

World Heritage Sites

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YOSEMITE NATIONAL PARK CALIFORNIA, UNITED STATES OF AMERICA

Yosemite National Park lies in the heart of the Californian Sierra. Its vast glaciated valley, granite domes, hanging valleys, waterfalls, tarns and moraines, make it an excellent multifaceted example of a glaciated granite landscape. Its range of habitats from 600m to 4,000m contains great biodiversity.

COUNTRY United States of America - California,

NAME Yosemite National Park

NATURAL WORLD HERITAGE SITE

1984: Inscribed on the World Heritage List under Natural Criteria vii and viii.

IUCN MANAGEMENT CATEGORY

II National Park

BIOGEOGRAPHICAL PROVINCE

Sierra-Cascade (1.20.12)

GEOGRAPHICAL LOCATION

In the central Sierra Nevada mountains 225 km due east of San Francisco at 37°30' to 38°11'N by 119°12' to 119°53'W.

DATES AND HISTORY OF ESTABLISHMENT

- 1864: Yosemite Valley and Mariposa Big Tree Grove granted to the state of California under President Lincoln by Act of Congress 13 Stat.325;
- 1890: Yosemite National Park created around the Yosemite Valley and Mariposa Grove reserve by decree 26 Stat. 650, through the advocacy of John Muir and President Roosevelt, and granted to the state of California;
- 1905: Californian state lands conveyed to the Federal government; National Park boundary adjusted;
- 1929: Park extended by 4,846.47 ha; further extended in 1930, 1931, 1932, 1937, 1938 and 1984;
- 1984; 95% of the Park designated a Wilderness by Congress;
- 1987: The Merced River designated a National Wild and Scenic River.

LAND TENURE

Federal government. Managed by the National Park Service (NPS) of the Department of the Interior.

AREA

308,283 ha. The Park is surrounded by four national forests: Stanislaus northwest, Toiyabe northeast, Sierra southwest and Inyo southeast.

ALTITUDE

Ranges from 549m to 3997m (Mt. Lyell).

PHYSICAL FEATURES

The Sierra Nevada range is between 80 and 130 km across, sloping gradually to the west and steeply to the east. Yosemite straddles the Sierra Nevada batholith, a massive composite granite pluton composed of a mosaic of smaller magmatic bodies that solidified underground in the Cretaceous period, were later thrust to the surface and then exposed by the erosion of overlying sedimentary rocks. About 10 million years ago, through tectonic activity accompanied by vulcanism, the batholith was buckled, uplifted and tilted to the west. The steepened gradient greatly accelerated erosion by existing rivers. Some two to three million years ago a series of glacial advances gouged out steep-sided U-shaped valleys. The last of the glaciers carved a 910m cleft in the surrounding uplands, now the spectacular 11km-long Yosemite valley, flanked by massive exfoliated granite domes, half domes and sheer cliffs. In retreat it left a series of morainal dams near El Capitan, impounding a lake which became the valley floor. The sheer monolithic granite walls appear newly glaciated, showing little postglacial erosion though rockfalls are quite frequent. The Park encloses the headwaters of the Tuolumne and Merced rivers. It contains many waterfalls from the hanging valleys and some 300 lakes. At 746m the three-tier Yosemite falls are the longest falls in the country. The Park's other large canyons are the Grand Canyon of the Tuolumne river and the Tenaya Canyon. The transmountain Tioga road rises some 1,800m to the Tioga pass at 3,060m, the highest road pass in the country.

CLIMATE

Beyond the semi-arid foothills this is a changeable mountain climate with cold snowy winters when two-thirds of the annual precipitation of 950mm falls as snow which averages 2m deep above the 2,100m level. The crests and peaks are relatively dry but during the spring thaw when the many waterfalls erupt, floods in the valleys can be destructive. Average winter temperatures in Yosemite Valley and Wawona in the south of the Park, both at 1,200m, range between 12°C to -2°C. Summers are warm to hot, ranging between 31°C and 1°C. Temperatures at Tuolumne Meadows at 2,645m in the mountains are 15° to 20°C colder. The average annual diurnal temperature range is 20°C.

VEGETATION

The vegetation of Yosemite is unfragmented, varied and largely intact. It has 1,460 species of vascular plants, ferns, bryophytes and lichens in 27 plant communities and 16 major forest types containing 37 tree species. The six main vegetation types are a small fringe of foothill chaparral-oak woodland from 300m to 900m (~4% of the Park), lower montane mixed forest between 900m and 1,800m (22% of the Park), upper montane conifer forest between 1,800m and 2,450m (28% of the Park), and subalpine forest from 2,450m to 2,900m (39% of the Park). Above this are alpine fell fields and rock (7% of the Park). Small areas of riparian vegetation, wetlands and meadows (~4% of the Park, within the other zones), are found at every elevation and are important as they contain nearly 40% of the Park's flora. There is one endemic species, Yosemite woolly sunflower *Eriophyllum nubigenum*, and 8 eight nationally threatened or endangered species (NPS,2007).

The foothill chaparral-oak woodland (probably created by Indian burns) has digger pine *Pinus sabineana*, interior live oak *Quercus wislizeni* and an understory of California lilac *Ceanothus* spp., manzanita *Arctostaphylos* spp. and chamise *Adenostoma fasciculatum*. The western foothills are clothed in a lower montane mixed forest of ponderosa pine *Pinus ponderosa*, incense cedar *Calocedrus decurrens*, Douglas fir *Pseudotsuga menziesii*, and white fir *Abies concolor* (15.18% of the Park), interspersed with areas of black oak *Quercus kelloggii* and canyon live oak *Quercus chrysolepis*. A few stands (168 ha) of giant sequoia *Sequoiadendron gigantea* grow between 1,550 and 2100m. There are three big groves of the tree in the Park: Mariposa, Tuolumne, Merced.

The equally large area of upper montane forest is dominated by lodgepole pine *Pinus contorta* (20.45% of the Park), red fir *Abies magnifica* (12.38%), western white pine *P. monticola*, with jeffrey pine *P. jeffreyi*, western juniper *Juniperus occidentalis*, and one of the finest virgin stands of sugar pine *Pinus lambertiana* in the country. This zone has many meadows and bogs with a very high water table in late summer. Above this is the extensive subalpine forest of lodgepole pine with western white pine, and at higher elevations, mountain hemlock *Tsuga mertensiana*, and whitebark pine *Pinus albicaulis* growing to the treeline. Above 3,900m are alpine fell fields with alpine willow *Salix petrophila* and sparse low growing, perennial herbs, grasses and sedges.

FAUNA

Beyond the main tourist areas Yosemite has a wide range of intact habitats which harbour 250 species of vertebrates. 90 species of mammals are recorded, among them opossum *Didelphis virginiana*, 7 shrews, 17 bats, 5 Lagomorphs, 39 rodents including the golden beaver *Castor canadensis auratus*

and (introduced), yellow-haired porcupine *Erethizon dorsatum*, 6 squirrels, 8 chipmunks, 8 mice and 19 carnivores (NPS, 2007).

The most commonly seen mammals are in the warmer lowland forests. They include chipmunk *Eutamias* spp., Sierra black bear *Ursus americanus californiensis*, mountain coyote *Canis latrans lestes*, grey fox *Urocyon cinereoargenteus*, racoon *Procyon lotor*, pronghorn antelope *Antilocapra americana* and mule deer *Odocoileus hemionus*. The western mastiff bat *Eumops perotis*, whose echolocation calls are audible, is North America's largest bat. Golden mantled ground squirrel *Spermophilus beecheyi* is common higher up. Resident but rarely seen are pine marten *Martes americana*, fisher *M. pennati*, wolverine *Gulo gulo* (VU), mountain lion *Puma concolor*, ringtail cat *Bassariscus astutus*, bobcat *Lynx rufus* and Sierra red fox *Vulpes vulpes necatoc*. In the alpine area Sierra bighorn sheep *Ovis canadensis sierrae* (40 individuals), extinct in Yosemite by 1914, but reintroduced in 1986, the yellow-bellied marmot *Marmota* and the Mount Lyell shrew *Sorex lyelli*, the Park's only endemic mammal are found. The pika *Ochotona princeps* is an alpine species which needs cold conditions: its disappearance may be an indicator of climatic warming.

This is an Important Bird Area having 247 species with 150 species regularly and over 80 occasionally seen. 84 species breed in the Park including peregrine falcon *Falco peregrinus*, great grey owl *Strix nebulosa* and northern goshawk *Accipiter gentiles*. The nationally endangered southern bald eagle *Haliaeetus leucocephalus* migrates through the Park. A decline in the bird population has been partly ascribed to the nest-parasite brown-headed cowbird *Molothrus ater*, a non-native species.

17 species of amphibians include the Lyell salamander *Hydromantes platycephalus* which is endemic to the region, the common and noisy Pacific tree frog *Pseudacris regilla*, the rare mountain yellow-legged frog *Rana muscosa* (CR) and endemic Yosemite toad *Bufo canorus* (EN). 22 reptiles are recorded, among them the western pond turtle *Terrapine ornata*, 8 lizard and 13 snake species including western rattlesnake *Crotalus oreganus* and the red, black and cream mountain kingsnake *Lampropeltis zonata*. The Park contains 11 fish species, six of which are endemic. The introduction of alien game fish has adversely effected native species (NPS, 2007).

CULTURAL HERITAGE

Indians have lived in the valleys for at least 8,000 years. The last Indian inhabitants, the Ahwahneechee, named after their village in the valley, were a sub-tribe of the Mono Paiute from the east. The peaceful Miwok to the west are said to have termed them 'yosemite' or 'killers' (Anderson, 2007), but the word may denote easterners. Some 1,000 designated archaeological sites have been recorded. The valley was discovered by gold rush adventurers in 1851 and its inhabitants driven out in the Mariposa Indian war of 1861, shortly before the area was granted to the state of California. The great conservationist John Muir campaigned for the Park and unsuccessfully against the Hetch Hetchy reservoir on the Tuolumne river in the Park.

LOCAL HUMAN POPULATION

The immediately surrounding population is sparse, totalling less than 100,000 in 1995 (NPS, pers.comm., 1995). In 2000, 265 people were living in the Park village of Yosemite Valley.

VISITORS AND VISITOR FACILITIES

Annual visitation which was already one million in 1954, now exceeds 3.5 million. A very full range of visitor services is available, both in the Park and in the surrounding communities,: visitor and information centers, library, museum, history center, cultural exhibit, Mariposa Grove museum, nature center, wilderness centers, mountaineering school and clinic. Activities, most run by the Yosemite Concession Services Corporation, cover bus tours, driving, bicycling, mule rides, guided riding and hiking, mountaineering, climbing, fishing, swimming, rafting, skating, snowshoeing and skiing, cross-country and downhill. There are 1,280 km of trails and 19 km of roads. The Tioga road, Highway 120, crosses the mountains but is closed in winter. There is overnight accommodation of various kinds for over 15,700: 4 lodges in the valley with several just outside the Park, and camping for 900 in 13 campsites, including group and stock camps for riders. Use of the wilderness is limited by permit and quota. Educational programs are run by the Yosemite National Institutes and interpretive services are offered by the Yosemite Association. There are three airports within an hour and a half from the Park.

SCIENTIFIC RESEARCH AND FACILITIES

The area has been studied since the 19th century. A detailed baseline survey of the vertebrate fauna made between 1914-1920 by Grinnell & Storer of the Museum of Vertebrate Zoology, University of

California at Berkeley was part replicated by a team from the same institution in 2003 (Sanders, 2003). Past research projects have covered atmospheric research, physics, hydrology, geology, biology, plant ecology, zoology and animal ecology, sociology, forestry, epidemiology and geographical information systems. Recent mammal research covered black bear ecology and population dynamics, ground squirrel social behaviour, the distribution, abundance and habitat requirements of Sierra mountain beaver, the population dynamics, movement patterns and foraging ecology of Sierra Nevada bighorn sheep, forest carnivores and the interactions between mountain lions and humans. The air quality is constantly monitored for signs of acid rain and ozone. The Institute for Bird Populations has operated bird-banding stations in Yosemite, yielding valuable data on long-term population trends, and conducted a park-wide survey of species in 1999-2000 that provided extensive information about species-habitat relationships. The Sierra Nevada Aquatic Research Laboratory of the University of California is also researching stream hydrology and ecology in the Park, evaluating fish, amphibian, and invertebrate populations and the effect of non-native species. There is a research library and a museum collection containing some 2,000 bird and mammal study skins, 2,000 insect specimens, an herbarium of 5,000 plant specimens, 5,000 archaeological specimens and over 20,000 historic photographs.

CONSERVATION VALUE

The Park is an area of outstanding mountain scenery and of great value as wilderness. There are areas representing nearly all the different environments of the Sierra Nevada, including sequoia groves, historic sites and evidence of Indian life. It lies within a Conservation International-designated Conservation Hotspot, a WWF Global 200 Eco-region and a WWF/IUCN Centre of Plant Diversity.

CONSERVATION MANAGEMENT

The National Park Service General Management Plan grew out of a major extended planning study and public involvement program and was approved in 1980. It zoned the Park into Natural (98%), Cultural (2%) and Special Use (1%) zones. In the Natural zone were the Wilderness subzone with limited visitor numbers though sport fishing is permitted; Environmental Protection Subzone for scientific research only; Outstanding Natural Feature Subzone for maximum protection; and Natural Environment Subzone for roads, picnicking areas, and trailheads but minimal development. In the Cultural zone were the Historical Subzone for preservation of historical resources; Archeological Subzone for preservation of park-wide archaeological resources; Development Zone for visitor use and park operation and Special-Use Reservoir Subzone for the two reservoirs of Hetch Hetchy and Lake Eleanor in the northwest, managed by the San Francisco Water Department. The four surrounding national forests provide important buffers. A subsequent Resources Management Plan identified the major threats to conservation and the programs designed to tackle them and mitigate their impacts.

The General Management Plan updated in 2000 incorporated the 1992 Concessions Services Management Plan and Final Environmental Impact Statement with Plans for Visitor Use, Indian Cultural Programs, Park Operations and Visitor Protection, Boundary Alteration, Land Acquisition and Additions to Wilderness, and 18 Development Area Plans. Hundreds of projects were to be implemented over a 20 to 30 year period, of which fifteen projects for improvements, maintenance and restoration were submitted to Congress and completion expected by the mid 2000s. A Fire Management Plan prescribes fires in the giant sequoia woodlands and other fire-dependent communities to ensure their future; such controlled burns and the use of wildfires are now used to avoid the build up of debris which makes fires more destructive.

MANAGEMENT CONSTRAINTS

The most serious current threats to Yosemite's native wildlife and ecosystems include loss of the natural fire regime, invasion by alien species, habitat fragmentation, air pollution and climate change. From 1890 to 1968 the Park management suppressed natural fires causing significant changes to the forests by leaving brush which intensifies fires when they occur. The area was formerly heavily grazed which resulted in changes in species composition and the introduction of exotic plants. Grizzly bear, California bighorn sheep and grey wolf disappeared in the late 19th to early 20th centuries. The beaver, brown-headed cowbird *Molothrus ater*, the game birds white-tailed ptarmigan *Lagopus leucurus* and wild turkey *Meleagris gallopavo* and game fish species are all alien intrusions which unbalances the natural ecology.

Extreme visitor pressure and the inappropriate large-scale development of modern accommodation and commercial facilities have also had a disturbing effect on the Valley. A major trans-Sierra road bisects the Park, giving easier access to the high backcountry and studies have shown serious impacts

caused by hikers and campers there. Heavy tourist pressure has forced the closure of uncontrolled camping and controls over the feeding of animals, especially bears which are spoiled by contact with humans. The two hydroelectric and water storage reservoirs permitted under special legislation cause local disturbance. Destructive floods (as in 1997) have enforced the building of new facilities out of floodplains; but destructive rockfalls are harder to predict.

STAFF

About 300 year-round permanent and 300 seasonal employees with 1,800 concession employees in summer and 900 in winter (undated information), supplemented with over 5.2 million hours of volunteer labor. Recent figures were not found.

BUDGET

The 1980 General Management Plan estimated a budget of \$15.5 million over 10 years for new and restored concession and government facilities. In 1989 there was an annual operating budget of US\$ 10,780,182. Revenue from entrance fees is high. More recent figures were not found.

LOCAL ADDRESS

Superintendent, PO Box 577, Yosemite National Park, California 95389.

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DATE 1983. Updated 5-1990, 7-1995, November 2007.