NAME Nyika National Park

TYPE NP

BIOTIC PROVINCE 4.6.5

LEGAL PROTECTION Total

DATE ESTABLISHED 1 January 1966, under the Game Ordinance (also known as Malawi National Park).

GEOGRAPHICAL LOCATION About 480 km by road north of Lilongwe and 35 km west of Livingstonia on Lake Malawi: S 10°20'; E 33°30'

ALTITUDE 1600-2606 metres

AREA 304,385 ha (93,300 ha excluding areas of extensions, not yet gazetted).

LAND TENURE Government ownership

PHYSICAL FEATURES A roughly ovoid plateau with its long axis north-east to south west, forming part of the western margin of the East African Rift Valley system. Four big rivers originate within the Park, which is one of the most important water catchments in the country, and drain into Lake Malawi, notably the North Rukuru river which enters the lake at Karonga. The temperature range is from below 0°C during cold months to over 21°C in the warm season. Mean annual precipitation is 1140 mm.

VEGETATION 90% of the plateau over 1800 m is covered by a short, open grassland dominated by Loudetia simplex, red oat grass Themeda triandra and Exotheca abyssinica. An estimated 2%-4% has relict evergreen forest, largely in valley heads and in hollows on valley slopes. Lower elevations are dominated by mixed Brachystegia woodland.

NOTEWORTHY FAUNA Mammals include one 'vulnerable' Red Data Book species, the leopard Panthera pardus, zebra Equus burchelli, warthog Phacochoerus aethiopicus, bushbuck Tragelaphus scriptus, eland Taurotragus oryx, grey duiker Sylvicapra grimmia, redbuck Redunca redunca and roan antelope Hippotragus equinus. Among the more unusual of the characteristic birds of the plateau are red-winged francolin Francolinus levaillantii, wattled crane Bugeranus carunculatus and Jackson's busterd Reutia demhai Jacksoni.

ZONING The Park was zoned in the 1975/76 Master Plan on the basis of the five land-use categories developed by the Canadian National Parks Service: Class I special areas; Class II Natural environment areas; Class III Lower category Natural environment areas; Class IV General outdoor recreation; Class V Intensive use areas.

DISTURBANCES OR DEFICIENCIES The greatest threat is wild fire, originating outside and inside the Park, and the protection of the remaining forest patches from these annual burns is a critical problem.

TOURISM 1200-1500 visitors annually; facilities include four chalets each with four single and six double rooms. Over 240 km of unpaved roads are for the most part passable throughout the year.

SCIENTIFIC RESEARCH A permanently established wildlife research officer.

WDNP IUCN © 1977 (1)F Code: MAL(2).2.1
SPECIAL SCIENTIFIC FACILITIES  At present only an office with minimal equipment, reference books and specimens.

PRINCIPAL REFERENCE MATERIAL


STAFF  36 full time and up to 250 labourers and artisans on a temporary basis.

BUDGET  Equivalent of U.S. $ 114,000 allocated by the Government for the development of the Park, in the financial year 1976/77, together with about U.S. $ 50,000 for recurrent expenditure.

LOCAL PARK ADMINISTRATION  Senior Game Warden, Private Bag Chilinda, P.O. Rumphi or Principal Game Warden, Department of National Parks and Wildlife, P.O. Box 30131, Capital City, Lilongwe 3.
MALAWI

AREA 118,484 sq. km (of which 24,406 sq. km are surface water)

POPULATION 4,039,583 (1966 census), 5,175,000 (1976 estimate)

PARKS AND RESERVES LEGISLATION The Land Act authorizes acquisition of customary land and its declaration as Public Land, which is then available for gazettement as National Park. The Game Act (1954) prescribes a means for establishment of Game Reserves and identifies prohibited activities within these. The National Park Act (1969) provides the most comprehensive control of all other activities. No National Park may be reduced in area without a specific resolution of Parliament. A new comprehensive Flora and Fauna Act is in preparation, designed to supersede the Game Act and to make provision for stricter protection of wildlife resources outside the Parks.

PARKS AND RESERVES LEGISLATION Prior to 1973, National Parks and Game Reserves were the responsibility of the Game Division of the Department of Forestry and Game. In April 1973, as directed by the President, a separate Department of National Parks and Wildlife was established within the Ministry of Agriculture and Natural Resources and now manages four National Parks and four Game Reserves (one of the latter still at the proposal stage). It is also responsible for crop protection outside Reserves. A Principal Game Warden, responsible to the Secretary for Agriculture and Natural Resources, has three Regional Game Wardens serving under him. Each National Park is the responsibility of a Senior Game Warden. Other staff includes 15 Game Rangers and 100 Game Scouts.

ADDRESS Department of National Parks and Wildlife, P.O. Box 30131, Lilongwe 3, Malawi.

TOTAL AREA UNDER PROTECTION 1,042,601 ha (as per the following list, which includes substantial additions to areas 2.1, 2.2 and 3.1, which may not yet have been gazetted, and one Game Reserve which had not been finally approved and put on a legal footing when list was prepared).

PROTECTED AREAS

<table>
<thead>
<tr>
<th>Area</th>
<th>Name</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Nyika National Park</td>
<td>304,385</td>
</tr>
<tr>
<td>2.2</td>
<td>Kasungu National Park</td>
<td>220,320</td>
</tr>
<tr>
<td>2.3</td>
<td>Nkhota Kota Game Reserve</td>
<td>174,960</td>
</tr>
<tr>
<td>2.4</td>
<td>Vwaza Marsh Game Reserve (proposed)</td>
<td>103,680</td>
</tr>
<tr>
<td>3.1</td>
<td>Lengwe National Park</td>
<td>90,720</td>
</tr>
<tr>
<td>3.2</td>
<td>Majete Game Reserve</td>
<td>64,000</td>
</tr>
<tr>
<td>3.3</td>
<td>Liwonde National Park</td>
<td>58,616</td>
</tr>
<tr>
<td>3.4</td>
<td>Mwabvi Game Reserve</td>
<td>25,920</td>
</tr>
</tbody>
</table>
NAME Kasungu National Park

TYPE NP

LEGAL PROTECTION Total

DATE ESTABLISHED Established as a Game Reserve in 1930 and as a National Park in 1970.

GEOGRAPHICAL LOCATION West of Kasungu, about 175 km north of Lilongwe and extending towards the Zambian border: S 13°00'; E 33°10'

ALTITUDE 1000-1340 metres

AREA 220,320 ha (204,800 ha excluding approved extensions not yet gazetted)

LAND TENURE Government ownership

PHYSICAL FEATURES Relatively flat plateau embracing much of the higher catchment of the Dwangwa River, which, together with its tributaries, is seasonal in flow but generally still has water in deeper pools during the dry months. Several prominent inselbergs break the general plateau surface. Climatically typical of Central Malawi with daily maximum often exceeding 29°C from September to May and daily minimum of 4°C-7°C from June to August. Annual rainfall averages 750 mm to 1000 mm but may vary significantly between years.

VEGETATION Open to fairly wooded country forming a mosaic of medium height 'miombo' woodland dominated by Brachystegia spp. and Julbernardia globiflora. A more varied woodland dominated by Combretum spp., Acacia pilostigma and Terminalia occurs along the Dwangwa and some of its larger tributaries. A zone of moderately dense Hyparrhenia grassland also borders the rivers in places. The relatively infertile leached plateau areas up to 1200 m also have their own characteristic tree cover.

NOTEWORTHY FAUNA Wild dog Lycaon pictus and cheetah Acinonyx jubatus are seen occasionally, the latter classified as a vulnerable species in the Red Data Book. About 1500-2000 elephant Loxodonta africana are conspicuous and thought to be increasing. Black rhino Diceros bicornis (another 'vulnerable' species) is also seen occasionally. A wide variety of other wildlife typical of Brachystegia woodland includes many small mammals. Some 200 bird species have been recorded.

ZONING The entire area has been zoned using five land-use categories developed by the Canadian National Parks Service (see under Area 2.1).

DISTURBANCES OR DEFICIENCIES The eastern boundary adjoins an expanding project based on tobacco grown by smallholders. Conflicts with wildlife can be expected and a physical barrier will probably be needed in future. An additional strip of country along this border, for which application has been made, would help to mitigate the problem.

TOURISM Around 3500 visitors annually. Accommodation for 36 people in a 12 rondavel camp. Around 120 km of gameviewing tracks.

SCIENTIFIC RESEARCH None reported
SPECIAL SCIENTIFIC FACILITIES  None

PRINCIPAL REFERENCE MATERIAL

STAFF  34 full time and up to 200 artisans and labourers on a temporary basis.

BUDGET  Equivalent of U.S. $ 78,500 allocated by the Government for development during the 1976/77 financial year, together with a similar amount for recurrent expenditure.

LOCAL PARK ADMINISTRATION  Senior Game Warden, Kasungu National Park, P.O. Box 43, Kasungu or Principal Game Warden, Dept. of National Parks and Wildlife, P.O. Box 30131, Capital City, Lilongwe 3.
NAME Lengwe National Park

TYPE NP

BIOTIC PROVINCE 4.6.5

LEGAL PROTECTION Total

DATE ESTABLISHED As Game Reserve in 1928, National Park in 1970.

GEOGRAPHICAL LOCATION About 80 km south of Blantyre, to the west of the Shire river: S 16°15'; E 34°45'

ALTITUDE 130-393 metres

AREA 90,720 ha (12,800 ha excluding approved extensions, not yet gazetted)

LAND TENURE Government ownership

PHYSICAL FEATURES Relatively flat region divided into three physiographic units: a gently undulating landscape sloping upwards to the watershed between the Shire and the Zambezi rivers; extensive plains of alluvial deposits; and seasonally flooded depressions known as "dambos" found along drainage lines. Daily temperatures often exceed 35°C during hot months and may occasionally be experienced throughout the year. Annual precipitation is extremely variable and its amount is not quoted.

VEGETATION Most of the Park is dominated by a combination of mopane woodland Colophospermum mopane in the south, and 'miombo' woodland of Brachystegia and Combretum spp. in the north. The most important plant communities for wildlife are the dry deciduous thickets of Pterocarpus antunesisi and of Lecania discus fraxinifolius, which form the habitat of the nyala antelope. Several sandstone ridges also occur and support a taller woodland of Pterocarpus angolensis and Afzelia cuanzensis.

NOTEWORTHY FAUNA Mammals recorded include samango monkey Cercopithecus mitis albugularis (or monoides), spotted hyena Crocuta crocuta, leopard Panthera pardus and bush pig Potamochoerus porcus, the leopard a 'vulnerable' species according to the Red Data Book classification. The Park is one of two remaining habitats in Malawi in which the nyala antelope Tragelaphus angasi occurs. Other ungulates include bushbuck T. scriptus, greater kudu T. strepsiceros, buffalo Syncerus caffer, grey duiker Sylvicapra grimmia, suni Nesotragus moschatus and impala Aepyceros melampus. A striking assortment of lowland, tropical birds is an important element in the Park.

ZONING The Park has been zoned on the basis of the five land-use classes developed by the Canadian National Parks Service (see under Area 2.1).

DISTURBANCES OR DEFICIENCIES The Park is nearly surrounded by agricultural schemes, including a major sugar production project. No buffer land exists between its boundary and these developed areas and 13 km of fencing has already had to be erected and more will be needed.

TOURISM No information

SCIENTIFIC RESEARCH None reported

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SPECIAL SCIENTIFIC FACILITIES

None

PRINCIPAL REFERENCE MATERIAL


STAFF 11 full time and up to 30 labourers and artisans on a temporary basis

BUDGET Equivalent of U.S. $44,000, allocated by the Government for development of the Park in the financial year 1976/77, and a similar amount to cover recurrent expenditure.

LOCAL PARK ADMINISTRATION

Senior Game Warden, Lengwe National Park, P.O. Box 25, Chikwawa or Principal Game Warden, Dept. of National Parks and Wildlife, P.O. Box 30131, Capital City, Lilongwe 3.
NAME Liwonde National Park

TYPE NP

BIOTIC PROVINCE 4.6.5

LEGAL PROTECTION Total

DATE ESTABLISHED May 1973

GEOGRAPHICAL LOCATION Upper Shire River plain and east of the river, 140 km north of Limbe: S 14°50'; E 35°20'

ALTITUDE 472-961 metres

AREA 58,616 ha

LAND TENURE Government ownership

PHYSICAL FEATURES The Park is geographically well defined, being bounded on the west by the Shire River and Lake Malombe and on the other sides by hills and ridges. The topography is a gentle slope upward from the river, broken only by two isolated groups of hills. Mean annual temperature on the plain is 13°C, with extremes of 7°C and 39°C. Annual precipitation averages 650-1150 mm.

VEGETATION There is a series of seven main vegetation types up the gradually rising slopes of the Shire River, the most widespread of which is mopane woodland Colophospermum mopane. The shore of Lake Malombe and the margins of the Shire have typical riverine and floodplain vegetation, intergrading with small areas of gallery forest, palm savanna of Hyphaene ventricosa and woodland savanna.

NOTEWORTHY FAUNA Early reports suggested an abundance of game in what is now the Park area but this is now much reduced, although nearly all species are still present. Lion Panthera leo are seen occasionally and moderate numbers of leopard P. pardus, together with elephant Loxodonta africana, a fairly good population of hippo Hippopotamus amphibius, greater kudu Tragelaphus strepsiceros, buffalo Syncerus caffer, waterbuck Kobus ellipsiprymnus and sable antelope Hippotragus niger. The leopard is classified as a vulnerable species by the Red Data Book, while the crocodile Crocodylus niloticus, of which a few survive in the river, now rates as 'endangered'. Plans exist for reintroducing the race of wildebeeste Connochaetes taurina johnstonii, which once used to be found in Malawi. A preliminary bird check-list includes 207 species, many of them aquatic.

ZONING This has been applied on the basis of the five land use categories developed by the Canadian National Parks Service (see Area 2.1 for details).

DISTURBANCES OR DEFICIENCIES Originally the Park only included the east bank of the Shire River, open and vulnerable to insensitive use. Steps have been taken to extend the boundary to include the entire river. Periodic closure of the Liwonde Barrage, immediately downstream of the Park, floods substantial areas for varying periods; the ecological impact of this is not yet clear.

TOURISM There are plans to open the Park, to which the public is not yet admitted, in the 1977/1978 season, on a daytime visit only basis.
SCIENTIFIC RESEARCH  

The Liwonde Research Project was set up in 1974 by the staff of the University of Malawi. The aim is a detailed survey of the plants and animals with description of the population dynamics of major components. Plans exist for an eventual Ecological Research and Monitoring field station.

SPECIAL SCIENTIFIC FACILITIES  

None to date

PRINCIPAL REFERENCE MATERIAL


STAFF

10 full time and up to 30 labourers and artisans on a temporary basis

BUDGET

Equivalent of U.S. $ 41,000 allocated by the Government for the financial year 1976/77 to the development of the Park, together with a similar amount to cover recurrent expenditure.

LOCAL PARK ADMINISTRATION

Senior Game Warden, Liwonde National Park, Private Bag 18, Kasupe or Principal Game Warden, Dept. of National Parks and Wildlife, P.O. Box 30131, Capital City, Lilongwe 3.
MALAYSIA

AREA 366,700 sq. km

POPULATION 10,434,034 (1970 census)

PARKS AND RESERVES LEGISLATION State National Park Ordinances under which all the listed areas were established, are understood to be still in force.

PARKS AND RESERVES ADMINISTRATION Normally the responsibility of Boards of Trustees appointed under the relevant State Ordinance (e.g. Ord. No. 17 of 1954 in the case of Sarawak) and by the State Government, officials of which are usually the members.

ADDRESS No information

TOTAL AREA UNDER PROTECTION Very considerable areas are known to receive some degree of protection, including a number of game reserves in Malaya and ten 'national parks' in Sarawak, which were scheduled for establishment in the 1964/1968 Development Plan of that State. The total protected area in 1972 was of the order of 600,000 ha. However, no up to date information is available on several of the reserves, and the area of the parks and one reserve currently included in the U.N. List, plus an estimated 9 ha for the above water section of the three Turtle Island sanctuaries established in 1972, totals: 510,972 ha.

PROTECTED AREAS (mainly U.N. Listed)

2.1 Taman Negara National Park (Malaya) 429,312 ha
3.1 Kinabalu National Park (Sabah) 71,225 ha
5.1 Sungei Dusun Game Reserve (Malaya) 4,280 ha
5.2 Tunku Abdul Rahman National Park (Sabah) 3,596 ha
5.3 Bako National Park (Sabawak) 2,550 ha
7.1 Pulau Selingan Game and Bird Sanctuary (Sabah) with Pulau Gulisan and Pulau Bakkungsan Kechil 9 ha
<table>
<thead>
<tr>
<th>NAME</th>
<th>Kinabalu National Park (Sabah)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE</td>
<td>NP</td>
</tr>
<tr>
<td>BIOTIC PROVINCE</td>
<td>5.12.3</td>
</tr>
<tr>
<td>LEGAL PROTECTION</td>
<td>Total, except that the right to authorise prospecting for minerals is retained by the Government.</td>
</tr>
<tr>
<td>DATE ESTABLISHED</td>
<td>1964, under the National Parks Ordinance</td>
</tr>
<tr>
<td>GEOGRAPHICAL LOCATION</td>
<td>About 50 km ENE of the capital, Kota Kinabalu and overlooking the north-west coast: N 6°; E 116°40'</td>
</tr>
<tr>
<td>ALTITUDE</td>
<td>150–4101 metres (summit of Kinabalu)</td>
</tr>
<tr>
<td>AREA</td>
<td>71,225 ha</td>
</tr>
<tr>
<td>LAND TENURE</td>
<td>Held by Board of Trustees on a 999-year lease from the Sabah State Government.</td>
</tr>
<tr>
<td>PHYSICAL FEATURES</td>
<td>Kinabalu is a granitic plutonic extrusion which forced its way through the sandstone rocks of the Crocker range in the late Pliocene to early Pleistocene. Glaciation and violent erosion set in during the late Pleistocene. The terrain is rugged with steep-sided ridges. Rainfall at 1500 m averages 3175 mm and temperatures, which vary little through the year, average about 22°C by day and 14°C at night. Frost but not snow occurs in the summit area.</td>
</tr>
<tr>
<td>VEGETATION</td>
<td>In well marked zones: below 1200 m typical Malaysian dipterocarp forest predominates; from 1200 to 1800 m, mixed forest with some austral conifers and such genera as Agathis (kauri), Trigobalanus, Ilex, Eugenia, Tristania, Symplocos, Lithocarpus and Podocarpus and an understory of Rubus, Lauro-慈us, Nepentes etc.; from 1800 to 3000 m moss forest dominated by Podocarpus, Phylicladus, Primula, Leptospermum, Tristania, Eugenia and Schima, the ground cover by Ericaceous and Vaccinaceous species; and finally on the granitic slopes above 3000 m, alpines and herbs of which several are related to Chinese and Himalayan species, e.g. Photinia, Potentilla and Daphniphyllum spp., and others to Australasian species, e.g. Ranunculus, Patersonia and Euphrasia spp. and many ferns.</td>
</tr>
<tr>
<td>NOTEWORTHY FAUNA</td>
<td>Inaccessibility of much of the terrain and vegetation density makes the mammals difficult to see: squirrels and shrews are the most conspicuous; the presence of chevrotain or mouse deer Tragulus spp., barking deer Muntiacus sp. and Malay sambar Cervus equinus is confirmed by their tracks and that of Bornean wild pig Sus bampatus by the signs of its rooting. The orang utan Pongo pygmaeus, Sumatran rhinoceros Dicerorhinus sumatrensis and banteng Bos banteng have been recorded. The avifauna at all levels is remarkably rich in species.</td>
</tr>
<tr>
<td>ZONING</td>
<td>Under consideration, since increasing pressure from tourism makes it essential that areas are set aside for the purpose of containing possible future development of facilities.</td>
</tr>
<tr>
<td>DISTURBANCES OR DEFICIENCIES</td>
<td>Some small scale poaching still occurs but is not regarded as serious.</td>
</tr>
<tr>
<td>TOURISM</td>
<td>Numbers of visitors increased from 800 in 1965 to almost 9000 in 1971. Facilities include eight cabins, a 40-bed Youth Hostel and a camping ground. A number of mountain huts for climbers have also been established. In addition to the 8-mile trail to the mountain summit, there are about six miles of nature trails.</td>
</tr>
</tbody>
</table>

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SCIENTIFIC RESEARCH  The Sabah Forest Department and other scientific organizations in Malaysia have carried out various research programmes from time to time by arrangement with the Park authorities.

SPECIAL SCIENTIFIC FACILITIES  None

PRINCIPAL REFERENCE MATERIAL


STAFF  Park Warden, Assistant Park Warden, 2 Park Rangers, 12 Assistant Park Rangers, labour force of 20 on monthly and 25 on daily terms. There are also an administrative staff of six, three drivers and usually at least one voluntary service worker on attachment.

BUDGET  In 1971 the Government provided $ 600,000 (about U.S. $ 235,000).

LOCAL PARK ADMINISTRATION  National Park Board, P.O. Box 626, Kota Kinabalu, Sabah.
MALAYSIA

NAME Bako National Park (Sarawak)

TYPE NP

BIOTIC PROVINCE 5.12.3

LEGAL PROTECTION Total, except for rights to forest produce still exercised by one neighbouring village.

DATE ESTABLISHED 1957, under the National Parks Ordinance of 1956

GEOGRAPHICAL LOCATION Peninsula adjoining rivermouth about 20 km north-east of Kuching: N 1°30'; E 110°45'

ALTITUDE Sea level to 244 metres

AREA 2728 ha (formerly 2550)

LAND TENURE State ownership

PHYSICAL FEATURES About 30 km of coastline, indented by small sandy bays and often backed by steep cliffs, half encircling an area of hills. The underlying rock is a coarse-grained Tertiary sandstone, and the soils tend to be infertile or podsolic except where there are alluvial deposits.

VEGETATION A survey recognized some twenty-five vegetational types: there are some patches of dipterocarp forest, but most of the park is covered by dense 'kerenga' or 'padang'-type forest and there are also extensive areas of stunted scrub, in which insectivorous and myrmecophilous plants are abundant.

NOTEWORTHY FAUNA Proboscis monkeys Nasalis larvatus, which are endemic to Borneo, inhabit forest bordering the sea and the wild pig Sus barbatus, chevrotain Tragulus sp. and Malayan sambar Cervus equinus have increased under protection. Malaysian and plumbeous dolphins Sousa borneensis and plumbea have been reported off the coast. The birdlife is plentiful and includes such diverse species as white-bellied sea-eagle Haliaetus leucogaster, a local race of the goldenback woodpecker Dinopium javanense and the paradise flycatcher Terpsiphone sp.

ZONING None

DISTURBANCES OR DEFICIENCIES Cutting of firewood and poles by the local villagers in exercise of their traditional rights.

TOURISM Over 4000 people visited the Park for one or more days in 1972. Access is by boat which can be hired commercially or from the National Park Warden in Kuching and takes about an hour to reach the Park. Accommodation of various grades for up to about 90 persons is available in a rest-house and bungalows. A guidebook to the Park was first issued in 1965.

SCIENTIFIC RESEARCH The plant survey was carried out by the Curator of the Sarawak Museum and the Forest Department.

SPECIAL SCIENTIFIC FACILITIES None

PRINCIPAL REFERENCE MATERIAL None listed
STAFF  A Park Warden stationed in Kuching and two Park Rangers

BUDGET  M $ 25,000 (approximately U.S. $ 8500)

LOCAL PARK ADMINISTRATION  The Warden, Bako National Park, Forest Department Headquarters, Kuching, Sarawak.
NAME Pulau Selingaan Game and Bird Sanctuary (Sabah)

TYPE MR

BIOTIC PROVINCE 5.12.3

LEGAL PROTECTION One of three small island sanctuaries (the others being Pulau Gulisan and Pulau Bakkungaan Kechil) declared under Gazette Notification No. 26 of 27 July 1972. The decree includes regulations for the protection of natural resources, including total protection for turtles and birds. However, traditional fishing round the islands is permitted.

DATE ESTABLISHED 23 August 1972

GEOGRAPHICAL LOCATION About 36 km north of Sandakan, north-east Sabah, close to the sea frontier with the Philippines, which separates the rather larger islands of the Philippine sector of the Turtle Islands: N 6°11'; E 118°04'.

ALTITUDE Sea level to about 2 metres

AREA No information: presumably the land surface of the three islets totals no more than a few hectares, but it would be interesting to know the full extent of the underwater sectors protected.

LAND TENURE State ownership

PHYSICAL FEATURES The islet is 2 km and 3 km respectively from the two others also declared as sanctuaries, Gulisan and Bakkungaan Kechil. The highest of the islets, Bakkungaan, has eight still active mud volcanoes in the elevated portion which rises to about 5 m above the sea. Each is surrounded by a fringing coral reef which on the north side of the islets is fully exposed at low tide but only partially so on the south, where the beaches and inshore areas are sandy, the width of the beaches varying from 10 to 26 metres. The water is clear especially round Selingaan, where water visibility is sometimes as much as 10 metres.

VEGETATION Selingaan was planted up with coconut trees Cocos nucifera in the early 1900s. The underbrush is a mixture of Pemphis acidula (Lythraceae), the liane Allophylus cobbe (Sapindaceae), Neonauclea cryptopoides, the mangroves Lumnitzera littorea and Aegiceras corniculatum and patches of lalang or cogon grass Imperata cylindrica. Bakkungaan Kechil also has some screw-pines Pandanus along the eastern shore. Marine vegetation is known to include Sargassum cristocelium.

NOTEWORTHY FAUNA Skinks are common on Bakkungaan and resident birds in the islets include the white-bellied sea eagle Haliaeetus leucogaster and a kingfisher, presumably a Halcyon sp. Migrating birds are often seen between September and April in the northern winter. Bats are reported to be numerous. The most important animals are, however, the green turtle Chelonia mydas and the hawksbill Eretmochelys imbricata, which nest in varying numbers throughout the year along the sandy southern beaches, the hawksbill mainly on Gulisan islet; it was for them the sanctuaries were primarily created. The total breeding populations in 1970 were estimated as 1065 green and 15 hawksbill turtles. Black rats Rattus rattus have been accidentally introduced on Selingaan and Bakkungaan.

ZONING None

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DISTURBANCES OR DEFICIENCIES The threat of piracy in the Sulu Sea necessitates the stationing of small police detachments on Selingaan and Bakkungaan. Fishing trawlers are active in surrounding waters and occasional dynamiting of reefs still occurs with very adverse effects on turtles and other wildlife species. Week-end campers add their litter to the flotsam and jetsam washed ashore.

TOURISM The season for visits which can be arranged through a local tourist agent is May-October, permits being issued by the Chief Game Warden, Forest Department, Sandakan. There are no facilities at present but it is planned to provide them as soon as possible. Meanwhile boats may be anchored overnight, but camping is not allowed on Selingaan though permissible on the two other islands; lighting of fires and high-powered lamps are, however, prohibited on all three.

SCIENTIFIC RESEARCH Ecological studies of the breeding turtles. Turtle hatcheries have been in operation since 1966 and a turtle tagging programme was inaugurated in 1970.

SPECIAL SCIENTIFIC FACILITIES None

PRINCIPAL REFERENCE MATERIAL

STAFF Two Game Rangers, a boatman and 2 labourers on Selingaan, with an Assistant Game Ranger on Gulisan and a Game Ranger on Bakkungaan.

BUDGET Annual allocation by State of Sabah: no details available

LOCAL PARK ADMINISTRATION Assistant Chief Game Warden, Forest Department, P.O. Box 311, Sandakan, Sabah, East Malaysia.
MAURITIUS

AREA 1,843 sq. km (or 2,085 sq. km inclusive of dependencies)

POPULATION 868,000 (June 1976 estimate)

PARKS AND RESERVES LEGISLATION The Forest, Mountain and River Reserves Act, No. 18 of 1971, is now the basis, but all existing reserves were created under the Ancient Monuments Ordinance of 1944, Cap. 282 of the Laws, as from time to time amended.

PARKS AND RESERVES ADMINISTRATION Responsibility of the Forestry Service

ADDRESS Conservator of Forests, Forestry Service, Ministry of Agriculture, Natural Resources and the Environment, Curepipe, Mauritius.

TOTAL AREA UNDER PROTECTION 4,514 ha

PROTECTED AREAS

5.1 Macchabée/Bel Ombre Nature Reserves 3,594 ha
7.1 Round Island 160 ha

Unlisted: 13 Reserves.
MAURITIUS

NAME Macchabée/Bel Ombre Nature Reserves

TYPE MR

Biotic Province 4.12.3

Legal Protection Total

Date Established The six reserves which at present constitute the complex and
some of which are fairly widely separated from one another, together with the date
and Government Notice by which they were established are:

1) Macchabée/Mare Longue (G.N. 59 of 1951)
2) Petrin (G.N. 59 of 1951)
3) Ste Marie and Cocotte (G.N. 59 of 1951)
4) Bel Ombre (G.N. 59 of 1951)
5) Extension of Petrin (G.N. 661 of 1971)
6) Gorges and Plaine Champagne (G.N. 989 of 1974)

Geographical Location South-western uplands of the Island, centred on a point
about 10 km SSW of the urban complex of Curepipe: S 20°24'; E 57°30'.

Altitude 50-650 metres

Area 3594 ha

Land Tenure Public ownership

Physical Features The Reserves comprise parts of the south-western plateau, of
its steep slopes and escarpments, and of the rivers, lakes, craters and marshes
which dissect or are situated within it. The varied terrain results in an equally
wide variety of soil types, on which the vegetation and general appearance of the
area in turn depend, ranging from brown forest soils and alluvium to humic
ferruginous latosols and groundwater laterites or lateritic concretions.

Vegetation Dominant species on brown forest soils at medium altitudes are
Himinosus maxima and petiolaris (Sapotaceae), Labourdonnaisia spp. (also Sapotaceous)
and ebonies Diospyros spp. Sapotaceae (including the rare Calvaria major),
together with Myrtaceae and Rubiaceae (about one-third of them endemic to Mauritius)
also dominate the evergreen montane forest on the latosols. The lateritic areas
are covered by Philiopappus and Phylica heaths and the wetlands are characterized by
screw-pine Pandanus thicket or a mixed Stillingia (Euphorbiaceae) - Croton scrub.
The Reserves are noted for the large number of rare endemic shrubs, climbers and
herbaceous plants, for example Coffea mauritiana, Trochetia spp., orchids Angraecum
spp., the fern Blechnum attenuatum, agaves Cohnia spp., Bakarella hoyifolia
(Loranthaceae) and Clematia mauritiana.

Noteworthy Fauna One roost at least of the Mauritian flying-fox or fruit-bat
Pteropus nigro, classified as 'rare' in the Red Data Book, is to be found in the
Reserves. The crab-eating macaque Macaca fascicularis, the mongoose Herpestes
edwardsi, wild pig Sus scrofa and Timor deer Cervus timorensis have been introduced.
The woodlands and scrub still, however, constitute the habitat of some of the rarest
birds of the world, four of them, the Mauritius kestrel Falco punctatus, the pink
pigeon Nesoenas mayeri, the Mauritius parakeet Psittacula echo and the Mauritius
fody Foudia rubra being classified in the Red Data Book as 'endangered', one, the
Mascarene paradise flycatcher or coq de bois Terpsiphone bourbonnensis desolata, as
'rare' and two more, the Mauritius cuckoo-shrike or cuisiner Coracina typica
and the Mauritius or olive white-eye Zosterops chloronothos, as 'vulnerable'. Also of
interest are the Mauritius olive bulbul Hypsipetes borbonicus olivaceus and the
Mauritius manioc-bird or grey white-eye Zosterops borbonica mauritiana.

WDNP IUCN © 1977 (1)F Code: MAU(2).5.1
DISTURBANCES OR DEFICIENCIES  None reported, but a certain amount of disturbance from forestry operations on the periphery, human activities off recognized paths and routes and, not least, from the unavoidable impact of periodic cyclones, still occurs. However, the biggest threat to the wildlife of the Reserves is perhaps predation by the introduced and long established macaque *Macaca irus*.

TOURISM  The popularity of the Reserves with both residents of and visitors to Mauritius is increasing annually. Notice boards have been installed marking some of the boundaries where they cross the roads of access, the roads which are unmetalled are kept in reasonable condition and provided with 'lay-bys', and open shelters, with cement floors, tables and benches, have been erected at several of the outstandingly fine viewpoints.

SCIENTIFIC RESEARCH  Considerable attention has been paid to studies aimed at providing a scientific basis for the management and rehabilitation of rare and endangered species.

SPECIAL SCIENTIFIC FACILITIES  Aviaries for captive breeding of birds and bats, with accommodation and offices, are established nearby at Black River township.

PRINCIPAL REFERENCE MATERIAL


STAFF  About ten officers of the Forestry Service supervise or have other responsibilities in the Reserves.

BUDGET  No information

LOCAL PARK ADMINISTRATION  No information
MAURITIUS

NAME Round Island

TYPE NR BIOTIC PROVINCE 4.12.3

LEGAL PROTECTION Total

DATE ESTABLISHED 1957

GEOGRAPHICAL LOCATION About 24 km north-east of Cap Malheureux, the northernmost point of Mauritius: 19°51'S; 57°47'E

ALTITUDE Sea level to 300 metres

AREA 159 ha (elsewhere put at 151.4 ha)

LAND TENURE Public ownership

PHYSICAL FEATURES Part of a volcanic cone of which a kidney-shaped section remains above water. Most of the island is composed of volcanic tuff, weathered into curious horizontally ridged pillars and deep gullies. Blocks of basalt and deposits of coral detritus occur at various levels.

VEGETATION Greatly reduced by rabbits and goats (introduced in 1840). Thus of the indigenous palms Macaranga revaughanii and Dictyosperma album var. furfuraceum no more than a dozen specimens survive. Scattered Latania loddigesii and the screw-pine Pandanus vandermeerschi sometimes form small clumps and in a few places there is moderately dense ground cover of grasses, herbs and widespread ruderal species.

NOTEWORTHY FAUNA The island still provides a breeding place for fairly good populations of four species of seabirds, the wedge-tailed shearwater Puffinus pacificus, the Trinidad Petrel Pterodroma arminjoniana (elsewhere known to breed only on the Trindade/Martin Vaz Islands off the south-east coast of Brazil), the red-tailed tropic-bird Phaethon rubricauda and the white-tailed tropic-bird Phaethon lepturus. The island is also visited by migrant waders such as the turnstone Arenaria interpres and several species of tern feed close in to its shores. Reptile species constitute the most notable element of the fauna with no less than four species included in the Red Data Book - the Serpent Island gecko Cyrtodactylus serpensinsula, the Round Island day gecko Phelsuma guentheri, the Round Island or Telfair's skink Leiolopisma telfairii, the Round Island boa Bolyeria multicarinata and the keel-scaled boa Casarea dussumieri, the day gecko and skink classified as 'rare', the Serpent Island gecko and the two snakes as 'endangered' species. In addition, another gecko Phelsuma ornata and two more skinks Scelotes bojeri and Ablepharus boutonii are present in larger numbers.

ZONING None

DISTURBANCES OR DEFICIENCIES Due to physical conditions, wardening of the island is a difficult problem and a certain amount of poaching - mainly of petrel and tropic-bird chicks - and disturbances still occur. Some success has recently been achieved in eliminating goats and reducing the number of rabbits but extermination of the latter is still a priority. The solution of these problems once again depends on very substantial funds.
TOURISM  Due to the difficulty of effecting a landing except for the period September to mid-December, visitors to the island have been very limited in number; no water or shelter is available on the island, and the heat may be considerable. Landing or evacuation by helicopter has been effected occasionally but is expensive and a helicopter may not always be available. Nevertheless, the potential for a very unusual tourist attraction is there if and when adequate development funds can be provided.

SCIENTIFIC RESEARCH  Several studies of the fauna and flora by individual scientists.

SPECIAL SCIENTIFIC FACILITIES  None

PRINCIPAL REFERENCE MATERIAL


STAFF  The island is visited as often as possible by Forest Service officers.

BUDGET  Virtually nil

LOCAL PARK ADMINISTRATION  Enquiries to: Conservator of Forests, Forestry Service Headquarters, Curepipe, Mauritius.
MEXICO

AREA  1,972,546 sq. km

POPULATION  61,000,000 (1976 estimate)

PARKS AND RESERVES LEGISLATION  No information


ADDRESS  No information

TOTAL PROTECTED AREA  171,650 ha

PROTECTED AREAS

3.1 La Malinche National Park  45,711 ha
3.2 Iztaccihuatl-Popocateptl National Park  25,679 ha
4.1 Pico de Orizaba National Park  19,750 ha
4.2 Zoquiapan National Park  19,418 ha
4.3 Bosancheve National Park  15,000 ha
4.4 Cofre de Perote National Park  11,700 ha
4.5 Lagunas de Chacahua National Park  10,000 ha
4.6 Lagunas de Montebello National Park  6,002 ha
4.7 Constitucion de 1857 National Park  5,009 ha
5.1 Lagunas de Zempoala National Park  4,669 ha
5.2 Desierto de los Leones National Park  2,132 ha
5.3 El Chico National Park  1,835 ha
5.4 Insurgente Jose Maria Morelos y Pavon National Park  1,813 ha
5.5 Insurgente Miguel Hidalgo y Costilla National Park  1,760 ha
5.6 Grutas de Cacahuamilpa National Park  1,232 ha

7.1 Rancho Nuevo Reserve  140 ha
NAME Rancho Nuevo Reserve

TYPE MR-M

BIOTIC PROVINCE 1.11.4

LEGAL PROTECTION Marine turtles are protected during breeding season (April to July) each year. No picnicking and no beach access at this time unless valid reason can be given. Commercial and sport fishing permitted, provided no disturbance to the emerging turtles is caused.

DATE ESTABLISHED 1966 (on the advice of the Instituto Nacional de Pesca); but the area has not yet been declared as a National Park.

GEOGRAPHICAL LOCATION On the coast of Tamaulipas State, in the Aldama Municipio, about 100 km north of Tampico: N 23°; W 97°50'

ALTITUDE Sea level to 4 metres; water depth not specified

AREA Beach area: 140 ha

LAND TENURE Public ownership

PHYSICAL FEATURES Broad white sand beach with relatively small tides. There is a well-defined elevated and vegetated dune area bordering most of the beach; some sections of the beach are covered with pebbles and rocks, and those in which nesting of turtles often takes place are backed by extensive swampy areas or moderately large shallow lagoons with seasonal narrow connections with the ocean.

VEGETATION No details

NOTEWORTHY FAUNA The reserve exists for the protection of the Atlantic ridley turtle Lepidochelys kempi, classified as an 'endangered' species in the Red Data Book, for which this is the only known nesting place (apart from a few sporadic records). The other marine fauna includes red snapper Lutjanus aya, silver mullet Mugil cephalus, blue crab Callinectes sapidus, shrimps Penaeus sp., oyster Crassostrea virginica and cephalopods.

ZONING None

DISTURBANCES OR DEFICIENCIES Occasional disturbance of the turtles and their eggs presumably still continues since regular patrols have to be maintained to ensure that persons carrying baskets, bags and knives are prevented from reaching the beach. As recently as 1970, a contract for killing nesting ridleys for their skins was given but fortunately did not coincide with a major arribada or emergence of turtles from the sea.

TOURISM None: no camping facilities exist, but a few deer-hunters visit the hinterland during the hunting season.

SCIENTIFIC RESEARCH A marine biologist from the Instituto Nacional de Pesca responsible for turtle protection, assisted by an Inspector from the Subsecretaria de Pesca, monitors the turtle population and manages a well protected hatchery.

SPECIAL SCIENTIFIC FACILITIES Centro de Promoción Pesquera de Tampico, Tamaulipas State and the Instituto Nacional de Pesca, Mexico City, provide facilities for management research in the reserve.
PRINCIPAL REFERENCE MATERIAL


STAFF Based at Rancho Nuevo: includes a Marine Biologist and Inspector; the Secretaria de Marina at Tampico supplies a ranger and naval personnel for patrols.

BUDGET Not yet defined

LOCAL PARK ADMINISTRATION Instituto Nacional de Pesca, Av. Cuauhtemoc 80, 6 piso, Mexico (?), D.F.
NEPAL

AREA 140,797 sq. km

POPULATION 11,289,000 (1971 census)

PARKS AND RESERVES LEGISLATION A National Parks and Wildlife Protection Act appears to have replaced the Wild Animals (Protection) Act not long before 1973, when the first National Park was established under the new Act. Previously, national park status for any 'wildlife sanctuary' duly gazetted under the old Act required separate legislation to be enacted in each case.

PARKS AND RESERVES ADMINISTRATION Responsibility of the Forest Department, which appoints a Chief Game Warden to be in charge of the day to day maintenance and running of the protected areas.


TOTAL AREA UNDER PROTECTION No information has been received about the status of some areas known to be protected and only one area is currently included in the U.N. List. The list which follows must therefore be regarded as somewhat provisional. It totals: 107,498 hectares.

PROTECTED AREAS

3.1 Royal Chitwan National Park 54,500 ha
3.2 Royal Karnali Wildlife Reserve 34,800 ha
4.1 Sukla Phanta Sanctuary 12,500 ha
5.1 Tappu Sanctuary 5,698 ha
NAME Royal Chitwan National Park

TYPE NP

BIOTIC PROVINCE 5.6.4

LEGAL PROTECTION Protected as National Park and all forms of exploitation prohibited, except controlled and supervised thatch grass gathering.

DATE ESTABLISHED 20 September 1973, under the National Parks and Wildlife Protection Act.

GEOREGRAPHICAL LOCATION In the Terai zone at about the halfway point of Nepal's southern border and 115 km WSW of Kathmandu: N 27°03'; E 84°20'

ALTITUDE 130-700 metres

AREA 54,500 ha

LAND TENURE Government ownership

PHYSICAL FEATURES Part of the valleys of the Narayani and Rapti rivers, near their junction and upstream of the Gandak dam, where a number of forested islands have been created along the course of the Narayani by the impoundment. Extensive alluvial plains bordering the rivers merge into the wooded slopes at the western end of the Sumesar hills which are an isolated central section of the Churia ranges along the southern flank of the Himalayan foothills. They are geologically composed of a late Tertiary complex of sandstones, shales, conglomerates and quartzites. Annual rainfall is around 2156 mm, of which 90% comes during the monsoon months of May to September.

VEGETATION Riverine grasslands occupy about 19% of the Park and are dominated by wild sugar Saccharum, reed Phragmites and oat grass Themeda, in places forming dense stands as much as 6 m high. Another 63% consists of fairly open deciduous forest in which sal Shorea robusta, Terminalia, dhok Anogeissus, Dillenia, Bauhinia and Dalbergia are prominent species. Riverine forest accounts for a further 6-7% of the area and comprises a number of successional stages of development towards deciduous forest: among the main species are Acacia catechu, shisham Dalbergia sissoo and in the later stages of succession the silk cotton tree Bombax malabaricum. There is also a small area, perhaps around 2% of the Park, with a mixed forest of the Indian pine Pinus roxburghii and Shorea.

NOTEWORTHY FAUNA Mammals include occasionally sighted Gangetic dolphins Platanista gangetica, fairly common sloth bears Melursus ursinus (a species classified in the Red Data Book as of 'indeterminate' status), about 20-25 tigers Panthera tigris (an 'endangered' species) and leopard P. pardinus (rated as 'vulnerable'), some 200-250 great Indian rhinoceros Rhinoceros unicornis (another 'endangered' species) and one of those which the Park was particularly designed to protect), plentiful wild boar Sus scrofa and good populations of barking deer Muntiacus muntjak, cheetal Axis axis, hog deer A. porcinus and sambar Cervus unicolor. Small numbers of gaur Bos gaurus (another 'vulnerable' species) are also present. Birds include numbers of peacock Pavo cristatus, reptiles the mugger Crocodylus palustris, gharial Gavialis gangeticus and python Python molurus, the two crocodilians rated as 'endangered' species and the snake as 'vulnerable'.

ZONING None
DISTURBANCES OR DEFICIENCIES  Uncontrolled grass burning encroaches into the Park as to a small extent do cattle. Unauthorised fishing in the rivers bordering the Park is difficult to control.

TOURISM  A successful tourist lodge is operated by concessionaires and is situated inside the Park. Jungle tours on elephant-back are organized for visitors.

SCIENTIFIC RESEARCH  Detailed ecological studies of the rhinoceros and the tiger are being undertaken.

SPECIAL SCIENTIFIC FACILITIES  A research unit is planned for the future.

PRINCIPAL REFERENCE MATERIAL


STAFF  In 1975 the full-time guard force was 80, under direction of Park Warden. It was due to be increased to 130 and this may now have been achieved.

BUDGET  Equivalent of U.S. $100,000 provided annually by the National Government.

NAME Royal Karnali Wildlife Reserve

TYPE MR BIOTIC PROVINCE 5.6.4

LEGAL PROTECTION Fully protected but local people permitted to fish and to collect thatch grass and herbs. No hunting permitted.

DATE ESTABLISHED Legally gazetted as wildlife reserve on 8 March 1976. Formerly declared as hunting reserve (July 1969).

GEOGRAPHICAL LOCATION Western Nepal, near Gaidakanda, to the east of the Karnali River: N 28°35'; E 81°20'

ALTITUDE 150-1220 metres

AREA 34,800 ha

LAND TENURE Government ownership

PHYSICAL FEATURES About two-thirds of the Reserve consists of fairly flat alluvial land below 300 m, but the remainder flanks the first great ridge of the Himalayas, the Churia (Sivalik) range, which rises steeply to over 1200 m and is composed of tertiary rocks. The eastern branch of the Karnali River, a tributary of the Gaghara or Gogra, forms the north-western boundary of the Reserve and includes several forested islands. Climate is of a monsoon type with a summer rainfall of over 1500 mm. Temperatures range from 10°C in December to 40°C in May.

VEGETATION Three quarters of the Reserve is covered by sal Shorea robusta forest, which is seasonally deciduous (1.1.3) and in places is mixed with Terminalia spp. Small stretches of evergreen gallery forest (1.1.1.5) are composed mainly of Acacia catechu, sisham Dalbergia sissoo and simul Bombax malabaricum. Other plant associations of the Reserve include tall grass savanna woodland (5.1.1.1), short grass tree savanna (5.1.2.1) and groundwater savanna (5.1.1.5). Grassland areas are dominated by Saccharum spontaneum, Imperata cylindrica, Cynodon dactylon and the monotypic tiger-grass Thysanolaena sp.

NOTeworthy fauna Mammals include the Gangetic dolphin Platanista gangetica, sloth bear Melursus ursinus, tiger Panthera tigris tigris (perhaps 15-20 individuals), leopard P. pardus (not less than 12 individuals), elephant Elephas maximus (less than 12 wild elephant visit the Reserve seasonally), barking deer Muntiacus muntjak, spotted deer Axis axis, hog deer A. porcinus, swamp deer Cervus d. duvaucelii (12-15 of the typical race probably visit the Reserve from west of the Karnali), sambar C. unicolor and nilgai Boselaphus tragocamelus. Reptiles include the mugger Crocodylus palustris palustris and the gharial Gavialis gangeticus (in small numbers on the Karnali and the upper reaches of the Babai River, which joins the Karnali south of the Indian border). Many of these species have a place in the Red Data Books, the tiger, swamp deer, crocodile and gharial being classified as 'endangered', the leopard and elephant as vulnerable' and the sloth bear as 'indeterminate'.

ZONING An area of some 700 ha is to be set aside as strict nature reserve; the remainder will be a managed natural zone.
DISTURBANCES OR DEFICIENCIES  Local fishermen and others wreak havoc on nesting gharial and mugger. There is a grave threat of further major dam construction on the Karnali River which could have a very adverse effect, as would the construction of a proposed highway through the Reserve. Feasibility studies for the dam have already done some harm to the nesting of gharial.

TOURISM  None at present but will be encouraged when access is improved.

SCIENTIFIC RESEARCH  A Peace Corps volunteer ecologist has been undertaking general ecological research for management purposes.

SPECIAL SCIENTIFIC FACILITIES  None

PRINCIPAL REFERENCE MATERIAL

STAFF  Civilian warden, assistant warden and 12 administrative and field staff. There is a guard force of 46 soldiers.

BUDGET  Nepal rupees 314,374 (U.S. $25,250)

NICARAGUA

AREA  148,005 sq. km

POPULATION  2,400,000 (1976 estimate)

PARKS AND RESERVES LEGISLATION  No information has yet been supplied about the legal basis of the Decrees under which National Parks have been established, the first of which was reported to have been made in 1941, for a small park known as the Las Piedrecitas National Park.

PARKS AND RESERVES ADMINISTRATION  None at present exists but it is reported that a Government agency is to be created in the fairly near future for the purpose of managing the country's natural resources and that this will include provision for park and reserve administration.

ADDRESS  No information

TOTAL AREA UNDER PROTECTION  Apart from the small 100 hectare park mentioned above under Legislation, the continued existence of which has not been confirmed, only the area listed below is known to be officially established, though an additional park near Masaya, about 35 km south-east of Managua, is known to be under consideration.

PROTECTED AREA

<table>
<thead>
<tr>
<th>Area ID</th>
<th>Name</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1</td>
<td>Saslaya National Park</td>
<td>11,800</td>
</tr>
</tbody>
</table>
NICARAGUA

NAME Saslaya National Park

TYPE NP

BIOTIC PROVINCE 3.8.1

LEGAL PROTECTION Protection afforded by national park status is said to have support of the local inhabitants. Hunting, fishing, cutting of forest and farming within the area are prohibited.

DATE ESTABLISHED 27 March 1971, by Decree No. 1789

GEOGRAPHICAL LOCATION About 75 km south-west of Bonanza and 34 km west of Siuna in the hinterland of the Department of Zelaya: N 13°45'; W 83°00'

ALTITUDE 200-1650 metres

AREA 11,800 ha

LAND TENURE Government ownership

PHYSICAL FEATURES A complex of old volcanic peaks of which the highest, Cerro Saslaya (1994 m), dominates the centre of the park; the other peaks within the Park boundary, ranging in height from 1150 to 1350 m, are named El Inocente, Alboní, Garrapata, El Toro, La Pimienta and El Hormiguero. Numerous small streams cascade from the mountains into the Rio Wani, which bounds the park on the north and is an upper tributary of the R Prinzapolka. The climate is very wet and hot, hence the dense tropical rain forest clothing much of the area.

VEGETATION Lowland tropical rainforest gives way at higher elevations to cloud forest and, in the summit areas, elfin cloud forest, which have never been disturbed or exploited. An inventory of the flora is in progress, but no details are yet available, though Tecoma sp. and other Bignoneous climbers are almost sure to be present.

NOTEWORTHY FAUNA Due to habitat diversity there is a rich fauna, the mammals including the howler monkey Alouatta villosa, white-throated capuchin Cebus capucinus, Central American spider-monkey Ateles geoffroyi, giant anteater Myrmecophaga tridactyla, ocelot Felis pardalis, jaguar Panthera onca, Central American tapir Tapirus bairdi, white-lipped peccary Tayassu albirostris, whitetail deer Odocoileus virginianus and red brocket Mazama americana. Among the many interesting birds are great tinamou Tinamus major, green and scarlet macaws Ara ambigu and macao, parrots Amazona spp., the quetzal Pharomacrus mocinno, keel-billed toucan Ramphastos sulfuratus and three-wattled bell-bird Procnias tricarunculata.

ZONING None

DISTURBANCES OR DEFICIENCIES Hitherto almost none, but with the increase of population and a steady movement from west to east farmers practising swidden or shifting cultivation are beginning to enter the lowlands bordering the Park and unless it is properly managed and protected they are likely to trespass over its boundaries within the not distant future.
TOURISM  None as yet, since the Park is only accessible on foot, a two-day walk from the nearest town and roadhead (Siuna). The link road from the Pan-American highway to the east coast at Puerto Cabezas, which is at present under construction, will pass by the southern end of the Park and open up the possibility of developing tourism in the region.

SCIENTIFIC RESEARCH  None to date

SPECIAL SCIENTIFIC FACILITIES  None

PRINCIPAL REFERENCE MATERIAL  None

STAFF  None yet appointed. A local National Park Committee in Siuna is keeping an eye on the area on a voluntary basis. A national agency, IRENA (Instituto de Recursos Naturales) is being set up and will take over parks administration.

BUDGET  None

LOCAL PARK ADMINISTRATION  None except for the local Committee.
NIGER

AREA 1,188,805 sq. km

POPULATION 4,030,000 (U.N. estimate 1972)

PARKS AND RESERVES LEGISLATION No information

PARKS AND RESERVES ADMINISTRATION Vested in the Administration des Eaux et Forêts, which is within the Ministère de l'Economie Rurale et du Climat. At national level, the central directorate is helped by four subsections, of which two are concerned with faunal matters: the Section Développement et Vulgarisation, divided into forestry and hunting/fishing subsections, and the Section Protection de la Nature et du Contentieux. These are represented at regional levels by various departmental and District services and by Forest department stations. The Secteur Chasse et Pêche is responsible for conservation, management and administration of existing reserves and creating and managing new reserves. The Section Protection de la Nature et du Contentieux is responsible for research and guarding against infractions of Reserve legislation as well as for welfare and protection of staff.

ADDRESS Ministère de l'Economie Rurale et du Climat, Niamey

TOTAL AREA UNDER PROTECTION 859,015 ha (present National Parks and Reserves). A further 2,020,000 ha of protected areas are at the planning stage and, in addition, 205,308,49 ha are protected as Forest Reserves.

PROTECTED AREAS

2.1 W National Park 334,375 ha
2.2 Partial Faunal Reserve adjacent to W National Park 306,000 ha
2.3 Tamou Strict Nature Reserve 142,640 ha
3.1 Gadabegi Fauna Reserve 76,000 ha
NIGER

NAME    "W" National Park
TYPE  NP
Biotic Province  4.6.1

Legal Protection  Total

Date Established  Originally classified as faunal reserve and state forest in 1953; declared as National Park in 1954.

Geographical Location  About 125 km SSE of Niamey, on the right bank of the River Niger and extending to the point where the frontiers of Niger, Upper Volta and Dahomey intersect: N 11°55'-12°35'; E 2°5'-2°50'

Altitude  Mean height of 250 metres

Area  334,375 ha

Land Tenure  State ownership

Physical Features  The Park takes its name from the double bend of the Niger between the points where two tributaries from the west, the Tapoa and the Mekrou, flow into it. The valleys of both tributaries are deeply incised and, together with the Barou rapids, are the principal scenic attractions. Geologically the Park consists of a lateritic peneplain at a ruling level of 250 m, deeply dissected by the drainage lines. Climatically it is typically sahelio-soudanian: the temperature ranges from 36.1°C max. to 21.6°C min. and the annual rainfall, although averaging between 800 and 900 mm, is very unreliable.

Vegetation  Secondary forest occupies 70% of the Park, composed of a mixture of grassland and rather stunted savannah woodland composed of such species as Celtis integrifolia, Boscia senegalensis, Balanites aegyptiaca, Parkia biglobosa, Diospyros mespiliformis, Bauhinia reticulata, Adansonia digitata, Tamarindus indica, Terminalia ivonnicoides, Combretum spp. and Lannea spp. Many of these species are also present in the gallery forests, which occupy much of the remaining 30% of the area and which do also have good stands of Cola laurifolia and Kigelia aethiopica.

Noteeworthy Fauna  Larger mammals include spotted hyaena Crocuta crocuta, striped hyaena Hyaena hyaena, serval Felis serval, caracal lynx Felis caracal, lion Panthera leo, two species classified as 'vulnerable' in the Red Data Book, leopard Panthera pardus and cheetah Acinonyx jubatus, elephant Loxodonta africana, hippo Hippopotamus amphibius, buffalo Syncerus caffer, grey duiker Sylvicapra grimmia, Defassa waterbuck Kobus defassa, roan antelope Hippotragus equinus, topi Damaliscus korrigum and dama gazelle Gazella dama. The avifauna is very varied and abundant. There are still some crocodiles in the river.

Zoning  None

Disturbances or Deficiencies  Poaching, illegal grazing, bush fires and cultivation within the Park still occur.

Tourism  The tourist season is from 1 December to 30 June and brings in between 1.2 to 1.5 million CFA Francs annually. In 1971 facilities included a 32-bed rest camp near the Tapoa river, in the north-west of the Park. 226 km of motorable tracks and a light aircraft landing strip.
SCIENTIFIC RESEARCH  None

SPECIAL SCIENTIFIC FACILITIES  None

PRINCIPAL REFERENCE MATERIAL  None listed

STAFF  An officer in charge, 4 game guards, a tracker and a driver. Two peace corps volunteers have been posted to the Park from time to time.

BUDGET  2,850,000 CFA Francs annually for maintenance of tourist roads and buildings (equivalent to about U.S. $12,000).

LOCAL PARK ADMINISTRATION  No details, but information obtainable from the Service des Eaux & Forêts & Chasse, Ministère de l'Economie Rurale et du Climat, Niamey.
NAME Tamou Strict Nature Reserve

TYPE MR

BIOTIC PROVINCE 4.6.1

LEGAL PROTECTION Total, but still some areas of settlement and cultivation within the reserve boundaries.

DATE ESTABLISHED 8 August 1962, under Order No. 62-188/MER

GEOGRAPHICAL LOCATION About 100 km from Niamey, to the immediate north of the 'W' National Park and west of the River Niger: N 12°30'-12°55'; E 2°10'-2°30'

ALTITUDE Averaging about 240 metres

AREA 142,640 ha

LAND TENURE State ownership

PHYSICAL FEATURES Like the nearby 'W' National Park, the reserve is geologically part of a lateritic peneplain which has been deeply incised by watercourses. Climatically it is of a sahelo-sudan type with a temperature range of 21°C to 36°C and rainfall averaging 800-900 mm but very variable.

VEGETATION Savanna woodland largely created by the practice of shifting cultivation. Species present are similar to those of the 'W' National Park and include Balanites aegyptiaca, Adansonia digitata, Parkia biglobosa, Bauhinia reticulata, Terminalia sp., Combretum sp., and Lannea sp. Gallery forests extend along the watercourses.

NOTEWORTHY FAUNA Broadly similar to that of the 'W' National Park. This reserve covers part of the regular seasonal movements of several of the Park species such as lion Panthera leo, elephant Loxodonta africana, buffalo Syncerus caffer, roan Hippotragus equinus, topi Damallcus korrigum and gazelle Gazella dama. Among the birds recorded are white pelican Pelecanus onocrotalus, egrets Egretta spp., saddle-bill stork Ephippiorhynchus senegalensis, marabou stork Leptoptilos crumeniferus and secretary bird Sagittarius serpentarius.

ZONING None

DISTURBANCES OR DEFICIENCIES There are still some homesteads and areas of cultivation inside the reserve, and as a result a good deal of illegal grazing, burning and intensive poaching. Prospecting for phosphates has also been authorised and was in active progress in 1975.

TOURISM None

SCIENTIFIC RESEARCH None

SPECIAL SCIENTIFIC FACILITIES None

PRINCIPAL REFERENCE MATERIAL None listed

STAFF Officer in Charge, from the department of Eaux et Forêts; also one forest guard.

WDNP IUCN © 1977 (1)F Code: NIG(1).2.3
BUDGET Combined with that of the "W" National Park; totals 2,850,000 CFA Francs (about U.S. $12,000 annually).

LOCAL PARK ADMINISTRATION No details, but information obtainable from the Service des Eaux & Forêts & Chasse, Ministère de l'Economie Rurale et du Climat, Niamey.
**NORWAY**

**AREA** 323,877 sq. km

**POPULATION** 3,972,990 (December 1973 estimate)

**PARKS AND RESERVES LEGISLATION** No recent information but according to the Second Edition of the U.N. List of National Parks and Equivalent Reserves (1971) the legal basis is a law enacted on 1 December 1954.

**PARKS AND RESERVES ADMINISTRATION** No information, but according to the source quoted above, administration is the responsibility of the State Forest Department, with which the Naturvernradet (Nature Protection Council) and the Statens naturverninspektør are in consultative relationship.

**ADDRESS** Miljøverndepartementet, Avdelingen for naturvern og friluftsliv, Oslo-Dep, Oslo-1.

**TOTAL AREA UNDER PROTECTION** U.N. Listed areas (below) total 3,556,200 ha

**PROTECTED AREAS**

<table>
<thead>
<tr>
<th>No.</th>
<th>Name of Area</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Northeast Svalbard Nature Reserve</td>
<td>ca. 1,555,000 ha</td>
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<tr>
<td>1.2</td>
<td>Southeast Svalbard National Park</td>
<td>ca. 645,000 ha</td>
</tr>
<tr>
<td>2.1</td>
<td>South Spitzbergen National Park</td>
<td>ca. 467,300 ha</td>
</tr>
<tr>
<td>2.2</td>
<td>Northwest Spitzbergen National Park</td>
<td>ca. 328,300 ha</td>
</tr>
<tr>
<td>2.3</td>
<td>Anarjokka National Park</td>
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<tr>
<td>2.4</td>
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<td>3.1</td>
<td>Øvre Dividal National Park</td>
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<tr>
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<td>Rondane National Park</td>
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<td>3.3</td>
<td>Prins Karl's Forland National Park</td>
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<td>3.4</td>
<td>Femundsmarka National Park</td>
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<td>4.5</td>
<td>Øvre Pasvik National Park</td>
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<tr>
<td>5.1</td>
<td>Gutulia National Park</td>
<td>1,900 ha</td>
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</tbody>
</table>
NORTH-EAST SVALBARD

**NAME** Northeast Svalbard Nature Reserve

**TYPE** NP

**BIOTIC PROVINCE** 2.1.1

**LEGAL PROTECTION** Declared as Nature Reserve

**DATE ESTABLISHED** 1 June 1973, by Royal Decree

**GEOGRAPHICAL LOCATION** North-eastern Svalbard between N 78°40'–80°50'; E 16°–35°

**ALTITUDE** Sea level to 835 metres

**AREA** Ca. 1,555,000 ha

**LAND TENURE** Owned by the Norwegian government

**PHYSICAL FEATURES** The Reserve includes north-east Spitzbergen, the whole of Nordaustlandet, Kvitøya, Kong Karls Land, the smaller islands within this general area and all the surrounding territorial waters. Approximately 80% of the surface of the biggest unit, Nordaustlandet, is icecap or glaciers. Geologically, the Reserve is of sedimentary rocks such as shales, tillites, limestones, sandstones and siltstones, and of metamorphic rocks such as granites, gneisses and volcanics. High arctic climate with annual precipitation of not more than 400 mm.

**VEGETATION** Typical of high arctic tundra; 83 vascular species (approximately 50% of the total flora) have been identified on Nordaustlandet, constituting a mixture of shoreline communities, marsh and aquatic communities, vegetation on moving soil, and cliff and tundra communities. Nothing is yet recorded about the composition of the marine flora.

**NOTEWORTHY FAUNA** Mammals regularly found within the Reserve include arctic fox Alopex lagopus, polar bear Ursus maritimus (classified as a 'vulnerable' species in the Red Data Book), for which this is the main denning area in the archipelago, walrus Odobenus rosmarus, ringed seal Phoca hispida and bearded seal Erignathus barbatus. The Reserve is one of the more important breeding places of the walrus, the population being estimated at 300-400 (1973/74). The local subspecies of reindeer Rangifer tarandus spectbergensis meets with more extreme conditions in the Reserve than anywhere else in the archipelago. Seventeen bird species breed regularly, the most numerous of which are Brünnich's guillemot Uria lomvia, nesting in one of the largest seabird colonies in the islands.

**ZONING** None

**DISTURBANCES OR DEFICIENCIES** None reported

**TOURISM** None

**SCIENTIFIC RESEARCH** Geological, glaciological, botanical and zoological studies, mainly during summer, but also during winter expeditions.

**SPECIAL SCIENTIFIC FACILITIES** None at present (one winter station was in operation during the International Geophysical Year).

**PRINCIPAL REFERENCE MATERIAL** Publications of the Norsk Polarinstitutt, Rolfstangveien, 1330 Oslo Lufthavn.
STAFF  None, but supervision of the Reserve at local government level is vested in the Sysselmannen på Svalbard, 9170 Longyearbyen, Svalbard.

BUDGET  No information

LOCAL PARK ADMINISTRATION  Enquiries to: International Division, Ministry of the Environment, Myntgaten 2, Oslo-Dep., Oslo 1.
PAKISTAN

AREA  803,940 sq. km

POPULATION  72,400,000 (mid-1976 estimate)

PARKS AND RESERVES LEGISLATION  No information has been received as to the extent, if any, to which the Forest Act of 1927 and the Wild Birds and Animals Protection Act of 1912 still form the legal basis of national parks and other protected areas. The two National Parks established under that legislation and included in the U.N. List were situated in what became Bangladesh in April 1972. By that date National Parks had also been set up in present day Pakistan, but no details have been received of their current status and they have not so far been included in the U.N. List. The only U.N. Listed area, of which an account follows, appears to have been promulgated at provincial level by a new combined Wildlife and Forest Department, which suggests that its legal basis may also be a new Act.

PARKS AND RESERVES ADMINISTRATION  Presumed to be the responsibility of the Wildlife and Forest Department concerned.

ADDRESS  No information received concerning the Central Government office responsible for coordinating the Parks and Reserves system.

TOTAL AREA UNDER PROTECTION  Protected areas prior to 1972 included three national parks and one effective private Reserve, created under the auspices of the World Wildlife Fund by the Nawab of Kalabagh, with a total area of 12,110 hectares. If these still exist the addition of the U.N. Listed area specified below would bring the total area under protection to: 320,843 hectares.

PROTECTED AREA (U.N. List)

2.1 Kirthar National Park (Sind)  308,733 ha
Kirthar National Park (Sind)

**Legal Protection**
Total

**Date Established**
31 January, 1974: Wildlife and Forest Department Notification No. WML67T(SOL)-DCF-933/74

**Geographical Location**
Part of the Kirthar Range, 50 km NNE of Karachi and just inside the Sind border; N 25°10' -26°05'; E 67°10' -67°55'

**Altitude**
70-1004 metres

**Area**
308,733 ha

**Physical Features**
A series of ridges running north to south, separated by relatively wide undulating valleys. The lowest point, the Hab Dam on the river of that name, is in the south-west corner of the Park, the highest is Karchat mountain. Geologically the area forms part of the Gaj, Nari, Brahui and Ranikot series, some of which have rich fossil deposits of foraminifera, molluscs and echinoids. The climate is arid with a low rainfall of 76-132 mm varying considerably from year to year. Temperatures tend to be rather extreme, very hot in summer, cold and very windy in winter.

**Vegetation**
Mainly open communities of deciduous xerophytic trees and shrubs. Deeper soils are normally occupied by climax or near climax communities. Dominants on deep sandy soils with weak structure and low surface content of calcium, magnesium and carbonates are a thorny Capparis decidua-Prosopis spicigera association and Commiphora mukul. On seasonally flooded areas a post-climax closed community of Acacia arabica-Indigofera oblongifolia and Zizyphus nummularia is found. Shallow loamy soils have a subclimax of Euphorbia caudicifolia-Grawia tenax and Acacia senegal. Deep rooted trees such as Acacia jacquemontii and Gymnosporia montana may grow even during the dry season when other species are dormant.

**Noteworthy Fauna**
A good range of predators is present, but larger species such as wolf Canis lupus pallipes and leopard Panthera pardus (both classified as vulnerable in the Red Data Book) are scarce. Relatively low numbers of gazelle Gazella gazella are present on the plains and hills flanking the Park. The most common larger mammal is the Sind wild goat Capra hircus blycht, of which around 500 occur on Karchat mountain. The main groups, totalling about 70 animals, of Urial or Sind sheep Ovis orientalis blandfordi occur on the Murri Mongar ridge as well as on Karchat and one or two other peaks. Birds include many raptors, such as bearded vulture Gyps cinerascens, long-legged buzzard Buteo rufinus, imperial eagle Aquila heliaca, tawny eagle A. rapax, Bonelli’s eagle Hieraaetus fasciatus and laggar falcon Falco jugger. Game birds include see-see Ammoperdix griseogularis, Alectoris chukar, grey partridge Francolinus pondicerianus and houbara bustard Chlamydotis undulata. Reptiles include the desert monitor Varanus griseus, barred monitor V. flavescens and Python molurus, the last being rated as 'vulnerable' in the Red Data Book and the first included in Appendix I of the Convention on International Trade in Endangered Species.
ZONING Five zones have been declared: (1) Intensive Use zone with development; (2) Moderate Use zone, mainly the Murri Mongthar Ridge; (3) Wilderness zone, most of the plains and valleys of the Park; (4) Nature Reserves, all mountains except the Murri Mongthar; and (5) Historic and Natural Features which includes Ranikot fortress, the tombs at Taung and geological sites.

DISTURBANCES OR DEFICIENCIES None

TOURISM Divided into zones on which development will be based.

SCIENTIFIC RESEARCH Studies by Dr. G.B. Schaller on the Sind Ibex since 1972. Ecological studies of this species are expected to be continued.

SPECIAL SCIENTIFIC FACILITIES Said to be available but no details supplied.

PRINCIPAL REFERENCE MATERIAL


STAFF Total 61 (Director, 2 Rangers and 4 Assistant Rangers, Game Inspector and 53 game watchers). There are also two honorary appointments.

BUDGET Equivalent of about U.S. $81,000 (July 1974-June 1975) provided by the provincial government of Sind province.

LOCAL PARK ADMINISTRATION Sind Wildlife Management Board, Wildlife and Forest Department, Government of Sind.
PAPUA NEW GUINEA

AREA 461,692 sq. km

POPULATION 2,635,810 (1973 estimate)

PARKS AND RESERVES LEGISLATION The National Parks and Gardens Ordinance of 11 July 1966 established the National Parks and Gardens Board. Later amendments on 24 June and 3 December 1971, altered the name to National Parks Ordinance (and National Parks Board) and gave the Board more specific functions and powers. Areas reserved under the Land Ordinance are placed under the care, control and management of the Board. The Board has the power to investigate new areas for parks, to promote the concept of national parks and the conservation of national resources, to cooperate with other nature conservation organizations and to preserve and protect features of natural interest or beauty.

PARKS AND RESERVES ADMINISTRATION The National Parks Board, through an Executive Director, has ultimate authority for management of national parks and similar areas under its control.

ADDRESS Papua New Guinea National Parks Board, P.O. Box 5749, Boroko.

TOTAL AREA UNDER PROTECTION 3139 ha

PROTECTED AREAS

5.1 McAdarn National Park 2076 ha
5.2 Varirata National Park 1063 ha
NAME McAdam National Park

TYPE NP

BIOTIC PROVINCE 6.12.2

LEGAL PROTECTION Total

DATE ESTABLISHED 22 February 1962, by Proclamation in Government Gazette No. 9

GEOGRAPHICAL LOCATION New Guinea lower highlands, between Wau and Bulolo, Morobe District: S 7°15'-7°19'; E 146°39'-146°42'

ALTITUDE 670-1980 metres

AREA 2076 ha

LAND TENURE Government expropriated land by law

PHYSICAL FEATURES Landscape deeply dissected by fast running streams and fronting on the Bulolo River gorge. Mesozoic metamorphic rocks intruded by Pliocene porphyry and unconformably overlain by agglomerates and crystal tuffs. Mean annual rainfall of 2200 mm falling mainly between November and May.

VEGETATION Climax forest dominated on lower slopes by hoop pine Araucaria cunninghamii and klinki pine A. hunsteinii. Lowland rainforest extends to about 1070 m with Cedrela toona, Pometia tomentosa, P. coriacea, Elmerrillia papuana and Terminalia spp. Submontane closed forest from 1070-1820 m is dominated by Castanopsis acuminatissima with Araucaria cunninghamii and Pasania spp. associations. Finally, on the highest slopes the dominant species are southern beeches Nothofagus and softwoods, including Podocarpus spp., with a dense understorey of bamboos, lianes and regeneration.

NOTEWORTHY FAUNA No wildlife surveys have yet been made within the Park, but in the adjacent Wau-Bulolo valley over 180 bird species have been recorded. Mammals to be expected include the long-'beaked' echidna Zaglossus bruijni, the bare-eared and silky cuscuses, Phalanger gymnias and P. vestitus, and the curious water rats, Crossomys moncktoni and Leptomys elegans. Likely birds in such an area would include dwarf cassowary Casuarius bennetti, the New Guinea eagle Harpyopsis novae-guineae, fruit doves of the genus Ptilinopus, the mountain owlet-nightjar Aegotheles albertsi, and birds of paradise including the blue Paradisaea rudolphi and Princess Stephanie's Astrapia stephaniae.

ZONING No zoning proposed as yet

DISTURBANCES OR DEFICIENCIES Some alluvial gold mining activities by local people on the banks of the Bulolo River and within the park boundary. Illegal cultivation and hunting.

TOURISM

SCIENTIFIC RESEARCH Some research on flora by Papua New Guinea Forestry College

SPECIAL SCIENTIFIC FACILITIES None

PRINCIPAL REFERENCE MATERIAL None published

WDNP IUCN © 1977 (1)F Code: PAP.5.1
STAFF  None allocated as yet

BUDGET  Only expenditure up to 1973 comprised a small investigation vote from central funds of the National Parks Board

LOCAL PARK ADMINISTRATION  Executive Director, National Parks Board, P.O. Box 5749, Boroko, Papua New Guinea.
Name: Varirata National Park

Type: NP

Biotic Province: 6.12.2

Legal Protection: Total

Date established: 2 February 1963 by Proclamation in Government Gazette No. 7

Geographical location: Coastal Papua, 42 km by road from Port Moresby, Central District: S 9°26' - 9°30'; E 147°20' - 147°23'

Altitude: 620 - 1065 metres

Area: 1063 ha

Land tenure: Government expropriated land by law

Physical features: Sgori plateau with its prominent west-facing escarpment, which culminates further to the east in the Astrolabe mountain range. Pliocene volcanics represented by flat-lying andesitic agglomerate and deeply weathered tuff, lava and dyke rocks. Tropical-humid climate with dry season between May and December; average annual rainfall 2220 mm, mean annual temperature 27°C and mean relative humidity 74%.

Vegetation: Upland rain forest characterized by tall evergreen species such as Castanopsis, Elaeocarpus, Syzygium, Canarium, Myristica and Ficus, which form the highest storey, beneath which there is a main canopy of Lithocarpus, Agathis, Mangifera, Chrysophyllum, Dysoxylum, Cinnamomum, Sloanea and tall palms, and an understory of tree ferns Cycas, Pandanus, Pleomele, bamboo, rattan, young palms and Zingiberaceae. Numerous lianes, with Stenochlaena found as a creeper, and many epiphytes. The savanna vegetation which is typical of less protected areas has a scattered tree cover of Eucalyptus tereticornis and papuana, Casuarina papuana and Melaleuca, a conspicuous shrub layer of Banksia dentata and the grasses Ophiuro and Themeda australis dominating more open areas.

Noteworthy fauna: Common marsupials include the spiny anteater Tachyglossus aculeatus, sandy wallaby Proctomodon agilis, spotted cuscus Phalanger maculatus and New Guinea bandicoot Peroryctes raffrayanus. The avifauna is particularly rich, the most interesting group being the birds of paradise, among them the magnificent bird of paradise Diphylleia magnificus, Paradisaea ragiana, the magnificent rifle bird Craspedophora magnifica, the trumpet bird Phoenigammas keraudrenii and glossy mantled manucode Manucodia ater. Reptiles include the amethystine python Liasis amethystinus, green tree python Chondropython viridis and tree snakes Dendrelaphis spp. Many species of butterfly and day flying moths of the families Hesperidae, Papilionidae, Satyrinidae, Danainae, Arctiidae and Lycaenidae, including quite commonly the Birdwing Ornithoptera priamus.

Zoning: Main zones are being established to accommodate vehicles, medium density recreational use and a major protection area accessible only by footpaths.

Disturbances or deficiencies: Some of the natural areas have been disturbed by agricultural use in the past. Hunting on a small scale is still being carried out by villagers.

Tourism: WDNP IUCN © 1977 (1)F Code: PAP.5.2
SCIENTIFIC RESEARCH  Some initial research on flora and fauna. More detailed studies will be undertaken at a later stage.

SPECIAL SCIENTIFIC FACILITIES  None

PRINCIPAL REFERENCE MATERIAL  None published

STAFF  1 park ranger, 2 park assistants, 1 artisan and a number of unskilled workers

BUDGET  Expenditure for 1972/73 approximately Australian $22,500 (c. US$ 29,500) from central funds of the National Parks Board

LOCAL PARK ADMINISTRATION  Executive Director, National Parks Board, F.O. Box 5749, Boroko, Papua New Guinea.
PARAGUAY

AREA  406,628 sq. km

POPULATION  2,500,000 (1975 estimate)

PARKS AND RESERVES LEGISLATION  The legal basis for the Decrees by which National Parks are brought into being is presumed to be still the Law No. 854 enacted in 1963. This principally regulates the Agrarian System, but also, as pointed out in the 2nd Edition of the U.N. List of National Parks and Equivalent Reserves (Hayez 1971), contains provision for the setting aside by the Instituto de Bienestar Rural or even the expropriation of land as National Park, if the land is of special geographical, historical or touristic interest or is needed for the purpose of preserving fauna and flora.

PARKS AND RESERVES ADMINISTRATION  Appears to be vested in the Department of Forestry Development of the Ministry of Agriculture and Animal Husbandry.

ADDRESS  Departamento de Desarollo Forestal, Ministerio da Agricultura y Ganadería, Asunción.

TOTAL AREA UNDER PROTECTION  Not known: details available of only the one area mentioned below (not yet included in the U.N. List).

PROTECTED AREA

5.1 Ybyku’i National Park  5000 ha
Ybyku'i National Park  

**Type**: NP  

**Biotic Province**: 3.9.2/3.6.8  

**Legal Protection**: Total  

**Date Established**: 17 May 1973, by Executive Decree No. 32.772  

**Geographical Location**: 125 km south-east of Asuncion, on the southern flank of the Cordillera de los Altos in Paraguari Department: S 26°01'-26°06'; W 56°47'-56°52'  

**Altitude**: 150-200 metres  

**Area**: 5000 ha  

**Land Tenure**: Government ownership: there is still some illegal settlement by squatters.  

**Physical Features**: Part of a low range of hills, intersected by several small rivers and streams, which have falls and rapids. Geologically composed of sedimentary rocks. Mean annual temperature is 23°C and mean annual rainfall 1400 mm. The remains of an iron foundry dating back to 1853 constitute a feature of some historic interest.  

**Vegetation**: Sub-tropical humid forest of three main types: high forest with trees up to 20 m in height, low forest, and meadow or grassland.  

**Noteworthy Fauna**: Larger mammals include crab-eating fox Cerdocyon thous, Brazilian tapir Tapirus terrestris and peccary Tayassu sp. Birds include tinamous Crypturellus spp., toucans Ramphastos spp., golden-green woodpecker Piculus chrysochloros and the bare-throated bellbird Procnias nudicollis.  

**Zoning**: Six zones are defined: (1) primitive intangible zone (research only with special permit); (2) primitive zone for ecosystem protection, as a buffer to zone (1); (3) extensive recreation zone; (4) intensive recreation zone; (5) historic zone, for protection of the iron foundry ruins; and (6) a recuperation zone, applied to areas which have suffered from disturbance and need to be rehabilitated.  

**Disturbances or Deficiencies**: Some disturbance from past industrial activity and also from squatters who have settled illegally.  

**Tourism**: No details supplied, but rivers in which bathing and swimming are possible are said to be very popular with visitors.  

**Scientific Research**: None  

**Special Scientific Facilities**: None  

**Principal Reference Material**: ANON. 1973. Plan de Creacion y manejo del Parque Nacional Ybyku'i. (Prepared by an interdisciplinary team). Due for publication at Asuncion in 1973, but no details given of where or how obtainable.
STAFF  No information
BUDGET  No information

LOCAL PARK ADMINISTRATION  Parque Nacional Ybyku'i, Departamento de Desarrollo Forestal del Ministerio da Agricultura y Ganadería, Asuncion.
PERU

AREA 1,375,290 sq. km

POPULATION 14,121,564 (1972 census)

PARKS AND RESERVES LEGISLATION 'Decreto Ley No. 19608 - Ley Orgánica del Sector Agrario' of 21 November 1972, gives the Dirección General de Forestal y Caza, responsibility for the conservation of natural areas. The Dirección General de Forestal y Caza proposes to the Government the establishment of National Parks and equivalent reserves as well as the standards and rules for management of these areas.

PARKS AND RESERVES ADMINISTRATION The Dirección General de Forestal y Caza, Ministerio de Agricultura, has ultimate authority for management of national parks. The direct administration for most national parks is the responsibility of the Agrarian Zone unit in charge of the area in which the national park or equivalent reserve is located.

ADDRESS Dirección General de Forestal y Caza, Ministerio de Agricultura, Natalio Sánchez 220 (3er piso), Lima, Peru.

TOTAL AREA UNDER PROTECTION 2,201,806 ha

PROTECTED AREAS
1.1 Manu National Park 1,532,806 ha
1.2 Pacaya National Reserve 660,000 ha
4.1 Pampa Galeras National Reserve 6,500 ha
5.1 Cutervo National Park 2,500 ha

PERU

NAME Manu National Park

TYPE NP

BIOTIC PROVINCE 3.7.3

LEGAL PROTECTION Total

DATE ESTABLISHED June 1973, by Supreme Decree No. 644-73-AG

GEOGRAPHICAL LOCATION South-east Peru, upper Amazon basin S 11°17'-13°11'; W 71°10'-72°22'

ALTITUDE 240-4000 metres

AREA 1,532,806 ha

LAND TENURE Mostly government owned, a few individually owned areas in the mountain regions.

PHYSICAL FEATURES Upper Amazon basin, difficult access, mainly by boat and canoes, but there is a small airstrip. Forested with plains, hills, mountains, lakes and rivers. Mean annual precipitation ranging from 2000 mm in north, north-east and south-east to 4000 mm in centre and south. Rainy season February/March. Mean annual temperatures range from 19°C to 24°C. Quaternary sediments with latosols, and lateritic and podsolic soils.

VEGETATION Virgin forest, Holdridge classification; low humid tropical (bh-T), low humid sub-tropical (bh-ST), very humid low sub-tropical (bmh-ST) and very humid low montane (bmh-MB). Most common species include: ivory nut Phytelephas macrocarpa, cedars Cedrela odorata and C. fisilis, Ita palm Mauritia flexuosa, Honduras mahogany Swietenia macrophylla and bamboos Chusquea spp., together with various species of Cecropia, Heliconia, Podocarpus, Guadua grass, Jessenia palm and Calycophyllum.

NOTEWORTHY FAUNA Rich amazonian fauna includes a number of Red Data Book species, such as giant anteater Myrmecophaga tridactyla, bush dog Speothos venatus, spectacled bear Tremarctos ornatus, giant otter Pteronura brasiliensis, jaguar Panthera onca, spectacled caiman Caiman crocodilus (sclerops), black caiman Melanosuchus niger and the Ierecay or yellow-spotted sideneck turtle (bearded greaved tortoise) Podocnemis unifilis. Other mammals include capuchin monkeys Cebus sp., black spider monkey Ateles paniscus, dwarf anteater Cyclopes didactylus, capybara Hydrochoerus hydrochaeris, paca Cuniculus paca and peccaries Tayassu sp. The bird list of the park is equally extensive and species of special interest range from tinamous Crypturellus spp., hoatzin Opisthocomus hoazin and the stork Jabiru mycteria to macaws Ara spp., yellow-headed parrot Amazona ochrocephala and yellow-rumped cacique Cacicus cela. The fish fauna comprises many well-known amazonian species such as the piráña Serrasalmus spp., and catfish Pseudopimelodus spp., and no doubt some that are elsewhere endangered by exploitation or not yet identified.

ZONING Not yet established but preliminary surveys indicate that 70% should be classified as strict nature reserve and not be disturbed, 15-20% for tourism and 10-15% for scientific research. It is proposed to establish 'defence zones' around areas which are in particular need of protection.

WDNP IUCN © 1975 6(1)F Code: PER.1.1
DISTURBANCES OR DEFICIENCIES Very little at the moment. Indigenous Indians are permitted to hunt for food with traditional weapons. Oil exploration concessions given for about 100,000 ha in the south of the park.

SCIENTIFIC RESEARCH Anthropological, herpetological (caimans) and ornithological studies have been undertaken.

SPECIAL SCIENTIFIC FACILITIES A small biological station at Coscha Cashu and some facilities at the guard station at Tayakome.

PRINCIPAL REFERENCE MATERIAL


STAFF 1 Administrator, 9 guards

BUDGET US$ 40,000 for 1973-1974 (not including grants received from external sources)

LOCAL PARK ADMINISTRATION Administrator, Parque Nacional de Manu, Dirección General Forestal de Caza y Tierras, Ministerio de Agricultura, Lima.
PERU

NAME Pacaya National Reserve

TYPE NR

BIOTIC PROVINCE 3.7.3

LEGAL PROTECTION Total

DATE ESTABLISHED October 1968 by Supreme Decree 210-68-AG (first measures in 1946)

GEOGRAPHICAL LOCATION North-east Peru, between River Marañón and River Ucayali about 220 km south-west of Iquitos, S 4°57'-6°37'; W 74°12'-75°31'

ALTITUDE 125-200 metres

AREA 660,000 ha

LAND TENURE Presumably state ownership

PHYSICAL FEATURES Upper Amazonian basin, a low lying area of marshlands between the R. Marañón and the R. Ucayali, the Rio Pacaya being a tributary of the Ucayali. Quaternary sedimentary area with alluvium, river deposits and acid sandy soils. Annual precipitation 2400 mm, mean temperature 25.7°C with maximum monthly mean of 31.4°C and minimum of 20°C.

VEGETATION Tropical humid forest, principal species including - ivory nut Phytelephas macrocarpa, Ita palm Mauritia flexuosa, Jamaica red cedar Cedrela odorata, rubber Hevea brasiliensis, silk cotton Ceiba samauma, Honduras mahogany Swietenia macrophylla and species of Ficus, Cecropia, Iriartea and Scheelea palms, the resin-yielding Copaiba Copaifera, Virola, Aniba, Ocotea, greenheart Nectandra and Amburana.

NOTEWORTHY FAUNA Pacaya was originally a 'hunting reserve' for the capture of spectacled caiman Caiman crocodilus (sclerops) and 'paiche' Arapaima gigas fishing. It supports several Red Data Book species, namely three mammals: the giant armadillo Priodontes giganteus, ocelot Felis pardalis and jaguar Panthera onca; and three reptiles: the South American river turtle (Arrau tortoise) Podocnemis expansa, spectacled caiman Caiman crocodilus and the black caiman Melanosuchus niger. Other mammals include doucougui Aotus trivirgatus, squirrel monkey Saimiri sciureus, capuchin monkey Cebus sp., capybara Hydrochoerus hydrochaeris, paca Cuniculus paca, agouti Dasyprocta sp., the two freshwater dolphins Inia geoffrensis and Sotalia fluviatilis, the manatee Trichechus inunguis, tapir Tapirus terrestris, peccaries Tayassu spp. and the red brocket deer Mazama americana. Birds, reptiles, amphibia and fish are all well represented in the reserve. Among the first named the hoatzin Opisthocomus, aracaris and toucans Pteroglossus and Ramphastus, and several of the larger waterbirds, are noteworthy.

ZONING None

DISTURBANCES OR DEFICIENCIES Illegal hunting, some local commercial fishing

SCIENTIFIC RESEARCH Some on fish resources

SPECIAL SCIENTIFIC FACILITIES A small laboratory. There is a plan to establish an Amazonas Biological Institute based on the reserve.

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PRINCIPAL REFERENCE MATERIAL


STAFF
1 administrator, 12 guards and labour force

BUDGET
US$ 10,000 annually (capital expenditure US$ 70,000)

LOCAL PARK ADMINISTRATION
Region del Oriente. Ministerio de Pesquería, Iquitos, Peru.
PERU

NAME Pampa Galeras National Vicuna Reserve

TYPE NR BIOTIC PROVINCE 3.8.5

LEGAL PROTECTION Total

DATE ESTABLISHED 18 May 1967, by Supreme Resolution No. 157-AP

GEOGRAPHICAL LOCATION North of the towns of Nasca and Pucuio in the hinterland of the south-western coastal Department of Ica, S 14°39'-14°44'; W 74°19'-74°27'

ALTITUDE 3800-4200 metres

AREA 6500 ha (plus a buffer zone of 10,000 ha)

LAND TENURE Owned by the municipality of Ica

PHYSICAL FEATURES High Andean plateau, undulating treeless 'puna'. Andesites and tufa of lower tertiary age, soils with humus-rich layer over sand and rock. Annual mean temperature 0°C - 6°C with a maximum of 25°C and minimum of -18°C. Annual precipitation between 250 mm and 700 mm with rainy season from December to March. Various old Inca constructions present such as stone traps for vicuna and stone fences, also some cave paintings.

VEGETATION 'Puna' or alpine semi-desert dominated by desert grass with 80 species of Gramineae, including fescues Festuca sp., meadow grasses Poa sp., and feather grasses Stipa sp., also prickly pear Opuntia sp., balsam bog Azorella varita and Buddleia sp.

NOTEWORTHY FAUNA The vicuna Vicugna vicugna, a vulnerable species now numbering around 10,000, of which, according to the Red Data Book, about half are in the Reserve. This was especially designed to afford them effective protection. Other species include Cuvier's chinchilla Lagidium peruanum, guanaco Lama guanaco, and occasional puma Felis concolor. Among the birds Pentland's tinamou Tinamotis pentlandii, Andean goose Chloephaga melanoptera, sharp-winged teal Anas flavirostris oxypterus, Andean condor Vultur gryphus, white-throated caracara Phalcoboenus albogularis and golden woodpecker Colaptes rupicola puna, are noteworthy.

ZONING 6500 ha strict natural reserve, 10,000 ha protected buffer zone

DISTURBANCES OR DEFICIENCIES Some grazing by alpaca, llama and cattle

TOURISM Will be limited because of altitude; at present about 100 visitors a year. Guesthouse planned.

SCIENTIFIC RESEARCH On vicuna: population dynamics, parasites, nutrition, exploitation of wool without damage to the animals, and capacity and production of pastures.

SPECIAL SCIENTIFIC FACILITIES A basic laboratory and a meteorological station

WDNP IUCN © 1975 6(1)F Code: PER.4.1
PRINCIPAL REFERENCE MATERIAL


HOFMANN, R. (undated) La población de Vicuñas en Pampa Galeras. Informe Técnico No. 22. Instituto de Investigaciones Forestales, Lima, Peru.

STAFF 2 German bilateral aid experts, 1 administrator, 24 guards and trained handymen plus 4 unskilled labourers.

BUDGET Annually approximately US$ 20,000 (not including grants from external sources)

LOCAL PARK ADMINISTRATION Dependencia Principal de la Zona Agraria V., Ministerio de Agricultura, Ica, Peru.
PERU

NAME Cutervo National Park

TYPE NP

Biotic Province 3.8.3/3.8.4

Legal Protection Total

Date Established 12 September 1961, by Ley No. 13694

Geographical Location Inland from Chiclayo, in the Lambayeque Department of the N.W. coast of Peru, S 6°08'–6°12'; W 78°42'–78°51'

Altitude 2200–3500 metres

Area 2500 ha

Land Tenure Government owned

Physical Features Peruvian Andes, steep hills and mountains, caverns and archaeological remains (at San Andrés). Clay silt soils with pH of 5.0–6.0. Mean annual precipitation 810 mm with wet season from December to April, mean annual temperature 13°C with maximum of 19°C and minimum of 8°C.

Vegetation Subtropical forests, low humid montane forests and very humid montane forests. Most common species include: jacaranda Jacaranda acutifolia, species of Podocarpus, greenheart Nectandra, Ocotea, Weimannia, Cinchona, Piper and Miconia; also the alder Alnus jorulensis, cedar Cedrela sp., tree ferns Cyathea spp., and palms.

Noteworthy fauna Mammals include mountain tapir Tapirus pinchaque, classified by the Red Data Book as 'endangered', for which this reserve implements recommendations for protection in northern Peru, and also two 'vulnerable' species, the spectacled bear Tremarctos ornatus and ocelot Felis pardalis. Other mammals include vampire and other bats Chiroptera, the Colpeo fox Dusicyon culpaeus, peccary Tayassu tajacu, white-tailed deer Odocoileus virginianus and the red brocket deer Mazama americana. The most remarkable bird species are the cave-dwelling oil bird Steatornis caripensis and the cock-of-the-rock Rupicola r. peruviana.

Zoning

Disturbances or Deficiencies There are still some human settlements within the area, including a village of 200 inhabitants established at the same time as the park.

Tourism Not yet developed. There is no motorable road of access

Scientific Research Mainly on the flora and fauna

Special Scientific Facilities One small investigation centre

Principal Reference Material


STAFF 2 guards (untrained)

BUDGET US$ 200 annually (capital expenditure of US$ 7000 on facilities)

LOCAL PARK ADMINISTRATION Zona Agraria II, Chiclayo, Planning and Technical Division. Dirección Forestal de Caza y Tierras, Ministerio de Agricultura, Lima, Peru.
RHODESIA

AREA  390,622 sq. km

POPULATION  6,000,000 (estimated 31 December 1973)

PARKS AND RESERVES LEGISLATION  The Land Tenure Act, 1969, establishes and defines the boundaries of the National Parks and Game Reserves. These areas are vested in the President and the Act states that their use shall be in accordance with the law of the Legislature. The National Parks Act and the Wild Life Conservation Act presently prescribe the use of these areas. The post of Director of National Parks and Wild Life Management is created under these Acts and he is the executive of the Minister in assisting him to exercise his functions which are to preserve wild animal and fish life and vegetation and objects of geological, ethnological, historical or other scientific interest within National Parks and to control and manage these parks. The Director assists similarly in conserving and controlling the wild animal life under the Wild Life Conservation Act and conserving indigenous fish under the Fish Conservation Act.

PARKS AND RESERVES ADMINISTRATION  The Director of National Parks and Wild Life Management has overall responsibility. Enquiries regarding the use or the availability of tourist accommodation should be addressed to the Officer in Charge, Central Booking Office.

ADDRESS  Director of National Parks and Wild Life Management, P.O. Box 8365, Causeway, and Officer in Charge, Central Booking Office, P.O. Box 8151, Causeway, Salisbury.

TOTAL AREA UNDER PROTECTION  3,457,992 ha

PROTECTED AREAS

1.1 Wankie National Park  1,462,000 ha
2.1 Gonarezhou Game Reserve  496,400 ha
2.2 Chevore Game Reserve  399,935 ha
2.3 Chizarira Game Reserve  191,000 ha
2.4 Chirisa Game Reserve  171,300 ha
2.5 Mana Pools Game Reserve  137,000 ha
2.6 Matusadona Game Reserve  137,000 ha
2.7 Kariba Game Reserve  130,000 ha
2.8 Chete Game Reserve  108,100 ha
3.1 Victoria Falls National Park  57,300 ha
3.2 Danda Game Reserve  52,000 ha
3.3 Rhodes Matopos National Park  43,200 ha
3.4 Kazuma Pan National Park  31,290 ha
3.5 Rhodes Inyanga National Park  29,637 ha
3.6 Chinimanimi National Park  17,110 ha
3.7 Malapati Game Reserve  16,200 ha
3.8 Mushandike National Park  12,900 ha
3.9 Kyle National Park  9,065 ha
3.10 Robert McIlwaine National Park  6,100 ha
3.11 Ngezi National Park  5,800 ha
4.1 Sebakwe National Park  2,909 ha
6.1 Zimbabwe National Park  746 ha
6.2 Melsetter Eland Sanctuary  700 ha
**RHODESIA**

**NAME** Wankie National Park

**TYPE** NP

**BIOTIC PROVINCE** 4.6.4

**LEGAL PROTECTION** Total

**DATE ESTABLISHED** 1930, confirmed by the Land Tenure Act, 1969

**GEOGRAPHICAL LOCATION** On border with Botswana, 170 km NW of Bulawayo: S 18°30'-19°53'; E 25°48'-27°27'

**ALTITUDE** 938-1152 metres

**AREA** 1,462,000 ha

**LAND TENURE** Nationally owned and used for conservation of wild plants, animals and fish in accordance with Land Tenure Act.

**PHYSICAL FEATURES** The centre and south are a uniformly flat region of aeolian Kalahari sands with no permanent water and few natural waterholes. Shallow clay pans are plentiful and seasonally flooded. Long wide parallel ridges of sand are a unique feature probably caused by erosion of longitudinal dunes. The north has more broken topography with basalts, gneissic rocks, sandstones and grits. Main rivers include the Deka, Lukosi and Inyantue draining north-eastwards into Gwai R. outside the park. Tropical climate with mean maxima from 32.5°C-35°C, minima from 3.5°C-17.6°C, with winter frost; mean rainfall of 655 mm falling almost entirely in the November/March hot season.

**VEGETATION** The Kalahari sands area has woodlands and open woodlands largely composed of Rhodesian 'teak' Baikiea plurijuga, Guibourita coleosperma, Terminalia sericea and Combretum spp., with thickets of Acacia spp. often fringing dry watercourses, and some open grasslands. The shallow basaltic sandstones and gneissic lithosols support woodland of Colophospermum mopane, Combretum spp. and Commiphora spp. Deeper basaltic vertisols have open grasslands of Ischaemum afrum, Setaria spp. and Hyparrhenia spp.

**NOTEWORTHY FAUNA** Larger mammal species include bat-eared fox Otocyon megalotis, brown hyaena Hyaena brunnea, cheetah Acinonyx jubatus (classified as 'vulnerable' in the Red Data Book), elephant Loxodonta africana, white rhinoceros Ceratotherium simum and black rhino Dicerorhinus bicornis, both reintroduced, eland Taurotragus oryx, buffalo Syncerus caffer, roan and sable antelope Hippotragus equinus and H. niger, gemsbok Oryx gazella and red hartebeest Alcelaphus buselaphus, the two last-mentioned species and the hyaena being of rare occurrence. Over 400 species of bird have been listed, including many raptors, such as the martial eagle Polemaetus bellicosus and five vulture spp., also Bradfield's hornbill Tockus bradfieldi, a species almost confined to Baikiea woodlands of the Kalahari sands. A peculiar stunted form of Tilapia mossambica occurs in the warm saline springs and a wide variety of other fish species are present in rivers and pans.

**ZONING** 4 zones proposed: (i) restricted size special conservation areas; (ii) c.40% of area as wilderness area; (iii) wild areas for game viewing; and (iv) a development area for tourist facilities and administration.

**DISTURBANCES OR DEFICIENCIES** Artificial supply of permanent water has caused marked increase in some animal populations, notably elephant. Introduced barbel Clarias gariepinus have adversely affected aquatic invertebrate populations. Local habitat change and degradation due to fire and past land use practices. Threat of increased poaching and bush fires in the south; disturbance in western border areas from safari concessionaires' activities in Botswana.
TOURISM  3 camps, restaurants, shops, rail service, airport and 560 km of game viewing roads are all concentrated in the northern sector. The number of vehicles now permitted access is limited. Plans for development of the roads to all weather standard and of visitor facilities in the southern perimeter.

SCIENTIFIC RESEARCH  Broadly based ecological, vegetation and species studies (especially on elephant and on rare and abundant species) undertaken by staff of 3 biologists and assistants, on short and long term bases.

SPECIAL SCIENTIFIC FACILITIES  Research centre with laboratory, herbarium, library, general equipment and darkroom.

PRINCIPAL REFERENCE MATERIAL

STAFF  Regional warden, 5 wardens with 92 permanent field staff, 3 research officers, 6 other permanent research staff and casual labour.

BUDGET  Approximately U.S. $ 620,000

LOCAL PARK ADMINISTRATION  Regional Warden, Wankie, Private Bag DT.5776, Dett, Rhodesia.
RHODESIA

NAME Gonarezhou Game Reserve

TYPE NP

BIOTIC PROVINCE 4.6.4

LEGAL PROTECTION Total

DATE ESTABLISHED 1968, confirmed by Land Tenure Act, 1969

GEOGRAPHICAL LOCATION On south-eastern border with Mozambique: S 21°06'-22°12'; E 31°20'-32°25'

ALTITUDE 162-578 metres

AREA 496,400 ha

LAND TENURE Nationally owned in accordance with the Land Tenure Act

PHYSICAL FEATURES Rocks include Cretaceous sandstones, a considerable area of granophyre in the north and some basalt. The rivers Lundi, Sabi and Nuanetsi have carved gorges, that of the Lundi having spectacular red sandstone cliffs at Chilojo affording good views over lower ground. Soils are mostly derived from the sandstones and range from deeper regoliths to medium textured siallitic soils; also some basalt derived clays.

VEGETATION A wide variety of vegetation includes mixed Brachystegia glaucescens woodland on granophyre hills, with Kirkia, Commiphora and baobab Adansonia digitata on steeper slopes and Colophospermum mopane on basalt and alluvial soils. Guibourtia conjugata forms pure stands on edges of sands in the Lundi valley. Non-eroded sandstone soils support mixed communities of Combretum, Pteleopsis, Strychnos, Terminalia, Kellogia (= Ostryoderris) and Pterocarpus. A relict riverine forest has several giant Chlorophora excelsa, otherwise rare in Rhodesia, together with other coastal species and the aloes Aloe suffulta and A. lutescens, Androstachys johnsonii of the monogenic family Androstachydaceae is confined in Rhodesia to the SE corner of the park where it forms small dry thickets on sandstone and granophyre. Adenium obesum and Pachypodium saundersii are well represented.

NOTEWORTHY FAUNA Mammals include the red bush squirrel Paraxerus palliatius, an over-abundance of elephant Loxodonta africana (c. 3000), black rhino Diceros bicornis (of which 80 have been reintroduced after earlier extermination of this 'vulnerable' species in the area), hippo Hippopotamus amphibius (one of the two breeding populations in Rhodesia), the nyala Tragelaphus angasi, and a probably unique sympatric occurrence of grey duiker Sylvicapra grimmia, klipspringer Oreotragus oreotragus, oribi Ourebia ourebi, steenbok Raphicerus campestris, Sharpe's grysbok R. sharpei and Livingstone's suni Nesotragus moschatus. Lichtenstein's hartebeest Alcelaphus buselaphus lichtensteini has been reintroduced from Mozambique. Other species of interest include crested guineafowl Guttera edouardi, a significant Crocodylus niloticus population in the Lundi river, a freshwater turtle Cycloderma frenatum, lung fish Protopterus annectens and rare top minnows Notobranchius spp.

ZONING 4 zones proposed: (i) special conservation areas; (ii) wilderness areas; (iii) wild areas served by roads for wildlife viewing; and (iv) development areas for tourists and administration.

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DISTURBANCES OR DEFICIENCIES  Serious poaching from tribal lands and from across the frontier.  Wild fires, planned fires and bush clearing for tsetse fly control have degraded vegetation in some areas.  An over-population of elephant has also been noticed.  Extraction and pollution of water of the Lundi R. is adversely affecting its ecology.  Inadequate staff for effective control of tourists and anglers.

TOURISM  Two access points, at the Chipinda Pools on the Lundi R. in the north-east and at Mabalauta on the Nuanetsi R. in the south-west, with no link road.  Limited accommodation and camps and a network of game viewing roads at each centre: a popular Wilderness Trail from Mabalauta along the river.


SPECIAL SCIENTIFIC FACILITIES  None at present unless the research laboratory of which construction was due to begin in 1974 has been completed.

PRINCIPAL REFERENCE MATERIAL


STAFF  2 wardens, 28 other permanent field staff, research officer and one permanent research assistant, plus casual labour.

BUDGET  Approximately U.S. $ 68,000

LOCAL PARK ADMINISTRATION  Chipinda Pools: Warden in Charge, Private Bag 7003, Chiredzi; Mabalauta: Warden in Charge, Private Bag U5513, Bulawayo, Rhodesia.
RHODESIA

NAME Chizarira Game Reserve
TYPE NP BIOTIC PROVINCE 4.6.4

LEGAL PROTECTION Total
DATE ESTABLISHED 1963, confirmed by Land Tenure Act, 1969

GEOGRAPHICAL LOCATION About 35 km SE of the southern end of Lake Kariba:
S 17°32'-18°01'; E 27°36'-28°14'

ALTITUDE 648-1433 metres (summit of Mt. Tundazi)

AREA 191,000 ha

LAND TENURE Nationally owned in accordance with the Land Tenure Act

PHYSICAL FEATURES A gently undulating plateau rising from the Zambezi valley and Lake Kariba in the north in a 500 m escarpment and falling away more gently in the south and south-west. Two ridges on a north-east/south-west alignment form watersheds; the rivers draining from them have cut gorges, some spectacular, through the scarp. The area is well watered with numerous permanent springs and salt pans. The Ruziruhuru R. rises on the plateau flowing westwards to the Zambezi. Geologically part of the 'Sijarira system' of grits and sandstones. A small marshland area is known as the Manzituba.

VEGETATION The reserve forms an island of highveld surrounded by lowveld. Much of the plateau is dominated by Julbernardia globifera/Brachystegia spiciformis miombo woodland, with some patches of B. boehmi and Colophospermum mopane. Gorges have riverine vegetation and there is also some open grassland comprising a considerable diversity of species. The Potaliaceous tree Anthocleista grandiflora is of special biogeographical interest.

NOTEWORTHY FAUNA Aardwolf Proteles cristatus and cheetah Acinonyx jubatus (rated as 'vulnerable' in the Red Data Book) occur sparsely, as well as other large carnivores. The herbivores include black rhino Diceros bicornis, significant populations of roan antelope Hippotragus equinus, and tsessebe Damaliscus lunatus. Among the birds identified in the reserve is the Taita falcon Falco fasciinucha (classified as a 'rare' species) and several extensions in range of other species have been recorded and are probably connected with the 'island effect' referred to above. A small population of Nile crocodile Crocodylus niloticus (now also classified as 'vulnerable') is also present.

ZONING 4 zones proposed: (i) special conservation areas; (ii) wilderness areas without development; (iii) wild areas serviced by roads for game viewing; and (iv) a developed area for tourists and staff.

DISTURBANCES OR DEFICIENCIES Past cultivation and past and present fires have modified vegetation and water run-off. Poaching expected to increase with settlement of surrounding tribal areas.

TOURISM No facilities at present and poor road access. Functional accommodation will be provided eventually, but visitor usage will be strictly controlled and angling, for example, will not be permitted.
SCIENTIFIC RESEARCH  Observation and experimental research for management purposes, especially on population dynamics and distribution of large herbivores, and on elephant and their use of Brachystegia boehmii.

SPECIAL SCIENTIFIC FACILITIES  Research centre with herbarium, library, general equipment and darkroom.

PRINCIPAL REFERENCE MATERIAL

THOMSON, P.J. 1973. Field Work Sheet (IBP/CT. Rhodesia): CT Record Centre, Atlantica Ecological Research Station, P.O. Box 8305, Causeway, Salisbury.

THOMSON, P.J. 1973. The role of elephants, fire and other agents in the decline of Brachystegia woodland (ms. in press).

STAFF  Senior ranger and 13 other permanent field staff, research officer and 2 other permanent research staff plus casual labour.

BUDGET  Approximately U.S. $ 40,000

LOCAL PARK ADMINISTRATION  Senior Ranger in Charge, Chizarira Game Reserve, Private Bag DT 5779, Dett, Rhodesia.
RHODESIA

NAME  Chirisa Game Reserve

TYPE  NP  BIOTIC PROVINCE  4.6.4

LEGAL PROTECTION  Total

DATE ESTABLISHED  1969, in terms of the Land Tenure Act, 1969

GEOREGRAPHICAL LOCATION  Adjoining Chizarira reserve (q.v. - 2.3) on SE and 175 km west of Gatooma: S 17°39'-18°13'; E 28°00'-28°31'

ALTITUDE  680-1043 metres

AREA  171,300 ha

LAND TENURE  Nationally owned in accordance with the Land Tenure Act

PHYSICAL FEATURES  Most of the area lies below 900 m and is composed of Karroo grits and sandstones with some Kalahari sands. The broad sandy Sengwa R. flowing due north to enter the Kariba Lake at its mid-point, together with its flood plain, dominates the reserve. The other most striking feature is the occasional red sandstone 'inselberg' formation.

VEGETATION  Miombo woodlands, dominated by Julbernardia and Brachystegia, with also fairly common areas of mopane Colophospermum mopane. The rivers are bordered by belts of Acacia tortilis and Grewia flavezens, but both these species have been reduced from their former abundance by elephant and indeed all the major vegetation types have been considerably modified by this factor. Kalahari sand 'gusu' woodlands of Rhodesian teak Baikiaea plurijuga and 'jesse' thickets of Combretum and Commiphora species also occur.

NOTEWORTHY FAUNA  Many of the larger African mammals, including most Rhodesian species of antelope are found in the reserve. Black rhino Diceros bicornis has been reintroduced through translocation from other areas where its continued presence was threatened.

ZONING  No detailed plan has as yet been implemented. In the south an area has been set aside as the 'Sengwa Wildlife Research Area'.

DISTURBANCES OR DEFICIENCIES  Surrounded by tribal lands except where it borders the Chizarira Game Reserve to the west. Poaching is a problem and could increase, especially if tsetse eradication is successful.

TOURISM  No facilities for visitors at the moment and roads are in poor condition, except for that to the Hostes Nicolle Institute.

SCIENTIFIC RESEARCH  The Sengwa Wildlife Research Area (40,000 ha) is set aside for long term study of native flora and fauna. Elephant, kudu, and warthog are currently under biotelemetric study. Other studies are also under way on vultures and vegetation.

SPECIAL SCIENTIFIC FACILITIES  The Hostes Nicolle Institute of Wildlife Research has laboratories, offices, herbarium, library/mapping room, and many other facilities.
PRINCIPAL REFERENCE MATERIAL


STAFF

Senior research officer, 16 other research staff, 30 staff with responsibilities in the reserve and adjoining areas, casual labour.

BUDGET

Approximately U.S. $21,000 on research alone. Other funds are also applied in the adjoining areas.

LOCAL PARK ADMINISTRATION

Officer in Charge, Hostes Nicolle Institute for Wildlife Research, Private Bag 6002, Gokwe, and Secretary for Internal Affairs, Private Bag 7702, Causeway, Salisbury, Rhodesia.
NAME: Chete Game Reserve

TYPE: NR

BIOTIC PROVINCE: 4.6.4

LEGAL PROTECTION: Total

DATE ESTABLISHED: 1963, confirmed by the Land Tenure Act, 1969

GEOGRAPHICAL LOCATION: Bordering the southern shore of Lake Kariba: S 17°11'-17°37'; E 27°35'-27°59'

ALTITUDE: 485-930 metres

AREA: 108,100 ha

LAND TENURE: Nationally owned in accordance with the Land Tenure Act

PHYSICAL FEATURES: A broken and undulating area dissected by numerous watercourses belonging to the river systems of the Ruziruhuru, which rises in Chizarira Game Reserve, the Senkwi/Murambare and the Mwenda. These flow seasonally but have numerous perennial pools. Several perennial springs are also present. The shore of Lake Kariba which forms the NW boundary is characterised by many bays formed by drowned valleys. Geologically the area is composed of ripple-marked flags of the Upper Karroo system with shallow stony soils containing much loose rock.

VEGETATION: Most of the area is covered by open mopane Colophospermum mopane woodland with associated poor grass cover. Sandy ridges support a more varied miombo Julbernardia globiflora/Brachystegia spp. woodland. Watercourses have riverine vegetation with steeper slopes characterised by Commiphora and Combretum spp. and a scatter of baobab Adansonia digitata. Grass cover varies with soil and slope, with considerable species diversity. Bays on Lake Kariba are covered by a mat of water fern Salvinia molesta, often supporting secondary plant growth.

NOTEWORTHY FAUNA: Most of the large herbivores and carnivores are present, including a population of black rhino Diceros bicornis (classified as a 'vulnerable' species), but roan and sable antelope Hippotragus equinus and H. niger are rare. Little is known of the avifauna but the fish eagle Haliaetus vocifer is conspicuous along the lake shore and marabou stork Leptoptilos crumeniferus has been found nesting. A significant population of Nile crocodile Crocodylus niloticus (another Red Data Book 'vulnerable' species) is present. Fish are abundant in the lake and rivers.

ZONING: None

DISTURBANCES OR DEFICIENCIES: Uncontrolled fires present a current problem and contribute to vegetation and run-off modification. Illegal hunting and fish poisoning are likely to increase with settlement of adjoining tribal lands.

TOURISM: No facilities and entry only with permission

SCIENTIFIC RESEARCH: Studies of interaction between terrestrial and aquatic ecosystems.

SPECIAL SCIENTIFIC FACILITIES: A research station of the University of Rhodesia is on a leased portion of the reserve. Living and working facilities are available for research visitors.
PRINCIPAL REFERENCE MATERIAL  Unpublished reports and papers

STAFF  Senior ranger and 3 other permanent field staff with a small casual labour force.

BUDGET  Approximately U.S. $9000

LOCAL PARK ADMINISTRATION  Senior Ranger in Charge, Chete Game Reserve, c/o Private Bag DT 5776, Dett, Rhodesia
RHODESIA

NAME Malapati Game Reserve

TYPE NP

BIOTIC PROVINCE 4.6.4

LEGAL PROTECTION Total

DATE ESTABLISHED 1969, under the terms of the Land Tenure Act, 1969

GEOGRAPHICAL LOCATION Bordering the Gonarezhou Reserve (q.v. - 2.1) on south-east: S 21°49'-22°03'; E 31°21'-31°29'

ALTITUDE 253-396 metres

AREA 16,200 ha

LAND TENURE Nationally owned under the terms of the Land Tenure Act

PHYSICAL FEATURES An area of broken granophyre and rhyolite outcrops with sandy clay soils. The Nuanetsi R. forms the eastern boundary, with alluvial sands along the river.

VEGETATION Mainly Copaifera/Combretum scrub and woodland with large expanses of Androstachys thicket, this being a member of the monogeneric family Androstachydaeae which only occurs in Rhodesia in this and the neighbouring Gonarezhou area. Good patches of woodland occur in the main bed of the Nuanetsi R. also some degraded riverine forest. Aloe lutescens is common on rocky outcrops.

NOTEWORTHY FAUNA Many of the herbivores found in the Gonarezhou Game Reserve occur here also and population estimates for that reserve include the Malapati as this forms part of the Nuanetsi ecosystem. The nyala Tragelaphus angasi is perhaps the most important species.

ZONING None

DISTURBANCES OR DEFICIENCIES Serious poaching occurs from the tribal lands lying to the west.

TOURISM Wilderness trails from the Mabalauta section of Gonarezhou reserve enter into the Malapati reserve. A safari lodge has been constructed by a lessee.

SCIENTIFIC RESEARCH None

SPECIAL SCIENTIFIC FACILITIES None

PRINCIPAL REFERENCE MATERIAL


Various unpublished departmental reports are also available.

STAFF None; the area is patrolled from the adjoining reserve.

WDNP IUCN © 1977 (1)F Code: RHO.3.7
BUDGET
None, the budget for the adjoining area includes this reserve.

LOCAL PARK ADMINISTRATION
The Secretary for Internal Affairs, Private Bag 7702, Causeway, Salisbury, Rhodesia.
NAME Mushandike National Park

TYPE NP

BIOTIC PROVINCE 4.6.4

LEGAL PROTECTION Total

DATE ESTABLISHED 1955, confirmed by the Land Tenure Act, 1969

GEOGRAPHICAL LOCATION Eastern boundary is 10 km west of Fort Victoria: S 20°04'-20°09'; E 30°32'-30°44'

ALTITUDE 935-1310 metres

AREA 12,900 ha

LAND TENURE Nationally owned under the Land Tenure Act

PHYSICAL FEATURES The area lies across the valleys of 4 south flowing tributaries of the Sabi-Lundi system and a dam immediately below their confluence in the Mushandike R. has formed a 412 ha lake. In the north are granite whale-back 'dwala' and rock columns and numerous sheer zones associated with quartz outcrops. The general land form consists of broken ridges dissected by many small seasonal watercourses. Soils are shallow and coarse. In the south the hills exhibit a great variety, with crystalline limestone, a banded ironstone massif and schists. The south-west corner has shallow red-brown clay soils formed over basic rock with ridges of shallow sands over gneiss.

VEGETATION Almost entirely covered with semi-deciduous woodland of trees not more than 10 m high and a thin ground cover of woody shrubs and perennial grass. Dominant trees on granite and gneissic sands are the 'micabo' species Julbernardia globiflora and, on better soils, some Brachystegia spiciformis. The southerly or coastal nature of this association is shown by the frequent presence of the handsome monotypic Bolusanthus speciosus and of the mahogany bean Afzelia quanzensis. The typical species of the granite hills are Brachystegia tamarindoides, Kirkia acuminata and Commiphora spp. while Colophospermum mopane occurs along sandy watercourses with restricted drainage. Combretum/terminallia bush dominates the red soils in the south and a stand of Faurea saligna/Euclea linearis savanna characterises one schistose grit hill.

NOTEWORTHY FAUNA Carnivores include side-striped jackal Canis adustus and leopard Panthera pardus (classified as 'vulnerable' in the Red Data Book). The herbivores include hippo Hippopotamus amphibius (which has been introduced), waterbuck Kobus ellipsiprymnus, sable antelope Hippotragus niger, klipspringer Oreotragus oreotragus and impala Aepyceros melampus (also introduced). A notable feature of the birdlife is the large number of raptors, with 9 species of eagle (all recorded as breeding in 1972/73), kites, hawks, buzzards, falcons and owls. A few crocodiles Crocodylus niloticus (also now classed as 'vulnerable') inhabit the dam.

ZONING In progress: a wild area and 2 or more development areas are designated at present but an integrated development plan will orient use towards ecological education.

DISTURBANCES OR DEFICIENCIES Past disturbance of vegetation due to cutting, cultivation and fire. Four old mine shafts within the park and mining operations near its borders still continue and may give rise to some poaching. Large-mouth
bass and a cyprinid species have been introduced and sport fishing, in the alleged interest of which crocodiles were formerly controlled, remains a disturbing factor. Materials for park buildings are quarried within its borders.

TOURISM Permanent study centre for the Rhodesian Educational Courses in Conservation and Environmental Studies (R.E.C.E.E.). Day visits only for ordinary visitors except during the school holidays.

SCIENTIFIC RESEARCH A small mammal survey has been made and a detailed description of the park was prepared for the conservation of terrestrial communities section of the International Biological Programme.

SPECIAL SCIENTIFIC FACILITIES None

PRINCIPAL REFERENCE MATERIAL
WRIGHT, P.J. (in prep.) Survey of the small mammals of the Mushandike National Park. Departmental reports with relevant information available on application to National Parks and Wild Life Management Department, P.O. Box 8365, Causeway.

STAFF Senior ranger, 13 other permanent field staff and a small casual labour force, plus staff at the special study centre.

BUDGET Approximately U.S. $14,000, excluding the costs of the special study centre.

LOCAL PARK ADMINISTRATION Senior Ranger in Charge, Mushandike National Park, Private Bag 9036, Fort Victoria, Rhodesia.
RHODESIA

NAME Ngezi National Park
TYPE NP
LEGAL PROTECTION Total
DATE ESTABLISHED 1956, confirmed by the Land Tenure Act, 1969

GEOGRAPHICAL LOCATION On a tributary of the Umniati R. 60 km SE of Gatooma: S 18°38'-18°44'; E 30°20'-30°27'

ALTITUDE 1220-1340 metres
AREA 5800 ha (of which 360 ha are water)
LAND TENURE Nationally owned under the Land Tenure Act

PHYSICAL FEATURES The principal features are the Ngezi R. and dam, the latter constructed on the eastern slope of the Great Dyke, an igneous intrusion extending for over 530 km in central Rhodesia. This section of the Dyke contains pyroxenites which have a marked effect on vegetation. The Mashaba hill, a section of the dyke, rises to 80 m - 100 m above the surrounding country in a series of broken summits. Otherwise the area includes two strips of gently sloping bush land bordering the man-made lake. The Ngezi R. ceases flowing for short periods and none of the subsidiary streams are perennial.

VEGETATION The pyroxenes of the dyke result in the absence of the Andropogon grasslands found elsewhere. The western slope is dominated by Brachystegia boehmi woodlands, but the crest and the eastern slopes have a more open and varied savanna of B. spiciformis, Fauraea saligna and Combretum zeyheri. To the east the flatter granitic sandveld is covered with B. spiciformis and Julbernardia globiflora woodland, interspersed by large grassy vleis or seasonal swamps, while a more mixed vegetation dominated by Sterculia sp., Kirkia acuminata and an occasional baobab Adansonia digitata occurs on granite ridges. Aloe species are common. Shoreline vegetation is well established on the dam, Phragmites mauritianus being the dominant species, especially at the upstream end.

NOTEWORTHY FAUNA A small number of hippo Hippopotamus amphibius occur but the area is noted for its easily visible waterbuck Kobus ellipsiprymnus, big population of reedbuck Redunca arundinum, sable antelope Hyaenota niger and impala Aepyceros melampus. Considerable numbers of duck frequent the dam seasonally and the osprey Pandion haliaetus has often been observed. A significant nesting area for the vulnerable status of the species.

ZONING 3 zones are proposed: (i) development area for administration and tourist facilities; (ii) special conservation area (to include hippo nesting area); and (iii) remaining wild area.

DISTURBANCES OR DEFICIENCIES Use of water results in fluctuating shoreline. Mining activity has left a two-metre-deep trench along the whole length of the dyke and mining claims outside the park have been pegged right up to the boundary. Use for cattle grazing during drought, past cutting and burning and sporadic poaching especially from the uncontrolled public roads traversing the park are other adverse factors.

WDNP IUCN © 1977 (1)F Code: RHO.3.11
TOURISM  Popular for fishing and boating; 4 service lodges with 16 beds and 25 camp sites available for visitors (Salisbury is only 161 km away), the numbers of whom are to be controlled.

SCIENTIFIC RESEARCH  Study of the biology of the tiger fish *Hydrocynus vittatus* is in progress.

SPECIAL SCIENTIFIC FACILITIES  None

PRINCIPAL REFERENCE MATERIAL


STAFF  Senior ranger and 8 other permanent field staff with a small casual labour force.

BUDGET  Approximately U.S. $ 18,000

LOCAL PARK ADMINISTRATION  Senior Ranger in Charge, Ngezi National Park, Private Bag 207, Featherstone, Rhodesia.
RHODESIA

NAME Sebakwe National Park

TYPE NP

BIOTIC PROVINCE 4.6.4

LEGAL PROTECTION Total

DATE ESTABLISHED 1959, confirmed by the Land Tenure Act, 1959

GEOGRAPHICAL LOCATION About 60 km north-east of Gwelo: S 19°00'-19°04'; E 30°13'-30°17'

ALTITUDE 1230-1380 metres

AREA 2700 ha

LAND TENURE Nationally owned under the Land Tenure Act

PHYSICAL FEATURES The central feature is a man-made lake formed by a dam astride the Great Dyke, an intrusive feature of serpentine, pyroxenite and norite rocks important as a deposit of metallurgical chrome. In the west of the park the soils are derived from granitic rocks and doleritic intrusions. An area of from 0.5 km to 1.5 km surrounds the lake which occupies the bulk of the area, the hills of the dyke running on a north-south line to the centre of the lake.

VEGETATION The serpentine soils associated with the dyke in this area support a distinctive open Andropogon grassland and a great number of species which, while they are found elsewhere in Africa are restricted to this one locality in Rhodesia. These include Acacia chariessa, Pearsonia metallifera and Lottonepisserpentinicolora. In the granitic areas Kirkia acuminata is sometimes dominant on steep slopes below the creast-bugging Brachystegia glaucescens which forms the best example of this beautiful woodland to be found in the Rhodesian National Parks. Julbernardia globifera and Brachystegia spiciformis are also present on granite, also a few Sterculia africana trees, here approaching their southern limit. Aloe excelsa occurs in profusion and grows up to 6 m in height, also Euphorbia ingens. The vegetation is generally of great botanical and ecological interest.

NOTEWORTHY FAUNA The surrounding area is settled but some of the larger mammals of the region occasionally occur. In 1974, the granite boulder islands in the lake supported a large mixed heronry with no less than nine species nesting.

ZONING Zoning is planned as a method of reducing the conflicts arising from different forms of land use in the park and its vicinity.

DISTURBANCES OR DEFICIENCIES Mining for chrome and other heavy metals since 1929, has scarred the main hills with trenches and the mining continuing right up to the park boundary may well have an adverse effect in future. Two large granite quarries remaining from dam construction are a prominent feature on the southern shore. Unfenced boundaries result in over-grazing in some areas by cattle from neighbouring ranches, since the whole of the surrounding area is farmed.

TOURISM Limited accommodation, popular for bird-watching, fishing and boating, especially with visitors from Salisbury or Gwelo via Que Que (which is only 51 km away by the road which in the opposite direction leads to Umvuma).

SCIENTIFIC RESEARCH None
SPECIAL SCIENTIFIC FACILITIES
None

PRINCIPAL REFERENCE MATERIAL

STAFF
Senior ranger and 7 other permanent field staff with a small casual labour force.

BUDGET
Approximately U.S. $16,000

LOCAL PARK ADMINISTRATION
Senior Ranger in Charge, Sebakwe National Park,
P.O. Box 636, Que Que, Rhodesia.
NAME   Zimbabwe National Park
TYPE   NP
LEGAL PROTECTION  Total
DATE ESTABLISHED  1952, confirmed by the Land Tenure Act, 1969
GEOGRAPHICAL LOCATION  Near southern shore of Kyle Dam, about 25 km SW of Fort Victoria: S 20°16'-20°17'; E 30°55'-30°57'
ALTITUDE  1025-1300 metres
AREA  746 ha
LAND TENURE  Nationally owned in accordance with the Land Tenure Act; the ruins have been declared a National Monument.

PHYSICAL FEATURES  An area of undulating granite hills and batholiths on the south edge of the Rhodesian plateau, the hills being deeply dissected by tributaries of the Mtilikwe R., while the northern slopes drain to Lake Kyle. A great variety in topography, aspect and drainage make for an equally varied and scenic landscape. Climate is milder than in surrounding areas, frost being a rarity, and the winter dry season is regularly interrupted by orographic rainfall. Annual rainfall is c. 750 mm. The exfoliated granite blocks form convenient building stones, and were used in the construction of the famous Zimbabwe ruins which are the raison d'être of the park.

VEGETATION  One of a series of mesic floral isolates, all presumed to be relics of an earlier forest continuum along the scarps bounding the country on the southeast. There is a complex pattern of habitats and about 500 flowering plants and ferns have been recorded, including several unusual species for the locality. Notable trees are Oricia swynnertonii and Ficus vogelii; flowering Aloe spp. and Erythrina spp. are conspicuous. The resurrection plant Myrothamnus flabellifolius and others on the batholiths show interesting adaptations to varying moisture regimes. The plant succession distinctively reflects a long period of human settlement.

NOTEWORTHY FAUNA  Over 50 mammal species have been recorded: thick-tailed galago (bush-baby) Galago crassicaudatus and vervet monkey Cercopithecus aethiops are abundant and there is still a small population of bushbuck Tragelaphus scriptus. The avifauna is diverse with over 300 species identified, many of them winter visitors. The black rough-wing swallow Psalidoprocne holomelana and swee waxbill Estrilda (= Coccothraustes) melanotis are of biogeographical interest and linked to the floral isolates. A wide variety of lithophilic lizards occur, notably of the genera Platysaurus and Gerrhosaurus.

SPECIAL PURPOSE OF THE AREA  Preservation of the world renowned Zimbabwe ruins, in which process it also serves to safeguard biota of great interest.

ZONING  Not undertaken yet, to be drawn up.
DISTURBANCES OR DEFICIENCIES Almost total removal of woody vegetation by past human impacts produced a very open woodland. Subsequent fire-protection and control of cutting has enabled the vegetation to recover almost up to the limits imposed by climate. Recreational use is now the main cause of disturbance but water extraction, buildings and other construction and the introduction of exotic or ruderal plants are other serious factors.

TOURISM The ruins are a popular attraction and complemented by an archaeological museum. Limited accommodation available in the park; good facilities exist in the surrounding area.

SCIENTIFIC RESEARCH Primarily archaeological but some plant collecting and ornithological observation. Studies of mammals, vegetation and birds in progress.

SPECIAL SCIENTIFIC FACILITIES Archaeological museum and plans for environmental education programmes.

PRINCIPAL REFERENCE MATERIAL

STAFF Senior ranger and 7 other permanent field staff with a small casual labour force.

BUDGET Approximately U.S. $ 24,000

LOCAL PARK ADMINISTRATION Senior Ranger in Charge, Zimbabwe National Park, Private Bag 9087, Fort Victoria, Rhodesia.
SENEGAL

AREA 96,129 km²

POPULATION 3,909,000 (1971)

PARKS AND RESERVES LEGISLATION Up till 1967 the management of the National Parks of Senegal belonged to the Service des Eaux et Forêts of the Ministry of Rural Development. On 29 September 1967, the President of the Republic decided to create a National Parks Service directly responsible to his own Secretariat. In terms of a Presidential Decree No. 69-858 of 22 July 1969, all the parks became the responsibility of the National Parks Office under the Prime Minister. Finally, in April 1973 a Parks Directorate was established at Dakar: it has a total staff of ten headed by the Director, who is appointed by Presidential decree, and is now supervised by the Délégation générale du tourisme, although still within the Prime Minister's over-all responsibilities.

The Forest and the Hunting and Nature Protection Codes also remain in force for the general regulation of nature conservation, but each of the parks also has its own set of rules for this purpose, all of which it is the Chief Conservator's duty to make effective. Guarding the parks, and more particularly the animals, is the job of two brigades of the national Gendarmerie stationed near the Niokolo-Koba park boundaries.

PARKS AND RESERVES ADMINISTRATION The Directorate of National Parks, under the Chief Conservator, maintains liaison with all relevant organizations at national and international level and, subject to the approval of the National Commission on Lands and of the President of the Republic, is empowered to create new reserves, as well as to plan the organization and management, conservation of the flora and fauna, and tourist development of the parks system. The whole structure owes a great deal to the personal interest taken by the President and his Prime Minister in nature conservation and environmental problems.

ADDRESS Direction des parcs nationaux, B.P. 5135, Dakar-Fann, Sénégal.

TOTAL AREA UNDER PROTECTION 842,000

PROTECTED AREAS

1.1 Parc national du Niokolo-Koba 826,000 ha
4.1 Parc national des Oiseaux du Djoudj 12,000 ha
5.1 Parc national de Basse-Casamance 4,000 ha
SENEGAL

NAME: Parc national du Niokolo-Koba

TYPE: NP

LEGAL PROTECTION: Total


GEOGRAPHICAL LOCATION: On either side of the upper Gambia River. N 12°30’-13°20’; W 12°45’-13°30’

ALTITUDE: 16-311 metres (summit of Assirik Mtns.)

AREA: 826,000 ha

LAND TENURE: Public ownership, the park having been formed by the gradual amalgamation of forest reserves and an old hunting reserve.

PHYSICAL FEATURES: Hills, dales and plateaux of low elevation, separated by wide floodplains which during the rains are inundated over a vast area by the Gambia, the only perennial river of the region. Its tributaries, the Niokolo-Koba and Koulountou, more or less cease to flow in the dry season. Soils are derived from a mixture of lateritic and sedimentary materials overlying the Cambrian sandstone strata, which outcrop in places and are themselves underlain by a metamorphic pediment.

The typically Soudanian climate features a dry season from November to May, followed by the wet season with an average rainfall of 1000-1100 mm. May is the hottest month, January the coolest.

VEGETATION: Varies, under the rather extreme climatic pattern, from its dry season aspect of grass parched by sun or burnt by fire and leaves remaining only on a few woody species, through the period of gradual recovery as the rains approach, to the explosion of flowers and leaves when the rains finally break in June. The vegetation reflects the position of the park in a transitional zone, which ranges from characteristically Soudanian grasslands and savanna woodlands, with a variably dense cover of trees and bushes, to more typically Guinean gallery forest. The four principal formations are the seasonally inundated grassland, typically composed of Paspalum orbiculare and Echinochloa; tree savanna, dominated by Pterocarpus erinaceus and Combretum glutinosum; savanna woodland, dominated by Erythrophleum africanum and Terminalia laxiflora; and gallery forest of Cola laurifolia and Zizyphus amphibia. Other locally dominant tree genera are Xylopia, Bombax, Lannea and Borassus, while grassland components include Andropogon and Eleocharis.

NOTEWORTHY FAUNA: Among 70 mammal species recorded are elephant Loxodonta africana (300), buffalo Syncerus caffer (2000) and Hippopotamus amphibius (800), all thought to be increasing. The decline of the giant eland Taurotragus d. derbianus, a Red Data Book subspecies, seems to have been halted and the current population is estimated at 300. Carnivores include Panthera leo and P. pardus, the lynx Felis caracal, palm civet Nandinia binotata, side-striped jackal Canis adustus, wild dog Lycaon pictus and ratel Mellivora capensis. Other interesting species are the red colobus Colobus badius, aardvark Orycteropus afer, giant pangolin Manis (Smutsia) gigantea and the bush pig Potamochoerus porcus. 329 species of
Birds have been recorded, 36 reptiles including three species of crocodile and four of tortoise, 20 amphibians, more than 60 fishes and a great number of invertebrates.

ZONING  Not applied, but there is one hunting zone on the border of the park

DISTURBANCES OR DEFICIENCIES  A start has been made under a recent governmental decision with moving the indigenous inhabitants (c. 4000) outside the park boundaries and is due to be completed in 1974. Poaching, once active, has been largely brought under control. Two large mammal species, the giraffe and topi (Damaliscus korrigum) disappeared from the park in fairly recent years, due it is believed to a combination of hunting pressure and disease. Proposals for barrages on the Gambia and Niokolo-Koba rivers are under consideration, but possible consequences to the ecological balance of the park, which could be irreversible, are to be assessed by the park authorities and, if necessary, UNESCO and IUCN would be consulted.

TOURISM  Open to the public from 15 December to 15 June (6000 visitors in 1972), the park is accessible by road from Dakar (600 km) or by rail and then by road (100 km) from Tambacounda, or by air to Siminti and Niokolo-Koba Camp. There are hotels and lodges at both centres and 1000 km of motorable trails. A private hunting association is based on Niokolo-Koba Camp, shooting being permitted in an area bordering the park mentioned above under 'Zoning'.

SCIENTIFIC RESEARCH  Research workers of national and international organizations such as CNRS, ORSTOM and IFAN are welcomed.

SPECIAL SCIENTIFIC FACILITIES  A laboratory was established at the end of 1973 at Niokolo-Koba Camp and is available throughout the year for approved research workers.

PRINCIPAL REFERENCE MATERIAL


STAFF  A conservator, an assistant director, an accountant and an ecologist, with supporting staff, and 56 game wardens.

BUDGET  US$ 70,000 for maintenance, $53,000 for salaries and about $100,000 over the last three years for equipment.

LOCAL PARK ADMINISTRATION  Chief Conservator, National Parks of Senegal, B.P. 37, Tambacounda.
NAME  Parc national des Oiseaux du Djoudj
TYPE  NP
LEGAL PROTECTION  Total
DATE ESTABLISHED  14 April 1971, by Decree No. 71411
GEOGRAPHICAL LOCATION  In the north of the Senegal River delta, at approximately N 16°25' and W 16°20'
ALTITUDE  Near sea level to c. 20 metres
AREA  c. 12,000 ha
LAND TENURE  Public ownership

PHYSICAL FEATURES  Saline flats of the Senegal River delta between the main channel to the north and the Goram anastomosis to the south. Rain water tends to remain on the surface of the impermeable soils, which are also seasonally flooded by the river. Water salinity varies from nearly fresh during the winter inundation to distinctly brackish as the water level falls: by July the floodplain is dry with only small channels still carrying some fresh water.

VEGETATION  The park lies within the Sahel zone and its typically sparse and uniform vegetation is dominated by thorny bushes principally Acacia nilotica and tamarisk. However, during the rains a very dense vegetation, including bulrush Typha and waterlily species, appears in the wet zones, only to vanish again when the floodplain dries.

NOTEWORTHY FAUNA  Mammals occurring include the patas monkey Erythrocebus patas; the zorilla Ictonyx striatus, Libyan striped weasel Poecilictis libyca, ratel Mellivora capensis, African civet Viberra civetta, striped hyena H. hyaena, the serval Felis serval and African wild cat F. libyca; Bohor reedbuck R. redunca and red-fronted gazelle Gazella rufifrons. Of rare or endangered "Red Data Book" species, the cheetah Acinonyx jubatus has been seen in recent years, and the West African manatee Trichechus senegalensis occasionally swims up the channels at flood times.

Birds are the great feature of the park, as its name implies, over 100 species having been recorded of which 90% are waterfowl and 60% palearctic migrants, their numbers being estimated at times to exceed 2 million. The most abundant migrants are garganey Anas querquedula, marbled teal A. angustirostris, pochard Aythya ferina, ruff Philomachus pugnax and black-tailed godwit L. limosa, while the most abundant resident waterfowl are white-faced tree duck Dendrocycla viduata, fulvous tree duck D. fulva and spur-winged goose Plectropterus gambensis.

SPECIAL OBJECTIVES  The park, which is a great improvement on the small and now defunct Djovol reserve a few kilometres to the south, serves the vital purposes of providing a substantial refuge for the migratory waterfowl which tend to be very heavily exploited wherever they are open to hunting.

ZONING  None in the park but there is a hunting zone on the periphery
DISTURBANCES OR DEFICIENCIES  Poaching is being reduced by good patrolling. The park has become infested by 'hundreds' of feral pigs and donkeys.

TOURISM  Visits on permit (CFA 500), mainly from St. Louis (60 km to the S.W.) and using car, boat, horse, camel and foot. A small huddled camp on the banks of the Gorom River, special observation huts and hides. A large enclosure for Dorcas gazelles, which it is hoped to reintroduce, forms a tourist attraction.

SCIENTIFIC RESEARCH  ORSTOM and the Muséum National d'Histoire Naturelle (Paris) have sponsored research in the area since 1955 and in the last five years in particular, the Museum, the CNRS and the IWRB have sent several expeditions.

SPECIAL SCIENTIFIC FACILITIES  None at present but there is a proposal for a permanent bird ringing (banding) station under the sponsorship of "AFRING" which is trying to organize bird migration studies on a continent-wide basis.

PRINCIPAL REFERENCE MATERIAL

STAFF  A conservator, a scientific assistant, a secretary and 5 game wardens, plus c. 50 temporary staff for development work.

BUDGET  About US$ 39,000

LOCAL PARK ADMINISTRATION  Under the direction of the Bureau des parcs nationaux (B.P. 5135 Dakar-Fann), but address of local office not quoted.
NAME Parc national de Basse-Casamance

TYPE NP

BIOTIC PROVINCE 4.6.1 - 4.7.2

LEGAL PROTECTION Total

DATE ESTABLISHED 1970

GEOGRAPHICAL LOCATION Near Guinea Bissau border, between the town of Oussouye and Cap Skiring (Roxo) on the extreme S.W. coast, at N 12°24' and W 16°35'.

ALTITUDE From near sea level to 14 metres

AREA 4000 ha

LAND TENURE Public ownership

PHYSICAL FEATURES Flats partly traversed by the Casamance River

VEGETATION Mangroves dominate the western end, Guinean woodland savanna and secondary forest the rest. The main Santiaba-Mandjak forest area contains islets of primary forest: these relict patches of species having an affinity to the rain forests of Guinea give the park a high scientific interest. The largest trees are of Parinari excelsa, with Cathormion altissimum, Chlorophora regis, Detarium senegalense and numerous Treculia africana in the lower canopy.

NOTEWORTHY FAUNA Over 30 species of mammals recorded, including primates: a subspecies of mona monkey Cercopithecus mona campbelli, green monkey Cercopithecus aethiops, patas Erythrocebus patas, red colobus Colobus badius and chimpanzee Pan troglodytes; rodents: Becroft's scaly-tailed squirrel Anomalurops beecrofti, crested porcupine Hystrix cristata and great cane rat Thryonomys swynderianus; carnivores: Cape clawless otter Aonyx capensis, genet Genetta sp., the Gambian kusimanse Mungos gambianus, spotted hyaena Crocuta crocuta, serval Felis serval and leopard Panthera pardus; and ungulates: bush pig Potamochoerus porcus, Hippopotamus amphibius, bushbuck Tragelaphus scriptus, buffalo Syncerus caffer, of the smaller subspecies nanus, the duiker Cephalophus maxwelli and Buffon’s kob Kobus kob. Among rarer species are the aardvark Orycteropus afer and the West African manatee Trichechus senegalensis, which is listed in the Red Data Book.

The bird list includes over 120 species, of which the yellow-casqued hornbill Ceratogymna elata, the Senegal touraco Turacu persa buffoni and the blue-billed weaver Malimbus nitens may be mentioned as out of the ordinary. The reptiles and invertebrates also include many interesting species.

ZONING Not applied

DISTURBANCES OR DEFICIENCIES None of note: no resident human population

TOURISM The road from Ziguinchor via Oussouye to the coast skirts the park. About 20 km of paths for guided visits on foot. A camping area with local style-huts is being built outside but near the park. Boat trips on the Casamance River are available.

SCIENTIFIC RESEARCH IFAN (now the Institut Fondamental d’Afrique Noire) has sponsored investigations since 1940 and especially since 1969.
SPECIAL SCIENTIFIC FACILITIES

Scientific research missions are facilitated during the dry season.

PRINCIPAL REFERENCE MATERIAL


STAFF

A director, 8 game wardens and a temporary labour force of about 50 for development of the park.

BUDGET

No information available

LOCAL PARK ADMINISTRATION

Under direction of the Bureau des parcs nationaux (B.P. 5135, Dakar-Fann), but no local address quoted.