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SELOUS GAME RESERVE TANZANIA

Selous contains a third of the wildlife estate of Tanzania. Large numbers of elephants, buffaloes, giraffes, hippopotamuses, ungulates and crocodiles live in this immense sanctuary which measures almost 50,000 square kilometres and is relatively undisturbed by humans. The Reserve has a wide variety of vegetation zones, from forests and dense thickets to open wooded grasslands and riverine swamps.

COUNTRY

The United Republic of Tanzania

NAME

Selous Game Reserve

NATURAL WORLD HERITAGE SITE

1982: Inscribed on the World Heritage List under Natural Criteria ix and x.

IUCN MANAGEMENT CATEGORY

IV Habitat/Species Management Area

BIOGEOGRAPHICAL PROVINCE

Eastern Miombo Woodland/Savanna (3.07.04)

GEOGRAPHICAL LOCATION

In central south-eastern Tanzania between 130 and 500 km southwest of Dar-es-Salaam at 7° 20' to 10° 30'S, and 36° 00' to 38° 40'E.

DATES AND HISTORY OF ESTABLISHMENT

1896-1912: Four reserves established by the German administration (250,000 ha);

1922: The existing reserves combined to form the Selous Game Reserve Sanctuary, named for the hunter Captain Frederic Selous;

1936-47: Boundaries enlarged several times to include elephant migration routes and to relocate villagers

1964: The adjacent Mikumi National Park and Kilombero Game Controlled Area established;

1974: The Reserve was legally established under the Wildlife Conservation Act as amended by the Wildlife Conservation (Amendment) Act of 1978;

1980: Designated a National Project as a Special Protection Area;

1994: The adjacent Udzungwa Mountains National Park established.

LAND TENURE

Government, in Coast, Morogoro, Lindi, Mtwara and Ruvuma regions. Managed by the Wildlife Division of the Ministry of Natural Resources and Tourism.

AREA

4,480,000 ha. Contiguous with the Mikumi National Park (323,000 ha) and Udzungwa Mountains National Park (200,000 ha) in the northwest and Kilombero Game Controlled Area (530,000 ha) in the west, The area, with these protected areas, totals 5,710,000 ha. There is a buffer area of ~3,500,000 ha.

ALTITUDE

From 80m in the north-east to 1,300m in the south-west (Mbarika Mountains).

PHYSICAL FEATURES

Selous is the largest Game Reserve in Africa, part of the Selous ecosystem of over 9,000,000 hectares which includes two National Parks and a Game Controlled Area. A large part of the Reserve is drained by the Rufiji River, the largest river in east Africa, which, with its tributary the Ruaha, drains most of south-central Tanzania and is formed where the Ruaha and Luwegu rivers join above the Shughuli Falls. Tributaries in the southwest include the Kilombero, Luhombero, Mbarangandu and Njenji rivers which are the main permanent streams. Below the Rufiji-Ruaha confluence there is a stretch of lakes and swamps. The southeast border is drained by the Matandu river, the northern border by the Mgeta.

The centre of the Reserve is a flat to rolling landscape with alluvial valleys and protruding inselbergs largely underlain by the Karoo sandstone and metamorphosed upper PreCambrian schists and gneisses with granite outcrops. It is covered by thickets and closed woodland; the south is hilly, rugged and forested. The southwestern Mbarika Mountains reach 1,300m, the west is mountainous and forested with intervening wet lowlands. The east and north are treed grassland on alluvial hardpan, in places seasonally flooded by the Rufiji which can rise 5 metres. The soils of the Rufiji basin are highly leached, acidic and nutrient-poor, unsuited to agriculture and in the south are alkaline sands over hardpan. Erosion is accentuated by the frequent fires and heavy November rains which result in rivers of sand (Stephenson, 1990).

CLIMATE

The Reserve has a dry sub-humid climate influenced by the prevailing southeasterly winds which bring rainfall to the Eastern arc mountains along its western border. The annual rainfall ranges from 750mm in the east to 1,300mm in the west, falling mainly between mid-November and mid-May but is very variable. The six months of winter are very dry. The average annual range of maximum and minimum temperatures at Kingupira Research Station on the hotter eastern edge is between 17.9°C and 37.3°C but for the whole Reserve range from 13°C to 41°C, depending on elevation.

VEGETATION

The Reserve is between the Somalia-Maasai and Zambezian regional centres of endemism, mostly within the latter, and has a wide variety of vegetation zones, from forests and dense thickets to open wooded grasslands and riverine swamps. 2,149 plant species have been recorded, and more might be found in the remote forests of the south.

Two main vegetation types dominate the reserve. North of the Ruaha-Rufiji rivers (17% of the area) is mainly open wooded grassland underlain by poorly drained alkaline sandy clay. It is dominated by the flat-topped *Terminalia spinosa* and dotted with doum palm *Hyphaene thebaica*, with riverine swamps covered by tracts of woodland of borassus palm *Borassus aethiopicum*. The rest of the Reserve is dry deciduous *miombo* woodland which provides the chief elephant habitat, much of which is maintained by fire. Its dominant species, rarely found outside *miombo* woodland, are *Brachystegia spiciformis*, *B. boehmii* and *B. allenii* with *Julbernardia globiflora*, bloodwood *Pterocarpus angolensis*, *Isobertinia* spp. and the commercially valuable zebrawood *Dalbergia melanoxylon*. The shrub layer is predominantly *Diplorhynchus condylocarpus* and leadwood *Combretum* spp. This occurs as closed woodland and dense thickets in the centre and south, as open woodland in the west, and as scattered tree grassland in the east. But there is a great diversity of other vegetation: rocky acacia-clad hills, gallery and ground water forests dominated by other species of *Brachystegia* and by the wild date palm *Phoenix reclinata*, seasonally flooded sand rivers, swamps and lowland rain forest.

FAUNA

The Reserve has a higher density and species diversity than any other *miombo* woodland area, despite long winter drought and poor soils, owing to its size, the diversity of its habitats, the availability of food and water and the lack of settlements. Many species are characteristic of savanna. Some 400 species of animals are known and in 1986 approximately 750,000 large animals of 57 species were recorded (Douglas-Hamilton, 1986). The greatest concentrations are in the north and northeast, also in the inner

south, now recovering after years of decline. However, due to ivory poaching the 1980 population of 109,000 elephants *Loxodonta africana* (VU) dwindled to 31,889 by 1989 (TWCM, 1995; GTZ/SCP, 1995). Within Selous they rebounded to 52,000 by 1994 owing to greatly improved security and spread throughout the Reserve (Baldus *et al.*, 2003). They are expected to total 70,400 by 2006 (UNESCO, 2007). Eastern black rhinoceros *Diceros bicornis michaeli* (CR) which numbered 3,000 in 1981 then declined to 3-400, were estimated to be some 4,000 by Baldus *et al.* in 2003, but numbers have dropped sharply again since to between 45 and 60 of which over half may be central black rhinoceros *Diceros b. minor* (CR) (Anon., 2006; IUCN, 2010; UNESCO, 2007).

Many of the other animal populations are large according to a TWCM aerial survey in 1994. Grassland species north of the Rufiji include lion *Panthera leo* (VU: 5,000 individuals in 2003) and an occasional cheetah *Acinonyx jubatus* (VU), desert warthog *Phacochoerus aethiopicus*, giraffe *Giraffa camelopardalis tippelskirchii* (2,200), Nyassa and eastern white-bearded wildebeest *Connochaetes taurinus johnstoni* and *C. t. albojubatus*, (46,500), central African savanna buffalo *Syncerus caffer aequinoctialis* (138,000), impala *Aepyceros melampus* (29,500), common eland *Tragelaphus oryx*, southern reedbuck *Redunca arundinum*, plains zebra *Equus quagga* (21,500), Lichtenstein's hartebeest *Alcelaphus buselaphus lichtensteini* (20,000), Coke's hartebeest *Alcelaphus buselaphus cokei* (11,700) and common waterbuck *Kobus ellipsiprymnus* (10,000). Bohor reedbuck *Redunca redunca* and oribi *Ourebia ourebi* thrive in disturbed grasslands. The populations of animals in the surrounding areas are often high, especially in the dry season, and contain many of the same species. An aerial census in 2006 showed notable decline in many of these numbers due probably to financial restraints on controls (UNESCO, 2007).

Typical *miombo* woodland species include greater kudu *Tragelaphus strepsiceros*, sable antelope *Hippotragus niger* (1,600), with eland, impala, wildebeest and hartebeest. Hippopotamus *Hippopotamus amphibius* (VU: 27,000) and crocodile *Crocodylus niloticus* are abundant. Other relatively widespread mammals include yellow baboon *Papio cynocephalus*, spotted hyaena *Crocuta crocuta*, the largest population in Africa of wild dog *Lycaon pictus* (EN: ~1,300) according to GTZ/SCP (1995), sidestriped jackal *Canis adustus*, Selous' mongoose *Paracynictis selousi* and bushy-tailed mongoose *Bdeogale crassicauda*; also leopard *Panthera pardus*, caracal *Caracal caracal*, serval *Leptailurus serval* and *Miombo* genet *Genetta angolensis*. There are also puku *Kobus vardonii*, klipspringer *Oreotragus oreotragus*, blue and Natal red duikers *Philantomba monticola* and *Cephalophus natalensis*. Rarer species include Sanje crested mangabey *Cercocebus galeritus sanjei* (EN), Udzungwa red colobus *Procolobus badius gordonorum* (EN), eastern black-and-white colobus monkey *Colobus guereza caudatus*, topi *Damaliscus lunatus* and Sharpe's grysbok *Raphicerus sharpei*.

The Reserve lies in one of the world's Endemic Bird Areas and the birdlife is rich; 450 species of birds are recorded. The globally threatened wattled crane *Grus carunculatus* (VU), lesser kestrel *Falco naumanni* (VU) the endemic Udzungwa forest partridge *Xenoperdix udzungwensis* (EN) and rufous-winged sunbird *Nectarinia rufipennis* (VU) occur (Birdlife International, 2000). Other species include comb duck *Sarkidiornis melanotos*, bateleur eagle *Terathopius ecaudatus*, corncrake *Crex crex*, white-headed lapwing *Vanellus albiceps*, southern ground hornbill *Bucorvus cafer* and the near endemic Stierling's woodpecker *Dendropicops stierlingi*. The adjacent Mikumi lowlands and mountains, the Kilombero wetlands and the nearby Udzungwa Mountains are rich in species which like the Kilombero weaver *Ploceus burnieri* (VU) might stray into the Reserve. Reptiles and amphibians are numerous but little studied, three reptiles and one amphibian are endemic.

CULTURAL HERITAGE

The Reserve bisects the traditional lands of the Wangindo tribe of hunter-gatherers though the infertile land was always thinly settled except in the east. The area was also on the main slave-trading route to the port of Kilwa, was invaded by the Wangoni tribe, and fought over in both the 1906 colonial rebellion and World War I.

LOCAL HUMAN POPULATION

During the establishment of the Reserve, scattered settlements within the boundaries were relocated to areas now mostly within the buffer zone, first to avoid epidemics of sleeping sickness, then following the Tanzanian government *Ujamaa* policy of village creation. Many settled in the Kilombero valley to the west where they now threaten the wildlife in the Game Conservation Area. The area's high level of infestation by tsetse fly *Glossina* spp. which causes tripanosomiasis, effectively prevented pastoralism, thus protecting the wildlife but making bushmeat an important part of the local diet (Newmark *et al.*, 1993). Loss of the use of the Reserve lands has trapped many in poverty, and the Game Scouts are

much resented by the hunters who traditionally cropped the game which was central to their lives (Stephenson, 1990). However much of the land is marginal for farming, so the density of the surrounding population is generally low except on the north, northwest and central western boundaries.

VISITORS AND VISITOR FACILITIES

The Reserve is remote and not easily accessible except by air though access by the Tazara railway on the north-west edge is now possible. From March to May floods make access difficult. The land in the dry season between June and October is parched but the game is more concentrated and so is easier to see. There were around 2,135 visitors to the Reserve in 1993 and 6,000 in 2003, 600 being hunters. A tourism area has been set aside on the species-rich north bank of the Rufiji River where the widest diversity of the Reserve's animals exists where hunting is prohibited and game viewing, river safaris and photo-tourism encouraged. There are now a lodge and ten tented 4-person camps, one being a luxury camp, in the photo-safari area plus 10 more being built and several small lodges, (UNESCO, 2010). In accordance with the Wildlife Conservation Act, trophy hunting is permitted in Tanzania and provides income for the Reserve. In 1992 49 elephant-shooting licences were issued for use within the Reserve: 19 elephant bulls were shot and a further 5 were poached.

SCIENTIFIC RESEARCH AND FACILITIES

Studies mainly concern ecological and wildlife management problems in the *miombo* woodlands but research was for long hampered by a shortage of equipment and vehicles. Aerial censuses to estimate the number and distribution of mammal species were carried out regularly from 1976, the last in 2006. The Miombo Research Station at Kingupira in the east within easy reach of Dar-es-Salaam, is near four major habitat types though it is cut off in the wet season. There is an ecological monitoring unit at the Reserve's headquarters operated under the GTZ Selous Conservation Programme which, in addition, has sponsored many studies relevant to Selous. The GTZ Community Wildlife Management Programme has surveyed the potential Selous-Niassa corridor in the south in some detail (Baldus *et al.* 2003).

CONSERVATION VALUE

The Reserve is immense and has a wide variety of relatively undisturbed vegetation types, ranging from dense thickets to open grasslands, large enough to support very large populations of elephants, giraffes, wild dogs, ungulates, hippopotamuses and crocodiles. It lies within a Conservation International-designated Conservation Hotspot, a WWF Global 200 Eco-region, and is in one of the world's Endemic Bird Areas.

CONSERVATION MANAGEMENT

The Game Reserve was established to preserve the elephants, black rhinoceros and the other diverse wildlife which remain its main economic resource. With five other game reserves it was designated a National Project in 1980, giving it enhanced status as a Special Protection Area. Since the revision of the Wildlife Act in 2009 all reserves are controlled by a new Wildlife Authority within the Ministry of Natural Resources and Tourism and 50% of the revenues from tourism and hunting are to be reinstated. A database linking monitoring systems is being developed. The Chief Warden is headquartered at Matambwe in the north. As the area's residents were evacuated when the Reserve was established Selous has remained relatively intact. No large-scale forest exploitation has taken place. Mineral exploration has as yet failed to find any valuable deposits and the Stiegler's Gorge dam proposed for the Rufiji River in 1980 was not yet found to be economic in 2006. The Reserve is divided into eight sectors for decentralised administrative control, each under a Sector Manager, primarily for allocating hunting concessions in 42 of the 45 management blocks with three for photographic tourism. Zones adopted by the state Wildlife Division are: a Strict Nature Reserve in the Mbarika Mountains of the southwest, a Tourist area and a Rhino Sanctuary on the Rufiji river, safari hunting over the whole area south of the Rufiji and an approximately 15 km wide buffer zone round most of the Reserve.

The destruction of elephants after 1972 was finally tackled by the government's Operation Uhai in 1989 and elephant poaching virtually stopped by 1991. Since then all animal populations in the Reserve have greatly increased (Baldus *et al.* 2003). A WWF project which ran between 1984 and 1999, provided ranger equipment, training, and transport, monitored key wildlife species, produced an elephant management plan, and strengthened anti-poaching operations (WWF, 1996). In 1988 the ten-year joint Tanzanian - German government Selous Conservation Programme (SCP) was started to reduce the conflict between people and Park staff and to promote sustainable use of their wild resources by local people. A management plan drawn up in 1995 aimed to control poaching, logging and wildfires, train and equip the Game Scout force, monitor the Reserve and improve transport and communications.

Much Reserve infrastructure was improved under its direction, including the building of 160 houses (GTZ,2004) and, though hampered by lack of equipment, regular anti-poaching patrols were sent out. An updated comprehensive 2005-2015 Selous Game Reserve General Management Plan was developed with GTZ and approved in 2005. But on the advice of the World Bank, the Revenue Return Scheme which has underpinned financing of the Reserve was discontinued in 2004 resulting in a vast increase in poaching (UNESCO, 2007; 2010).

The most useful method used by the Conservation Programme for reducing the levels of poaching, which also created a buffer zone between the Reserve and surrounding settlements, was the establishment of the Tanzanian Wildlife Policy. This is a communal wildlife management scheme in wildlife management areas adjacent to 51 villages in which, villagers agree to monitor local wildlife and allow it onto part of their lands in return for a sustainable hunting quota and the right to benefit from offering tourist services. These schemes have been accompanied by self-help and rural development projects to improve village services. Until 2004, the Reserve authorities retained 100% of the income from photo-tourism and game viewing and 50% of that from hunting, to finance management. However, though profitable and developing rapidly, photo-tourism will require increased staff and accommodation. By the end of the programme the SCP had succeeded in achieving its aims (Baldus *et al.* 1994; GTZ/SCP,1995; Leader-Williams *et al.*,1996; GTZ, 2004; UNESCO,2007).

The southern hunting sector of the Selous, has most of the wildlife and provides most of the revenues of the reserve. The maintenance of a wildlife corridor to Mozambique is important to maintain the integrity of the property and there is a project to create a 160 km ±800,000 ha corridor to link the two largest elephant populations and *miombo* woodland ecosystems, in Africa, in Selous and the Niassa Game Reserve on the Mozambique border. Such a transboundary linking of reserves would encompass well over 100,000 elephants. This Community Wildlife Management program was set up in 2000 by the *Deutsche Gesellschaft für Technische Zusammenarbeit* (GTZ) which is supporting the Wildlife Division in the establishment of the Wildlife Management Area south of the Selous Reserve. The Wildlife Division of the Ministry of Natural Resources and Tourism, with other institutions and NGOs, also supports the initiative, which works through the village community wildlife areas which have been successful around the Reserve. The project is funded by GEF through UNDP and the liaison with the Niassa Reserve is managed through a public-private partnership, *Sociedade para a Gestao e Desenvolvimento da Reserva do Niassa*, with its current major donor and technical partner Fauna & Flora International. Surveys and plans have been prepared for the corridor but formal consultations between the two countries had not started in 2003 (Baldus *et al.* 2003). However, in 2008 the entire corridor was threatened by poaching for meat and ivory, habitat degradation due to wildfires and likely agricultural expansion (IUCN,2008).

MANAGEMENT CONSTRAINTS

The immediate and long-term threats to wildlife continue come from illegal hunting and unsustainable commercial poaching for meat, skins and trophies (Leader-Williams 1996). This became very destructive in the early 1980s when the absence of funding left the Reserve undefended and some 5,000 elephants a year were taken for ivory, reducing the population by 70%. Populations of rhinoceros and several other species also sharply declined. When funds from the Revenue Return Scheme were withdrawn in 2004 poaching, sometimes supported at high levels, greatly increased with a loss of approximately 31,500 elephants (44%) between 2006 and 2009 (UNESCO,2007,2010). The communal wildlife management schemes started under the Selous Conservation Programme have notably reduced conflicts between wildlife and rural communities over other recurring problems such as crop destruction, illegal fishing and honey poaching (Leader-Williams *et al.*,1996). However, local antagonism only decreases where the Reserve is seen to benefit the local people, who are not always sympathetic to conservation. During the 2003 drought for instance, famished lions left the Reserve and killed 28 farmers in the Rufiji valley nearby (IUCN, 2003), and the government paid no compensation for crop damage by animals or for people killed by wildlife. The resulting animal control by the victimised communities accounted for many lion deaths (UNESCO, 2007).

Roads proposed across the Reserve are also a potential threat. Oil exploration roads for the Shell Exploration Company built in 1981-5 over three quarters of the reserve caused much erosion. They improved access into the area and set up maintenance settlements within it. This led to uncontrolled poaching and, eventually, to easier access for mining prospectors and cultivators. A proposed upgrade in 2008 of the Tunduru-Songea road in the south of the Reserve will have similar effects. There has also recently been similar large scale prospecting for uranium within the Reserve by two Australian companies. However, no permits for exploration have yet been issued. A dam proposed at Kidunda on

the Ruvu river 12 km beyond the northeast corner to supply Dar es-Salaam is supported by the World Bank, and a dam within the property in Steigler's Gorge is still a possibility (IUCN,2008; UNESCO, 2010).

Lesser threats, such as destruction of the riverine forests by uncontrolled fires, illegal logging and deforestation for cultivation and grazing, are on the increase as a result of inadequate funding and transportation difficulties, which leave the interior of the Reserve insufficiently patrolled. There is a lack of vehicles, camping gear and radios. Up-to-date scientific support to management and reliable monitoring of the impacts of fire and hunting are still needed (UNESCO,2007). There is no overall plan for tourism although a large number of photo-safari and hunting tourist lodges is proposed which will need more staff, equipment and vehicles to monitor despite the diminished site budget. Tourist developments have grown up in the north of the Reserve and pressure is building up especially outside the main northern entrances.

STAFF

There is a Chief Warden, with seven sector managers and 365 support staff, a fifth of the number needed (UNESCO, 2010) and the force remains understaffed and underpaid.

BUDGET

In 1985 the Reserve earned approximately US\$2 million from licensed game hunting, though only 10% of this was returned for recurrent and capital budget expenditure. Since 1992 50% of the foreign exchange earned from licensed tourist game hunting and 100% of that from photo-tourism (US\$200,000 a year in 1997) was retained by the Reserve. To this was added US\$500,000 in salaries and other support from the government (Chief Warden, *in litt.*,1997). Up to 1993, US\$6million had been granted by the German government through GTZ, supplemented by the WWF, the African Development Bank, the African Wildlife Fund, WWF and the Frankfurt Zoological Society (J.Thorsell, pers. comm.,1993). By 1997 the Reserve annually earned US\$2,300,000, providing 24% of Tanzania's revenue from tourism, and retained US\$1,703,000. By 2003 the revenue retained had increased to US\$2,800,000 (US\$2,600,000 from hunting). But following the budget reductions in 2004, this is predicted to decline to US\$800,000 in 2008 (UNESCO,2007).

LOCAL ADDRESSES

The Chief Warden, Selous Game Reserve, PO Box 25295, Dar-es-Salaam.

The Wildlife Division, Ministry of Natural Resources and Environment, PO Box, Dar es-Salaam.

The Director, Community Based Wildlife Conservation Programme, PO Box 1519, Dar es-Salaam.

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