

## World Heritage Sites

### Protected Areas and World Heritage



## SERENGETI NATIONAL PARK TANZANIA

*Twice a year ungulate herds of unrivalled size pour across the immense savanna plains of Serengeti on their annual migrations between grazing grounds. The river of wildebeests, zebras and gazelles, closely followed by predators are a sight from another age: one of the most impressive in the world.*

### COUNTRY

The United Republic of Tanzania

### NAME

Serengeti National Park

### NATURAL WORLD HERITAGE SITE

1981: Inscribed on the World Heritage List under Natural Criteria vii and x.

### INTERNATIONAL DESIGNATION

1981: Serengeti-Ngorongoro recognised as a Biosphere Reserve under the UNESCO Man & Biosphere Programme (2,305,100 ha, 1,476,300 ha being in Serengeti National Park).

### IUCN MANAGEMENT CATEGORY

II National Park

### BIOGEOGRAPHICAL PROVINCE

East African Woodland/Savanna (3.05.04)

### GEOGRAPHICAL LOCATION

In the far north of Tanzania 200 km west of Arusha, adjoining the Ngorongoro Conservation Area, between 1° 30' to 3° 20'S and 34° 00' to 35° 15'E.

### DATES AND HISTORY OF ESTABLISHMENT

1929: Serengeti Game Reserve declared (228,600 ha) to preserve lions, previously seen as vermin;

1940: Declared a Protected Area;

1951: Serengeti National Park created, including Ngorongoro; boundaries were modified in 1959;

1981: Recognised as part of the Serengeti-Ngorongoro UNESCO Biosphere Reserve.

### LAND TENURE

State, in Mara, Arusha and Shinyanga provinces. Administered by the Tanzanian National Parks Authority.

### AREA

1,476,300ha. It is contiguous in the southeast with Ngorongoro Conservation Area (809,440 ha), in the southwest with Maswa Game Reserve (220,000 ha), in the west with the Ikorongo-Grumeti Game Reserves (500,000 ha), in the north with the Maasai-Mara National Reserve (151,000 ha) in Kenya and in the northeast with the Loliondo Game Controlled Area (400,000 ha). The total area is larger than the island of Taiwan.

## ALTITUDE

920m to 1,850m

## PHYSICAL FEATURES

The immense plains of Serengeti stretch 150 km south from the Kenyan border and 100 km east from almost the shore of Lake Victoria to the edge of the eastern Rift Valley. They are a west-sloping surface of weathered ash from the Ngorongoro volcanoes covering a plateau of mainly crystalline rock, pimpled with low outcrops of granite (*kopjes*). In the northeast and along the western corridor are low lightly wooded mountain ranges of mainly volcanic origin. In the northwest the Mara river crosses the northwest corner of the Park. In the centre the savanna is crossed by the Grumeti and Mbalageti rivers which are usually flowing, and drain to Lake Victoria. In the south are open grass plains. There are several small lakes, marshes, and seasonal waterholes all over the Park.

## CLIMATE

The mean annual precipitation varies from 1150mm in the northwest and 950mm in the western corridor to less than 500mm in the lee of the Ngorongoro Highlands in the east. It falls mainly between October and May with peaks in November (the short rains) and from March to April (the long rains). The annual drying up in May triggers migration north; the rains which start in October trigger the returning migration south. Generally the climate is warm and dry, coolest from June to October, with a mean annual temperature of 20.8°C, which is often less than the diurnal variation.

## VEGETATION

This is one of Africa's most complex and least disturbed ecosystems, alternating between dusty summer drought to green winter and spring lushness. Its centre is savanna with scattered acacia; in the south are wide open shortgrass plains; in the west and north are thornwood long grasslands, along the rivers, gallery forest and in the hilly western corridor extensive woods and black clay pans. Short grass is the major vegetation on the open plains which become almost desert during severe drought and are prone to wildfires, which the short grass can tolerate. This is the major wet season habitat of the migrating ungulates. Dominant species are couchgrass *Digitaria macroblephara*, *Sporobolus marginatus* and *S. kentrophyllus* - indicators of overgrazed and saline soils. The invasive poisonous Mexican poppy *Argemone mexicana* may be starting to spread from Ngorongoro (IUCN,2002). In wetter areas there are sedges such as *Kyllinga nervosa*. There is extensive acacia woodland savanna in the centre stretching east from Ikoma and some gallery forest along the rivers. Lowland woodlands include *Commiphora africana*, whistling thorn *Acacia drepanolobium*, *A. gerrardii* and *Balanites aegyptiaca*. Upland woodlands are of red thorn *Acacia lahai* and gum acacia *A. seyal*.

## FAUNA

The Park is best known as the ecosystem with the greatest concentration of large mammals in the world, both grazers and browsers, and the carnivores which live off them, totalling more than 2.5 million animals. Many of these migrate between seasonal water sources and grasslands, starting in May and June from the central plains to the western corridor and then northwards across the Mara river into Kenya in July to September, dispersing to the southeast in October and November to calve in midsummer in the south. It is dominated by white-bearded wildebeest *Connochaetes taurinus mearnsi* in enormous numbers, which totalled ~190,000 in the 1950s, some 1.69 million in 1989 (SRCS, 1992), but 1.27 million in 1991 (TWCM, 1992); also by plains zebra *Equus quagga* (about 200,000), Thomson's gazelle *Gazella thomsoni*, with some eland *Tragelaphus oryx* and topi *Damaliscus lunatus*, each harvesting the grass most suited to it. The herds are followed by prides of lion *Panthera leo* (VU) numbering up to 3,000 individuals (Packer, 1996), spotted hyena *Crocuta crocuta*, striped hyaena *Hyaena hyaena*, golden jackal *Canis aureus*, sidestriped jackal *C. adustus* and black-backed jackal *Canis mesomela*. The last packs of wild dog *Lycaon pictus* (EN) disappeared from the park in 1991. A rabies epidemic killed three of the packs, but there is no agreement on the full cause of the disappearance (Morell,1995; Dye,1996; East & Hofer,1996).

There are large herds of antelope of many species. On the grasslands are eland, lesser kudu *Tragelaphus imberbis*, roan antelope *Hippotragus equinus*, oribi *Oreibia oreibi*, Grant's gazelle *Gazella granti*, Coke's hartebeest *Alcelaphus buselaphus cokei*, steenbock *Raphicercus campestris*, topi and gemsbok *Oryx gazella*; also central African savanna buffalo *Syncerus caffer aequinoctialis*. In the woodlands are desert warthog *Phacochoerus aethiopicus*, bushbuck *Tragelaphus scriptus*, sitatunga *T. spekei*, grey duiker *Sylvicapra grimmia*, impala *Aepyceros melampus* and Kirk's dikdik *Madoqua kirkii*. In the swamps are reedbuck *Redunca redunca* and waterbuck *Kobus ellipsiprymnus*. Among the *kopjes* are klipspringer *Oreotragus oreotragus* as well as giraffe *Giraffa camelopardalis reticulata* and olive

baboons *Papio anubis*; and on the mountains there are *Chanler's* mountain reedbuck *Redunca fulvorufula chanleri* (VU).

Other characteristic larger mammals are leopard *Panthera pardus*, cheetah *Acinonyx jubatus* (VU), caracal *Caracal caracal*, savanna elephant *Loxodonta africana* (VU), estimated to number 1,357 in 1994 (Said *et al.*, 1995), eastern black rhinoceros *Diceros bicornis michaeli* (CR) totalling 20 in 2005 with those in Ngorongoro (Mills *et al.*, 2006), and hippopotamus *Hippopotamus amphibius* (VU). Smaller mammals include numerous species of bats, thick-tailed bushbaby *Otolemur crassicaudatus*, green monkey *Chlorocebus aethiops*, patas monkey *Erythrocebus patas* and eastern black-and-white colobus monkey *Colobus guereza caudatus*, aardvark *Orycteropus afer*, ground pangolin *Smutsia temminckii*, Cape hare *Lepus capensis*, porcupine *Hystrix indica*, three species of hyrax and many other rodents, bat-eared fox *Otocyon megalotis*, African clawless and spotted-necked otters *Aonyx capensis* and *Lutra maculicollis*, ratel *Mellivora capensis*, zorilla *Ictonyx striatus*, seven species of mongoose, aardwolf *Proteles cristata*, common genet *Genetta genetta*, large spotted genet *Genetta tigrina*, African civet *Civettictis civetta*, serval *Leptailurus serval*, golden cat *Profelis aurata*, African wildcat *Felis lybica* and bushpig *Potamochoerus larvatus*. Reptiles include crocodile *Crocodylus niloticus*, Nile monitor lizard *Varanus niloticus*, African rock python *Python sebae*, blacknecked spitting cobra *Naja nigricollis* and puff adder *Bitis arietans*.

The Park lies within a one of the world's Endemic Bird Areas. Over 500 bird species include 34 raptors, 6 vultures and aggregations of over 20,000 waterbirds. There are ostrich *Struthio camelus*, Madagascar pond heron *Ardeola idae* (EN), marabou stork *Leptoptilos crumeniferus*, lesser flamingo *Phoenicopterus minor*, African fish-eagle *Haliaeetus vocifer*, tawny eagle *Aquila rapax*, lesser falcon *Falco naumanni* (VU), pallid harrier *Circus macrourus*, secretary bird *Sagittarius serpentarius*, grey-breasted francolin *Francolinus rufopictus*, helmeted guineafowl *Numida meleagris*, grey-crowned crane *Balearica regulorum gibbericeps* (VU), kori bustard *Ardotis kori*, black-winged stilt *Himantopus himantopus*, avocet *Recurvirostra avosetta*, great snipe *Gallinago media*, blackwinged pratincole *Glareola nordmanni*, black-winged lapwing *Vanellus melanopterus*, Caspian plover *Charadrius asiaticus*, whitewinged black tern *Chlidonias leucopterus*, gull-billed tern *Sterna nilotica*, Fischer's lovebird *Agapornis fischeri*, giant eagle-owl *Bubo lacteus*, southern ground hornbill *Bucorvus cafer* (VU), yellow-billed barbet *Trachyphonus purpuratus*, red-throated tit *Parus fringillinus*, grey-crested helmet shrike *Prionops poliophus*, Karamoja apalis *Apalis karamojae* (VU), and several of restricted distribution such as rufous-tailed weaver *Histurgops ruficauda* (Stronach, 1990; Fishpool & Evans, 2001).

## CULTURAL HERITAGE

The Serengeti and Maasai Mara were open grasslands free from tsetse fly *Glossina* spp., the eastern half of which were a part of the Maasai nomadic cattle herding system from the middle of the 19<sup>th</sup> century. These are the largest group of pastoralists in East Africa, whose cultural code precludes eating wild animals so that their rangeland was used by both livestock and wildlife. This, with the tsetse-conveyed sleeping sickness, preserved the vast herds until invaded first by a rinderpest epidemic from Asia in the 1880s which led to severe losses of wildlife and domestic livestock and caused much of the human population to abandon the area. A second invasion has been by mechanised hunting (SRCS, 1992; Leader-Williams *et al.*, 1996).

## LOCAL HUMAN POPULATION

The Park has no resident inhabitants but the population around Serengeti increased by about 54% during the period 1967-1978. The Maasai occupy the eastern frontiers of the Park. The land to the west of the Park is densely settled by a growing population of farmers and herders: numbers in the seven districts there reached a total of 1,733,958 in 1988 and population growth on this boundary is 4% per year (Packer, 1996). Agriculture is the main source of income, but many people are attracted by the wildlife and the opportunities for work in tourism (Campbell and Hofer, 1993; Leader-Williams, 1996).

## VISITORS AND VISITOR FACILITIES

Tourist facilities include lodges at Seronera, Lobo, Sopa, Kirawira, Klein's Camp, Banagai, Turner Springs, Nyaruboru and Ndutu and some hotels. In 2005 a luxury hotel was proposed within the Park itself. In addition to Kijereshi Tented Camp there are 70 campsites in the Park. Six access routes exist, but access is usually by road from the Ngorongoro Conservation Area. There are several airstrips and an airfield at Seronera. The 1983 reopening of the border with Kenya increased visitor numbers from a low of 18,602 to 40,000 in 1991. Following improvements to the infrastructure, Serengeti between 1998 and 2000 attracted 310,550 visitors: 198,206 foreigners and 112,238 Tanzanians (Njuki, 2001). Wildlife watching is also possible from balloons.

## SCIENTIFIC RESEARCH

Serengeti National Park with Ngorongoro is one of the least disturbed and best studied areas in Africa and has been a centre for major research for thirty years. The Park in the 1950s was well publicised by Dr Bernhard Grzimek who made extensive aerial wildlife surveys and an influential film, *Serengeti Shall Not Die*. The Serengeti Wildlife Research Institute (SWRI) has a research centre at Seronera which has well-equipped laboratories, a library, herbarium and accommodation for visiting scientists. Projects during the 1990s included continuing long-term research on ecosystem processes, the behavioural ecology of lion, leopard and ungulates, mongoose population dynamics and reproduction and the ecology of dung beetles and termites. A program on the behaviour and ecology of the African wild dog used radio-collaring techniques to monitor 22 dogs (SWRC, 1993). But when the wild dog population disappeared from the Park in 1991, controversy erupted over whether the stress of fitting the dogs with radio-collars had caused their disappearance (Morell, 1995; Dye, 1996; East & Hofer, 1996). A number of externally funded scientists conduct research at the SWRI. The Tanzania Wildlife Conservation Monitoring (TWCM) has taken over the long-term ecological monitoring program, and carries out regular aerial surveys and wildlife censuses (SRCS, 1992). In 1996 the Tanzanian National Parks Authority with the Frankfurt Zoological Society established a veterinary department for the Park.

## CONSERVATION VALUE

Serengeti National Park, with its immense herds of ungulates and their associated predators, is the last remnant of a Pleistocene large-mammal savanna ecosystem in all its complexity. The area of the Park, with the Ngorongoro Conservation Area, the Maasai Mara Park and the surrounding game reserves, is large enough to ensure its survival. The Park lies within a WWF Global 200 Freshwater Eco-region, is in one of the world's Endemic Bird Areas and also overlaps a UNESCO Biosphere Reserve.

## CONSERVATION MANAGEMENT

The annual migration of the ungulate herds between their feeding areas extends in a circular movement from the Serengeti via the Grumeti-Ikorongo, Maasai Mara, Amboseli, Loliondo and Ngorongoro Reserves back to the Maswa Serengeti plains following rain-fed pastures, making each an important part of the whole ecosystem. In 1951, the original boundary of the National Park included land to the south and east of the present Park and the Ngorongoro Highlands. Pastoralism and cultivation by the Maasai were allowed to continue until 1954 when it was felt that this was incompatible with resource conservation, and the Park was divided into the present day Serengeti National Park, and the Ngorongoro Conservation Area. The National Park was set aside strictly for wildlife conservation and tourism, and human access was restricted (Leader-Williams *et al.*, 1996).

The preservationist approach to protected areas management slowly changed through the 1980s and 1990s. The IUCN in collaboration with the Norwegian Development Agency (NORAD) developed the Serengeti Regional Conservation Strategy (SRCS) for the Park. Phase II started in 1989 with the drafting of a Conservation and Development Plan, planned and executed with the local people. The overall goal was to change the approach of the management and use of the Serengeti from the traditional exclusion of local communities to one reconciling the needs of human development in the region with conservation (SRCS, 1992). Where local communities have legal rights to manage the wildlife around their villages it was hoped that the present unsustainable levels of poaching would decline. Buffer zones were selected where wildlife can be managed by the local people, and village wildlife committees are supervising conservation activities. The SRCS also includes programs to stabilise land use, and plans to channel more of the money earned from tourism in the park back into the communities (Leader-Williams *et al.*, 1996). The Park administration works with the village authorities to resettle encroachers and re-mark the boundary. The Ikorongo and Grumeti Game Reserves were incorporated in the Park for greater control of the area than is possible with Game Controlled Reserves. An example of communal wildlife management is a village bordering the Serengeti and Maasai Mara Reserves, Ololosokwan, which has dedicated a portion of its land to shared use by wildlife and cattle and helps to support four village game scouts, who protect and monitor the use of the area. Tourism companies which camp and sell photographic tourism on the land make financial and infrastructural contributions to the village in return (Singleton, 2004).

The scarcity of water necessitates environmental impact assessments before new drilling is permitted for tourist lodges, and technical and financial assistance for further water resource studies. The Mara River flow has diminished owing to deforestation in Kenya, a consequent high sediment load and over-extraction. Transboundary water management policies, based on a Flow Assessment funded by the WWF, are being formulated for extraction limits; a Strategic Environmental Assessment for the river

basin has been made and a Biodiversity Action Plan for the area drawn up. The three plans should permit the great migration to continue unhindered in the future. A 9,600 ha extension of the site to the Speke Gulf for its water resources could also lessen the effect of water shortages (UNESCO,2010).

### **MANAGEMENT CONSTRAINTS**

The human population to the west of the Park has expanded rapidly over the past 30 years, wildlife and livestock populations have grown, and demand for land is high. Grazing land is becoming scarce as pasture land is converted into cropland. Local people are vulnerable to external development and large scale agricultural schemes which do not benefit local communities. Open land ownership has also resulted in local people over-exploiting common resources (Leader-Williams *et al.*, 1996). Agriculture has encroached on the park's boundaries and former subsistence poaching has now become large-scale and commercial. An estimated 200,000 animals are killed annually, resulting in large falls in the numbers of several species: warthog, giraffe, eland, topi, impala and buffalo. Rhinoceros numbers have been reduced very low and elephants are increasingly poached. The rise in demand for meat has been partly driven by the growing local population and in-migration as wildlife and fuelwood is depleted elsewhere. The need for bushmeat has also been exacerbated by the relatively low contribution that tourism has made to the local economy and the resulting antagonism felt by the excluded local population (Leader-Williams *et al.*, 1996). The lion population is healthy but subject to problem-animal control by farmers who regard it as a pest. However, government control over the Park has improved since the 1970s.

Hunting permits in the Controlled Game Areas are granted at the discretion of senior government officials. Nevertheless, a ten-year hunting lease in the Loliondo Game Control Area next to Serengeti granted to a Brigadier of the Dubai Army attracted controversy. The lease is an exclusive permit which takes advantage of the migratory patterns of wildlife coming out of the Park. Reports on the first season noted wide use of machine guns and the taking of non-game species (IUCN, 1994). The concession may have severely impacted wildlife in the area (Lamprey, 1995). At one time the Serengeti was not inhabited by elephants, but cultivation and settlement outside the Park resulted in a change in their distribution. The combination of elephant, uncontrolled fires and subsequent browsing and stunting of regrowth by giraffe has caused a decline in woodlands. There has also been some tree cutting in small areas on the west and north-west boundaries.

In 1994 an epidemic of canine distemper virus killed 35% of the Serengeti and Masai Mara lions, although the populations recovered within five years. The disappearance of the wild dog population in 1991 may have been accelerated by rabies spread via domestic dogs: approximately 30,000 domestic dogs live in the area, most of which are not vaccinated, creating a large reservoir of diseases (Roelke-Parker *et al.*, 1996; Morell, 1995). Mass vaccinations of domestic dogs for distemper and rabies around the Park started in December 1996 to create an infection-free buffer zone on the western boundaries (Bristow, 1996). A new threat is the Mexican prickly poppy *Argemone mexicana* which rapidly invades overgrazed land, crowding out both crops and the native plants which are needed to sustain the existing patterns of wildlife (IUCN, 2002).

In 2009, an environmentally damaging 55 km east-west road was projected across the great migration route between the Grumeti and Mara rivers. Although to be gravelled this will dissect the northern wilderness, critical habitat for several species such as the black rhinoceros, restrict animal movements, fragment their habitat, facilitate poaching and the inflow of alien species and lead to road kills, only prevented by a fence which would stop the animals' dry season use of the Mara River. The WHC strongly advocated an alternative route such as a South Road proposal (UNESCO,2010).

### **STAFF**

A staff of over 180 includes one Chief Park Warden and five Park Wardens, 35 in administration, many of whom trained at the College of African Wildlife Management at Mweka or the University of Dar-es-Salaam and 80 anti-poaching staff (undated information).

### **BUDGET**

In 1990 US\$42,000 was provided from international sources for technical cooperation. In 1997 the annual budget was approximately equivalent to US\$314,000 including grants from external sources. There is no more recent information.

## LOCAL ADDRESSES

The Director-General, Tanzania National Parks Authority, PO Box 3134, Arusha, Tanzania.

The Director, Serengeti Wildlife Research Centre, P.O. Box 661, Arusha, Tanzania.

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