

Yellowstone NP

Documentation : satisfactory

Justification for inclusion in WH List

"In all four criteria, Yellowstone National Park represents the conditions of integrity - sufficient size, variety and continuity to represent an unbroken story from ancient to present time and every indication that the story is continuing to unfold according to nature's evolutionary design.

Provisional IUCN Recommendation

Declare as a World Heritage Site

UNITED STATES OF AMERICA

NAME Yellowstone National Park

IUCN MANAGEMENT CATEGORY II (National Park)

IX (Biosphere Reserve)

X (World Heritage Site - Criteria: i, ii, iii, iv)

BIOGEOGRAPHICAL PROVINCE 1.19.12 (Rocky Mountains)

GEOGRAPHICAL LOCATION In the southern portion of the northern Rocky Mountains, in the north-west corner of the state of Wyoming, overlapping into Montana on the north and Idaho on the west. The eastern boundary mostly follows topographic divides but the remaining boundaries are defined by compass lines. 44°08'-45°07'N, 109°10'-111°10'W

DATE AND HISTORY OF ESTABLISHMENT Created a national park on 1 March 1872; accepted as a biosphere reserve in June 1976; and accepted as a World Heritage site in 1978. Protection is provided under several congressional acts.

AREA The biosphere reserve covers an area of 898,349ha (824,263ha in Wyoming, 61,144ha in Montana and 12,743ha in Idaho). It is surrounded by wilderness and wildlands in six national forests and Grand Teton National Park to the south, plus two national wildlife refuges. Taken together, these areas make up the greater Yellowstone area, considered the largest intact ecosystem in the temperate zone of the earth, four times the size of the park alone.

LAND TENURE Federal government, except for 7.7ha

ALTITUDE 1,710-3,463m

PHYSICAL FEATURES The park is part of the most seismically active region of the Rocky Mountains, a volcanic "hot spot". The Yellowstone Plateau, now a forested area of 650,000ha with an average elevation of 2,000m, was formed out of the accumulation of rhyolite. The plateau is flanked on the north, east and south by mountains that rise to 4,000m. Crustal uplifts 65 million years ago raised blocks of crust to form the southern Rocky Mountains. After that, volcanic outflows of andesitic composition were common to about 40 million years ago. Andesitic ashflows and mudflows of Eocene age covered forests that became petrified. Nearly 200 species of petrified plants have been found. A more recent period of rhyolitic volcanism began in the region about two million years ago, during which time thousands of cu.km of rhyolitic magma filled immense chambers under the plateau, and then erupted to the surface. Three cycles of eruption, dated at 2.2 million years ago, 1.2 million years and

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600,000 years ago, produced huge explosive outbursts of ash. The latest eruptive cycle formed a caldera 45km wide and 75km long, when the active magma chambers erupted and collapsed. The crystallising magma is the source of heat for hydrothermal features such as geysers, hot springs, mud pots and fumaroles. Yellowstone contains more geysers than all the rest of the world combined, with 200-250 active geysers, and perhaps 10,000 thermal features in total. Most of the area was glaciated during the Pleistocene, and many glacial features remain. The park lies at the headwaters of three major rivers. Yellowstone River is a major tributary of the Missouri River that flows via the Mississippi to the Gulf of Mexico. Firehole and Gibbon rivers unite to form Madison River that also joins the Missouri. Snake River arises near the park's south boundary and joins the Columbia to flow into the Pacific Ocean. Yellowstone Lake (37,127ha) with a maximum known depth of 119m, is the largest lake at high elevation (2,357m) in North America. Lower Yellowstone Falls (94m) is the highest of more than 40 named waterfalls in the park.

CLIMATE Precipitation ranges from 258mm at Gardiner to an estimated 2000mm in the south-west, falling mainly as snow. Temperatures range from a January mean of -12°C to a July mean of 13°C at Lake Yellowstone.

VEGETATION The park is 80% forested, and 80% of that is dominated by lodgepole pine Pinus contorta. Great elevational differences produce a range of plant communities, from semi-arid steppe to alpine tundra. Seven species of coniferous trees and nearly 1,100 species of vascular plants grow in the park. One grass Agrostis rossae is endemic. The thermal areas contain unique assemblages of thermal algae and bacteria.

FAUNA Six species of ungulates are native to the park. In order of abundance they are elk Cervus elaphus (numbering 3,172 in 1968, 12,607 in 1975, 10-12,000 in the early 1980s and 19,000 in January 1988), mule deer Odocoileus hemionus, bison Bison bison (occurring in three herds and currently numbering 2,700 animals), moose Alces alces, bighorn sheep Ovis canadensis, pronghorn Antilocapra americana, and white-tailed deer Odocoileus virginianus. Grizzly bear Ursus arctos has been the subject of intensive study and management for 30 years. Its recovery has been of highest priority in the greater Yellowstone ecosystem since it was listed as endangered in 1973, and the National Park Service has striven to minimise contact between park visitors and bears. There are currently some 50 breeding females and 150 cubs have been born in the last three years. A minimum of 200 bears roam the 3,890ha recovery area. Other species of interest are the endangered bald eagle Haliaeetus leucocephalus, endangered peregrine falcon Falco peregrinus, and trumpeter swan Cygnus buccinator. Mountain lion Felis concolor are under study. Some 15-22 occupy the study area in the northern part of the park.

Grey wolf Canis lupus was native, but was extirpated by 1927 when national policy was to eliminate wolves from all public lands. However, there are plans to reintroduce the species into a core area in the park (Bishop, 1987). Native fishes, such as Yellowstone cut-throat trout Oncorhynchus clarki bouvieri and Arctic grayling Thymallus arcticus, are protected by regulations that also permit taking of non-native introduced species. Palaeontological study of Lamar Cave has yielded remains of over 30 species of mammals. This suggests a diversity of fauna in prehistoric times much like that found in Yellowstone to-day. Elk were found in six out of nine levels above and below a layer radiocarbon dated at 960 before present. Gray wolf bones were found below the 960 BP layer.

CULTURAL HERITAGE Archaeological investigations of numerous important sites show humans visited the park area for 10,000 years, but no group made it a permanent home. A cultural resources plan will be integrated with the natural resources management plan.

LOCAL HUMAN POPULATION A permanent community of about 300 people associated with park operations is located at Mammoth Hot Springs, the park headquarters. Smaller groups are stationed throughout the park at ten other locations.

VISITORS AND VISITOR FACILITIES A road system of 600km provides access to major features. Six major developed areas offer food, lodging, camping, and a recreational vehicle park. Eighty-five trailheads provide access to 1,930km of trails and 300 backcountry campsites. Annual visitation in recent years has been about 2.5 million. In winter, most roads are groomed as snowmobile trails.

SCIENTIFIC RESEARCH AND FACILITIES A resident research staff of 17 permanent and 40 seasonal employees studies large mammals, fisheries, vegetation, fire ecology and geology, assisting park management and interpretation. Another 200 independent researchers work in the park annually. Research projects requiring a natural environment or those orientated to management are given preference. Research requiring modification of the biota or environment is not permitted. The large area where natural processes are allowed to operate makes the park an excellent area for research on natural processes. Limited laboratory space is available. Access to backcountry is normally limited to non-mechanised means. The University of Wyoming - National Park Service Research Center, funded and administered jointly by the NPS and University of Wyoming, sponsors research in national parks in Wyoming, Montana, Idaho, South Dakota, Utah and Colorado.

CONSERVATION MANAGEMENT A master plan (1973), statement for management (1986), a natural resources management plan (1983), a

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land protection plan (1986), and an exotic vegetation management plan (1986) are among the documents that guide conservation of park resources. A Fire Management Plan was inaugurated in 1972, with 137,700ha designated as appropriate for natural fires. Revised in 1986, further revisions are proposed following the major fires of 1988. Interagency guidelines are followed for grizzly bear management. Cooperative interagency teams direct research and management of grizzly bears, ungulates, peregrine falcons, bald eagles and trumpeter swans in the greater Yellowstone area. Hunting, logging, mining, and domestic livestock grazing are prohibited. Regulated fishing and camping are allowed. There are three defined management zones: natural, 897,656ha; historic, 32ha; and development, 810ha.

MANAGEMENT CONSTRAINTS Grizzly bear recovery has been the dominant resource issue in the greater Yellowstone area for nearly 20 years. It has promoted an unprecedented level of interagency cooperation and public controversy. The park's bison are the only wild, continuously free-ranging bison in the United States. Winter weather is allowed to naturally regulate their numbers in the park, but their tendency to recolonise lands outside the park has led to large-scale control hunts north of the park. The winter range of the northern Yellowstone elk herd has been under study for at least three decades. Assuming overstocking and overgrazing, elk were trapped and translocated to restock other ranges and reduced by ranger shooting until 1968. Since then, the park has experimented with natural regulation, coupled with continuous monitoring and range studies. Commercial and private development north of the park may threaten the isolated pronghorn population. Several species of fish have been introduced, brook trout Salvelinus fontinalis, lake trout S. namycush, brown trout Salmo trutta and lake chub Couecius plumbeus. Rainbows and browns replaced cut-throat trout Salmo clarki and grayling Thymalius arcticus in much of the Madison River drainage. Lake and brown trout have severely affected Snake River fine-spotted cut-throat. Surface mining, oil and gas exploration and extraction, and development of geothermal resources near park boundaries potentially threaten park air and water quality and visual integrity. They also threaten critical habitat for grizzly bears. Fire suppression on the northern Yellowstone elk winter range for 100 years, and throughout the forested part of the park for about 40 years, was a departure from natural conditions. In 1988 a major uncontrolled fire occurred, and a total of 558,900ha in the Greater Yellowstone Area experienced fire to some degree, including 402,975ha within the park. Of the latter, 232,065ha were canopy burn, 148,600ha were surface burn, wherein most trees will have survived, and 22,000ha of meadows and sage/grasslands burnt. Despite the ferocity of the fire, losses of large mammals were light. A total of 25,000 personnel was involved at various times in fire fighting and a cost of some US\$112 million was incurred. The 1987 Northern Rocky Mountain Wolf Recovery Plan calls for

restoration of grey wolf to the park.

STAFF Permanent staff of 307: 13 assigned to the Superintendent's office; 44 to administration; 88 to resource management and visitor protection; 123 to maintenance; five to concessions management; 17 to research, and 17 to interpretation. In summer, the staff is supplemented by 511 seasonal employees, bringing the total to 818 maximum. Another 130 permanent and 3,900 seasonal employees operate three concessions to provide food, lodging and other services.

BUDGET US\$ 16,848,700 budgeted for fiscal year 1989

LOCAL ADDRESSES

Superintendent, National Park Service, PO Box 168, Yellowstone National Park, Wyoming 82190

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