

## 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 occurring 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, raccoon 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 threatened 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 MANAGERMENTS 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 regularly. 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