park contains 22 major watersheds and the water table is near the surface in almost all sections. Precambrian metamorphic rocks consisting of gneisses and schists, and sedimentary rocks of the Precambrian OCOEE series are predominant, while sedimentary rocks in the Appalachian Valley are the youngest. Mean annual temperature for Gatlinburg is 13.7°C, but the average temperature is 5-10° cooler higher up. Warm humid summers and relatively mild winters. Precipitation averages 1,626mm annually, but differences in average annual precipitation of more than 635mm have been recorded between a peak and valley only 16km apart. Snow accumulations may reach 1.2m at 1,500m, but are negligible below 1,000m.

VEGETATION The area is a pleistocene refuge and thus an outstanding example of the diverse Arcto-Tertiary geoflora era, having a high number of temperate species (1,450 species of flowering plants and 2,200 others including 130 trees) with some rich mixed stands. Some 30% of the Park is virgin forest and areas previously logged have been recovering for varied periods of time presenting a range of successional stages. Deciduous broad-leaved and needle-leaved evergreen conifer forests predominate with smaller areas of treeless grass and heath balds, open wet meadows and cliffs. The vegetation changes continuously with elevation, slope aspect and soil moisture patterns, notable types being: cove hardwood and hemlock forests dominated by 25-30

diverse tree species including Liriodendron tulipifera, Halesia carolina var. monticola, Tilia heterophylla, Quercus rubra, Fraxinus americana, Acer saccharum, Betula lutea, and Tsuga canadensis, 6-12 species being co-dominant at any one site, with diverse herbaceous understoreys with vernal peak flowering; a one-tenth hectare plot may support 40-50 species through the year. Forest areas include northern hardwood forest Fagus grandifolia, B. lutea, Acer saccharum, Aesculus octandra; spruce-fir forest of Picea rubens, Abies fraseri, B. lutea, Sorbus americana (the block of virgin red spruce is the largest left on earth, and over 40% of southern Appalachian spruce-fir occurs in the Park); mixed oak forest of Quercus alba, Q. rubra, Q. prinus and formerly Castanea dentata; and pine-oak forest of Pinus rigida, P. pungens, P. virginiana, Quercus coccinea, Nyssa sylvatica and Oxydendrum arboreum. On mesic sites, cove forest grades with elevation into northern hardwoods and finally spruce-fir forest, the transition occuring at ca. 1,700m. At mid and lower elevations, along a gradient from mesic to xeric sites, cove forest is replaced by mixed oak and then by pine-oak. Heath balds represent the xeric extreme at higher elevations and evergreen broadleaved shrubs dominate including Rhododendron minus, R. catawbiense, Kalmia latifolia, Leiophyllum buxifolium. Grass balds, cliffs, landslide scars and upper elevation forests support the growth of rare southern Appalachian endemics. 5 species are officially listed as endangered on the Fish and Wildlife Service List of Candidate Endangered Plants (Federal Register 45: 82480, 1980): Smoky Mountains manna grass Glyceria nubigena, spreading avens Geum radiatum, Cain's reedgrass Calamagrostis cainii, mountain rush Juncus trifidus var. Monathos and Rugel's ragwort Cacelia rugelia, but an additional 120 threatened species occur.

NOTEWORTHY FAUNA A diverse fauna occurs including at least 50 native animals, reflecting the richness of the flora. With the exception of the black bear Ursus americanus and white-tailed deer Odocoileus virginianus, large mammals are seldom seen though red fox Vulpes fulva, gray fox Urocyon cinereoargenteus, racoon Procyon lotor, opossum Didelphis marsupialis, woodchuck Marmota monax and bobcat Lynx rufus range throughout the Park. Other mammals include the red squirrel Tamiasciurus hudsonicus, grey squirrel Sciurus carolinensis, muskrat Ondatra zibethicus, cottontail rabbit Sylvilagus floridanus, several species of mice, moles and shrews, long-tailed weasel Mustela frenata, mink M. vison, and skunks. Several species of bats inhabit the park. The threatened Indiana bat Myotis sodalis (V) is known to use at least one of the Park's caves as a winter roost. There have been several recent, but unconfirmed, sightings of mountain lions Felis concolor. Beaver Castor canadensis, apparently once common here, are reappearing in several valleys. Bison Bison bison, wapiti Cervus elaphus, timber wolf Canis lupus (V), fisher Martes pennanti and otter Lutra canadensis once occurred here and could possibly be reintroduced. Over 200 species of birds have been observed with over 60 permanent residents including robin Turdus migratorius, cardinal Cardinalis cardinalis, song sparrow Melospiza melodia and wild turkey Meleagris gallopavo, and some 100 species have been observed in the Park and immediate vicinity during the winter. The peregrine falcon Falco peregrinus (V) once nested, but this species is rarely seen here now; the red-cockaded woodpecker Picoides borealis (V) has also been observed nesting, but the population is sparse and the species seldom seen. Reptile species include 7 turtle, 8 lizard and 23 snake. Heavy precipitation and numerous streams make the mountains ideal for a wide variety of amphibian species including about 27 salamander (the red-cheeked salamander Plethodon jordani appears to be endemic to the Park), 2 toads and at least 10 frogs. Over 70 species of native fish inhabit the streams including the eastern brook trout Salvelinus fontinalis (the Park's population may be a separate and threatened subspecies). Other theatened fish species reported include the smoky madtom Noturus baileyi, yellow-fin madtom N. flavipinnis (V) and stonecat N. flavus (though some of

these may no longer exist in Park waters). Over 20 minnow species and several kinds of darter, sucker, sunfish, bass, bullhead and catfish are also found. The Park also contains a diversity of invertebrates, especially land snails, spiders, insects and other arthropods, that is not well known. 105 species of stonefly including endemics such as Magaloptera williams, Hansonoterla appalachia, several Capnia spp. and Acroneura lycorias (found only in Sevier County). Most groups reveal a complex assortment of forms that often include species endemic to the Park and/or new to science.

CULTURAL HERITAGE Archaeological sites support the theory that prehistoric people (15,000 years ago) were hunters and gatherers. Present historical and cultural interpretation in the Park is based mainly on the structures dating from the middle 1800's to 1920 including the finest collection of log buildings in the U.S.A. The National Register of Historic Places includes 3 historic districts, 8 structures and 28 buildings.

ZONING Natural zone 92%; Historic zone 1%; Development zone 7%.

CONSERVATION MANAGEMENTS A limited area contains visitor, maintenance and administrative facilities and the Park also contains the historic district of Cades Cove. The remaining area has been allowed to revert to a forest state through natural plant succession processes and much management effort is directed at keeping human impact to a minimum. The Park has a general management plan and a series of sectoral management plans.

DISTURBANCES OR DEFICIENCIES Several road systems pass through the Park as well as over 1,280km of horse and foot trails which dissect the high country. The 3 historical zones have open fields of grass and Cades Cove supports a cattle operation. Subsistence farming and commercial logging have been practised in the past, and logging railroads were built. Some of the 1,200 structures in the Park when it was established have been removed, destroyed or allowed to deteriorate. Exotic species of plant and animal in particular wild boar Sus scrofa and 2 trout species are a disturbance and are removed regularily. Other threats include plant pests such as balsam woolly aphid, air pollution and visitor impact.

TOURISM 680,000 visitors each year. Camping grounds, trailer parks, hotels and other infrastructure are now encouraged outside the Park. Facilities within the Park include 9 campgrounds (3 primitive), 2 visitor centres and 18 shelters along the Appalachian Trail and other back country trails (668km)

SCIENTIFIC RESEARCH Research funded by the NPS is mainly directed at monitoring impacts and developing methods for reducing, eliminating, or compensating for them. Much effort is being made to conduct and coordinate research under the guidance of scientists based at the Uplands Field Research Laboratory. The laboratory maintains comprehensive monitoring programmes on a variety of chemical pollutants and biological communities.

SPECIAL SCIENTIFIC FACILITIES Uplands Field Research Laboratory offering both research and accomodation facilities.

PRINCIPAL REFERENCE MATERIAL
The Park library and Uplands laboratory have numerous reference documents, and there are about 600 publications relating to the Park. A full bibligraphy of scientific study has been published by the Southern Appalachian Research/ Resources Management Cooperative and Western Carolina University (1982, US MAB Report No. 4, Washington DC) who also published a history of scientific study in the area (1982, US MAB Report No. 5, Washington, DC).

Carlos C. Campbell Birth of a National park in the Great Smoky Mountains.

General Management Plan - Great Smoky Mountains National Park, North Carolina-Tennessee. (1982) US Department of the Interior, National Park Service, Denver Service Center, Denver, CO. 70p

Maps: 1:125,000 Great Smoky Mountains National Park and Vicinity, US Geological Survey.

Biosphere Reserve nomination submitted to Unesco

STAFF 105 permanent and 200 temporary and full-time employees

BUDGET The financial statement for 1982 totalled US$5,613,000

LOCAL PARK OR RESERVE ADMINISTRATION Superintendent, Great Smoky Mountains National Park, Gatlinburg, Tennessee 37738, U.S.A.

DATE August 1982