



Thirty-first session  
Agenda item 12

LIST OF NATIONAL PARKS AND EQUIVALENT RESERVES

Report by the Secretary-General

INTRODUCTION

1. The United Nations accorded recognition to the significance of national parks and equivalent reserves as an aspect of the wise use of natural resources when the Economic and Social Council adopted resolution 713 (XXVII) at its twenty-seventh session in 1959,<sup>1/</sup> which reads as follows:

"The Economic and Social Council,

"Noting that national parks and equivalent reserves have been established in most countries which are Members of the United Nations or the specialized agencies, and that they contribute to the inspiration, culture and welfare of mankind,

"Believing that these national parks are valuable for economic and scientific reasons and also as areas for the future preservation of fauna and flora and geologic structures in their natural state,

"1. Requests the Secretary-General to establish in co-operation with UNESCO, FAO, and other interested specialized agencies, a list of national parks and equivalent reserves, with a brief description of each, for consideration by the Council at its twenty-ninth session, together with his recommendations for maintaining and developing the list on a current basis and for its distribution; 2/

1/ This proposal originated from a resolution concerning national parks and reserves adopted by the Sixth General Assembly of the International Union for the Conservation of Nature and Natural Resources, held at Athens and Delphi, Greece, in 1958, transmitted to the Secretary-General of the United Nations.

2/ The response to the Secretary-General's invitation to Governments to furnish information for the list was inadequate for the submission of a list at the twenty-ninth session of the Council.

"2. Invites States Members of the United Nations and of the specialized agencies to transmit to the Secretary-General a description of the areas they desire to have internationally registered as national parks or equivalent reserves; and

"3. Furthermore invites the International Union for Conservation of Nature and Natural Resources and other interested non-governmental organizations in consultative status to assist the Secretary-General, upon his request, in the preparation of the proposed list."

2. In accordance with the resolution, the International Union was asked to assist in the analysis of the material submitted by Governments and in the preparation of the list. The International Union assigned this responsibility to its International Commission of National Parks, which has been co-operating closely with the Secretariat of the United Nations and collaborating with the United Nations Educational, Scientific and Cultural Organization and the Food and Agriculture Organization.

3. Prior to 15 December 1960, fifty-two Governments had responded to the Secretary-General's memorandum of inquiry inviting them to furnish information about their national parks and equivalent reserves for consideration for inclusion in the list. It is proposed to issue the list in two parts: Part One, which has been completed and is submitted for consideration by the Council, represents a preliminary list of national parks and reserves in those countries whose Governments supplied information by 15 December 1960; Part Two will include information from those Governments wishing to add their national parks and reserves to the preliminary list, and appropriate revision and additions to the data that have already been included.

4. It is recommended that the International Union for the Conservation of Nature and Natural Resources be invited to undertake the preparation of Part Two of the list and subsequent additions to it, in consultation with the United Nations, the United Nations Educational, Scientific and Cultural Organization, the Food and Agriculture Organization and other interested specialized agencies. In view of the proposed first World Conference on National Parks to be held in Seattle, Washington, United States of America in July 1962, it is hoped that as comprehensive a list as possible will be completed for this Conference.

5. In compiling the material submitted, the definitions set forth in the Secretary-General's memorandum of inquiry were used as guiding principles. They were as follows:

(a) The definition in the Convention Relative to the Preservation of Fauna and Flora in their Natural State, done at London, 8 November 1933, reads (Article 2, para. 1):

"1. The expression 'national park' shall denote an area (a) placed under public control, the boundaries of which shall not be altered or any portion be capable of alienation except by the competent legislative authority; (b) set aside for the propagation, protection and preservation of wild animal life and wild vegetation, and for the preservation of objects of aesthetic, geological, prehistoric, historical, archaeological, or other scientific interest for the benefit, advantage or enjoyment of the general public; (c) in which the hunting, killing or capturing of fauna and the destruction or collection of flora is prohibited except by or under the direction or control of the park authorities. In accordance with the above provisions facilities shall, so far as possible, be given to the general public for observing the fauna and flora in national parks."

(b) The definition in the Convention on Nature Protection and Wild Life Preservation in the Western Hemisphere, done at Washington, 12 October 1940, reads:

"1. The expression 'National Parks' shall denote: Areas established for the protection and preservation of superlative scenery, flora and fauna of national significance which the general public may enjoy and from which it may benefit when placed under public control." (Article 1, para. 1)

"... The resources of these reserves shall not be subject to exploitation for commercial profit." (Article 3, para. 1)

(c) The attention of Governments was also drawn to a definition of the term "equivalent reserves" suggested during the discussion at the twenty-seventh session of the Council by the representative of the United States of America, which reads:

"The term 'equivalent reserves' would apply to those areas which, although not specifically designated as national parks, qualified for inclusion in the international list as significant areas which were given equal protection and which corresponded to the definition given in the London Convention. The list would not include, on the other hand, many reserves such as those set aside for such purposes as the protection of forests, historic monuments or special game species."

6. The material received varied in style, and included comprehensive descriptions of the features and administration of individual national parks and reserves as well as statistical tabulations of various types of reservations. In addition to

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reserves that clearly came within the scope of the above definitions, some reserves ranged in size from a few hectares to thousands of square miles; these reserves are afforded varying degrees of protection depending on the particular purposes for which they were established. Accordingly, those national parks and reserves which appeared clearly to come within the definitions have been described briefly in this preliminary compilation, in those instances where such information was made available officially; other reserves have been listed or presented in tabular form; some of the reserves presented in tabular form will probably qualify for inclusion as national parks or equivalent reserves under the definitions when further information becomes available.

7. There has been wide-spread interest in the fact that the United Nations is issuing this list. A number of Governments have indicated that new legislative measures are now under consideration for the establishment and protection of national parks and equivalent reserves. Other Governments have indicated that they intend to submit additional areas for inclusion in the list. Yet other Governments have been so recently established that they have not completed their programmes for national park and reserve systems, and have expressed the hope that they may have an opportunity to add information on their areas for inclusion in the list. It has also been pointed out that the list will be of the greatest interest to the working party on wildlife management established by the Food and Agriculture Organization's African Forestry Commission.

8. So much valuable data have been received in response to the Secretary-General's request that the Council might wish to request the International Union for Conservation of Nature and Natural Resources to give consideration, on completion of Part Two of the list, to the publication and dissemination of the list for the benefit of all interested countries.

ALBANIA

There are four national parks in Albania which are administered by the Forest Service; all of the land is public domain. The inhabitants of nearby villages may collect wood in the national parks, but no hunting is permitted.

Dajti National Park - 3,000 hectares (7,500 acres), located 25 km east of Tirana, established in 1956. The mountain chain of Dajti ranges from 400 metres to 1,611 metres, rises like a wall east of Tirana, and is covered with forests of beech and pine and with a type of Mediterranean scrub. Beyond, a plateau offers a beautiful view. Access is by motor transportation.

Divjaka National Park - 2,000 hectares (5,000 acres), located 28 km west of Lushnja on the Adriatic Sea, established in 1956. The most interesting aspect is a landscape of dunes along the sea, covered in part with pine forests. Access is by motor transportation except during winter.

Lura National Park - 3,000 hectares (7,500 acres), located 40 km northeast of Burreli, established in 1956. The mountain chains of Deja and Lura form most of the Park, from 1,000 metres to 2,246 metres, and are covered with forests, mostly virgin, of pine, fir and beech. There are many mountain lakes and alpine meadows above the forests. Interesting fauna includes lynx and bear. Access to the Park is by motor transportation; within the Park there are only trails.

Tomori National Park - 3,000 hectares (7,500 acres), located 25 km east of Berat, established in 1956. The Park comprises the mountain chain of Tomori with an altitude of 800 metres to 2,400 metres. The slopes are covered with beech and pine forests and with alpine meadows. Access is by foot only.

AUSTRALIA

NEW SOUTH WALES

With the exception of Kosciusko State Park, which was established by a special Act of Parliament, the procedure for national park establishment is for the Minister for Lands, by Government Gazette notification, to either reserve or dedicate appropriate areas for public recreation and/or the preservation of native flora and fauna under the various statutes, such as the Public Trusts Act 1897-1944, the Public Parks Act of 1912, the Crown Lands Consolidation Act of 1913 and the Fauna Protection Act of 1948. He may alter or modify the boundaries of the areas by Gazette notification, and may revoke a reservation, but the approval of Parliament is required for the revocation of dedicated areas. Each national park is administered by a separate trust of local residents, or in some cases by representatives of Government departments, and the trustees are assisted in their management by separate codes of regulations put into force for the respective areas. A National Parks Act with establishment of a central authority to provide for a co-ordinated management policy and a uniform planning system has been proposed.

Government grants are provided to the National Park Trusts, although at present they are handicapped by a lack of finances. Only a few of the parks have personnel attached to them. Voluntary organizations assist in trail work, development of camping areas, etc., in some of the parks. No research or interpretive facilities are available. Accommodations are usually located in the vicinity of the parks.

Action is proceeding for the dedication of two additional areas as national parks: Barrington, 1,938 acres (775 hectares), and Gloucester Tops, 3,832 acres (1,533 hectares).

National Parks

Blue Mountains National Park - 155,000 acres in the Blue Mountains 60 miles west of Sydney - established in 1959. The park comprises rough broken country of sandstone formation with mountains, towering cliffs, deep gorges and bushland valleys providing scenery of rugged grandeur. The area

preserves a wide variety of native flora and fauna. Stunted and rougher types of flora are found on the higher portions, while the gullies contain thick rain forest type of vegetation, including many types of eucalypts and some attractive blue gums. Access is by motor and rail. Trails have been provided.

Bouddi Natural Park - 1,280 acres (512 hectares) on the east coast - established in 1937. The park contains an area of primitive coastal bushland with magnificent vistas. In the spring, it has a very wide and beautiful variety of coastal native flora. Brisbane Water National Park is located nearby. The park is being kept in its primitive state. Access is by motor and trails are available; fishing is good.

Brisbane Water National Park - 15,000 acres (6,000 hectares) 50 miles north of Sydney - established in 1959. The park comprises several broad ridges with elevations to 800 feet; dropping steeply to the tidal waters, and contains exposed Hawkesbury sandstone tops, deep gullies of rain forest remnants, and sheltered tidal waters in Patonga Mullet and Mooney creeks. The Hawkesbury sandstones have a unique flora and wildflowers are abundant. The park adjoins the Ku-ring-gai Chase at the Hawkesbury River and both areas adjoin the Warrah Sanctuary and Broken Bay National Fitness Camp where natural flora is preserved. Access is by highway and railway which run through the park.

Burrinjuck National Park - 106 acres (42 hectares) 32 miles from the town of Yass - established in 1957. The park comprises a small area of relatively level land on the foreshores of the reservoir; it was set aside purely for recreational purposes, especially aquatic sports. Access is by motor highway; accommodations are available.

Dorrigo National Park - 3,872 acres (1,549 hectares) in northeast New South Wales - established in 1927. The park is a unique example of the scenic grandeur of precipitous coastal mountain country, covered partly with dense bush, vines, thick undergrowth and tall hardwood trees. It contains spectacular waterfalls. Access is by a motor road leading to the mountain top, and trails are provided. No overnight accommodations are available.

Frazer Park - 2,152 acres (861 hectares) on the Pacific coast - established in 1927. The park includes an area of undulating to steep coastal country covered mainly with scrub and stunted timber, with ocean frontage of about three miles. Access is by motor road; shelter sheds and other conveniences are available.

Garawarra Park - 1,465 acres (586 hectares) 20 miles south of Sydney - established in 1934. The park consists mainly of open forest sandstone gullies, but there are also remnants of the rare sub-tropical jungle once found along the coast, that contain a variety of palms, vines, ferns and rare types of flora, as well as a wealth of bird life. The park is being kept very much in its primitive state. A popular surfing area is located on the eastern boundary. The park adjoins the Royal National Park on the north and the Heathcote Primitive Area is a short distance away. Trails and shelter sheds are available on the beach.

Glenbawn Dam National Park - 344 acres (138 hectares) in the Upper Hunter region of the central-northern tablelands - established in 1958. The park comprises mainly hilly and undulating country along the foreshores and around a reservoir. It was set aside as a recreational area and is being developed. Access is by motor transportation.

Keepit National Park - 44 acres (18 hectares); to be completed to 1,000 acres when the reservoir is completed, in the central north-west section of New South Wales - established in 1957. The park is an undulating area with hilly parts, mostly dead timber land, having been cleared for grazing. It is primarily a recreational area, and a potential waterbird sanctuary. Access is by motor highway; facilities for aquatic sports are available.

Kosciusko State Park - 1,500,000 acres (600,000 hectares) in southern New South Wales - established in 1944. The park was established by a special Act of Parliament primarily to protect the watershed and to set aside a winter sports area, as well as to protect the natural features. The terrain varies from open rolling plateaus covered with grass to precipitous rugged country. The basic formation is granite; in the northern section are large tracts of limestone, honeycombed with underground



caves, rivers and creeks. The Yarrangubilly Caves are a notable attraction. The park includes Mt. Kosciusko, the highest mountain in Australia, rising to 7,308 feet, and other mountains. The Snowy Mountains Hydro-electric Scheme is situated mainly within the boundaries of the park, and consists of large river dams, underground tunnels and power stations. There is some private land within the park, and leased grazing is permitted in the lower portions. Access is by an extensive road system developed in the park. A hotel, ski lodges, ski lifts and guided tours are available.

Lane Cove National Park - 830 acres (332 hectares) along the banks of the Lane Cove River in some northern suburbs of Sydney - established in 1930. A considerable portion of the country is rough and broken, with a good variety of native flora. Large areas along the river bank have been developed as recreational grounds, with facilities for swimming, boating, picnicking. Access is by motor highways leading throughout the park.

Mount Canobolas National Park - 4,110 acres (1,644 hectares) 8 miles from the city of Orange - established in 1944. The park is a mountainous area of volcanic origin in the central tablelands, with Mount Canobolas (4,610 feet) providing miles of scenic views. Access is a road to the summit; trails are available.

Mount Kaputar National Park - 2,550 acres (1,020 hectares) in the central northwest part of New South Wales - established in 1925. The park is located in the Nandewar Range (highest altitude 5,000 feet) and contains steep precipitous slopes, deep gorges and high cliffs. A variety of native flora and fauna occur, and natural conditions are preserved. Access is by a gravel road; a shelter is available.

New England National Park - 56,150 acres (22,460 hectares) 50 miles east of Armidale - established in 1935. The park consists of a mountainous area (altitude 1,000 to 5,200 feet) on the eastern slopes of the Great Dividing Range. It is largely rain forest with hardwoods on the ridge tops and contains a wide variety of native trees, including red cedar, hoop-pine and tallowood. Deep valleys contain streams forming part of

the coastal rivers. This area is mainly untouched, except for a few trails. There are almost no exotic plants or animals. The park adjoins extensive areas of state forest. Access is by motor roads and trails.

Royal National Park - 36,800 acres (14,620 hectares) on the Pacific coast - established in 1886, proclaimed a national park in 1955. The park is a giant reserve of natural forest, containing many species of native flora and fauna. Its eastern boundary is eight miles of coast, broken by fine surfing beaches interspersed with noble headlands. The park adjoins Garrawarra Park and Heathcote Primitive Area. Access is by scenic roads leading throughout the park with trails to scenic areas. Guest houses, shelter sheds, tennis courts, boats and a swimming pool are available.

Warrumbungle National Park - 8,300 acres (3,320 hectares) in the Warrumbungle Mountains in northwestern New South Wales - established in 1953. The park consists of a rough, broken mountainous range of unique dormant volcanic peaks and spires. There are many majestic rock formations of various shapes and sizes. The area is covered with a variety of native flora. Wildlife includes many kangaroos, wallaroos, giant wedge-tail eagles and other species. Access is by road. Accommodations, recreational facilities and hiking trails are planned.

Wyangala National Park - 1,068 acres (427 hectares) in west-central New South Wales - established in 1949. The park is a hilly and undulating area surrounding the Wyangala Reservoir. It is mainly a recreational area. Access is by highway. Camping facilities are available.

#### Other Nature Reserves

Heathcote Primitive Area - 1,760 acres (705 hectares) 20 miles south of Sydney - established in 1943. The reserve is comprised of the steep-sloped Heathcote Creek valley in broken rugged terrain, covered with thick scrub containing a variety of native flora and fauna. Trails are available throughout the reserve, a popular hiking and camping area.

Ku-Ring-Gai Chase - 38,000 acres (15,200 hectares) south of Sydney -

established in 1894. The area consists of a rough broken country with exposed sandstone ridges, bushland scrub, rain forest vegetation in the deep gullies, and protected tidal inlets. A profusion of native flowers thrive in the area. Although extensively developed, a large area is maintained in its primitive state. A small fauna sanctuary exhibits koalas, kangaroos and other wildlife. The park adjoins Brisbane Water National Park, Warrah Sanctuary, Broken Bay National Fitness Camp and Muogamarra Sanctuary. Access is by highway and scenic roads throughout the park. Trails, boating centres, camping areas and swimming pools are provided.

Morton Primitive Area - 45,000 acres (18,000 hectares) in the coastal range

100 miles south of Sydney - established in 1938. The area is rugged mountain country with sandstone tops and deep gorges. The higher areas are generally of poorer quality bloodwood-scribbly gum open forest associations tending toward heathland in places. The gorges have good hardwood forests on their slopes and heavy rain forests on the floors. The junction of the Kangaroo and Shoelhaven rivers is within the area and the rugged gorges and cliffs provide magnificent views. The park contains some private lands. Access is by highway to the park perimeter, with very rough vehicular tracks and trails in the area. Shelter sheds are available.

#### Faunal Reserves

Faunal reserves are established under the Fauna Protection Act of 1948. The areas are dedicated by the Governor for protection, propagation and study of fauna. Any dedication under this section shall not be revoked wholly or in part without an Act of Parliament. The areas are administered by the Fauna Protection Panel under the chairmanship of the Chief Guardian of Fauna, an officer in the Chief Secretary's office. Taking or killing of fauna, and mining are prohibited; cutting of timber and grazing require special permission by the Panel. Inspectors and voluntary rangers patrol the areas when possible. Government grants are provided for the reserves. The following are the most important faunal reserves:

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Barren Grounds Faunal Reserve - 3,680 acres (1,472 hectares) in the coastal range south of Sydney - established in 1949. The reserve is a gently undulating elevated plateau with sandstone formations, containing scattered growths of stunted timber and low heath scrub. Swampy areas occur along most of the creeks. There is a considerable variety of flora; the principal fauna is bird life, including the rare ground parrot. Prior to being reserved, the area was leased for grazing purposes and was often burned to promote grass growth, which destroyed considerable flora and fauna, and endangered the swamps. However, grazing has been controlled, and in a few years, the area should become a veritable paradise of heath, flowers, scrub, and bird and animal life. The reserve adjoins other reservations. Access is by road.

Nadgee Faunal Reserve - 28,000 acres (11,200 hectares) on the border between New South Wales and Victoria, adjoining the Pacific coastline - established in 1957. The reserve presents an excellent combination of seashore, lagoon, moorland, swamp, river and river valley, open forest, hill and mountain, and is rather isolated. In the past, there was indiscriminate trapping and hunting, and bushfires destroyed some of the flora. The western boundary of the reserve adjoins state forests. Access is by highway with a very rough track leading into the area; fishing is good.

## AUSTRALIA

### NORTHERN TERRITORY

There are four reserves in the Northern Territory established by proclamation of the Minister of State for the Territories, under the Crown Lands Ordinance. The Cobourg Peninsula Flora and Fauna Reserve is administered by the Northern Territory Administration, while the other reserves are administered under the Northern Territory Reserves Board which derives its power under the National Parks and Gardens Ordinance. Funds are obtained by grants from the Commonwealth.

#### Parks and Reserves

Ayers Rock-Mount Olga National Park - 487 square miles in southwest Northern Territory - established in 1958. The area comprises two huge monoliths of sedimentary quartzite of granite origin rising out of a flat open plain from 1,720 to a maximum height of 2,820 feet. There are native paintings on the rocks. Flora consists of desert oak, mulga, mallee and much spinifex. Field personnel is one ranger. Camping facilities are available.

Howard Springs Public Park and Recreation Reserve - 700 acres (335 hectares) near Darwin - established in 1952. The park includes a small watercourse fed by springs rising in a jungle patch set in open savannah forest. A dam has been built and a swimming pool created adjacent to a fine picnic ground. Access is by highway.

Cobourg Peninsula Flora and Fauna Reserve - over 100 square miles in upper Northern Territory above the Van Dieman Gulf - established in 1924. The reserve consists of a large, heavily indented peninsula generally 20 to 50 feet above the high water mark, covered with open savannah forest. There are two small hills about 250 feet above the general level. In addition to the normal eucalypts, there are also good stands of cypress pine. Fauna includes kangaroos, buffalo, and many species of birds, including the large brolga, bush turkey, and tiny finch. There is good fishing in the coastal waters.

Simpsons Gap National Park - 1 square mile in north Northern Territory -  
established in 1957. The area contains a gap in the MacDonnell Ranges  
(average altitude 2,500 feet) through which runs a large watercourse with  
a deep pool. Mulga and river gums surround the pool.

AUSTRALIA

QUEENSLAND

National parks in Queensland are proclaimed under the "State Forests and Parks Act 1906 to 1948" by the Governor in Council, and are vested in the Crown. After proclamation, the areas may not be alienated except by a special Act of Parliament.

National parks in Queensland are areas of outstanding scenic, scientific and recreational interest, set aside for preservation for all time in their primeval condition for the recreation, health, enjoyment and education of the people.

The national parks are automatically sanctuaries under the Fauna Conservation Act, affording native birds and other animals full protection. The Forestry Department administers the areas. Two national park rangers supervise a staff of 50 men, and Honorary Rangers assist them on weekends. The 1958-1959 budget was £42,000.

In the administration of national parks, the Department has the support of public bodies interested in protection and conservation of native flora and fauna, notably the National Parks Association of Queensland, whose members are constantly on the lookout for suitable additional areas which might be proclaimed national parks.

The policy followed is to interfere as little as possible with the vegetation and thus to preserve the primitive beauty so that areas will remain unimpaired for the enjoyment of future generations. Under this ideal, there is no marketing of timber, no gathering of flora or artificial landscaping, no hunting of wildlife, and no introduction of any plant, birdlife or other animal life not indigenous to the particular locality.

Because of control by a single authority, all national parks in Queensland are administered to the same code of conditions and restrictions. Public reaction to the administrative policy followed has been very favourable and the number of visitors to the national parks reached 500,000 annually.

The chief work carried out by the Forestry Department on National Parks has been the construction of carefully located and easy graded walking tracks

which can be carried out with a minimum of interference to nature and fit unobtrusively into the landscape. As of 31 December 1958, there were approximately 245 miles of such graded tracks. Other improvements comprise picnic ground facilities, toilet facilities, appropriate entrances using local materials to harmonize with the surroundings, nameplating of selected trees along the walking tracks, feature lookouts with safety fences, and a comprehensive system of distinctive signs and notices. These improvements are carried out by the resident Overseers and workmen as employees of the Forestry Department, under the direction and supervision of the National Parks Rangers and are paid for from the annual allotment of funds by the government for national parks work.

No specific educational or interpretation services are provided for visitors, but the services and advice of the national parks Rangers and the resident field staff are available for the guidance of visitors to the parks. Every co-operation is extended to botanists, scientists, etc., who may wish to visit the parks in furtherance of their studies.

On all the more popular mountain and island national parks, guest houses cater for the accommodation of tourists, but these are privately conducted. However, where such guest houses are located on the national park or Crown land held under leasehold, protective conditions for the national park are included in the lease.

As of 31 December 1958, there were 252 national parks containing 837,394 acres (338,957 hectares). However, this figure represents only .195 per cent of the total area of Queensland. It is estimated this parkland comprises 350,000 acres of scrub and 487,394 acres of forest. These reservations are selected areas of wide representation of bushland between the New South Wales border in the south and the Atherton Tableland in the north, as well as many of the islands in the Great Barrier Reef along the coast of Queensland. Some of the more noteworthy areas are as follows:

Bellenden Ker National Park - characterized by tropical forests. The State's highest peak, Mt. Bartle Frere, is contained in the park, and many of the jungle-clad peaks in the McPherson and Great Dividing Ranges in South Queensland are also set aside as national parks.



Bunya Mountains National Park - includes a variety of botanical interests, varying from sub-tropical coastal forests to drier inland vegetation. The Bunya pine (Araucaria bidwilli) is the most interesting tree species in this area.

Carnarvon Range National Park - the most westerly national park, it has a varied forest cover and evidence of former aboriginal inhabitants.

Eungella National Park - 120,360 acres (48,144 hectares), the largest national park in Queensland, it is characterized by tropical forests.

Green Island National Park - has a unique underwater observatory from which may be viewed at first hand colourful coral, fishes and marine life.

Hinchinbrook Island National Park - 97,000 acres (38,800 hectares), the largest island national park, it carries characteristic scrub forest with a backbone of serrated peaks.

Lamington National Park - the best known of Queensland's national parks. In addition to inspiring views, it contains numerous waterfalls and a wealth of trees and herbaceous species - including Antarctic beech (Nothofagus) which reaches the northern-most extent of its range in this area.

Tully Falls National Park - the falls drop 725 feet into a boiling chasm with sheer rock walls.

Reservations of great beauty surround the unique jungle girt lakes of Eacham and Barrine, both national parks, while the Crater National Park embraces an extinct volcano (Mt. Hypipamee).

AUSTRALIA

SOUTH AUSTRALIA

National Park

The National Park - 2,243 acres (897 hectares), eight miles south of Adelaide, established in 1891. The park was established under the National Park and Wildlife Reserves Act, 1891-1955. No alteration of its boundaries may be made except by Act of Parliament. A Board of Commissioners administers the park. Annual appropriations are £15,000 (\$42,000) supplemented by governmental grants. The park comprises an area in the Mount Lofty Ranges, and its objectives are to give complete protection to native plants and animals under natural conditions, and to provide a place for public enjoyment. Much of the area is open virgin savannah eucalypt forest in the lower western areas, rising to steep rocky hills to the east. The more level areas have been altered by livestock grazing and removal of timber. Roads penetrate the park and a lookout tower provides a panoramic view. Tennis courts, a golf course and picnic areas are available.

Nature Reserves

The following Reserves are established under the Park and Wildlife Reserves Act and are administered by the Board of Commissioners of the National Park and Wildlife Reserves. The primary objective is the preservation of native flora and fauna.

Ferries and McDonald Reserves - 2,000 acres (800 hectares) on the east side of Mount Lofty Ranges, established in 1956. The reserves comprise an area of sandy soil thickly covered by low scrubby eucalypt and brush. These reserves are perhaps the last places where the Mallee Hen (Leipoa) occurs in its native state. Kangaroos and a variety of smaller bird species also inhabit the area. Some destruction of fauna occurs when they leave the reserves for food in the surrounding area.

Nixon Skinner Reserve - 20 acres (8 hectares), in the southern Mount Lofty Ranges, established in 1958. The reserve contains an area of savannah and eucalyptus forest with virgin undergrowth.

The following reserves have been proclaimed in the Government Gazettes. They are administered by the Flora and Fauna Committee of the Department of Agriculture. Each reserve is a characteristic area of virgin country and considered as being too arid and barren for clearing and cultivation with a liability to wind scouring if cleared. These large tracts of land are covered with considerable vegetation, some of it unique and some of the species of plants are very rare. They are inhabited by a considerable population of birds and marsupials.

County of Jervois - 128,525 acres (51,410 hectares) established in 1957

Hundred of Archibald - 35,400 acres (13,800 hectares) established in 1953

Hundred of Billiatt - 56,000 acres (22,400 hectares) established in 1940

Hundred of Flinders - 35,522 acres (14,209 hectares) established in 1957

Hundred of Hambridge - 38,950 acres (15,580 hectares) established in 1957

Hundred of Hinks - 55,620 acres (22,248 hectares) established in 1957

Hundred of Lake Wangary - 4,502 acres (1,801 hectares) established in 1954

Hundred of Makin - 12,150 acres (4,860 hectares) established in 1953

Hundred of Minnipa - 41 acres (16 hectares) established in 1957

Hundred of Murlong - 27,520 acres (11,008 hectares) established in 1957

Hundred of Nicholls - 29,620 acres (11,848 hectares) established in 1957

Hundred of Peebinga - 6,088 acres (2,435 hectares) established in 1940

The following reserve was established under the Flora and Fauna Reserve Act, 1919-1935, for the protection of fauna and flora and for a pleasure and health resort. It is administered by the Fauna and Flora Board; appropriations for 1958/59 were £4,800 (\$13,440).

Flinders Chase - 212 square miles on the western end of Kangaroo Island, established in 1919. The reserve comprises an ancient peneplain tilting to the south with the highest point at Mount McDonnell (800 feet). The north coast has abrupt cliffs with small valleys and beaches. Fauna includes the black faced kangaroo (Macropus fuliginosus) which is found only on Kangaroo Island, echidnas, dama wallabies (Thylogale eugenii), black swans and pelicans. Native bears (Koalas) and platypuses have been introduced. Several new species of plants have been recorded, but have not yet been taxonomically described. The reserve is accessible by road.

#### Tourist Bureau Reserves

The South Australian Tourist Bureau has several areas of Crown Lands near Adelaide under its control, of which the following are the most important.

Horsnells Gully Reserve in the Adelaide Hills

Morialta Reserve in the Adelaide Hills

Obelisk Estate - 1,753 acres (701 hectares) in the Adelaide Hills, established in 1945. The Estate comprises an area which ranges from the foothills to the crest of Mount Lofty (2,000 feet). Natural vegetation in a virgin condition is preserved over the greater part of the area; dominant trees are eucalypts and acacias. The lower elevations are covered with introduced species of pasture grasses, as a result of grazing.

AUSTRALIA

TASMANIA

There are two national parks in Tasmania which were established under the Scenery Preservation Act of 1915, and its amendments, by proclamation of the Governor after recommendation of the Scenery Preservation Board which administers the Act; boundary alterations are made in the same manner. Regulations prohibit the hunting of wildlife, removal of vegetation, and grazing. Each park is administered by a special board. The primary objective is to retain the national parks in their natural state and to develop accommodation facilities. Field personnel, consists of six park rangers, of the Scenery Preservation Section of the Lands and Surveys Department, and additional labour when needed. The Scenery Preservation Board publishes an annual report. The Government Tourist Department and private tourist agencies distribute information and arrange park tours. Scientific material is available.

National Parks

Cradle Mt.-Lake St. Clair National Park - 333,106 acres (133,240 hectares) in northeast Tasmania - established in 1922. The park comprises an unspoiled scenic area of mountains, lakes, rivers and forests, with an altitude range of 2,000 to 5,310 feet at the summit of Mt. Ossa, the highest mountain in Tasmania. The area contains extensive forests of King William pine and pencil pine, and eucalypt, typical examples of Tasmanian rain forest, savannahs and plains with peculiar flora, and mountains of interesting geological formation with colorful flora. Lake St. Clair, located in the park, is connected to the state hydro-electric power system and is used for water storage purposes. There is a privately owned area of pine forest within the park. Access is by highway, and accommodations are available.

Mount Field National Park - 42,020 acres (16,808 hectares) 50 miles from Hobart - established in 1916. The area includes forests of giant eucalypt, rain forest, highland moors with a distinctive flora, mountains, fern gullies,

lakes and waterfalls. The altitude ranges from 514 to 4,710 feet at the summit of Mt. Field West. There is much evidence of glaciation in the valley floors, moraines and erratics. Several extensive areas of flora unique to specialized situations in Tasmania occur in the park - horizontal scrub (Biglandulosum anodopetalum), deciduous beech (Nothofagus gunnii), and the leatherwood (a member of the saxifrage family). Two other plants endemic to Tasmania are the giant heath (Richea pandannifolia) and the climbing epacris. Varied flora occur at each elevation. The mountain shrimp (Anaspides tasmanica), a "living fossil" which is unique to Tasmania, is found in the mountain tarns. Native fauna is plentifully dispersed throughout the park, and Lake Fenton has been dammed to augment Hobart's water supply. A public company manufacturing newsprint holds large forest concessions on the park's western boundary. The park is accessible by a highway into the centre. Accommodations and skiing facilities are available; fishing is permitted.

#### Other Parks and Reserves

Detailed information is not available on the following areas:

- Ben Lomond National Park - 39,460 acres (15,784 hectares) in northeast Tasmania.
- Frenchman's Cap National Park - 25,380 acres (10,151 hectares) on the west coast.
- Freycinet Peninsula National Park - 16,050 acres (6,420 hectares) on the east coast.
- Hartz Mts. National Park - 22,300 acres (8,920 hectares) in south Tasmania.
- Lake Pedder National Park - 59,000 acres (23,600 hectares) in southwest Tasmania.
- Mt. Barrow National Park - 1,134 acres (453 hectares) in northern Tasmania.

#### Mountain Reserves

Mt. Strzelecki - 8,500 acres (3,400 hectares) on Flinders Island.

Coastal Reserves

- Brown Mt.-Remarkable Caves - 150 acres (60 hectares) on Tasman Peninsula.
- Cookville-Penguin Island - 3 acres (1 hectare) on Bruny Island.
- Eaglehawk Neck and Foreshore - 90 acres (36 hectares) on Tasman Peninsula.
- Eaglehawk Neck-Taranna - 61 acres (20 hectares) on Tasman Peninsula.
- Fluted Cape-Cloudy Bay - 600 acres (240 hectares) on Bruny Island.
- Lookout Rock - 5 acres (2 hectares) in Bicheno.
- Port Davey Foreshore - 1,350 acres (640 hectares) in southwest Tasmania.
- Pt. Puer-Crescent Bay - 92 acres (37 hectares) on Tasman Peninsula.
- Pt. Puer Approach - 84 acres (34 hectares) on Tasman Peninsula.
- Stewart's Bay, Esplanade, Pt. Puer - 58 acres (23 hectares) on Tasman Peninsula.
- Tasman Arch-Blowhole - 146 acres (58 hectares) on Tasman Peninsula.
- Waterfall Bay - 30 acres (12 hectares) on Tasman Peninsula.

Waterfall Reserves

- Forth - 64 acres (26 hectares) at Sheffield.
- Liffey - 50 acres (20 hectares) at Western Tiers.
- Marriott - 300 acres (120 hectares) in national park.
- St. Columbia - 775 acres (310 hectares) at Pyengana.

River Reserves

- Derwent Cliffs - 11 acres (4 hectares) at New Norfolk.
- River Gordon - 6,200 acres (2,400 hectares) on the west coast.
- River Pieman - 8,170 acres (3,268 hectares) on the west coast.
- Roger River Pass - 430 acres (172 hectares) on northwest Tasmania.

Cave Reserves

Baldock - 105 acres (42 hectares) at Mole Creek.

Hastings - 131 acres (52 hectares) in southern Tasmania.

King Solomon - 500 acres (200 hectares) at Mole Creek.

Maracoopa - 146 acres (58 hectares) at Mole Creek.

Scenic Roads

Lyell Highway - 18,000 acres (7,200 hectares) in Western Highlands.

St. Marys Pass - 674 acres (270 hectares) at St. Marys.

Weldborough - 169 acres (68 hectares) in northeast Tasmania.

Zeehan-Renison Bell - 272 acres (109 hectares) on west coast.

Fern Gullies and Forests

Bird Sanctuary - 16 acres (6 hectares) at Steppes.

Corinna - 3 acres (1 hectare) on the west coast.

Corra Linn - 1 acre (.5 hectare) at Launceston.

Ferndene Gorge - 6 acres (2 hectares) at Penquin.

Hellyer Gorge - 198 acres (79 hectares) in the Waratah area.

Notley Gorge - 28 acres (11 hectares) at West Tamar.

Waterfall Creek - 60 acres (24 hectares) on Bruny Island.



AUSTRALIA

VICTORIA

The first of Victoria's national parks was reserved under the Land Act of 1869 until 1956 when the National Parks Act of Victoria came into effect. This Act established principles of protection and administration and established a National Parks Authority responsible to the Premier, with membership from Government Departments, private associations and individuals. The Governor in Council, in co-operation with the Authority, promulgates regulations and has general cognizance over the national parks. The National Parks Association of Victoria, a private organization, assists the Authority and publishes extensively on the national parks.

National Parks

Alfred Park - 5,406 acres (2,162 hectares) in East Gippsland, established in 1925.

The park consists of a steep and mountainous area with valleys on the eastern slope of Mt. Drummer and contains a dense sub-tropical jungle. Water vines (Cirsus tyopglaucus) with diameters up to a foot or more entwine the trunks of kanookas (Tristania laurina), blackwoods (Acacia melanoxylon) and lilly pillly (Acinertia smithii). Along the gullies, ferns grow in profusion, with occasional specimens of tree orchid. The violet nightshade (Solanum violaceum) is known only in Victoria from the Drummer jungle, and the downy shield fern (Dryopteris tenera) reaches its western limit in the park. The park is being maintained in a primitive state. Access is by the Princes Highway which passes through the park.

Bulga Park - 91 acres (36 hectares) in eastern Victoria, established in 1941.

The park preserves a perfect example of the lovely rainforest which once clothed the Strzelecki Ranges and is particularly rich in rare ferns, mosses, sassafras and myrtle which grow in profusion. A suspension bridge spans one of the more beautiful fern gullies. Access is by highway and trails and a picnic ground are available. Accommodations are near the park.

Churchill National Park - 477 acres (191 hectares) in the suburbs of Melbourne, established in 1930. The park preserves natural bushland and its fauna and

offers beautiful vistas of the surrounding Dandenong Ranges. Access is by highway.

Fern Tree Gulley National Park - 927 acres (371 hectares) in the Dandenong Ranges in southern Victoria, reserved in 1887 and designated as a national park in 1928. From the summit of One Tree Hill, 1,647 feet above sea level, are panoramic views over the blue-shadowed mountains and across the bays. The hillsides are thickly wooded with tall mountain gray gums, peppermint, messmate and long-leaf box, and are inhabited with many species of wildlife, including the echidna, wombat, bell bird and whip bird. Picnic facilities are provided. Access is by highway and electric railway.

Fraser National Park - 6,600 acres (2,640 hectares) in central Victoria, established in 1957. The park covers the Eildon Reservoir and its 300 miles of forested shoreline, with picturesque inlets, bays and headlands. From the high ridges in the park are magnificent views of the Victorian Alps. Kangaroos, wombats and other wildlife inhabit the park. Provision is being made for picnicking, camping and boating, swimming and fishing facilities, and the Maroonah Highway is famous for its scenery.

Kinglake National Park - 14,079 acres (5,632 hectares) in south-central Victoria, established in 1928. Located on the southern slopes of the Plenty Ranges, the park is heavily forested mountain country, intersected in places by deep fern gullies, some with waterfalls, which provide an excellent habitat for the lyrebird and other unique wildlife. Over 326 plant species have been recorded including many species of eucalypts, acacias and orchids and ferns. Two unusual and rare orchids are the small *Sarcophilus* and the elbow orchid. Wildlife includes wombat, great grey kangaroo, blacktailed wallaby, bandicoot, dasyure, ring-tail possum, koala, echidna, platypus, several species of reptiles and numerous species of birds. Access is by highway which leads through the park. Trails, tourist facilities and shelter houses are available. The annual visitation is 16,000 (one ranger).

Lakes National Park - 4,938 acres (1,975 hectares) located on the Sperm Whale Peninsula in the Gippsland Lakes District. The park consists of a sand dune area set aside as a sanctuary for fauna and flora. Rich in bird life, more than 140 species have been recorded including many waterbirds as well as

other kinds associated with the heathland and forest country, and most notably the very rare green and crimson ground parrot. Great grey kangaroo, black-tailed wallaby, brush wallaby (rare), koala (rare), brush-tailed opossum, ring-tailed opossum, opossum mouse, phalangers, water rat, wombat, echidna and tortoise inhabit the park. The park is also notable as the only locality of the fine white flowered Thryptomene miqueliana and as the western limit of the mahogany gum (Eucalyptus botryoides). The area was in the territory of a sub-tribe of aborigines called the Brabalungs. Access is by water and by automobile, and a vehicle track penetrates the park.

Lind Park - 2,882 acres (1,153 hectares) in East Gippsland, established in 1926.

The park lies within the drainage basin of the Bemm River and is characterized by steep-sided valleys. The area is very rich in plant life and includes several unusual species, e.g., the brilliant red gippsland waratah (Telopea oreades). Many species of eucalypts occur and along the valley of the Euchre Creek there is a dense semitropical rain forest with blackwood, (Acacia melanoxylon), kanooka (Tristania laurina), lilly pilly (Acinera smithii), blanket wood (Bedfordia salicina), musk (Olearia argophylla), sweet pittosporum (Pittosporum undulatum), and hazel pomaderris (Pomaderris apetala). The park is a primitive area and no roads have been built into it. Access to the park is by the Princes Highway.

Mallacoota Inlet National Park - 11,225 acres (4,490 hectares) on the extreme eastern coast, established in 1932. The park includes an almost enclosed inlet on the Genoa River and provides protection for the fauna and flora of the evergreen bush. The Inlet has excellent facilities for swimming, boating and fishing. There are several hundred acres of private lands within the park boundary. Access is by highway, rail and water. Accommodations are available at the township of Mallacoota.

Mt. Buffalo National Park - 27,280 acres (10,912 hectares) in northeastern Victoria, established in 1898. Mt. Buffalo is a vast granite plateau rising nearly 6,000 feet above sea level. The plant associations include a wet sclerophyll forest, sub-alpine woodland, sod tussock grassland along the broad valleys, heath land, and lichens and mosses on bare rock. Attractive

wildflowers bloom in the spring. Wildlife includes wombats, wallabies, echidna, kangaroos and many species of birds including the lyrebird. Access is by roads which extend through the park. Lake Catani, an artificial lake, supplies boating and fishing. Ski runs, a ski lodge, a chalet, trails and tourist facilities are available.

Tarra Valley National Park - 200 acres (80 hectares) in the Strzelecki Ranges of East Gippsland, established in 1941. The park comprises an area of native vegetation with deep gullies and is particularly noted for its luxuriance and variety of ferns of which 36 species occur. Much of the area is dominated by mountain ash (Eucalyptus regnans), while in the deep gullies Myrtle beech, sassafras, blackwood and tree ferns predominate. Eighty-nine species of flowering plants have been recorded and 160 species of fungi, including several new species that have been discovered in the park. Black-tailed wallaby, wombat, platypus, koala, short-nosed bandicoot, echidna and other animals and many birds inhabit the park. Access is by highway. Trails and picnic facilities are available.

Tower Hill National Park - 1,360 acres (544 hectares) in southern Victoria, established in 1892. The park consists of a beautiful coastal volcanic caldera, and protects waterfowl and other wildlife, which is recovering from former shooting and burning of the habitat.

Wilson's Promontory National Park - 102,379 acres (40,952 hectares) on the southern coast of Victoria, established in 1905. Majestic peaks sweep down to wide white beaches and sheltered bays; the park includes 80 miles of magnificent coastal scenery, backed by fern gullies and winding streams, with a profusion of wildflowers. Wildlife is abundant and includes wombats, koalas, emus and variety of other species. Excellent tourist facilities are available. Access is by highway.

Wingan Inlet National Park - 4,730 acres (1,897 hectares) on the eastern coast, established in 1909. The park is located at the mouth of the Wingan River, with a hinterland of rugged mountain terrain. Miles of white beaches border the ocean, and many birds forage on the shore and among the sand dunes. The flora is colorful and varied. Practically undisturbed since the first

explorer landed here in 1797, the environment has remained almost unchanged. There are no facilities except rough hiking tracks, and the area is visited mainly by fishermen.

Wyperfeld National Park - 140,000 acres (56,000 hectares) in northwestern Victoria, established in 1921. The park was reserved especially to protect the extraordinary wildlife of the semi-desert Mallee region. The western section is predominantly sandhill country, lightly covered with heath and dwarf shrubs, while the eastern section is dominated by Mallee. Black box and red gum trees are dominant on the creek flats. In spring a profusion of wildflowers covers the landscape. Many kinds of birds inhabit the park, including the Major Mitchell Cockatoo, the Regent Parrot, emu and the rare Mallee Hen or Lowan. Black-faced kangaroos abound on the flats. The only facilities are a hut and sandy vehicle tracks. Access is by road.

AUSTRALIA

WESTERN AUSTRALIA

There are more than 450 nature reserves, ranging in size from one-quarter acre upwards, set apart as national parks and for the protection of flora and fauna. Some of these were established soon after the State was founded in 1829, and reserves have been created from time to time ever since. They are now created and set apart under Part III of the Land Act, 1933-1958, and may be placed under a local governing authority, a special board elected by local residents, or an official board appointed by the Government. Most of the reserves for parks in country towns are under the control of the local governing authority. While control of reserves for the protection of flora and fauna is usually vested in the Fauna Protection Advisory Committee, where distance makes it more convenient, a Board is appointed under the "Parks and Reserves Act". Funds for operation and maintenance, where warranted, are provided from State grants, and in certain cases from rents, leases, admission and parking fees, etc.

The following tabulation includes only reserves of 1,000 acres or more. Those marked "A" cannot be altered without the approval of both houses of Parliament; the others can be altered with the approval of the Governor in Executive Council. The Bureau of Mineral Resources has suggested an additional twenty-six reserves be created because of their geological significance.

Plan Index No.	Area		District	Purpose and Description
	Acre	Hectare		
13 A	995	398	Perth	Kings Park - natural bushlands within city limits overlooking Perth
14 A	3,514	1,406	Swan	National park and reserve for native game - scenic drive with views of coastal plain and overlooking suburbs of Perth
15 A	3,350	1,340	Nelson	National park - spectacular Karri forest
16 A	3,850	1,580	Nelson	National park - forest scenery
17 A	50,000	20,000	Barrow Island	Flora and Fauna

Plan Index No.	Area		District	Purpose and Description
	Acre	Hectare		
18 A	270,000	108,000	Plantagenet (Stirling Range)	National park - mountain scenery and its unique flora
19	7,870	3,148	Meekatharra	Native flora
20 A	3,766	1,506	Rottneest Island	Public recreation - national park tourist island resort
21	12,240	4,896	Nelson	National park - forest scenery
22	15,500	6,200	Nelson and Hay	National park
23 A	5,384	2,153	Plantagenet	National park - mountain scenery and fine forest growth (Porongorup Range)
24	5,600	2,240	Swan	Flora and fauna - recreational facilities
25	8,230	3,292	Roe	Conservation of indigenous flora
26 A	39,500	15,800	Esperance	National park - unique botanical specimens and tourist attractions
27	4,820	1,928	Esperance	Fauna protection - numerous fresh- water swamps and lakes for preservation and protection of wild fowl
28	987,000	394,800	Naridup (Cape Arid)	Flora and fauna - unique botanical specimens and spectacular coastal scenery
29	604,300	241,720	Bremier Bay	Flora and fauna - unique botanical specimens and wild flowers
30	516,240	206,496	Jilbadji Leake Ngalbain	Flora and fauna
31	213,000	85,200	Victoria	Flora and fauna - protection of wild flowers
32	4,037	1,614	Melbourne	Flora
33 A	2,043	817	Plantagenet	National park and recreation - rugged coastal scenery
34	2,016	806	Avon	Flora and fauna conservation

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Plan Index No.	Area		District	Purpose and Description
	Acre	Hectare		
35	74,000	30,400	Windell	Flora and fauna - scenery and tourist attraction
36	7,173	2,869	Melbourne	Flora
37	29,000	11,600	Esperance	Flora
38	65,488	26,192	Melbourne Victoria	Flora
39	176,400	70,560	Victoria	Protection of flora - area preserved for apiarists (honey industry)
40	1,985	798	Avon	Protection of flora
41 A	10,945	4,378	Melbourne	Preservation of caves and national park - limestone caves not open to the public
42	3,700	1,480	Kojonup	Conservation of flora
43	4,999	1,996	Victoria	Flora
44	145,000	38,000	Victoria Murchison	Flora
45 A	26,000	10,400	Gascoyne	Flora
46 A	232,700	93,080	Roe and Kent	Fauna - for preservation chiefly of the gnaw (mallet hen)
47 A	2,912	1,165	Kojonup and Williams	Fauna
48 A	2,090	816	Kojonup and Williams	Fauna
49 A	4,016	1,606	Kojonup and Williams	Fauna
50	4,500	1,800	Peawah	Preservation of flora and fauna
51	4,180	1,672	Victoria	Recreation - flora and fauna
52 A	3,430	1,372	Sussex	National park and recreation - caves



AUSTRIA

At present, there are no national parks in Austria, but the legal basis for establishing national parks and nature resources for the preservation of natural areas, scenery and plant and animal life is under study and appropriate legislation is being formulated. It has been proposed to set up a National Park Commission by action of the Federal Government, with membership from the Federal Government, the governing bodies of the Landes, private organizations, and individuals, as an executive body to establish, administer and have responsibility for the management of national parks. Among the areas most suitable for such status are the western Hohen Tauern, in the Alps, and Neusiedler See, in Burgenland. The respective Landes have promulgated laws and ordinances which provide varying degrees of protection to a large number of nature reserves ranging in size from a few acres to many square kilometres.

Burgenland

Scenic Reserves

Eisenberg and der Pinka		
Hirschenstein and Geschriebenstein		
Königsberg near Hannersdorf		
Mühlbachinsel near Heiligenkreuz	1941	Game preserve
Neusätzen near Lockenhaus		
Neusiedler See and Seewinkel	1940	
Rocks at Güssing Castle		Trap-tufa
Steinstückel near Bernstein		Occurrences of serpentine
The southwestern region of the Leitha Mountains including Sonnenberg		

Leased Reserves of the Austrian Federation  
 for Nature Conservation

Haidlacke	1957	
Höllacke	1957	
Hotterlacke	1957	
Illmitzer Zicksee	1952	
Lange Lacke	1952	
Krottenlacke or Einsetzlacke	1952	7 ha (17.5 acres)
Oberer Schrändlsee	1957	
Oberer Stinkersee	1952	80 ha (200 acres)
Sections of the shores of the St. Andräer Zicksee	1957	
Scheibenlacke	1957	
Unterer Schrändlsee	1957	
Unterer Stinkersee	1952	54 ha (135 acres)

Carinthia

Nature Reserves

Gossgraben and Maltatal	215 km <sup>2</sup>	1943	
Grossglockner and Pasterze including Gamsgrube	3,698 ha	1935	
Willacher Alpe (Dobratsch)	1,902 ha (4,755 acres)	1942	
"Wulfenia" reserve in the Siebendorfschaftsalpe (Gartnerkofel)		1929	Wulfenia Conservation area

Scenic Reserves

Faakersee and surroundings	1940
Görlitzen and Ossiacher See	1942
Grossglockner Hochalpenstrasse	1934
Keutschacher Seetal and Wörthersee	1942
Klopeiner See, Kleinsee and Sablattnigsee	1940
Längsee and surroundings	1941
Leonharder Seen and Wollanig	1943
Magdalensberg	1950
Moosburg and its scenic ponds	1942
Millstätter See and surroundings	1943
Park at Wolfsberg Castle	1942
Porcia Castle and park	1950
Saisser See	1942
St. Urbanersee	1952
Turracher Höhe and Speikkofel	1942
Ulrichsberg and Zollfeld	1944
Villach municipal district	1943
Villacher Alpe	1942
Weissensee and surroundings	1940
Wurznerstrasse	1941
A 200-metre zone on the Plöckenstrasse	1943
A 200-metre zone along the road from Heiligenblut to Lienz	1943
A 200-metre zone on the Grossglockner Hochalpenstrasse	1943
A 200-metre zone along the road from Obervellach to Mallnitz	1943

Lower Austria

Nature Reserves

Kotherbergbachtal Kothberg, Lunz am See	40 ha (100 acres)	1941	Alpine flora in low-flying situations above the dolomite
Lasse	1,385.4 ha (3,464 acres)		Relics of original xerophytic vegetation with Pannonian rarities
Lechnergraben	211.8 ha (530 acres)	1942	Alpine flora in low-flying situations above the dolomite
Mühlberg	0.08 ha (2 acres)		Pannonian xerophytes
Rothwald	600 ha (1,500 acres)	1942	Largest virgin forest in central Europe
Weikendorf game reservation	220 ha (550 acres)	1927	Pannonian feather-grass associations with Steinröschen ( <u>Daphne striata</u> ) and juniper woods
Zeiserlberg	0.02 ha (0.5 acres)		Extreme westerly habitat of colewort ( <u>Crambe tataria</u> )

Nature Reserves in the region of Greater Vienna

Eichkogel			Interesting Pannonian flora
Lobau		1942	Ancient watermeadows beside the Danube below Vienna
Teufelstein	0.7 ha (1.8 acres)	1936	Tertiary relics of the Drachenkopf and surrounding forest areas

Scenic Reserves

Blumental	12 ha (30 acres)	1941	Region of pines with original Pannonian flora
Harrach-Park Brugg	50 ha (125 acres)	1941	English park with relics of the Leitha meadows and old trees
Helenental	18 ha (65 acres)	1937	Romantic uninhabited region of valleys; the Austrian pine grows on the rocky slopes
Hohe Wand		1955	
Johannes-bachklamm	700 ha (1,750 acres)	1940	Beautiful countryside with gorge and hilltop ruins
Kamptal		1955	
Kogelberg	5 ha (13 acres)	1942	Moorland with granite boulders and thickets
Kogler Hausberg	4 ha (10 acres)	1949	The Hausberg is a long-standing recreation area for the district, with grassy slopes and solitary pines twisted into strange shapes
Mödringbach	3.5 km long, 10-14 m wide	1942	Fine old stands of trees with many small mammals and birds
Nesting area at Freundorf; ditches and hedgerows	nearly 5 km long and from 5 to 7 m wide	1942	Last of the hedgerows with abundant birdlife
Park at Obørsiebenbrunn Castle	35 ha (88 acres)	1940	Park dates from period of Maria Theresa
Peterwald	42 ha (107 acres)	1942	Ancient woodlands of Austrian pine; recreation area

Scenic Reserves (cont'd)

Ötscher and Dürrenstein	360 km <sup>2</sup>	1940 and 1955	Area of mountain scenery almost devoid of human habitation with virgin forest (Rothwald); rugged limestone area on the Dürrenstein; doline; upland bog at Lunzer See; the Lunzer See and Erlauf See; Ötschergräben; Ötscher Stalactite cavern; fields of narcissi
Rax-Schneeberg region	114 km <sup>2</sup>	1942 and 1955	Preservation of the popular Viennese excursion and recreation areas at the Vienna flood-control point; very strict surveillance of animal and plant life. Includes the highest mountain peaks in Lower Austria
Rocky areas of the Hacklmühle	1.5 ha (4 acres)	1949	Woodlands with rocky outcrops, including the small waterfall on the Brühlbach
Staning and Muhlradung reservoirs	150 ha (375 acres)	1948	Surveillance over the formation of a new landscape pattern with abundant birdlife. Joint Lower Austrian and Upper Austrian scenic reserve
Steinbergwald	130 ha (325 acres)	1948	Relics of the ancient oak forest with xerophytic vegetation; recreation area for the population of the oil district
Strudengau		1955	
Vienna Woods (Wienerwald) including the Helenental as from 21 May 1937		1955	
Wachau		1955	

Upper Austria

Nature Reserves

Bogland near Mondsee	15 ha (38 acres)	Original upland bog
Dachsteinglacier		
Feichtauer Urwald and Hoher Nock	14 km <sup>2</sup>	Region of Alpine pastures and virgin forests with woodlands which have been left in their natural state for 400 years
Filzmöser		Upland bogs on the spurs of the mountains of the Warscheneck group
Forest of sweetchestnut trees at Unterach am Attersee	40 ha (100 acres)	
Frankiner Moor		
Green belt around Linz	60 km <sup>2</sup>	Mixed woodlands and landscape of hedgerows
Heradinger See		
Hinterstoder Priel	600 km <sup>2</sup>	Very picturesque limestone mountain range with chamois, golden eagles, weatherbeaten larches, Alpine stone pines and beautiful upper reaches to the valleys; includes Polsterlucke, Dietlmoorsee and Baumschlaggerith and Huttererboden near Hinterstoder
Hirlatz-Dachstein group		
Hochmoor Ewigkeit		
Huckinger See		
Leitensee		
Mixed alder woodlands on the Pickl-Z'buri peninsula	1 km <sup>2</sup>	
Reicherinsel		

Nature Reserves (cont'd)

Schafweidmühle		
Staning slopes		
Tanner Moor near Liebenau	1 km <sup>2</sup>	Upland bog with sub-species of mountain pine ( <u>Pinus montana</u> ) known locally as the <u>Spirk</u>
Traunstein including Laudachsee and Laudachmoor	20 km <sup>2</sup>	Plant conservation area

Scenic Reserves

Adalbert Stifter scenery at Hellmonsödt and Kirchsschlag	30 km <sup>2</sup>	Further areas of the green belt around Linz-Urfahr
Anton Bruckner scenery at St. Florian		
Amiesberg		
Ausseerland		
Bohemian Forest (Böhmerwald) between Ulrichsberg and Schwarzenberg	960 km <sup>2</sup>	Natural scenery (coniferous forests) with eagle-owl eyries
Boulder-strewn terrain at St. Thomas am Blasenstein	8 km <sup>2</sup>	Includes Wackelstein
Boulder-strewn terrain at Sandl and Liebenau	220 km <sup>2</sup>	Boulder-strewn terrain at Mühlviertel with eagle-owl and peregrine-falcon eyries
Dachstein region	220 km <sup>2</sup>	Including Hallstätter See, Trauntal, the Dachstein glaciers, glacier lakes, ice caves, the <u>Gletschergarten</u> in the Echerntal, the charnel-house at Hallstatt and many examples of limestone weathering
Höllengebirge including the Aurachklause and Langbathseen	80 km <sup>2</sup>	



Scenic Reserves (cont'd)

Itmer Moor	5 km <sup>2</sup>	Most interesting bog in Austria; contains two lakes which are relics of the post-glacial Salzachsee and includes examples of lowland and upland bogs as well as intermediate types and the Hochmoor "Ewigkeit"
Langensteiner Mauer		
Mühlrading and Staning Reservoirs		
Pyrggas massif and Hengstenstrasse	160 km <sup>2</sup> 1944	
Sternwald		
Trattenbach, Beistein and Kreuzmauer	7 ha (18 acres)	Weird Jurassic cliff features with woods of wild box, yew and juniper
Vornbacher Enge	30 km <sup>2</sup>	Sheer cliffs at Inntal with magnificent views of a landscape checkered with hedgerows
Vorderstoder-Warscheneck	1,200 km <sup>2</sup>	Centuries' old Alpine stone pines, fields of primulas, upland bogs
Welser Heide		Includes 39 pine forests

Other Nature and Scenic Reserves

Conservation area for the Auhirsch in the meadows of the Danube lying between Traun and Enns	14 km <sup>2</sup>	Authentic meadowland setting, with reeds four metres high and creepers twenty metres long, containing 150 deer of the <u>Auhirsch</u> species; only remaining habitat of these deer in Central Europe. Abundant birdlife (herons, cormorants and kites)
Fischlhamer Au on the right bank of the Traun between Lambach and Wels		Unusual flora

Other Nature and Scenic Reserves (cont'd)

Fishponds (Schacherteiche) at Kremsmünster		Beautiful water-lilies
Gorge of the Steyr and Pitzfelsen		
Hawthorns on the southern slopes of the Schieferstein		
Kobernauserwald	1 km <sup>2</sup>	Forest conservation area
Mixed yew forest at Lansberg near Leonstein	4 ha (10 acres)	

Upper Austria

Protected areas on banks and shores  
Steep cliffs and luxuriant water-meadows

Almsee	Altausseer See
Aschach	Attersee
Bad Kreuzen	Banks of the Danube
Elmsee	Feld-und Waldaist
Grosse Mühl	Grossee
Grundlsee	Hallstätter See
Innauen	Kammersee
Kesselbachtäler	Kleine und Grosse Rodl
Kleine Mühl	Lahngangsee
Mondsee	Naarental
Nussensee	Ödseen
Ofensee	Pesenlaub
Ranna	Salzachauen
Sarmingstein	Schacherteiche
Schwarzensee	Steyrsee

Protected areas on banks and shores (cont'd)

Steyratal	Toblitzsee
Traunsee	Wolfgangsee
Traunauen (water-meadows of Traun)	Zellersee

The protected lakeside and riverside zones are 500 m wide and include all the large and small lakes of Upper Austria. The total area thus protected is about 35 sq. miles.

Salzburg

Nature Reserves

Ammertal-Dorferöd	1921	1,289 ha (3,222 acres)
Ancient bog near Vorau		
Blümbachtal (Bluntautal?)		
Fuschertal-Käfertal		
Hebachtal and Hollersbachtal		
Kötschachtal-Anlauftal		
Rotgüldensee		
Schmalzgrube in the Hochalmgruppe		
Tappenkarsee-Jägersee in the Kleinarltal		
Upper Stubachtal and Ammertal	1921	Nature conservation area (nature reserve)
Venediger group including Wildgerlostal, Krimmler Achentel, and the upper and lower Sulzbachtal	1940	Kriml, Wald, Neukirchen

Scenic Reserves

- A 500 m zone on the Grossglockner-Hochalpenstrasse between Ferleiten and Hochtor
- A 200 m zone on the Reichsautobahn between Salzburg and Linz 1940
- Hohe Tauern scenic reserve, including the valleys from the Gerlostal to the Raurisertal, Gasteinertal, Kleinarltal and the upper reaches of the Grossarlital 1942
- Lakes district: (Seengürtel): protected lakeside zones 550 m wide along the Abersee or Wolfgangsee, Attersee, Fuschlsee, Grabensee, Hintersee, Krottensee, Mondsee, Trummerseen and Wallersee and in surrounding areas 1941
- Landschfeldtal, Oberes Zederhaustal and oberes Murtal 1941 and 1953 Plant conservation area and animal reservation (1953)
- Leopoldskroner-Moor
- Salzachauen
- Scenic reserve of the Göllgebirge, Hagengebirge and Hochköniggebirge and the Steinernes Meer 1923 and 1953 350 km<sup>2</sup> Conservation area, plant and scenic reserve; ibex reservation
- Untersberg 1941 Plant conservation area, with relics of the Untersberger Moor
- The Monchsberg and the Festungsberg 1933 Preservation of the local character and scenery of Salzburg
- Woods and shrubberies in the town of Salzburg 1941

Other Scenic Reserves

"Bruderloch" Gorge and Cavern

Hintersee near Feistenau

Lessachtal including Hochgolling

Hohe Tauern - Nature Park of the Nature Park  
 Society of Stuttgart (Verein Naturschutzpark  
 Stuttgart)

Dorfer-und Ammertaler Öd

3,930 ha (9,825 acres)

Sulzbachtal

Styria

Nature Reserves

Ammering-Grössenberg-  
 Stubalpe

209 km<sup>2</sup> 1942

Examples of granite  
 gneisses with ice-age  
 cirques

Dachstein-Ramsau

140 km<sup>2</sup> 1941

Triassic limestone over  
 crystalline rocks with  
 lake-filled dolinas;  
 glaciers, plant-  
 conservation area

Ennstaler Alpen-Laussa region

570 km<sup>2</sup> 1941  
 and 1944

Magnificent range of high  
 mountains, a produce of  
 glacial attrition and of  
 the polishing and  
 excavating action of water  
 erosion; superb Alpine  
 flora

Gams-Wildalpen

520 km<sup>2</sup> 1941

Characteristic triassic  
 limestone with jurassic  
 chalk; caves (Beilstein-  
 Eishöhle, Krausgrotte);  
 rich flora

Gleinalpen-Speikkogel

77 km<sup>2</sup> 1941  
 and 1947

Primary crystalline rocks  
 with abundant plant-life

Nature Reserves (cont'd)

Grebenzen-Kalkberg- Neumarkter Teiche	60 km <sup>2</sup>	1941	Limestone massif of the palaeozoic era with ice-age deposits, dolinas and caverns; bird sanctuary on the Furtner, Podoler, Holzer and Graslup ponds
Gulsen-Mittagskogel	6 km <sup>2</sup>	1941 and 1942	Deposits of magnesite and serpentine with characteristic flora
Hochschwab-Aflenzer Staritzen Kaiserschild	550 km <sup>2</sup>	1942	Impressive and picturesque limestone massif; superb mountain setting; luxuriant Alpine vegetation
Idlerek-Hohenwart- Schoberspitz	150 km <sup>2</sup>	1941 and 1942	Crystalline rocks with limestone schist and dolomite. The region possesses a rich flora
Jungfernsprung-Plabutsch	5 km <sup>2</sup>	1941	Alpine flora on cliff slopes; protection of a popular recreation district
Lantsch-Schöckel	290 km <sup>2</sup>	1941 1942	Bear reservation in rocky gorge with excellent examples of the effects of erosion; limestone massif of the Lantsch and Schöckel with abundant plant-life; conservation is necessary as the area is used for recreation; picturesque gorge of the Raab and the Weiz with Alpine flora growing on the steep slopes
Lichtensteinberg	3 km <sup>2</sup>	1946	Alpine plants in low-lying situations
Peggauer Wand-Lurgrotte	16.5 km <sup>2</sup>	1941	Limestone cliffs with many caves; terrain above the caves at Lur contains dolinas; notable flora
Plesch-Pfaffenkogel	58 km <sup>2</sup>	1940	Rich Alpine flora; protection of a popular recreation area

Nature Reserves (cont'd)

Reinischkogel-Rosenkogel- Teigitschklaum	206 km <sup>2</sup>	1941	Primary crystalline rocks and remarkable flora
Reiting-Magdwiaseck, Krumpen-Reichenstein	107 km <sup>2</sup>	1941	Massif of glacial origin with flora characteristic of Alpine limestone regions
Rennfeld	3.5 km <sup>2</sup>	1942	Plant-conservation area
Schladminger Tauern- Süssleiteck-Barbaraspitz Ruprechtseck	675 km <sup>2</sup>	1941	Massif of crystalline rocks, ice-age deposits, cirques, cirque-stairways, glaciated rocks, rich Alpine flora
Schneealpe-Veitschalpe-Rax	195 km <sup>2</sup>	1942	Alpine table-land of lime- stone with abundant flora
Seckauer Alpen-Bösenstein	655 km <sup>2</sup>	1941 and 1942	Mountains formed of crystalline rocks with layers of magnesite, serpentine and limestone, relics of the ice age, cirques, cirque-stairways and upland lakes, varied and abundant plantlife
Selztaler-Pürgschacher Moor	27 km <sup>2</sup>	1941	Extensive bogs with original vegetaion
Turacher Alpe-Stangalpenzug	270 km <sup>2</sup>	1941	Massif of the palaeozoic era, weathering of the limestone, cirques, arêtes, distinctive flora
Wundschuh-Steindorfer Teiche	7 km <sup>2</sup>	1943	Region of ponds with luxuriant vegetation and nesting grounds
Zeiritzkampel	47 km <sup>2</sup>	1941	Link between the Alpine limestone regions and the crystalline rocks of the Niedere Tauern; wide range of vegetation due to the constantly varying nature of the rocks

Nature Reserves (cont'd)

Zirbitzkogel	80 km <sup>2</sup>	1942	Crystalline rocks with veins of marble; ice-age deposits; forests of alpine stone pine and rich flora
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Styria

Scenic Reserves

Annaberg near St. Michael	110 km <sup>2</sup>	1941	Typical landscape of valley boglands; recreation area
Aussee region	370 km <sup>2</sup>	1946	Limestone mountains of the triassic and jurassic eras with cirques, dolinas and weathering of the limestone; lakes carved out by glaciers and enclosed by morainic ridges
Falkenberg	2.5 km <sup>2</sup>		
Frauenbergermoor and the Frauenberge	110 km <sup>2</sup>	1941	Typical landscape of valley boglands; recreation area
Friesingwand	12 km <sup>2</sup>	1941	Steep limestone cliffs with caverns; heat-loving Pontic and Alpine flora
Fürstenfeld-Lafnitzau	9 km <sup>2</sup>	1946	Remarkable meadowland flora
Gföllriegel	10 km <sup>2</sup>	1941 1942	Bogs in an area of crystalline rocks
Gleichenberg	70 km <sup>2</sup>	1946	Conservation of flora; recreation area in the vicinity of the Gleichenberg spa
Herbersteinklamm	11 km <sup>2</sup>	1946	Epigenetic valley of hornblende schists with unusual flora
Hörfeld	0.3 km <sup>2</sup>	1946	Bird sanctuary in the marshes
Kirchbach-Kirchberg	80 km <sup>2</sup>	1946	Plant conservation area



Scenic Reserves (cont'd)

Kirchdorf near Pernegg	6 km <sup>2</sup>	1942	Massif of serpentine with characteristic flora
Koralpe	34 km <sup>2</sup>	1941 1951	Mountains of fragmented crystalline rocks with relics of the ice age; conservation of plant life
Lassnitzau	5 km <sup>2</sup>	1941	Watermeadows and bird sanctuary
Main Roads	350 km <sup>2</sup> and 80 km <sup>2</sup>	1940	Scenic reserve along the main highways and main railway lines
Mehlstüberl	4.5 km <sup>2</sup>	1942	Picturesque limestone massif with sheer cliffs
Mugel-Hochalpe- Hochanger-Schottalm	66 km <sup>2</sup>	1941 1942	Recreation area of Leoben is a scenic reserve; there is a game reserve on the Schottalm
Murauen-Graz Werndorf	13.5 km <sup>2</sup>	1942	Riverside woodlands and banks of the River Mur; recreation area for the people of Graz
Murauen-Leibnitz- Sulmmündung	13.5 km <sup>2</sup>	1942	Riverside woodlands and banks of the River Mur; recreation area for the people of Graz
Neudauerwald und Teiche- Lindegg-Jobst	16 km <sup>2</sup>	1946	Fine old oak forest and beautiful flora
Platte-Rettenbachklamm- forest area around Graz	59 km <sup>2</sup>	1941	Recreation area for the people of Graz
Pleschaitz-Puxberg	17 km <sup>2</sup>	1941	Limestone and schists with ice-age deposits; remarkable rock formations and unusual flora
Ponds at Gleinz	10.9 km <sup>2</sup>		Recreation area
Radkersburger-Murecker Auen Hürth	104 km <sup>2</sup>	1941	Watermeadows with rich plant life; recreation area for the people of Mureck and Radkersburg

Scenic Reserves (cont'd)

Riegersburg	18 km <sup>2</sup>	1946	Igneous rocks with distinctive flora; region of historical interest
Rosegger's Waldheimat	7 km <sup>2</sup>		Region of historical interest recreation area
Sausal	73 km <sup>2</sup>	1946	Interesting flora; northern limits of southern plant species
Schlossberg near Leutschach	20 km <sup>2</sup>	1941	Countryside of historical interest; remarkable flora
Sinnersdorf-Tanzegg	27 km <sup>2</sup>	1946	Interesting fauna
Soboth-Radl-Kapunerberg-Mauthnereck	93 km <sup>2</sup>	1946	Crystalline rocks in the western part and tertiary gravels with huge conglomerate boulders in eastern part; distinctive landscape
Söchau	18 km <sup>2</sup>	1946	Interesting fauna
St. Johann-Teiche	2.5 km <sup>2</sup>	1941	Area of small lakes set aside as a bird sanctuary
Stuhleck-Pretul	47 km <sup>2</sup>	1941 1942	Mountain area of ancient crystalline rocks; caves; boglands
Tauplitz-Bleibergermoos-Wörschachermoor	233 km <sup>2</sup>	1941	Limestone massif with broad crest surrounded by tapering peaks; carboniferous, triassic, jurassic and cretaceous deposits; the popular mountain climbing area is a scenic reserve
Waldbach-Vorau-Wechsel	174 km <sup>2</sup>	1946	Region of historical interest boglands; recreation area

Tyrol

Nature Reserves

Ahrenwald near Vill	1 km <sup>2</sup>	1943	Bird sanctuary
Ahrnspitz region	12.5 km <sup>2</sup>	1942	Interesting flora; seriously damaged by large forest fires
Karwendel region	720 km <sup>2</sup>	1943 and 1947	Conservation of plant and animal life and protection of the scenery in the limestone region of the Karwendel mountains
Mutterer Alm		1956	Protection of the country around the terminus of the Muttereralm railway
Patscher Kofel	12 km <sup>2</sup>	1947	Conservation of the Alpine flora (especially rhododendrons) on the Hausberg at Innsbruck
Penken region		1956	
Rosengarten near Patsch	80 ha	1942	Protection of wooded areas for birds and of plant life in the Lower Alps
Upper Walsertal	28 km <sup>2</sup>	1941	Interesting flora
Zirnborg on the Glungezer	178 ha (445 acres)	1942	Protection of the tree-crowns in the Alpine stone-pine forests

Scenic Reserves

a 200 m zone on the Achenseestrasse	1940
Feldwach region in Leutasch	1942
Galgenbühl near Innsbruck Hotting	1941
Maple woods in the Kurzen Grunde	1941
Lindenhain near Ramsberg	1940
Gschnitztal	1949

Scenic Reserves (cont'd)

Morainic ridge near Trins	1950	Terminal Moraine
Reitermoor near Seefeld	1940	
Scheulingwald near Mayrhofen	1941	

Vorarlberg

Nature Reserves

Rheinau	14 km <sup>2</sup>	1935
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Scenic Reserves

a 200 m zone on the Silvretta-Hochalpenstrasse	1956
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Vienna

Nature Reserves

Lainzer Tiergarten	2,300 ha (5,750 acres)	1941	Former imperial hunting-grounds; recreation area for people of Vienna; protected section of Viennese Woods (Winerwald); woodland with very old trees
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Scenic Reserves

Gatterhölzl (Springerpark)	1943	
Heuberg		Bird sanctuary
Laaer-Wäldchen		
Military Shooting Range and the Kaiserwasser		
Napoleonwald	1941	
Oak woods	1941	
Rock Formations	1939	Igneous rocks

Scenic Reserves (cont'd)

Rock formations

Rock formations (exposed  
geological structures)

1939

Scenic reserve at Laaerberg-  
Filmstadt

1943

Wolfsgraben

1938

Occurrence of the green  
hellebore (Helleborus  
viridis)

Woodlands near the  
Hütteldorf Cemetery

1946

BRITISH GUIANA

Kaieteur National Park - 45 square miles, on the banks of the Potaro, Mure Mure and Elinku rivers - established in 1930. The park was established under the Kaieteur National Park Ordinance, which empowers the Governor in Council to appoint a commissioner or commissioners and rangers, and to alter the boundaries of the park. No personnel have been assigned to the park at present, and no funds have been provided for its maintenance. The Commissioner of the Interior, through the Commission of Lands and Mines and its district offices, supervises the park. It is unlawful to hunt or to disturb animal life, to gather flora, or to disturb the soil by mining or construction. The area is mostly forested, ranging in elevation from 400 feet to 1,200 feet. The principal feature is the Kaieteur Fall, which has a vertical drop of 741 feet. Accommodations for thirty people are available. Access to the park is by steamer, smaller boats and aircraft. Guided tours may be arranged in Georgetown.

BRITISH SOLOMON ISLANDS PROTECTORATE

The High Commissioner may declare by proclamation any area of land to be a national park and may define or alter the limits of any such area, as well as acquire private lands within the park through purchase or otherwise. The single park is administered by the District Commissioner, Central Solomons, while the High Commissioner for the Western Pacific may make rules relating generally to its management, protection and use.

Queen Elizabeth Park - 15,200 acres (6,080 hectares), adjoining Honiara, (the capital), to the south - established in 1954.

The park contains Mt. Austen and the Mantanikai River, an area of very broken country interlaced with ridges and valleys. There is little fauna except bird life. Tropical hardwoods abound.

The area was a battleground during World War II and much evidence remains. Twenty-four families live in four small villages within the park boundaries, and cultivation and fishing are permitted. These villagers own tracts of communal land within the park under native customary tenure. Access is by rough motor-tracks and footpaths. Most of the park is inaccessible to tourists.

BURMA

No national parks have been established in Burma, but a number of sanctuaries for the protection of wildlife have been reserved within the Forest Divisions.

<u>Name of Sanctuary</u>	<u>Area in Square Miles</u>	<u>Forest Division in which Situated</u>	<u>Species for which the Sanctuary is primarily Constituted</u>
<u>Sanctuaries in Burma Proper</u>			
Pidaung	278.5	Myitkyina	Elephant, bison, saing ( <u>Bibos banteng burmanicus</u> ), sambhur, leopard, bear, pea-fowl, pheasant, jungle-fowl, partridge and quail, hog-deer, barking-deer, pig, tiger.
Shwe-u-daung	81.0*	East Katha	<u>Rhinoceros sumatrensis</u> , elephant, bison, saing ( <u>Bibos banteng burmanicus</u> ), serow, sambhur, barking-deer, pig, tiger, bear, leopard, pea-fowl, jungle-fowl, pheasant, partridge and quail.
Maymyo	49.0	Maymyo	Barking-deer, jungle-fowl, partridge and pea-fowl.
Moscós Islands	19.0	Tavoy	Sambhur, barking-deer and pig.
Kahilu	62.0	Thaton	<u>Rhinoceros sumatrensis</u> , serow, sambhur, barking-deer, hog-deer, jungle-fowl.
Mulayit	53.5	Thaungyin	Barking-deer, pig, tiger, leopard.
Wetthigan	1.75	Minbu	Many species of water-fowl.
Kyatthin	104.0	Shwebo	<u>Thamin</u> ( <u>Rucervus Thamin</u> ).
Shwezet-taw	213.4	Minbu	Bison, sambhur, <u>Thamin</u> ( <u>Rucervus Thamin</u> ) and barking-deer.
Kelatha	9.45	Kadoe and Agency	Barking-deer, serow, jungle-fowl and numerous species of birds.

\* The total area of this sanctuary is 126 sq. mi. of which 81 sq. mi. fall within the East Katha Forest Div. (Burma) and 45 sq. mi. in the Mongmit Forest Div. (Shan State).



<u>Name of Sanctuary</u>	<u>Area in Square Miles</u>	<u>Forest Division in which Situated</u>	<u>Species for which the Sanctuary is primarily Constituted</u>
<u>Sanctuaries in the Shan States</u>			
Shwe-u-daung	45.0*	Mongmit	<u>Rhinoceros sumatrensis</u> , elephant, bison, <u>saing</u> ( <u>Bibos banteng burmanicus</u> ), serow, sambhur, barking-deer, pig, tiger, leopard and bear.
Taunggyi Fuel Res. North Blook	6.2	Southern Shan State	Birds and barking-deer.
Total	922.80		

\* The total area of this sanctuary is 126 sq. mi. of which 81 sq. mi. fall within the East Katha Forest Div. (Burma) and 45 sq. mi. in the Mongmit Forest Div. (Shan State).

BYELORUSSIAN SSR

There are two national reservations in the territory of Byelorussian SSR; they were established by decree of the Government. Both reservations are the object of many educational excursions and also serve as places of relaxation.

Belovezhskaya Pushcha Game Preserve - 75,000 hectares (187,500 acres) 60 km north of the town of Brest, established 1939. The area is said to be one of the oldest reservations in the world, as it had long received protection before designation as a game preserve. The objectives of the preserve are to protect and foster the reproduction of the pure-blooded Byelorussian aurochs and of other valuable wild animals and birds, to protect the largest broad-leaved forest of the European type in the USSR, and to evolve scientifically and test the basic principles for the management of national game preserves in the Byelorussian SSR. The area is bordered by a protective zone with an average width of 10 to 12 kilometres, within which hunting and other activities contrary to the purposes of the reservation are prohibited. A nature museum and scientific library are attached to the reservation.

National Reservation on the Berezina River - 67,000 hectares (167,500 acres) in central Byelorussian SSR, established in 1925. The reservation is situated in the basin of the Berezina River, the right tributary of the Dnieper, with an altitude ranging from 150 metres to 200 metres above sea level. The original primary purpose of the Reservation was to protect and foster the reproduction of a small colony of river beavers which had survived the War of 1914-20 in Byelorussia. Its present purpose is to promote an increase in the number of wild animals under protection, so that they may be distributed throughout the territory of the Republic and beyond, and to protect all the natural features of the area, which are extremely varied and have been little affected by the works of man.

CANADA

National Parks

All national parks in Canada are established by Parliament under the National Parks Act of 1930, revised in 1952, which states:

"The Parks are hereby dedicated to the people of Canada for their benefit, education and enjoyment, subject to the provisions of this Act and the regulations, and such parks shall be maintained and made use of so as to leave them unimpaired for the enjoyment of future generations."

The boundaries of national parks are extended or otherwise altered by an amendment to the schedule of the Act, which contains a description of each park.

The Act vests the administration of the national parks in the Minister of Northern Affairs and National Resources and provides for the establishment of regulations for the preservation, control and management of the parks by the Governor General in Council. Authority for the administration of the parks is delegated by the Minister to the Director of the National Parks Branch of the Department. In turn, responsibility for the development, operation and maintenance of the parks is entrusted to the Chief of the National Parks Service, with its main office in Ottawa.

Each of the larger national parks, or in some cases a group of parks, is administered by a resident Superintendent. He normally has the assistance of an administrative staff, a Chief Park Warden, a Park Warden Service and maintenance and labour forces. Problems of an engineering or technical nature are usually solved by technical personnel. These officers may be attached to the office of the Resident Engineer or may be seconded to the National Parks Service from the Engineering Services Division of the National Parks Branch. Scientists attached to the National Parks Branch conduct research in forestry, botany, mammalogy, fish culture and similar subjects.

Permits for taking flora and removing geological material may be issued in special circumstances by the Director. Hunting in the parks is prohibited. The Director, National Parks Branch, may authorize the destruction of dangerous game animals and the reduction of over-populous species. An Education and Interpretation Section has been established in response to growing popular demand

for information about the national parks and their natural attractions. The National Parks Service employs a permanent staff of 14 Superintendents, approximately 189 administrative and scientific personnel, 16 Chief Park Wardens, 113 Park Wardens, 269 maintenance and labour personnel, and an additional 1460 seasonal personnel.

### National Parks

Banff National Park - 2564 square miles on the eastern slope of the Canadian Rockies extending northerly along the Provincial boundary between Alberta and British Columbia, in Alberta - established in 1887. Sections of the park boundary are contiguous with those of Jasper National Park in Alberta and Kootenay and Yoho National Parks in British Columbia.

The park protects the spectacular scenery of the central Rocky Mountains which rise here to 11,900 feet. It provides an exceptional exhibit of mountain-building forces, with towering fault-blocks, jagged escarpments, compressed anticlines, and other geological phenomena. Mountain peaks encircle many lakes, of which Lake Louise is the most famous. The ranges are covered with extensive forests of lodgepole pine, fir, spruce, birch and aspen, and wildflowers are abundant. Wildlife is plentiful and includes Rocky Mountain goat, bighorn sheep, mule deer, elk, moose, grizzly and black bear, cougar, and many smaller species; golden eagles, ptarmigan, grosbeaks, and other birds characteristic of the northern mountains.

Approximately 980,000 visitors enter the park annually, and excellent accommodations are available. Two townsites are located within the park: Banff, which has a permanent population of about 3,000 people, and Lake Louise, where 50 people live the year round. In addition to several large hotels, numerous campgrounds have been established, and 700 miles of trails for riders and hikers have been built. The park may be reached by automobile or by train, and there are good highways in the park.

Banff is a noted center for winter sports, and a chairlift, sedan and gondola lifts, golf course, and other sports facilities are available. Two museums have been established in Banff containing exhibits of geology, wildlife, botany and Indian culture.

In 1960, an appropriation of \$8,108,575 was provided for Banff National Park, and the resident staff numbers 78 persons.

Cape Breton Highlands National Park - 367 square miles on northern Cape Breton Island, Nova Scotia - established in 1936. Rugged hills and mountains, with deep valleys, extend from the Atlantic Ocean to the Gulf of St. Lawrence. The eastern shore contains many coves. The upper slopes are covered with mixed conifer and deciduous forests, while the interior plateau supports growths of stunted evergreens, shrubs and mosses. A number of coastal villages adjacent to the park rely mainly on commercial fishing for livelihood. The Cabot Trail Highway enters the park from the south and runs 70 miles inside it, providing magnificent scenic views. Twenty-five miles of hiking trails are available, and campgrounds are provided. Approximately 193,000 people visit the park annually.

Elk Island National Park - 75 square miles in central Alberta - established in 1913. The terrain of the park is comprised of rolling hills with broad open meadows and many shallow lakes, and abundant growth of aspen and white poplar. The park is fenced to protect herds of approximately 700 plains bison, 350 elk, 200 moose and smaller numbers of deer. It is accessible by highways and railroad. Campgrounds are provided. Approximately 200,000 visitors enter the park annually.

Fundy National Park - 79.5 square miles on the northern shore of the Bay of Fundy in New Brunswick, established in 1948. Heavily forested benches rise above the Bay of Fundy to a series of rolling hills reaching 1,000 feet in elevation. Spruce and balsam fir are mixed with maple and other hardwoods. The park supports moose, white-tailed deer and black bear, and many smaller furbearing mammals and birds. It is reached by highway. Campgrounds and a trailer park are provided, and a heated salt water swimming pool, golf course and other recreational facilities are available. 199,000 visitors are recorded annually.

Georgian Bay Islands National Park - 5.4 square miles in Ontario on an arm of Lake Huron, established in 1929. The park is composed of thirty of nearly

30,000 islands in an archipelago in Georgian Bay. They are mostly wooded and separated by channels of sparkling water. Park Headquarters, campsites, and other facilities are on the largest island, Beausoleil Island. The park is accessible by boat from the mainland.

Glacier National Park - 521 square miles in the Selkirk Mountains of British Columbia - established in 1886. Hamber Provincial Park adjoins on the north, connecting it with Mount Robson Provincial Park and Jasper, Banff and Yoho National Parks. This great block of protected wilderness extends for 260 miles northwest-southeast and nearly 100 miles at its greatest width. Glacier National Park can be reached only by railroad, and is a magnificent region for hiking, camping and mountain climbing, with towering peaks, glaciers and lakes, dense conifer forests, and alpine tundra. Black and grizzly bears, mule deer, mountain goats, caribou, moose and elk are numerous and birdlife is abundant. There are no lodges or cabins in the park. The trans-Canada highway is under construction through the park, and will provide additional access in 1962.

Jasper National Park - 4,200 square miles on the eastern slope of the Canadian Rockies on the Alberta-British Columbia boundary - established in 1907. The great mountain ranges and peaks are separated by broad valleys. Mount Columbia, rising to 12,294 feet above sea level, is the highest peak. The famous Columbia Icefield covers 130 square miles. The water from melting glaciers drains into rivers that flow to the Pacific and Arctic Oceans. Many lakes are encircled with spectacular peaks. Conifer forests cover the lower slopes and wildlife is abundant. Within the park the town of Jasper is served by transcontinental railroad and highways, and excellent hotel accommodation is provided. 600 miles of trails are available for hiking and riding, and a camping ground and trailer park have been established. Approximately 325,000 visitors come to the park annually.

Kootenay National Park - 543 square miles along the western slope of the Canadian Rockies in British Columbia on the Alberta boundary - established in 1920. The park contains impressive mountain scenery, hot mineral springs and other unusual geological features, and forested canyons. The abundant flora and

fauna are typical of the central Canadian Rockies. The Banff-Windermere Highway crosses the park and provides access to some of the most scenic areas. Visitor accommodations are excellent. The park receives approximately 440,000 visitors annually.

Mount Revelstoke National Park - 100 square miles in the Selkirk Mountains of British Columbia - established in 1914. The park protects an unusual exhibit of rolling alpine plateau 6,000 feet in elevation, including Mount Revelstoke. The Clach-na-Cuddain Range rises to 7,983 feet, and contains a snowfield and glaciers. The alpine meadows are covered with flowers and interspersed with small lakes. The mammalian population includes grizzly and black bear, caribou and mule deer. Birdlife is abundant. Ideal snow conditions in winter make this park a favorite skiing area, and sports enthusiasts visit it every year. Overnight accommodations are available in the park and in the town of Revelstoke nearby. The park is accessible by railroad and highway. Approximately 7,000 people visit the park annually.

Point Pelee National Park - 6 square miles on a peninsula on Lake Erie in Ontario - established in 1918. The park was established to preserve the unique flora of the area and to provide a sanctuary for resident and migratory birds. It is a low triangular spit, the southern part heavily forested and the northern section composed mainly of ponds and marshes. During spring and autumn, thousands of waterfowl shelter in the marshes. The park is accessible by highway. A serviced campground is available, and a nature trail has been built. There are thirteen miles of swimming beaches in the park. It is visited by approximately 700,000 people annually.

Prince Albert National Park - 1,496 square miles in central Saskatchewan - established in 1927. The beauty of the myriad northern lakes and rivers, and the primeval freshness of the virgin conifer and deciduous forests, make Prince Albert National Park a wonderful outdoor recreational area. It is among the finest canoeing regions in North America, and it affords exceptional opportunities for camping. Wildlife is abundant, and the park is on the migration flyway of many species of waterfowl. The park is reached by highway. Approximately 135,000 visitors enter the park annually.

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Prince Edward Island National Park - 7 square miles extending 25 miles along the northern coast of Prince Edward Island on the Gulf of St. Lawrence - established in 1936. The park is noted for its broad sand beaches and sandstone cliffs indented with deep bays. The park is well forested, and furbearing mammals are numerous, as are many species of birds. Campgrounds, a golf course and bathing facilities are provided. The park is reached by highway. The annual number of visitors exceeds 200,000.

Riding Mountain National Park - 1,148 square miles in midwestern Manitoba - established in 1929. Riding Mountain is a vast forested plateau that rises abruptly in an escarpment standing 1,100 feet above the plain on the north and east. Glacial tarns are numerous; some are several miles in length. A former hunting ground of the Assiniboine and Cree Indians, the park supports a large population of animals and birds. Much of the park is a wooded wilderness. The park townsite of Wasagaming is the focal point for thousands of summer visitors. It is reached by highway. Campgrounds and a museum are maintained, and golf, tennis and other sports are available. The annual total of visitors is approximately 660,000.

St. Lawrence Islands National Park - 172 acres in Ontario - established in 1914. The park protects a mainland area and twelve of the picturesque "Thousand Islands" in the St. Lawrence River. Stands of pine, oak, maple and birch rise above cliffs of granite and limestone. Camping and swimming facilities are provided. The mainland section of the park is accessible by highway, and the islands by boat from cities and towns on the mainland.

Terra Nova National Park - 156 square miles in eastern Newfoundland - established in 1957. The park contains an attractive combination of forests, barrens and rocky hills rising from sheltered sounds which extend inland from the Atlantic Ocean. Still in the development stage, the park will have camping facilities, trails and picnic areas. The Trans-Canada Highway traverses the park.

Waterton Lakes National Park - 203 square miles in southwestern Alberta, contiguous with the United States Glacier National Park - established in 1895. The two areas are known officially as Waterton - Glacier International



Peace Park. The rugged, colorful, glaciated peaks of the continental divide form the western boundary of the park. The cirques and escarpments of dark red argillites and yellow shales tower above dense conifer forests and U-shaped valleys. Upper Waterton Lake extends seven miles and crosses the international boundary, and many smaller lakes occur in the park. The park may be explored by boat, foot or horseback, and automobile roads penetrate some distance into it. Many species of animals and birds inhabit the park, and it is noted for its wildflowers. Camping facilities, tennis courts and a golf course are provided, horses may be rented, and visitor accommodations are excellent. About 350,000 visitors enter the park annually.

Wood Buffalo National Park - 17,300 square miles in Alberta and the Northwest Territories between Lake Athabasca and Great Slave Lake, established in 1922. This park was established to preserve the only remaining herd of wood buffalo (Bison bison athabascaae Rhoads) in its natural state. The bison population was supplemented by about 6,700 head of the closely related plains buffalo (Bison bison bison) transported from Buffalo National Park near Wainwright, Alberta, before that reserve was abolished in 1947. The present population of hybrid buffalo, and a small herd of "wood buffalo" is between 12,000 and 14,000.

Special regulations recognize hunting and trapping rights of the native Indians of the vicinity. The park is accessible in summer by river boat from the Waterways railroad terminal, and air service is available to Fort Smith. There are no accommodations for visitors within the park.

Yoho National Park - 507 square miles along the western slope of the continental divide in British Columbia, adjoining Banff National Park on the east and Kootenay National Park on the south - established in 1920. Rivers and creeks drain from glaciers and icefields on the jagged peaks, forming waterfalls as they descend the canyons. Takakkaw Falls drops 1,800 feet from the Daly Glacier to the Yoho River. The lower slopes and canyons are densely forested, and many lakes dot the alpine uplands. Fauna and flora characteristic of the Canadian Rockies are abundant. The townsite of Radium Hot Springs within the park has two hot water pools. Camping, riding and hiking facilities are provided, including 250 miles of trails, and vehicles may use designated roads. Approximately 70,000 people visit the park annually.

## PROVINCIAL PARKS

### Alberta

The Order of Council has established 37 Provincial Parks, of which 30 are being extensively developed. Picnic facilities, playground equipment and camping areas are provided in these parks, which are maintained primarily for the recreation and enjoyment of the residents of the province. The Alberta Provincial Parks Board in the Department of Lands and Forests is responsible for the administration.

Crimson Lake Park - 7,834 acres (3,134 hectares), established in 1948. Dense forests surround the lake. Summer cottages, recreational and picnic facilities are available.

Cypress Hills Park - 49,453 acres (19,781 hectares), established in 1952. The striking terrain contains rare specimens of pre-glacial plant, insect and animal life, some species of which are found only in sub-tropical areas. Cottages, a tourist camp, recreational and picnic facilities are contained in the park.

Drumheller Protected Area - 5,517 acres (2,207 hectares), established in 1952. There are dinosaur fossils and interesting valley formations.

Gaetz Lake Park - 198 acres (79 hectares), established in 1952. The park is a sanctuary for birds and animals.

Garner Lake Park - 2,278 acres (911 hectares), established in 1952. Recreation and picnic facilities are available.

Gooseberry Lake Park - 1,395 acres (558 hectares), established in 1931. There are summer cottages, recreational and picnic facilities.

Saskatoon Mountain Park - 2,240 acres (896 hectares), established in 1930. The park is closed at present.

Vermilion Park - 1,600 acres (608 hectares), established in 1952. Recreation and picnic facilities are available.

Writing-On-Stone Park - 796 acres (318 hectares), established in 1930. The park contains natural obelisks and undeciphered hieroglyphics. There are recreational and picnic facilities.

### British Columbia

There are 124 Provincial Parks in British Columbia with a total area of about 13,151 square miles. Class A parks are those considered most highly for immediate recreational development under strict protection. Class B parks are wilderness areas or places set aside for a specific reason. Class C parks are intended primarily for the use of local residents and are usually under Board management. The parks are administered by the Provincial Parks Branch in the Department of Recreation and Conservation, Victoria.

Crescent Beach Park - 237 acres (95 hectares), established in 1938. The park is an ocean beach which is accessible by road.

Darke Lake Park - 5,472 acres (2,189 hectares), established in 1943. The park contains a scenic group of mountain lakes. Hunting is permitted.

Elk Falls Park - 2,558 acres (1,023 hectares), on Vancouver Island - established in 1940. The park contains a series of cascades and falls on Campbell River, and a stand of giant firs.

Garibaldi Park - 612,615 acres (245,046 hectares), located on the lower mainland, north of Vancouver - established in 1927. The park contains mountain lakes, peaks and glaciers, flower meadows, and geological features. Access is by trail.

Hamber Park - 2,431,960 acres (972,784 hectares), established in 1941. The park adjoins Jasper and Banff National Parks, and is an undeveloped forest and mountain area bordering the easterly portion of Big Bend Highway.

Kokanee Glacier Park - 64,000 acres (25,600 hectares), established in 1922. A high mountain park that features Kokanee Glacier and several scenic lakes. There is poor road and trail access.

Manning Park - 179,313 acres (71,725 hectares), established in 1941. High mountains with alpine flower meadows and scenic fishing lakes are in the park. It is a wildlife sanctuary and accessible by highway.

McMillan Park - 337 acres (135 hectares), on Vancouver Island - established in 1944. A famous stand of virgin west coast rain forest, the park is accessible by highway.

Mt. Assiniboine Park - 12,800 acres (5,120 hectares), south of Banff on the British Columbia-Alberta boundary - established in 1922. This is an outstanding area of Rocky Mountain scenery. Access is by horse trail.

Mt. Robson Park - 513,920 acres (205,568 hectares), adjacent to Jasper National Park - established in 1913. Mt. Robson, highest peak in the Canadian Rockies, and other peaks, Berg Lake, and impressive glaciers are found in the park.

Mt. Seymour Park - 9,156 acres (3,661 hectares), established in 1936. This is a mountainous winter-sport area. A highway is under construction.

Silver Star Park - 21,888 acres (8,755 hectares), established in 1940. The park is an interior mountain area with alpine scenery. It is accessible by poor road.

Strathcona Provincial Park - 529,920 acres (211,968 hectares), on central Vancouver Island - established in 1911. The park contains many glaciers, alpine meadows and lakes, and Della Falls, one of the world's highest falls. The park is undeveloped and accessible by trail.

Tweedsmuir Park - 3,456,000 acres (1,381,400 hectares), established in 1938. This is one of the largest wilderness areas in North America. Hunting is permitted.

Wells Gray Park - 1,165,005 acres (466,002 hectares), established in 1939. The park is an undeveloped lake and mountain area, accessible by poor road and trail. Hunting is permitted.

### Newfoundland

There are 55 square miles of provincial park area in Newfoundland.

Butter Pot Park - Avon Peninsula.

Serpentine Park - 43 square miles, established in 1939.

Sir Richard Squires Memorial Park - Upper Humber River.

### Ontario

There were 115 provincial parks and park reserves in Ontario in 1958. The parks are administered by the Parks Division of the Department of Lands and Forests, Toronto. The present administrative policy is to encourage the establishment of commercial recreation facilities on the park fringes and to return the parks themselves to their natural condition.

Algonquin Park - 1,754,240 acres (701,696 hectares), established in 1893. The park is a wilderness area and wildlife preserve. Facilities include hotels, summer cottage sites, and camp grounds.

Lake Superior Park - 345,600 acres (138,240 hectares), established in 1944. The park is a wilderness area and wildlife preserve.

Quetico Park - 1,190,400 acres (476,160 hectares), established in 1913. The southern boundary adjoins the International Boundary, contiguous with the U.S. Superior Roadless area. The park is a wilderness area and wildlife preserve.

Rondeau Park - 5,120 acres (2,048 hectares), established in 1894. The park contains partly cultivated, fine forest stands. Enclosed wildlife exhibits are present. Duck hunting is permitted. Fishing and camping facilities, cottages, and other recreation facilities are available.

Sibley Park - 40,320 acres (16,128 hectares), established in 1944. The park is a wilderness area and wildlife preserve.

### Quebec

The Province of Quebec has established five provincial parks and eight fish and game reserves which are administered by the Department of Game and Fisheries.

Gaspeian Park - 328,960 acres (131,584 hectares), on the Gaspe Peninsula - established in 1937. The park was established to preserve caribou and other wildlife. It includes the highest peaks of the Shickshock Mountains, including Mt. Jacques-Carter (4,160 ft.).

Laurentides Park - 2,312,100 acres (924,840 hectares), established in 1895.

The park contains numerous lakes and tumultuous rivers and many wildlife species, such as moose, wolves, etc. Hunting is prohibited.

La Verendrye Park - 3,038,000 acres (1,215,200 hectares), established in 1939.

The park contains many lakes and rivers. Tourist accommodations and fishing camps are available.

Mount Orford Park - 9,970 acres (3,068 hectares), established in 1938. Skiing and golf facilities are available.

Trembling Mountain Park - 782,720 acres (313,088 hectares), established in 1895. This is a winter and summer resort area. The highest peak is Mt. Tremblant (3,100 ft.).

#### Quebec Fish and Game Reserves

Chibougamau Fish and Game Reserve - 2,176,000 acres (870,400 hectares), established in 1946. The reserve extends about 80 miles on both sides of the Montreal-Abitibi Highway. It contains many lakes and rivers and abundant wildlife.

Kipawa Lake Fish and Game Reserve - 640,000 acres (256,000 hectares), established in 1950. The reserve contains numerous lakes and rivers.

Mistassini Fish and Game Reserve - 3,328,000 acres (1,331,200 hectares), established in 1953. The reserve contains many large lakes.

Petite Cascapedia Fish and Game Reserve - 305 square miles.

#### Saskatchewan

The Province has ten provincial parks with a total area of 1,700 square miles.

Cypress Hills Park - 10,880 acres (4,352 hectares), established in 1932. The park is a forest area with elk, antelope, and other wildlife. Summer housing and an auto camp are available.

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Duck Mountain Park - 51,840 acres (20,736 hectares), established in 1932. The park is a forest and lake area with beaches, fish, and moose, elk and other wildlife.

Good Spirit Lake Park - 3,827 acres (1,531 hectares), established in 1932.

Greenwater Lake Park - 22,240 acres (8,896 hectares), established in 1932. The park is a forest and lake area with abundant wildlife.

Lac La Ronge Park - 729,600 acres (291,840 hectares), established in 1939. The park is a lake area with spruce and poplar stands. Tourist accommodations are available.

Moose Mountain Park - 98,560 acres (39,424 hectares), established in 1932. The park is a lake area with stands of poplar and white birch, and wildlife is plentiful.

Nipawin Park - 161,280 acres (64,512 hectares), established in 1934. The park contains stands of lodgepole pine. Camp grounds are available.

#### Special Federal Provincial Park

Gatineau Park - 50,000 acres (20,000 hectares), in the Laurentian Hills north of Ottawa, in Quebec. It contains lakes, streams, and hills. The park is administered by the Federal District Commission as part of the National Capital Plan.

OTHER LARGER NATURE RESERVES

Alberta

<u>Name</u>	<u>Area in Square Miles</u>	<u>Game Preserve</u>	<u>Bird Sanctuary</u>
Birch Lake			X
Blackburn			X
Brooks			X
Buffalo Lake			X
Claresholm		X	
Cold Lake		X	
Cygnets Lake			X
Dried Meat Lake			X
Greene Valley		X	
Kirkpatrick Lake			X
Lac La Biche Lake			X
Many Islands Lake			X
Ministik Lake			X
Miquelon Lake			X
Pakowski Lake			X
Penhold		X	
Primrose Lake		X	
Sarcee Camp		X	
Suffield		X	
Taber		X	
Wainwright		X	
Wapiti River		X	



British Columbia - Game Preserves

<u>Name</u>	<u>Area in Square Miles</u>
Arrow Creek	
Bowron Lake	284.00
China Creek	
Deer Lake	350.00 (acres)
Elk and Beaver Lakes	350.00 (acres)
Elk River	460.00
Florence Lake	
Forbidden Plateau	80.00
Green Lake	
Itatsoo Lake	
Kelowna (Boyce-Gyro)	
Kunghit Island	128.00
Lake Kathlyn	640.00 (acres)
Little Saanich Mt.	116.00 (acres)
Lucy Island	160.00 (acres)
McGillivray Creek	200.00 (acres)
Miracle Beach	
North Vancouver	182.00
Prince George Municipality	
Royal Roads	
Shaw Creek	350.00 (acres)
Stanley Park	
Strathcona	640.00
Thetis Lake	
Tranquille	500.00 (acres)
Three Brothers and E.C. Maning Park	
University of British Columbia	
Vancouver Harbour and English Bay	46.00
Vasseaux Lake	1,000.00 (acres)
Victoria Harbour	35.00
Yalakom	60.00

Manitoba

Bird Sanctuary

Alfred A. Hole Wild Goose Breeding Bird Sanctuary

Game Preserves

Assiniboine  
Big Grass Marsh  
Birch Island  
Bird's Hill  
Carman  
Delta  
Doghead Point  
Duck Mountain  
Grant's Lake  
Grindstone Point  
Hillside Beach  
Lake St. Martin  
Lake Winnipegosis  
Lynch Point  
Marshy Point  
Minnedosa Lake  
North Kildonan

Peonan Point  
Red Deer Point  
Reindeer Island  
Rock Lake  
Rockwood  
Roseisle  
St. Charles  
Sheriff Inkster  
Spruce Woods  
Swan Lake  
The Pas  
Turtle Mountain  
Victoria Beach  
West Shoal Lake  
Whiteshell  
Zephyr

New Brunswick - Game Preserves

<u>Name</u>	<u>Area in Square Miles</u>
Bantalor	59.00
Becaguimec	43.5
Burpee	70.00
Canaan	175.00
Grand Lake	10.5
Kedgwick	320.00
Lepreau	96.00
Plaster Rock-Renous	325.00
Tracadie	12.00
Utopia	12.00

Northwest Territories

<u>Name</u>	<u>Area in Square Miles</u>	<u>Game Preserve</u>	<u>Bird Sanctuary</u>
Akimiski Island	1,300.00		X
Arctic Islands	772,302.00	X	
Boatswain Bay	69.00		X
Bowman Bay	415.00		X
Cape Dorset	100.00		X
Dewey Soper	3,300.00		X
East Bay	450.00		X
Hannah Bay	115.00		X
Harry Gibbons	575.00		X
James Bay Islands	1,453.00	X	
*MacKenzie Delta	14,000.00	X	
Peel River	7,300.00	X	
*Thelon	11,200.00	X	
*Twin Islands	55.00	X	

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\* These are classified as Game Sanctuaries. They receive much more rigorous protection than Game Preserves in the Northwest Territories.

Ontario

<u>Name</u>	<u>Area in Acres</u>	<u>Game Preserves</u>	<u>Wilderness Area</u>
Abbey Dawn		X	
Abitibi		X	
Abitibi Lake Narrows			X
Barkley		X	
Barriefield		X	
Bat Cave	177		X
Bobcaygeon		X	
Boyd		X	
Brigden		X	
Burwash,		X	
Cape Henrietta-Maria	225 sq. mi.		X
Caverley		X	
Chapleau		X	
Charlottenburgh		X	
Chatham		X	
Chippewa		X	
Cobourg		X	
Conestogo		X	
Conroy Marsh		X	
Crater Lakes	550		X
Crow, J.W.		X	
Darlington	252	X	
Dudley		X	
Dumfries		X	
Dundas Marsh		X	
Echo Township	492		X
Eden		X	
Eighteen Mile Island	482		X
Fairwood		X	
Fairy Point	640		X
Florence and Wellesley Islands		X	

Ontario (continued)

<u>Name</u>	<u>Area in Acres</u>	<u>Game Preserves</u>	<u>Wilderness Area</u>
Grange		X	
Heart Lake		X	
Hiawatha Park		X	
Highgate		X	
Hilton Township	97		X
Himsworth		X	
Hope		X	
Humberstone		X	
Innisfree		X	
Iroquois		X	
Kettle Creek		X	
Kishkebus Lake	332		X
Lake Nipigon Islands		X	
Lancaster		X	
Loch Garry		X	
Luther Marsh		X	
Markham		X	
Massacre Island	78		X
Matawatchan	160		X
McCrae Lake	625		X
Meadowvale		X	
Miner		X	
Montreal River	108		X
Mulmer		X	
Murray		X	
Night Hawk		X	
Nipigon-Onaman		X	
Nipissing		X	
Nopiming		X	
North Easthope		X	
North Gwillimbury		X	

Ontario (continued)

<u>Name</u>	<u>Area in Acres</u>	<u>Game Preserves</u>	<u>Wilderness Area</u>
Outer Barn Island	161		X
Paradise		X	
Paris		X	
Peasemarth		X	
Peel		X	
Pembroke		X	
Peterborough		X	
Porphyry Island	260		X
Puslinch		X	
Rondeau	559.74		X
Shirley Bay		X	
Sioux Mountain	28,398		X
Sleeping Giant	633		X
Sombra		X	
Southwold		X	
Sutton Lake Gorge	125		X
Tickell			X
The Jones Road	640		X
Vivian		X	
Whitefish Falls	266		X
Woodlands		X	
Wyandotte		X	
Yarmouth		X	

<u>Name</u>	<u>Area in Square Miles</u>	<u>Game Preserve</u>	<u>Bird Sanctuary</u>
Aiguebelle	100.00	X	
Birch Island	28.8		X
Bonaventure Island - Perce Rock	2.00		X
Chic Chocs	314.00	X	
Fog Island	16.00		X
Mecatina	48.5		X
Murray Bay	11.2		X
St. Augustine	26.5		X
St. Hyacinthe	60.00	X	
St. Mary Islands	13.00		X
Watshishu	45.00		X
Wolf Bay	12.5		X



Saskatchewan

Bird Sanctuaries

Basin and Middle Lakes	Neely Lake
Duncairn Reservoir (12.5 sq. mi.)	Old Wives Lake
Indian Head	Opuntia Lake
Last Mountain Lake	

Game Preserves

Andrews Lake	Dundurn	Little Manitou
Antelope	Eagle Lake No. 1	Lizard Lake
Arena	Eagle Lake No. 2	Lomond No. 1
Argo	Elbow	Lomond No. 3
Barrier Lake	Emmeline and Swan Lakes	Lone Tree
Battle Creek	Estevan - Cambria	Macklin
Battleford	Estevan Park	Manito Lake
Beaver Hills	Excel No. 1	Mankota
Beechy	Excel No. 2	Mantario
Berube Lake	Excel No. 3	Marean Lake
Big Beaver	Eyebrow Lake	Mariposa
Big River	Fairview	Marsden
Big Stick Lake	Flat Lake	Masefield
Bitter Lake No. 1	Fort a La Corne	Matador
Bitter Lake No. 2	Fort Walsh	McCraney
Blaine Lake	Golden Gate	McLaren Lake
Boggy Creek	Gooseberry Lake	Meadow Lake
Brokenshell No. 1	Great Bend	Melville
Brokenshell No. 2	Gull Lake	Midale
Bronson (541.65 sq.mi.)	Heart's Hill	Middle Creek
Cactus Lake	Hillsburgh	Monet No. 1
Caledonia	Hidden Valley	Monet No. 2
Charron Lake	Horseshoe Lake	Montrose
Clarke and Beaupre Lakes (260,000 acres)	Indian Head	Moose Jaw
Coalfields	Isle of Bays	Mount Hope
Cold Lake	Katepwe Point	Nashlyn
Cookson	Kazan and Cumins Lake	Neely Lake
Coteau	Kendal	Newcombe No. 1
Crystal Beach	Key West	Newcombe No. 2
Cutknife	Kindersley	Oakdale No. 1
Dafoe	Lake Four	Oakdale No. 2
Deep Lake	Last Mountain Lake	Opuntia Lake
Divide	Laurier	Outlook
Dixon	Lawson	Park
	Lees Lake	Pasquia

Saskatchewan - Game Preserves (continued)

Patterson Lake  
Paynton  
Porcupine  
Primrose Lake  
Progress  
Radisson Lake  
Regina Beach  
Reno No. 1  
Reno No. 2  
Rice Lake  
Rosedale  
Rowan's Ravine  
Royal  
Rudy  
St. Peter  
Saltcoats  
Sceptre  
Shamrock  
South Sask. River  
Spy Hill  
Swift Current No. 1

Swift Current No. 2  
Tecumseh  
Thackeray Lake  
The Gap No. 1  
The Gap No. 2  
Torch River  
Theodore  
The Pines  
Usborne  
Valjean  
Val Marie  
Waterhen Marsh  
Wellington  
Weyburn  
Willner  
Willow Bunch  
Wise Creek  
Wolverine No. 1  
Wolverine No. 2  
Wood Mountain  
Wreford

Yukon

Kluane Game Sanctuary - 6,500,000 acres  
McArthur Game Sanctuary

CEYLON

Administration

The Fauna and Flora Protection Act of 1938 created two main classes of protected reserves, subdivided into (a) strict natural reserves, national parks and intermediate zones and (b) sanctuaries. Only Crown lands can be declared national reserves; sanctuaries are not national reserves and can include private lands; they may be declared for religious reasons, as a bird refuge, or as a protective or buffer zone.

The power to establish or alter the limits of a national park or to make or vary regulations is vested with the Minister of Commerce and Trade, with the approval of Parliament. The Ordinance also sets forth the following area regulations:

Strict Natural Reserves - no person is entitled to enter or in any way disturb the fauna and flora, and entry is only by written permission of the Warden. Hunting, egg taking, gun firing, plant taking, fire building, use of traps, introduction of animals and taking of fish are prohibited. No domestic animals are permitted.

National Parks - entry is permitted on payment of a fee only for the observation of flora and fauna; permits may be issued for the scientific study and observation of flora and fauna. Prohibitions listed for strict natural reserves also apply to national parks.

Sanctuaries - there is to be no hunting or fishing (except below the limits of low tide), no gun firing, no domestic animals, no taking of eggs without a permit, and no disturbing of flora and fauna.

Intermediate Zones - hunting is permitted if authorized by the Warden, but tree felling, cultivation, fire building and trapping are forbidden without express order of the Warden.

All mining, forestry practices and agriculture are expressly forbidden in all strict natural reserves and national parks. Violation of these or other sections of the Ordinance may result in a fine of not more than 500 rupees or imprisonment of not more than six months, or both.

The Warden, appointed by the Government, administers all the national reserves, and is responsible to the Minister of Commerce and Trade. An Advisory Committee of eleven members, with the Warden as Chairman, is appointed by the Minister to advise the Warden and make recommendations to the Minister on all matters relating to the fauna and flora of the Island.

Appropriations are provided annually by Parliament on the Commerce and Trade budget. Total personnel employed during the 1958-1959 financial year numbered 197.

National Parks - Total Area 401.5 square miles

Wilpattu National Park - 252 square miles, established in 1938.

Mainly sandy area, with a few rocky outcroppings, it contains 40 natural lakes (all fresh water except 3 or 4). Archeological remains show that the eastern and central parts of the park were once intensively populated and cultivated. Many animals and birds (elephant, sambhur, leopard, hornbill, bee eater, flycatchers, etc.) can be seen in the park. There are no villages within the boundaries, although a few lie on the southern and eastern boundary; however, infiltration is rare.

A protective zone of approximately 200 square miles of Intermediate Zones and Sanctuaries runs almost completely around the park. Access is by vehicle only, with some 200 miles of jeep roads constructed. There are overnight accommodations for 12 persons at present. There is a ~~xxxxxxxx~~ permanent resident staff of 38 with a small temporary labour force, under the Divisional Game Ranger.

Gal Oya National Park - 98.4 square miles, established in 1954, skirting the periphery of the Gal Oya water storage reservoir. About one-quarter of the park is dry evergreen forest, the remainder covered by savannah forest, parklike with scattered trees and grass, with a range of mountains on the outer border. Most of the park is drained by the Gal Oya River, which provides good fishing. There are no inhabitants within the park except for the remnants of an ancient tribe of jungle dwellers who will be evacuated shortly. Much of the park is accessible only on foot, but there is launch service available on the reservoir and two small bungalows for visitors. Visitors are always accompanied by a game guard.

Ruhuna National Park - 91.16 square miles, established in 1938 and expanded in 1954.

The principal topographic features include park, open plains jungle rock, outcrops and water holes. Some of the plains were cultivated in the 2nd century B.C., now reverted to scrub and thorn jungle. Some rocky outcrops were former sites of Buddhist monasteries founded in the 2nd century B.C., and caves contain pre-Christian inscriptions. There are no villages within the park boundaries, and only one agricultural village in the contiguous Sanctuary, where hunting is prohibited. Public access is permitted only by vehicle, and 30 miles of jeep road are maintained. There are overnight accommodations for 16 people in the park bungalows. The permanent staff consists of 31 people and a small temporary labour force.

Strict Natural Reserves - Total Area 234.2 square miles

Yala - 111.6 square miles. Noted for high forests and rocky hills.

Wasgomuwa - 112.3 square miles

Ritigala - 5.9 square miles. Unique flora.

Hakgala - 4.4 square miles. Contains flora of highest elevations.

Sanctuaries - Total Area 314.9 square miles

Amparai - 148 square miles. This area is noted for its aquatic bird population, including the rare Painted Stork, and the large migrating herds of elephants. There are villages on the boundaries.

Senanayake Samudra - 35 square miles. The sanctuary contains much aquatic bird life.

Wilpattu West - 21,250 hectares (68,175 acres)

Chundikkulam - 11,020 hectares (27,550 acres)

Minneriya-Giritale - 6,650 hectares (16,625 acres)

Peak Wilderness - 4,840 hectares (12,100 acres)

Giant's Tank - 4,280 hectares (10,700 acres)

Wirawila-Tissa - 4,130 hectares (10,325 acres)

Anuradhapura - 3,460 hectares (8,650 acres)

Polonnaruwa - 1,504 hectares (3,760 acres)  
Telwatta - 1,420 hectares (3,550 acres)  
Katagamawa - 1,015 hectares (2,538 acres)  
Kataragama - 830 hectares (2,075 acres)  
Wilpattu North - 624 hectares (1,560 acres)  
Kumana - 282 hectares (1,305 acres)  
Tangamalai - 130 hectares (325 acres)  
Kegalle - 112 hectares (280 acres)  
Udawattekele - 103 hectares (258 acres)  
Galways' Land - 56 hectares (140 acres)  
Pallemalala - 14 hectares (35 acres)  
Ambalangoda-Hikkaduwa (Rocky Isles) - 1.20 hectares (3 acres)  
Mihintale - 1 hectare (2.5 acres)

Intermediate Zones - Total Area 486.9 square miles

Melkulam, Veddikachchi (entirely intensive agriculture), Wasgomuwa, Wilpattu, Wilpattu South, Yala East and Yala North.

## CHILE

The National Parks and Forest Reserves of Chile were established under the Forest Law of 1931 which provides that the purposes for which they are reserved may not be changed except by the passage of another law. However, an Act of 1935 authorizes the President to establish settlers on up to 80 per cent of the agricultural land which exists in the parks and reserves. They are administered by the Forest Service, a part of the Ministry of Agriculture. The principal purpose in creating the parks and reserves is the conservation of certain species of wildlife and flora and of soil. They have many different characteristics of topography, stretching the length of the country in the mountains of both the Andes and the Coastal Range. From the economic point of view, the reserves located southward from Nuble Province have great importance. The problems in this area concern forest conservation; whereas from Nuble northward, the problems concern forest restoration.

### National Parks

Easter Island National Park - 17,000 hectares (42,500 acres) on the Juan Fernandez Archipelago and on Easter Island.

Juan Fernandez National Park - 18,300 hectares (45,750 acres) on the Juan Fernandez Archipelago and on Easter Island. Easter Island National Park and Juan Fernandez National Park can be reached only by sea and are administered by the Bureau of the Navy.

Gabriel Coll National Park - 31.45 hectares (78.6 acres) in Coquimbo Province, established in 1951.

Pedro de Valdivia National Park - located in the city of La Serena, Coquimbo Province, established in 1952.

Fray Jorge National Park - 5,199 hectares (12,997 acres) in Coquimbo Province.

Talinay National Park - 114 hectares (285 acres), in Coquimbo Province. Because of lack of fences and vigilance, this area is being destroyed by pasturing.

Nahuelbuta National Park - 5,415 hectares (13,538 acres) in Malleco Province, established in 1939. It is administered from the Vegas Blancas Forest Reserve.

Contulmo National Park - 82 hectares (205 acres) in Malleco Province, established in 1941.

Tolhuaca National Park - 3,500 hectares (8,750 acres) in Malleco Province, established in 1935.

Los Paraguas National Park - 18,000 hectares (45,000 acres) in Cautin Province, established in 1940.

Cerro Sielol National Park - 76 hectares (190 acres) in Cautin Province, established in 1939.

Villarrica National Park - 13,780 hectares (34,450 acres) in Valdivia Province, established in 1940.

LaBarra del Rio Bueno National Park - 424 hectares (1,060 acres) in Osorno Province, established in 1949. A bathing resort has been established near the park.

Pirihueico National Park - (acreage not available) in the Province of Valdivia, established in 1945. This is private land. The owners accept the legal management of the national park.

Puyehue National Park - (acreage not available) in the Provinces of Osorno, Valdivia and Llanquihue. The land is privately owned.

Los Paraguas National Park - 18,000 hectares (45,000 acres) in Cautin Province, established in 1940.

Perez Rosales National Park - 135,175 hectares (337,938 acres) in Llanquihue Province. There are a number of residents and settlers with provisional deeds.

Caro de Hornos National Park - in Magallanes Province, established in 1945. It can be reached only by sea. Within its boundaries the hunting of aquatic mammals is prohibited.



Laguna de San Rafael National Park - 5,900 sq. km., in Aysen Province on land surrounding San Rafael Lake, established in 1959.

#### Forest Reserves

Yaretera Forest Reserve - Established in 1940 and located northward from Antofagasta Province. It includes lands of the Andes Range to heights of 4,000 metres above sea level, in Tarapaca and Antofagasta Provinces. Neither the area covered by, nor the amount available of, yareta, is determined exactly. Extensive exploitation of yareta is not possible, not only because of the difficulty in reaching the zones of yareta growth, but also because the uncontrolled exploitation which was practised until a few years ago has hastened the decrease of the species. Yareta is chiefly used as fuel. The Ministry has regulated its use in order to insure the fuel supply of the mining population of Norte Grande. The Forest Bureau plans a complete study of the yareta resources, as adequately as its available technical and material means will permit.

Rio Blanco Forest Reserve - 50,000 hectares (125,000 acres) in Antofagasta Province, established in 1938. The reserve is now composed only of mountainous lands, a very small part of which is usable in summer (para veranadas). The agricultural lands which the reserve originally had are now occupied and there are no other possibilities for utilization.

Lago Penuelas Forest Reserve - 9,095 hectares (22,738 acres) in Valparaiso Province, established in 1952. It is administered by the Bureau of Drinking Water of Valparaiso, and is planted in pines which are in a full state of development.

Federico Albert Forest Reserve - 80 hectares (200 acres) in Concepcion Province, established in 1938.

Contulmo Forest Reserve - 290 hectares (725 acres) in Arauco Province, established in 1941. This reserve covers the watershed which supplies the town of Contulmo with drinking water. The native forest is now being renewed and reforested with foreign species.

San Ramon Forest Reserve - 167 hectares (418 acres) in Malleco Province, established in 1938. It is planted in pines and settled for the most part.

Malleco Forest Reserve - 36,630 hectares (91,575 acres) in Malleco Province, established in 1907. The reserve includes rugged terrain whose altitude varies between 450 metres and 1,700 metres above sea level, the major part of the exploitable timber being between 600 and 1,200 metres above sea level. Approximately one third of the reserve is covered with rauli, coigue, oak, lingue and araucaria of good quality. In this part there must be about 750,000 metres of timber being cut. Another third of the value has been cut and now is partially covered with burned trees and new growth. The rest of the land is basically rugged, either unusable or very slightly usable. The various fragments of arable soil approximate 300 hectares. The bureau has a problem with about 120 families of squatters, comprising former reserve residents and lumber workers brought in by timber companies whose concessions have since expired, living in the zone which is burned and covered with new growth. A plan for reforestation and road-building, as well as other projects which will improve the administration of the reserve, are being brought to fruition. One of the FAO Mission technicians is preparing a plan for forest management. Exploitation of the timber forest can be realized once the technical studies are made. The Malleco Reserve is considered to be among those of the greatest value in the country's heritage.

Contraco Forest Reserve - 400 hectares (1,000 acres) in Malleco Province, established in 1947. The reserve consists of mountainous lands whose vegetation has been destroyed by unsuccessful cultivation. At the beginning it had an area of more than 3,000 hectares; but it has now been reduced to about 400 hectares of rugged terrain. The other part was intended for colonization, which has failed because of being tried in forest terrain.

Hijuela de Huenivales Forest Reserve - 500 hectares (1,250 acres) in Malleco Province, established in 1951. The reserve consists of 1,100 m.s.n.m. of araucaria and lenga growth.

Conguillio Forest Reserve - 5,000 hectares (12,500 acres in Malleco and Cautin Provinces) established in 1950. Araucaria is prevalent. The service marks the trees which can be used.

Malalcahuello Forest Reserve - 15,000 hectares (37,500 acres) in Malleco Province, established in 1931. This is a mountainous area, varying between 1,000 and 1,700 metres above sea level. When established, it had an area of about 29,000 hectares which is now reduced to about 15,000 hectares. The remainder has been settled with very bad results. The settlements have reverted to the reserve in disconnected pieces. Of these 15,000 hectares, 6,000 to 7,000 hectares are forested, chiefly with araucaria; the rest is rugged terrain suited for forest and with tourist value. Although the 6,000 to 7,000 forested hectares would be exploitable, it would be better for technical study to be made to determine the true extent, composition and value of these resources. About 780 residents live in the reserve.

Alto Bio Bio Forest Reserve - 34,000 hectares (85,000 acres) in Cautin Province in the Lonquimay Range, established in 1912. The reserve consists entirely of mountain lands, suitable for summer stock pasture.

Las Quilas Forest Reserve - 38,800 hectares (81,000 acres) in Cautin Province, established in 1938. It is in the rural area of the city of Temuco and is devoted to tree nurseries.

Pitrufquen Forest Reserve - 400 hectares (1,000 acres) in Cautin Province, established by laws of 1935, 1934 and 1943.

Villarrica Forest Reserve - 75,000 hectares (187,500 acres) in Cautin Province, established in 1912. In 1929, 90,000 hectares of this reserve were assigned for settlement. Of the remaining 75,000 hectares, about 70 per cent have been occupied by squatters; and of the remaining 30 per cent only about 20 per cent is covered with good-quality timber. This reserve is the one which has suffered most from settlement, and it is now divided.

Chanlil y Raguintulelfo y Rio Blanco Forest Reserve - 1,958 hectares (4,896 acres) in Valdivia Province, established in 1947. The reserve is entirely settled.

Llanacura Reserve - 1,800 hectares (4,500 acres) in Valdivia Province, established in 1946. Settlements have been made in the area with only fair results. It now constitutes the Experiment and Demonstration Centre where, with the co-operation of the FAO Mission, a model sawmill, the only one of its kind, is now being installed. This Centre also serves for practical training of the future Forest Engineers of the University of Chile.

Petrohue Forest Reserve - 152,000 hectares (380,000 acres) in Llanquihue Province, established in 1914.

Llanquihue Forest Reserve - 50,000 hectares (125,000 acres) in Llanquihue Province, established in 1912. The area is heavily settled.

Puerto Montt Forest Reserve - 126 hectares (305 acres) in Llanquihue Province, established in 1941. It is devoted to nurseries.

Chiloe Forest Reserve - 140,000 hectares (350,000 acres) in Llanquihue Province, established in 1941. Parts of the reserve are rich in forest value and the Bureau is interested in completing a study of these forests.

Guaitecas Forest Reserve - (acreage not available) on the islands on the 42nd parallel, established in 1938. It can be reached only by sea. This reserve was established chiefly to control the exploitation of the Guaitecas cypress. In spite of regulations to the contrary, the cypress has been almost exterminated by indiscriminate cutting. In recent years there has been slightly effective state control.

Coyhaique Forest Reserve - 6,052 hectares (15,130 acres) in Aysen Province, established in 1948. This is almost entirely exploited. The Bureau plans reforestation work.

Magallanes Forest Reserve - 15,500 hectares (38,750 acres) in Magallanes Province, established in 1932. This reserve has been used for years by many people for firewood to supply the city of Punta Arenas, which has resulted in the rapid exhaustion of timber in many places. However, there are still some sections worthy of consideration. This work is now suspended, and a plan for reforestation and conservation is being completed.

El Boqueron Forest Reserve - (acreage not available) in Magallanes Province, established in 1943. It can be reached only by sea. This is a forest group characteristic of the area where it is located, representing the only timbered area near the city of Porvenir on the Isla Grande of Tierra del Fuego. For several years it was subjected to extensive and indiscriminate use as domestic fuel, which now has been completely stopped because of the tremendous harm it caused, resulting in a conservation plan to prevent the total drain of the timber.

Navarino Forest Reserve - 10,500 hectares (26,250 acres) in Magallanes Province, established in 1948. It can be reached only by sea. This has abundant forest areas, some of which are suitable for industrial development, but this has not been accomplished because of its great distance from consumer centres and the low quality of the forest.

ETHIOPIA

Managasha National Park - 7,500 acres (3,000 hectares) on a mountain range west of Addis Ababa - established in 1958. The park was established by Imperial Order, and is administered by the Department of Forestry and Game, under the Ministry of Agriculture. Experimental forestry and sustained yield practices are followed in parts of the area, and a training centre for foresters is located there. Especially beautiful sections are maintained in the primeval state. The fauna is characteristic of the East Africa high mountains, and wildlife is strictly protected.

The Department of Forestry and Game has proposed twelve additional national parks and wildlife sanctuaries, now under study.

FEDERAL REPUBLIC OF GERMANY

The Federal Republic of Germany does not possess any national parks as defined by the United Nations and cannot create such national parks owing to the population density and the industrialization of the Federal Republic.

There are, however, six so-called nature parks in the Federal Republic which are deemed to qualify as "Equivalent Reserves". In addition to developing and preserving the landscape and to safeguarding the native flora and fauna their objective is to open up possibilities for recreation, after working hours, on weekends and during vacations, to the working population of the industrial centres. The nature parks shall be easily accessible from these centres. Facilities like parking lots on the parks' edges and hiking paths are designed to preserve quietness even in rush periods and to assure undisturbed enjoyment of nature for everybody. These objectives are pursued in each individual park in a manner suited to its particular features.

The areas were legally established by ordinances of districts or regions and are administered by governmental units or private organizations. The field staffs consist of personnel from districts, municipalities and from owners of land in the parks. The Federal Government contributes a large proportion of the annual appropriations for the parks.

The parks are accessible by motor transportation to parking areas where trails lead to the interior and protected areas. Numerous accommodations are available. Maps and publications dealing with specific parks are issued and private organizations carry out programmes of publicity. A research station, in co-operation with the University of Giessen is located at Naturschutzpark Hoher Vogelsberg.

Nature Parks

Naturschutzpark Hoher Vogelsberg - 21,500 hectares (53,750 acres) in central northeast Germany - established in 1958. The park contains an area of volcanic uplands with an altitude range from 300 meters to 776 meters. The basic formations are basalt with tuffs and loess. Woodland of copper beech and spruce cover about one third of the area and has increased during

the past 150 years as a result of afforestation measures. Of the area devoted to farming, two thirds is in pasture. The population of the thirteen municipalities within the park is 1,800. The park land is owned by the Land Hessen, various municipalities and private individuals. The park was given legal status by the Ordinance of 1957 of the Regional President of Darmstadt; it is administered by the Administrative Union for the Advancement of the Scenic Reserve of Hoher Vogelsberg Nature Park. The budget for 1959 was DM307,000 (\$73,095). Information concerning the park is provided by hiking maps and by a publication Naturpark Hoher Vogelsberg. In co-operation with the University of Giessen, a research station has been built in the park. Access is by automobile and rail; hotel accommodations are available.

Naturschutzpark Lüneburger Heide - 20,000 hectares (50,000 acres) in northern Germany - established in 1909. The park was reserved mainly for the protection of the landscape and its native heath. From the Wilseder Berg (169 metres above sea level) at the centre of the area, spur ridges extend in all directions over a wide plain of diluvial sands where there are many valleys and streams. These, with the juniper which are scattered over the heath, give the somewhat uniform landscape a special charm. The grazing of moorland sheep is essential to the propagation and maintenance of the heather. Forest tree species include oak, birch and pines. Fauna include forty species of mammals, 200 species of birds and six species of reptiles. The park area is very thinly settled. Wilsede has preserved its heath village character; its oldest houses date from the middle of the 17th century. The population makes a living from farming, sheep-raising, bee-keeping and forestry. A few crafts not found elsewhere are still practiced, such as reed-thatching. Due to military exercises by British troops, 2,000 hectares are closed to the public. 4,200 hectares are forest and farmland owned by private farmers. The Verein Naturschutzpark administers the area, which was entered in the Reich register of nature reserves in 1935. The financial requirements of the park are met out of the Association's own resources and by annual subsidies from the Federal Government; the total annual budget is DM800,000. The field personnel consists of a forestry supervisor appointed by the Association. Management of Lüneburger Heide differs from that of the



other nature parks in Germany in that the primary emphasis is placed on restoration and preservation of the characteristic features of the area and elimination of signs of industry. This includes restoring old farms and building new ones according to the traditional style and with thatched roofs, burial of telephone lines, planting heather for landscaping purposes and to increase the number of moorland sheep, etc. Trails, parking areas and shelters, as in other parks, are also being provided. The Association facilitates scientific and research work from which the park may derive benefit. The park is open to the general public but may be entered only on foot or in horse-drawn vehicles. Visitors are accommodated primarily in inns and hotels outside the park area. In 1958, a holiday village established with Federal aid was opened at the edge of the park. A museum was established in 1907 in an old farm house at Wilsede, which is similar to the farm dwellings of the period around 1815. The Association spends a considerable amount every year on publicity in behalf of nature parks in general and Lüneburger Heide in particular.

Naturpark Münden - 19,547 hectares (48,868 acres) in central northeast Germany - established in 1951. The park protects a very popular outdoor recreation area, and the southernmost fens of Lower Saxony, which extend over an area of fifty hectares, and the scenic Hühnerfeld in the middle of the Kaufungerwald. The park is a hilly area with an ideal combination of woodland and pasture. Forests cover 66 per cent of the area, about half of which is copper beech, with smaller areas of oak and miscellaneous species. Spruce is the predominant conifer. Upper red sandstone is the principal rock type of the area, while muschelkalk and keuper are encountered in the eastern sector. Volcanic peaks are scattered over the area. Of great importance are the loess formations, which occurred during the diluvial period. These are of varying thickness and contribute to the high yield of farming and forestry in the area. The park does not include any town or adjoining area. Of the total park area, 10,173 hectares (52 per cent) are publicly owned (State or monastic forests of the Land Lower Saxony). The Chief District Officer of the District of Münden is responsible for the park administration. No special park personnel has been provided;

the staff of various land owners is available for routine work and execution of park projects, in addition to their duties in connexion with forest management. The public is admitted free of charge. Trails and forest roads leading to the interior of the park from the transit and approach roads are closed to motor traffic. The central portions of the park are to remain oases of peace. The inns and hotels in neighbouring towns provide adequate overnight and other accommodations. In addition, there are nine inns within and around the park perimeter. Plans have been made to build holiday villages.

Naturpark Pfälzer Wald - 167,000 hectares (418,250 acres) in southwest Germany on the international border with France - established in 1958. The Pfälzer Wald is the largest area of continuous forest in the Federal Republic of Germany. Seventy-five per cent of the area is wooded, and the central portion of the park consists of dense forest. The main species are oak, beech and pine, with smaller amounts of spruce. The only area practically free of woods is the Weinstrasse, where vineyards predominate. The park is a Bunter sandstone plateau broken by deep indentations. Faults and erosion have resulted in the creation of an upland area. The flora consists basically of Eurasian species. The settled areas (approximately 120 villages) are scattered unevenly over the area. 127,500 hectares of the park are covered with forest, of which 60 per cent (75,100 hectares) is publicly owned. The remainder, situated in the eastern sector, belongs mainly to the municipalities; there are a few large private forests. In addition to the Pfalz Regional Government as the superior conservation authority, the park is managed by the Pfälzer Wald-Verein. There is no special administrative or field personnel. The landowners have their own personnel who, in addition to their forest-management duties, are at the disposal of the park. There is ample overnight accommodation in hotels.

Naturschutzgebiet Siebengebirge - 4,200 hectares (10,500 acres) in southwest Germany - established in 1930 (protected since 1922). The park was established to protect the Siebengebirge against further despoilment of the landscape by quarry workings, and to maintain and preserve the area for recreational purposes. The area includes many mountains of volcanic origin

and is covered with forests. The altitude ranges from sixty to 460 metres. Plant life is typical of limestone areas and contains orchids. The President of the Regional Government at Cologne is the supreme conservation authority; the Siebengebirge Development Association and nine municipalities furnish funds and personnel for the park. Permission must be obtained for the cutting and removal of timber. The extraction of materials from the soil, the removal or damage to plants, and the hunting, trapping or disturbing of wildlife are prohibited, although previous hunting rights are not affected. Hiking clubs and local development associations provide interpretive service for visitors.

Naturpark Südeifel - 10,700 hectares (26,750 acres) in southwest Germany on the frontier between Germany and the Grand Duchy of Luxembourg - established in 1958. The park comprises an area in the mountainous Eifel region bounded by the Moselle and Rhine rivers. The altitude ranges from 150 to 420 metres at the high plateau of Ferschweiler in the centre of the park. One half of the area is covered with tall, mixed deciduous forest interspersed with conifers; the remainder is mainly farmland. Grass and shrubs cover the rock-strewn areas. In addition to a variety of orchids, the very rare Leuchtmoss is found. The park is rich in wildlife of many species, particularly fallow and roe deer. Bird species include the peregrine falcon, red kite and dipper. More than half of the park is in private ownership. In Luxembourg, Echternach and Vianden national parks are contiguous to the Südeifel boundaries. The Verein Naturpark Südeifel is responsible for the establishment of the park and for its administration. The Association has developed thirty km. of trails, picnicking and camping areas, and shelters. Motor vehicles are excluded except on transit roads through the park. Hotel accommodations are available.

## FEDERATION OF RHODESIA AND NYASALAND

In Southern Rhodesia the first Game Reserve was established in 1927 with a foresight which saw the possibility of the gradual extermination of game by hunting and settlement. National Parks were not proclaimed until the end of 1949 when the National Parks Act was promulgated and the Governor was given authority to constitute any area of Crown land or any land bequeathed or donated to him as a national park. The Act also established a National Park Advisory Board and laid down its functions. More than 3,000,000 acres were designated immediately under this Act. On Federation, the national parks were made a Federal subject and Southern Rhodesia agreed to transfer the reserves in that territory in 1954; the Federal National Parks Board was established in 1958 and assumed full control of the 14 parks in Southern Rhodesia. The 1959-1960 appropriation for maintenance and development of the parks was £145,682.

The areas are administered by the Director of National Parks under the Minister of Home Affairs. The Director is responsible to the Secretary of Home Affairs who is the chairman of the Federalized National Parks Board. Local committees are appointed by the Board to each national park to assist the Board in its functions.

The three main purposes of the national parks are strict preservation of the natural area, systematic conservation of flora and fauna, and provision for access and facilities for the public. Independent research is encouraged and facilities are provided when available. A team of Fulbright research scholars conducted valuable wildlife research in the Wankie National Park in 1958 and plans are to continue the research in other national parks.

In Northern Rhodesia and Nyasaland, the function of national parks has not been transferred to the Federal Government and is still administered by the Territorial Governments.

SOUTHERN RHODESIA

Federalized National Parks

Chimanimani National Park - 20,213 acres (8,085 hectares) on eastern border on Southern Rhodesia - established in 1950. The park was proclaimed to protect the rugged grandeur of the Chimanimani mountain range. Forests in the kloofs are dominated by diverse variety of evergreens. The lower rocky slopes are covered with mountain acacia and a variety of bush, dense stands of Philippia or a sparser association of Protea, Lobelia cobaltica, and Leucospermum saxosum are also found on these slopes. Tree ferns and Strelitzia characterize many of the rocky stream sides. Terrestrial and epiphytic orchids are abundant. Xyris are conspicuous in the bogs and marshes. There are broad sweeps of undulating grassland. The park is accessible by motor transportation and a mountain chalet is available. The area is principally of interest to mountaineers.

Ewanrigg National Park - 707 acres (283 hectares) 25 miles east of Salisbury - donated in 1949 and established as a national park in 1955. The park was established to preserve and develop a unique botanical garden of hundreds of different species of aloea and cycads. The garden was developed by the late Harold Basil Christian, and is one of the famed sights of the Federation. Some 40 species of indigenous trees grow in the park, and native and exotic shrubs and other plants are exhibited. A variety of birds inhabit the park. Scientific studies are constantly in progress. Access is by motor transportation. There are no visitor accommodations.

Manchester National Park - 450 acres (180 hectares) 20 miles from Umtali - established in 1958. The park was established to protect and develop one of the loveliest landscape gardens in Southern Africa, and a part of the lush green Vumba Mountains. The gardens comprise 12 acres; it contains notable exotic trees and shrubs, and experiments are being carried out with native plants. Access is by motor road from Umtali winding through thick forest and picturesque gorges. There are accommodations in the vicinity.

Matopos National Park - 383 square miles 30 miles south of Bulawayo - established in 1953. The park comprises part of the granite country of the Matopos hills. Most of the area is well wooded, mainly with low tree savannah. There are a number of caves and rock shelters that contain paintings from the Middle Stone Age. The intrusive granite and its relation to fantastically shaped kopjes and balanced boulders are interesting. The plant life is varied and abundant. The dominant trees are the msasa (Brachystegia Spici formis) and the munhonde (Isoberlinia globifera), and other species are common. The climbing Gloriosa Lily is common, and in some years the meadows are covered with ground orchids. Troops of baboons and monkeys are numerous; there is a fine herd of sable antelope, and a small herd of impala and a few kudu. Klipspringers, rock rabbits and elephant shrews are plentiful, and leopards are often heard but seldom seen. Wildebeeste, eland and giraffe have been restocked from Wanki National Park. Bird life is abundant, and during the rainy season the park provides a sanctuary for many migrants. Some 700 Africans are permitted to reside in the park and to cultivate land allocated to them. There are five large dams and a number of smaller ones within the park boundaries. The park is accessible by motor transportation and accommodations are available.

Mtarazi Falls National Park - 4,400 acres (1,260 hectares) in north-east Southern Rhodesia - established in 1953. The park comprises an area of high ground and cliffs which give rise to many eastward-flowing rivers due to the heavy rainfall. It contains a good deal of natural evergreen forest, especially along the talus slopes at the foot of the cliffs. There is an exceedingly precipitous cliff-like escarpment from which the Mtarazi River drops some 2,000 feet, forming a magnificent waterfall. Prior to establishment as a national park, considerable damage was done by local Africans who burned the forests up to the cliffs in order to cultivate some of the steep slopes. These practices have now stopped and the damage remedied. The park adjoins the Rhodes Inyanga National Park and is under its administration. Access is by motor transportation. There are no accommodations.

Mushandike National Park - 33,000 acres (13,200 hectares) 19 miles from Fort Victoria - established in 1954. The area is centred around the Mushandike Reservoir (1,400 acres) which is surrounded by thickly-wooded kopjes. The park is covered principally by msasa, with a fair selection of Rhodesian wistaria (Balusanthus speciacus) and red mahogany (Afselia cuanzensis) and many other tree species. The area is rich in flowers at certain times of the year, outstanding being Haemanthus multiflora. Fauna include sable antelope, kudu, waterbuck, reedbuck, klipspringer, duiker, steenbuck and leopard. Little is known about the bird-life except the water-inhabiting species around the dam. Poaching is a problem which is somewhat controlled by patrols. The lake is under development as a fishing and yachting area. The park is accessible by motor transportation and accommodations are available.

Ngesi National Park - 24,932 acres (9,973 hectares) in northeast Southern Rhodesia - established in 1956. The main feature of the park is the Ngesi Dam, whose reservoir supports an exceptional population of tiger fish (Hydrocayan vittatus). The dam is on the eastern side of the Great Dyke, a gigantic and complex igneous intrusion which extends 330 miles north and south through the middle of Southern Rhodesia. The Ngesi River cuts through the Dyke. The foothills on the western side are heavily wooded with mfuti (Brachystegia boehmii) while the Great Dyke itself and the eastern slopes are more open, with such trees as African beech (Faurea saligna). Between the hills are large vleis of tall grass. On some of the more rocky ridges, Kirkia acuminata, Sterculia quinquelaba and baobab (Adansonia digitata) are found. The remainder of the park consists of typical granite sandveld. Access is by motor transportation and limited accommodations are available.

Rhodes Inyanga National Park - 86,000 acres (34,000 hectares) on the eastern border - established in 1950. The park is divided into two zones: the mountainous country in the east and centre with an altitude range of 5,000 to 8,000 feet, and the low-veld of 4,000 feet in the extreme west and southwest. The area is drained by numerous streams which include several fine waterfalls. Most of the hills are covered with rolling

grassland and the hillsides contain colorful flowers. Patches of evergreen forests occur. Tree ferns and giant heather are found in the kloofs. The slopes of Mount Inyanga (the highest mountain in Southern Rhodesia, with an altitude of 8,514 feet) contain patches of mlanje cedar (Widdringtonia whytei). A mountain chain runs through the park; many ruins and ancient relics are found throughout the area. Fauna include bushpig, leopard, kudu, waterbuck, bushbuck, reedbuck, grey duiker, spotted hyena, wild cat, side-striped jackal, otters, species of mongoose, polecats, weasels, ratels, aardwolf, baboons and many species of birds. Modern trout hatcheries have been constructed and fisheries research is carried out. A programme of dam construction is underway to provide recreational facilities. Access is by motor transportation, with a good network of roads within the park; accommodations and recreational facilities are available.

Robert McIlwaine National Park - 13,875 acres (15,550 hectares) 20 miles southwest of Salisbury - established in 1952. The park comprises Lake McIlwaine (6,000 acres), with abundant fish life, and the surrounding 7,000 acres of typical Mashonaland bush country which contains many species of trees on the deep granite soils and granite hills. Fauna include sable antelope, kudu, waterbuck, wildebeeste, reedbuck, duiker, stembuck, porcupine, warthog, baboons, monkeys, leopard and crocodile. Over 250 species of birds were identified in a 1954 survey, including many water-birds. The granite hills contain groups of rock paintings and the remains of fortifications of two large Mashona settlements. The park was created principally to cater to the recreational needs of the community, and the northern lake shore has been developed to provide boating and entertainment facilities. Access is by motor transportation and numerous accommodations and recreational facilities are available. The Tree Society of Southern Rhodesia has established an arboretum in the park, which now has over 200 named varieties of trees. A small wildlife reserve is being built.

Sebakwa National Park - 6,200 acres (2,480 hectares) in the Midlands - established in 1959. The park comprises a reservoir of 3,000 acres in a vast gap of



the Great Dyke and the surrounding country. The area has been reserved primarily as a yachting and fishing resort. The foothills on the west side of the lake are heavily wooded with mfuti, while the Dyke itself and the east slopes are more open, with trees such as African beech. Many springs originate in the Dyke. Between the hills are large vleis of tall grass. The remainder of the park consists of typical granite sandveld. The park is accessible by motor transportation and accommodations are available.

Sinoia Caves National Park - 716 acres (282 hectares) 5 miles north of Sinoia - established in 1955. The caves consist of a labyrinth of passages, tunnels and caverns, covering a linear distance of more than 750 feet. They were formed in dolomite or limestone by the action of water percolation; stalactites and stalagmites are present. The main feature of the caves is the "sleeping pool", with its entrance 20 feet below the surface of the ground. This deep pool lies directly under a great swallow-hole or opening which permits light to shine on the intensely blue and still water. Many species of trees and birds are found in the park area. Various speleological societies have investigated the caves. The park is accessible by motor transportation and accommodations are available.

Victoria Falls National Park - 132,250 acres (52,900 hectares) in northwest Southern Rhodesia - proclaimed a game reserve in 1931 and established as a national park in 1952. The park protects the magnificent Victoria Falls and surrounding terrain, and includes a fine game sanctuary that extends 40 miles upstream along the south bank of the Zambezi River. The Falls are 1,860 yards wide, with an average height of 310 feet, forming the largest curtain of falling water in the world. The Zambezi valley at the Falls is banked by low hills of Kalshari sand overlying wide sheet of basalt. There are three distinct areas of vegetation in the park: the thick belt of riverine vegetation bordering the Zambezi, the rain forest whose exceptional thickness is caused by continuous spray from the Falls, and the non-riverine area dominated by mopane (Colophosphermum mopane). The wildlife population varies with the availability of food; elephant, hippo, kudu, sable antelope, roan antelope, eland, bushbuck, waterbuck,

reedbuck, duiker, buffalo, lion, leopard, cheetah, warthog, otters, baboons and crocodile have all been seen. More than 220 species of birds have been identified in the area, including the goliath heron, purple heron, darter, reed cormorant, squacco heron, green backed heron, giant kingfisher and trumpeter hornbill. Two of the more curious river fish are the grunter (Synodontis sp.) and electric catfish (Malapterurus electricus). There is a certain amount of poaching in the park, but frequent patrols are reducing this to a minimum. The park is accessible by motor transportation which includes a 35 mile road along the Zambezi River; also rail and air service. Accommodations are available and provision has been made for caravans.

Wankie National Park - 5,060 square miles northwest of the city of Bulawayo - proclaimed as a game reserve in 1928 and established as a national park in 1949. The park comprises a forested area which includes extensive stretches of Kalahari sands. Rhodesian teak (Baikiaea plurijuga), mchibi (Guibourtia coleosperma), and mukwa (Pterocarpus angolensis) occur throughout the park. Fauna includes over 50 varieties of game and a large variety of birds. The primary administrative objective is the conservation of wildlife. In 1958, a team of Fulbright scholars initiated research on wildlife resources and wildlife problems which included study of the ecology of large mammals, assistance with practical management problems, and preparation of reference materials. Access is by motor transportation, and accommodations are available. Observation platforms have been erected at the Nyamandhlovu pan, from which herds of game can be seen. The park is open from June through November each year.

Zimbabwe National Park - 1,786 acres (714 hectares) 17 miles southeast of Fort Victoria - established in 1957. The park comprises a low-lying area with some luxuriant vegetation. Fauna include kudu, bushbuck, steenbuck, duiker, klipspringer, baboons, leopard and other animals. Bird life is abundant. The main features of the park are the archaeological ruins, including a temple 350 feet wide, with an acropolis rising above it. The main objective of management is the preservation of the ruins. Several archaeological investigations have been undertaken under the Natural and Historical Monuments Commission. An archaeological museum is located in the park. Access is by motor transportation; accommodations are available and a golf course has been constructed.

NORTHERN RHODESIA

National Park

Kafue National Park - 8,650 square miles, in southern Northern Rhodesia, established in 1950. The park consists in the main of Isoberlinia paniculata - Brachystegia woodland in the north and Kalahari sand in the south with an area of Copaifera mopani in the southeast. The woodland is intersected with open grassy "dambos" and there is a wide expanse of flood plain grassland in the Busanga and Lufupa river area of the north. The Kafue River and its tributaries flows for approximately 100 miles within the park.

The park preserves practically all of the plateau inhabiting species of fauna. The park is particularly rich in antelopes, among them eland, sable, roan, hartebeest, kudu, wildebeest, puku, impala, lechwe, bushbuck, Sharpe's grysbok, reedbuck, steinbok, oribi, waterbuck, common duiker, yellow backed duiker, klipspringer and sitatunga. The herd of no more than 200 lechwe which inhabits the Busango swamp comprises the only representatives of that species that are protected by inclusion in a reserve. Hippopotamus, buffalo, zebra, warthog, elephant, rhinoceros and the larger carnivores occur.

In 1950, some 2,000 native people lived in the park, but all but 200 have been relocated. Fishing has tended to become commercialized to the detriment of the park. Mineral rights remain the property of the British South Africa Company, but prospecting is localized and controlled. The park remains in Native Trust Land, set apart for the benefit of the natives of Northern Rhodesia.

The park was established under the Game Ordinance Cap. 106 by proclamation of the Governor with the consent of the Legislative Council; boundaries can be modified only in the same manner. The area is administered by the Director of the Game and Fisheries Department assisted by an Advisory Board. A permanent staff of 52 persons is headed by a warden. Appropriations for 1959-1960 were £14,050 (\$39,340), not including staff salaries.

Management is directed at preventing illegal hunting, woodcutting, and bush fires. Scientific investigations are conducted by the staff. Facilities are provided for private research workers. The park is open

to visitors from mid-July to early November. Access is by motor and air transportation. There are over 500 miles of roads in the park. Accommodations are available. Talks are given at Ngoma camp. A park brochure is available and a film on the park has been produced.

#### Game Reserves

Game reserves were originally established under the Game Ordinance of Northern Rhodesia by the Governor. When the relevant sections of the Game Ordinance were repealed and replaced by the Fauna Conservation Ordinance, the reserves were re-declared or established by the Governor in Council in Government Notice 175 of 1957, who may abolish the reserves or alter their boundaries. The areas are administered by the Director of the Department of Game and Fisheries. Approximately ten Game Rangers, whose scope of responsibility includes specific reserves, supervise a field staff of eighty. The Game Reserves were established to protect the fauna and all other natural features, and lie within Native Trust Land. The main objectives of management are the prevention of poaching, woodcutting, and bushfires. The Department staff maintains observations and records.

Isangano Game Reserve - 325 square miles, on the eastern edge of the Bangweulu flood plain, established in 1957. The area consists of woodland in the north and east and grassy plains in the south, well intersected with perennial streams. It provides the only sanctuary for the rare black lechwe herds of the Bangweulu swamps, especially during the flood season (December to April). The drier woodland fauna include elephant, buffalo, roan, eland, hartebeest, duiker, oribi, warthog and lion. The Department has made periodic aerial counts of the whole lechwe population and technical assistance has been sought in this research. The density of human settlement surrounding the reserve results in internal and external poaching as well as illegal fishing.

Kasanka Game Reserve - 150 square miles, south of the flood plain of the Bangweulu swamps, established in 1941. The center of the reserve is papyrus and reed swamp which lies at the junction of the Musola stream with the Kasank and follows the latter to the Mlembo River. The swamp area provides a sanctuary

for wildlife, especially the scarce situtunga. Wide grassy "dambos" flank the various affluents to the swamp and beyond them lie Brachystegia-Isoberlinia woodland interspersed with areas of "chipya" vegetation. Fauna include elephant, puku, waterbuck, hartebeest, reedbuck, hippopotamus, buffalo, eland, roan, sable, bushbuck, common duiker, yellow-backed duiker, Sharpe's grysbok, warthog, zebra, lion and leopard. A pair of shoe-billed storks (Balaeniceps rex), one of the rarest African birds, are thought to have bred there in 1957 and 1958. A heavy human population surrounds the reserve, but poaching is negligible. Individual arrangements are made for individuals wishing to visit the swamp.

Lavushi Manda Game Reserve - 580 square miles, southeast of the Bangweulu swamps, established in 1941. The area consists principally of Isoberlinia-paniculata-Brachystegia woodland growing on plateau soils with small areas of Combretum-Afromosia and Erythrophlocum-Pterocarpus complexes in the north and west. In the east, the land rises to rocky hills almost bare of vegetation. The Lukulu River bisects the reserve. In 1959, tracks of two black rhinoceros, believed to have been extirpated, were noted. Fauna includes elephant, buffalo, hartebeest, roan, sable, waterbuck, puku, reedbuck, bushbuck, common duiker, Sharpe's Grysbok, warthog, zebra, lion and leopard. Poaching has reached serious proportions, and bush fires are prevalent. The Kasanka Game Reserve is twenty miles to the west.

Luangwa Valley Game Reserve - established in 1942 in a southern section of 3,200 square miles on both banks of the Luangwa River, and a northern section of 1,790 square miles on the west bank, in northeastern Northern Rhodesia. On the west of the river, the reserve lies on the flat floor of the rift type valley, bounded on the west by the face of the Muchinga escarpment. On the east of the river, the reserve includes some lower foothills. The vegetation is principally Copaifera mopani woodland on brown lower valley and skeletal soils, with areas of Acacia-Combretum complexes on lower valley and alluvium soils along the river and its main tributaries. Certain groves of Acacia albida are particularly noteworthy. The river is fast flowing and constantly changing its course, thus forming ox bows or "lagoons" which play an important part in the ecology of the area. These are generally waterless in the dry season; during rains, the valley is flooded to a distance of

several miles back from the river. The abundant fauna include elephants (2,800 or more), hippopotamus, buffalo, waterbuck, impala, puku, roan, eland, kudu, bushbuck, zebra, Cookson's wildebeest, Thornicroft's giraffe, lion and leopard. Hartebeest and duiker occur in the foothills and sable, reedbuck, oribi and cheetah have been recorded, although they are rare. The Luangwa Valley is the last stronghold of the rhinoceros in Northern Rhodesia, of which some 300 occur. Cookson's wildebeest is well represented in the northern section, with an occasional vagrant appearing in the southern section. The bulk of the estimated population of from 200 to 250 Thornicroft's giraffe, which is also unique to the Luangwa Valley, is to be found in the east bank extension of the southern section. Mineral rights to the reserve belong to the British South Africa Company. A certain amount of peripheral poaching occurs, but a more serious threat is that game may be legally hunted when it leaves the reserve during migrations for water. Elephants, when they raid crops, are shot by a control staff. Game Reserve regulations have been applied to two additional areas on the east bank (Nsefu's and Luambe's) of 213 square miles with game watching camps. Access to the reserve is by motor transportation, and 200 miles of roads are in the reserve. The reserve is open to the public from 15 June to 30 October, and is closed during the rainy season. Several camps are available.

Lukusuzi Game Reserve - 1,050 square miles, located in upper northeastern Northern Rhodesia on the eastern watershed and foothills of the Luangwa valley, established in 1942. The area consists mainly of Brachystegia-Isoberlinia woodlands on broken escarpment country in the west and plateau soils in the east. Established primarily as a breeding ground for elephants, the reserve contains fair numbers of all other game animals, including rhinoceros and Cookson's wildebeest. There is considerable movement of elephants between the reserve and the Luangwa Valley Reserve and faunal protection zone across the Nyasaland border to the east. Poaching of considerable intensity occurs in the reserve. Tsetse control measures and resettlement of native populations require the elimination of game right up to the southern boundary.

Lunga Game Reserve - 650 square miles, in southwestern Northern Rhodesia between the Kabompo and West Lunga Rivers, established in 1951. The reserve consists principally of "mavunda", i.e., Cryptosepalum low forest and woodland with smaller areas of Isoberlinia paniculata-Brachystegia woodland in the north and south and two small grass plains. Fauna include elephant, hippopotamus, buffalo, eland, roan, sable, hartebeest, waterbuck, puku, reedbuck, impala, klipspringer, situtunga, oribi, common duiker, yellow-backed duiker, blue duiker, bushbuck, zebra, warthog, bushpig, lion, leopard and cheetah. Individual arrangements are made for visitors.

Lusenga Plain Game Reserve - 340 square miles, in northeastern Northern Rhodesia on the left bank of the Kalungwishi River, established in 1942. The reserve consists mainly of Brachystegia-Isoberlinia globiflora woodland with the plain lying on the western half. Fauna include moderate numbers of elephant, buffalo, roan, sable, eland, hartebeest, waterbuck, reedbuck, klipspringer, common duiker, blue duiker, yellow-backed duiker, zebra and warthog. A limited amount of poaching occurs.

Mweru Marsh Game Reserve - 1,210 square miles, in northern Northern Rhodesia near the Congo border, established in 1942. The eastern boundary follows an escarpment with two lakes lying at its foot. To the west of one of the lakes, Mweru Wantipa, is the marsh proper. The easternmost region consists of areas of phragmites reeds, papyrus, and a dwarf ambatch in association with grass growing in water that merges into dry grass plains in the west. Fringing the plains is an area of "mateshi", Bussea-Combretum thicket which gives way to Brachystegia-Isoberlinia paniculata woodland, interspersed with grassy "dambos" to the west. The flood plain and marsh provides excellent dry season forage. Fauna include 1,160 elephant, buffalo, hippopotamus, zebra, hartebeest, puku, warthog, roan, sable, eland, reedbuck, bushbuck, situtunga, common duiker, blue duiker, Sharpe's grysbok, bushpig, lion and leopard. A few black rhinoceros are to be found in the northern section. The mudflats created by the evaporation of Mweru Wantipa each dry season attract indigenous wading birds in great quantities, and palearctic migrants in October and November. Poaching has reached serious proportions. Fishermen

are permitted to fish certain specified waters. The dry grass plains on the west of the marsh form a major breeding ground of the red locust and I.R.L.C.S. operates throughout the area. A partial flooding of the plains has been proposed, to maintain the lake at maximum level, which would destroy the usefulness of the reserve to wildlife.

Sumbu Game Reserve - 780 square miles, on the southern shore of Lake Tanganyika, established in 1942. The shore-line is rocky, with a few sandy beaches and the land rises steeply in rocky ridges covered with deciduous Bussea-Combretum thickets. Deltas of alluvium occur at the mouths of minor streams running into the lake and support groves of Acacia albida. Further inland, the higher hills are covered with Brachystegia-Isoberlinia globiflora woodland with two small grass plains. Fauna include blue duiker, which is unusually common, elephant, hippopotamus, buffalo, eland, roan, sable, hartebeest, waterbuck, puku, bushbuck, klipspringer, Sharpe's grysbok, common duiker, zebra, warthog, lion, leopard and hyena. Hyrax are found on the rocky shores and vulture fish eagle are present. Native poaching from the inland boundaries has reached serious proportions. A concession has been granted to 100 fishermen to camp on the lake shore from 1 June to 31 October each year. The Sumbu First Class Controlled Hunting Area adjoins the reserve to the west. Further west lies the Mweru Marsh Game Reserve; there is a considerable movement of elephants between the two reserves. Access is by water transportation and boats and limited accommodations are available.



FIJI

The five nature reserves of Fiji were established under the Forest Ordinance of 1953 by Proclamations of the Governor. The Forestry Department administers the areas. The management objective is the protection of all natural features, fauna and flora.

Draunibota and Labiko Nature Reserve - 6 acres (2.4 hectares) in the Bay of Island Suva Harbour, established in 1959. The Reserve comprises small scenic islands containing natural bush; the highest altitude is 50 feet. Access is by boat.

Nadarivatu Nature Reserve - 230 acres (90 hectares) in the Nadarivatu-Nadala Forest Reserve, established in 1956. The Reserve comprises a mountain zone area and contains a remnant of virgin forest of Agathis vitiensis. Access is by motor transportation.

Naqaranibuluti Nature Reserve - 690 acres (276 hectares) in the Nadarivatu-Nadala Forest Reserve, established in 1958. The Reserve comprises a mountain area with inaccessible slopes covered in natural forests. Flora includes rare orchids and rare species of flowering trees. Access is by foot only.

Ravilevu Nature Reserve - 9,930 acres (3,972 hectares) in the southeast of the Island of Taveuni, established in 1959. The Reserve comprises a mountain zone area, the highest altitude of which is over 2,000 feet, with spectacular waterfalls and scenic gorges; it is the habitat of a distinctive fauna, including a small green lizard. Access is by foot only.

Tomaniivi Nature Reserve - 3,270 acres (1,308 hectares) in the Nadarivatu-Nadala Forest Reserve, established in 1958. The Reserve comprises a mountain area covered with natural forest and includes Mt. Victoria (4,341 feet). Fauna include rare birds; e.g. golden dove. Access is by trail.

## FINLAND

The conservation of nature is regulated by the Act of 1932, under which "general" (nature reserves) and "special" (national parks) reserve areas may, under separate legislation, be established on government land. Specific acts in 1938 and 1956 provided for the establishment of such reserves. The boundaries of some of these have not yet been defined completely.

National parks are established on virgin land and every possible effort is made to preserve the flora and fauna. Visitors are admitted without charge, and roads and buildings are planned to accommodate visitors.

Nature reserves are established mainly for scientific purposes. Entry is by special permit only. Movement within the reserves for visitors not holding permits is allowed along certain clearly marked trails.

In national parks and nature reserves the protection covers all natural features, with provisions made for fire prevention, scientific research and with specific consideration given to the activities of native populations, such as reindeer pasturage, hunting and fishing rights, etc. Predators, such as bear, lynx, wolf and wolverine, are not protected.

Some of the national parks and nature reserves are administered by the Board of Forestry, others by the Forestry Research Institute. The Government Inspector of Nature Reserves must be consulted concerning regulations and policy and for granting exceptions to the protective clauses for scientific research and collections.

### National Parks

Liesjärvi National Park - 375 acres (150 hectares), in southwestern Finland - established in 1956. Part of the Tammela upland, the area has remained an uninhabited forest region due to its barren clayless soil. The park is on the shores of Lake Liesjärvi and contains pine and spruce. Access is by side road. The park contains a camping area and hiking trail.

Linnansaari National Park - 2,000 acres (800 hectares), (not including water areas), in southeastern Finland - established in 1956. The park consists of a group of some 20 islands in Lake Hakivesi. Containing high rocky

outcrops, narrow ravines and rivulet beds, the area is a nesting place for ospreys and has many rare plants. Access is by boat. The park contains many trails and a camping area.

Petkeljärvi National Park - 1,575 acres (630 hectares), (land area 950 acres - 380 hectares), in southeastern Finland - established in 1956. The park contains pine forests, ponds, ridges, lakes and islands, in their natural state except for trenches and dugouts of the Winter War (1939-40). Access is by main road. A camping area and trails are available.

Pyhähäkki National Park - 2,500 acres (1000 hectares), in southwestern Finland - established in 1956. The park is an area of forest and marshland, with virgin pine forest over 250 years old. Some trees are as much as 450 years old. Swamps and peatland lakes are located in the area. A road and trails pass through the park.

Rokua National Park - 1,075 acres (430 hectares), in central Finland - established in 1956. The park contains old coastal sand dunes, with deep hollows containing clear ponds or peat land. The wooded areas are thinly growing pine heaths, white with lichen. Access is by road. Trails and a camping area are in the park.

Oulanka National Park - 25,645 acres (10,258 hectares), in northeastern Finland - established in 1956. The park is wild country along the River Oulankajoki and its upper tributaries, with foaming rapids, deep ravines, sand banks, riverside meadows and fields of flowers. Access is by road. Two hikers' cabins, a trail and camping ground are available.

Pyhäntunturi National Park - 7,500 acres (3000 hectares), in northern Finland - established in 1938. The park contains Pyhäntunturi, the most southerly arctic mountain in Finland, with deep wide ravines, steep slopes and rugged rocks, due to the quartzite soil. In olden times it was a holy place for the Lapps. The name means "Holy Mountain". Access is by road, and there is a lodge, camping area, trails and excellent skiing.

Palles-Ouastunturi National Park - 125,000 acres (50,000 hectares), in northwestern Finland, - established in 1938. The park is Lapp fjeld

country with arctic mountains and typical Lapp peat lands and forests at the foot. There are spruce and pine forests, lakes, pools and numerous gullies. Access is by road, with a hotel, camping area, trail and mountain skiing available.

Lemmenjoki National Park - 95,000 acres (38,000 hectares), in northern Finland - established in 1956. The park contains the area around the River Lemmenjoki which is fed by mountain streams and flows through a narrow gorge cutting through a ridge of fjeld mountains. At some points, the river widens into narrow lakes. Access is by boat.

## GHANA

Ghana has two game reserves and five game sanctuaries that are administered by the Division of Forestry, Ministry of Food and Agriculture. Game reserves are established for protection of all wildlife under the Wild Animals Preservation Orders, and the game sanctuaries are established under the Kommenda Native Authority Rules of 1947 which preclude any hunting, shooting, trapping, burning, collections of eggs or molestation of wildlife.

### Game Reserves

Mole River Game Reserve - 900 square miles in northwestern Ghana - established in 1958. Owned by the Gonja people, the reserve is savannah forest, with a game warden in charge. Management is directed toward the complete protection of wildlife. It is hoped that further development, including accommodations, will establish the reserve as a national park. The warden, or his assistant, accompany parties into the reserve.

Owabi Waterworks Game Reserve - 5.26 square miles in southwestern Ghana. The area contains the Owabi waterworks and dammed waters of Owabi stream. Flora includes a plantation of Cassia siamea, secondary forest and palm swamp. As a forest reserve, the area is protected against damage to vegetation.

### Game Sanctuaries

Kommenda Native Authority Game Sanctuary - 508 acres (203 hectares) in southwestern Ghana - established in 1947. The land is owned by the Kommenda Stool, with an Assistant Conservator of Forests in charge. The area contains scrub and coastal thicket. Wildlife, including duiker and rodents, is protected.

The following game sanctuaries are stool land and were constituted to give complete protection to wildlife. They are portions of existing forest reserves, which assures protection of the vegetation:

Aboma Game Santuary - 6.75 square miles in south-central Ghana. It contains mainly savannah forest.

Bia Shelterbelt Game Sanctuary - 6.75 square miles in southwestern Ghana. It contains high forest.

Bomfum Game Sanctuary - 6.5 square miles, in south-central Ghana. It contains mainly savannah forest.

Onuem Bepo Game Sanctuary - 13.34 square miles, in northern Ghana. It contains high forest.

## GREAT BRITAIN

This statement relates to "Nature Reserves" which in Great Britain comply with the definitions of "National Parks or equivalent Reserves" as set out on page 2 of the United Nations circular, reference SO 614/2, dated 2 September 1959. In Great Britain the term "National Park" is confined to areas in England and Wales (but not in Scotland) which are designated as such on account of their natural beauty and the opportunities they afford for open-air recreation. Such areas are not owned or managed by the National Parks Commission and are under the supervision of local planning authorities: they are not chosen or managed in the interests of fauna or flora, but the Nature Conservancy may declare and manage Nature Reserves within a National Park.

The Nature Conservancy was founded by Royal Charter on 23 March 1949, with the following objects:

"To provide scientific advice on the conservation and control of the natural flora and fauna of Great Britain; to establish, maintain and manage Nature Reserves in Great Britain, including the maintenance of physical features of scientific interest; and to organize and develop the research and scientific services related thereto."

The Nature Conservancy is thus the official agency under the British Government with responsibility for Nature Reserves and is financed by the Government by means of an annual Grant-in-Aid.

Additional statutory powers were granted to the Conservancy under the National Parks and Access to the Countryside Act of 1949. The Royal Charter provides for Reserves to be established by purchase or lease, and the National Parks and Access to the Countryside Act provides an additional method of securing Nature Reserves by means of a statutory agreement with the owner, lessee and occupier of the land. The Reserves established by the Conservancy by the above method are all National Nature Reserves declared as such under the provisions of the 1949 Act, which also empowers Local Authorities to establish Local Nature Reserves.

Another type of statutory Reserve exists in the form of Bird Sanctuaries (some of which are now known as Wildfowl Refuges) under the Protection of Birds Act, 1954, where the main interest of an area is the conservation of birds.

In Great Britain there are various unofficial bodies, such as the National Trust, the Royal Society for the Protection of Birds and the Society for the Promotion of Nature Reserves, whose objects include nature conservation and who establish and maintain Nature Reserves. These are all in close touch with the Nature Conservancy.

In addition to the establishment of Nature Reserves the Conservancy is also responsible under the National Parks and Access to the Countryside Act for notifying the appropriate Local Planning Authority of any area which is of special interest by reason of its flora, fauna or geological or physiographical features. These areas are known as Sites of Special Scientific Interest. At present there are approximately 1,600 of very varying size, throughout Great Britain. The Nature Conservancy has no control over these sites, many of which remain in private ownership, but is consulted before any development is authorized by the Local Planning Authority.

Following the establishment of a Nature Reserve one of the most important tasks of the Conservancy is to draw up and carry out a Management Plan. Each Plan is prepared on a uniform model, based on a clear and precise statement of the objects of management applicable in the particular case. After initial data have been given concerning location and acreage, and the reasons which led to acquisition of the Reserve, the scientific information available for the area is summarized under headings such as topography, geology, climate, soils, vegetation, fauna, land-use history and archaeology. The gaps in this statement often indicate projects for future research. Following the objects of management, a programme of operations is put forward, including in appropriate cases, proposals for research, sub-division of the Reserve for special purposes, and the details of estate management such as fencing, drainage, road making and the control of agricultural or forestry pests. Relations with the public form a special head of the plan, covering such questions as access, policy in relation to visitors' permits, the definition of rights of way, and the preparation of by-laws, if needed. The system of wardening is then defined and the practical implications, including time and cost of the necessary manpower, are worked out. The Plans are revised after being in operation for five years. Management Plans have not yet been completed for all declared Reserves, though the number is increasing continually.



Not all Reserves have full time Wardens at present as the Conservancy's system is to outpost a very limited number of staff to the Reserves. The scientific staff however totals 99, of which 23 are in the Conservation Branch with direct responsibility for the general supervision of Reserves.

The Conservancy has powers to make by-laws for the protection of the Reserves (though this power has been sparingly used) and to purchase land compulsorily (a power that has not, so far, been used at all). A permit is required for all collecting on Reserves

#### National Nature Reserves

Beinn Eighe National Nature Reserve - 10,450 acres (4,180 hectares) in Ross-shire, established in 1951 (owned).

Until a few centuries ago most of Scotland except the highest ground was covered with bog and forest. As Scotland is so near the Arctic, and yet washed by the Gulf Stream, several distinct forest types were represented including Birchwoods in the northwest, dense Hazel scrub with scattered Oak and Ash in the Inner Hebrides and elsewhere, Juniper scrub at medium altitudes in the Highlands with Birch, Rowan and Alder on the richer soils, Oak at low altitudes in the south and west, and the great Caledonian forest dominated by Pine in the heart of the Highlands.

Ruthless over-burning and over-grazing by successive generations have so destroyed and degraded these forests that only the most painstaking research in the surviving remnants can show what they were like and how, by working with nature, part at least of the Highlands may be restored to health and freed from the curses of erosion, soil impoverishment and the spread of Bracken.

At the southeast of Loch Maree in the North-West Highlands there still survives a badly damaged relic of the western type of the Caledonian Pine forest spread over about 600 acres of the 10,000-acre Beinn Eighe Nature Reserve. Loch Maree is near enough to the Atlantic to have a strongly oceanic climate and is at the meeting place of several different woodland types. Here at the Anancaun Field Station is centred the Nature Conservancy's research into the composition and ecology of the great Caledonian Forest. This western variant of Scottish Pine woods differs from more typical

development in the abundance of other tree species such as Oak, Holly, Rowan and Birch, the rarity of Juniper and the luxuriance of Sphagnum and other mosses on the forest floor.

Deer and straying livestock have been excluded by fencing from experimental plots and research in progress is mainly concerned with the natural regeneration of Pine in various vegetation types and methods of afforestation by direct seed sowing. The extent and the fate of an earlier and more wide-spread forest have been traced from a well-marked layer of Pine charcoal between the peat and the underlying sands and gravels, which confirms local legends of an early forest having been destroyed by fire.

Anancaun is also the scene of an extensive programme of climatological observations in the North-West Highlands. These are helping to explain the significant differences between West Highland and East Highland weather.

Most of the Reserve is on Cambrian quartzite and Pre-Cambrian Torridon Sandstone, the soil and vegetation of which are remarkably poor. Contrasting with these are patches of soil, developed from Cambrian dolomite and shale, carrying a varied vegetation which has been studied in much detail. The Kinlochewe Thrust and the results of glaciation add to the geological interest.

Other investigations which have been carried out include a reconnaissance soil survey and examination of sample soil profiles, and surveys of the somewhat limited invertebrate fauna. Fungi, lichens and bryophytes have also been specially investigated.

The mammals of the Reserve include the Wild Cat and Pine Marten which, although constantly present, are rarely seen, and then most often along the main road leading past the Reserve along the shores of Loch Maree. The Red Deer and the Mountain Hare are also among the characteristic mammals, while the birds include Ptarmigan and sometimes Golden Eagles on the higher ground, and Redstart, Whinchat, Wood Warbler, Redpoll and Bullfinch in the wood.

The Management Plan provides for fundamental botanical research centring round the autecology of the Scots Pine and the ecology of the montane plant associations, the purpose being the perpetuation and

rehabilitation of the existing woodland area. A research programme on predator-prey relationships is being carried out, of which the Pine Marten is one of the most important species. The Red Deer population is counted annually and kept under observation.

There is a resident Warden and limited accommodation for visiting scientists exists in the Field Station.

Caerlaverock National Nature Reserve - 6,226 acres (2,490 hectares) in Dumfriesshire, established in 1957 (Nature Reserve Agreement).

Caerlaverock Nature Reserve consists partly of salt marsh and partly of foreshore or mud between the River Nith and the Lochar Water. The sequence of vegetational types from seaward to landward reflects the way in which the marsh has developed and formed new ground. Sea Poa Grass (Puccinellia maritima) fixes the sandbanks exposed at low tide and, by trapping deposited sand, gradually builds up the ground level. Further up, drainage channels develop and wet hollows are left on the surface: and further inland still, maritime plants gradually disappear as the ground rises and grasses predominate. This is the final stage of marsh development - a rich grassland, affording excellent pasturage. Sometimes, however, this natural process of land reclamation is reversed and the tides begin to eat away the land that they have built up, thereby destroying valuable grazings. A study of salt marsh conditions at Caerlaverock may suggest methods of combating this process of erosion, one of the serious problems on the Solway.

The bird life of these marshes is no less distinctive than the flora. Caerlaverock is a noted winter haunt for wildfowl and, in particular, Pink-footed and Barnacle Geese, the latter a declining species on the Solway. Grey-lag Geese, Shelduck, Mallard, Wigeon, Teal and Pintail vary in numbers from year to year. The Common Tern, four species of Gull, and the Redshank, Dunlin, Oystercatcher and Shelduck, nest on the saltings.

The objects of the Management Plan centre round the conservation of wintering wildfowl, especially Barnacle Geese, and of shore-nesting species, especially Shelduck and Terns. In addition, the aim is to conserve the present range of salt marsh vegetation and the typical animals

and their habitats. Research is being carried out on the wintering wildfowl and also on the physiographic and plant ecology of the Reserve, with special reference to erosion and accretion of the salt marsh. The biology of the invertebrate fauna is also being investigated.

This Reserve is a Wildfowl Refuge on which a system of controlled wildfowl shooting on parts of the area is being maintained. There is a resident Warden and limited accommodation is available for scientific workers.

Cairngorms National Nature Reserve - 39,689 acres (15,875 hectares) in Inverness-shire and Aberdeenshire, established in 1954 (part owned, part Nature Reserve Agreement).

The 40,000-acre Cairngorms Nature Reserve, rising at several points above the 4,000-foot contour, is the principal mountain area among the British Nature Reserves and the largest Reserve in Britain. It contains many bleak and exposed summits with snow patches which lie nearly all the year, and with waterfalls and torrents, small rivers, lochans and lochs, precipices, crags and screes, stony plateaux, arctic-alpine heaths, high moorlands, grasslands, pine heaths and pine forest and other habitat types and stages.

Much remains to be learnt about the fauna and flora and also about the mountain climate, which is the subject of specialized studies by the Nature Conservancy and by Aberdeen University. This is one of the few parts of Britain where snow has important effects on vegetation and these are being studied by measurements of the depth and duration of snow cover.

Geologically the Cairngorms are a large granite mass rising to a surprisingly uniform summit plateau around 4,000 feet above sea level, deeply intersected by denudation and by the extensive impacts of the Ice Ages which have left many perfect examples of corries, moraines and characteristic U-shaped profiles in the valleys.

More than 200 species of flowering plants are found in the Reserve including most of the 75 British arctic-alpine species. The Cairngorms form one of the most suitable areas for the study of altitudinal limits of plants. The Scots Pine rarely occurs higher than about 2,000 feet as a

tree, although seedlings reach 3,400 feet on Ben Macdhui. Birch goes up to 2,300 feet and Common Sallow to 2,400 feet. Common Dandelions have been found up to more than 3,000 feet. On the other hand Grass of Parnassus (Parnassia palustris) stops at about 2,000 feet and Bog Myrtle (Myrica gale) about 1,500 feet. The impressive Pine wood in Glen Derry containing more than 4,000 trees is nearly all above the 1,400-foot contour. Pine stumps are found in the bogs up to about 2,900 feet. The extensive open Pine forest of Rothiemurchus interspersed with tall and flourishing Juniper is one of the largest and most impressive relics of the Caledonian Forest, and one of the few which is still regenerating freely. Ecological studies are being carried out on the native Scots Pine woods.

The Cairngorms Nature Reserve is also outstanding for its birds, including the Golden Eagle, Ptarmigan, Dotterel, Snow Bunting, Blackcock, Greenshank, Crested Tit and Scottish Crossbill. Among mammals the most conspicuous are the Red Deer, Roe Deer and Mountain Hare. Wild Cats occur only on the lowest fringes. While less is known about the invertebrates, a number of investigations have recently been carried out even on the highest summits and some interesting records of insect migration have been obtained. Some insects living on the more exposed tops have developed flightless forms which help in preventing them from being blown away.

The objects of the Management Plan are to allow this area to evolve naturally and to rehabilitate those parts which have been severely disturbed, e.g. all felled woodlands. The research will be particularly directed towards conservation and will include the rehabilitation and protection of woodlands by deer-proof fencing in areas of potential regeneration and the encouragement of natural regeneration elsewhere. Other projects will be observations on heather burning, studies of species composition and fodder values of mountain pastures with reference to edaphic conditions and altitudes, surveys of the fauna with regard to distribution, frequency and habitat, and studies of the status and habits of Red Deer.

The Reserve is wholly uninhabited except for one of the two Wardens and his family who live on its fringe. Limited accommodation is available for scientific workers.

Cors Tregaron National Nature Reserve - 1,842 acres (737 hectares) in Cardiganshire, established in 1955 and 1957 (Nature Reserve Agreement).

The rainy, windy, oceanic climate has given the British Isles a remarkably high proportion of the world's best-developed peat bogs. A large raised bog is one of the most remarkable works of nature in Britain, extending sometimes over several miles and having built up a mass of vegetation as much as twenty or more feet above the surrounding country, so waterlogged as sometimes to appear in conflict with the law that water runs downhill. The enormous water-holding capacity of these bogs is a safeguard against flooding of the adjoining and down-river land. They can also, like Cors Tregaron, serve as giant natural filters, taking in polluted water at one end and discharging it absolutely pure at the other.

Peat bogs moreover form natural refuges and reservoirs for scarce plants and animals which have been exterminated in other habitats. Without them the fauna and flora would be much the poorer. Peat has the property of preserving undecayed for many centuries anything embedded in it, such as pollen, roots, tree trunks, or even human bodies. It is therefore of special importance in understanding the past.

In England and Wales studies of raised bogs have recently been concentrated on the site of a former lake in the Teifi Valley above Tregaron in central Wales, which in Post-Glacial times became filled by fen peat over which have developed three large raised bogs. This area, about 540 feet above sea-level, was investigated during 1936-37 by a large party of botanists from British Universities.

The great bulk of the bog is formed of a species of bog-moss (Sphagnum imbricatum), which has now become extinct over the whole area, for reasons which are still not fully understood. Several other species of Sphagnum are, however, still actively at work in their specialized functions, Sphagnum cuspidatum lining the open water pools and S. papillosum creating the characteristic hummocks of the uneven bog surface. It appears that the bog is growing only slowly at the present day, as it did during dry periods in the past, and in contrast to its active growth in the cold wet climate of Iron Age Britain.

Like all typical raised bogs, those at Tregaron are dome-shaped, rising in the centre as much as 25 ft. above the river level. On the northwest side the "lagg" vegetation is best developed where the edge of the domed surface of the bog meets water draining from the surrounding countryside, yielding a greater mineral content in the soil and supporting richer vegetation, with dense growth of grasses and sedges and low trees of Willow and Birch and some Rowan and Hawthorn, visible in the aerial view. Compared with most large bogs Tregaron has suffered relatively little from fire or from peat-cutting, except near the edges, or from drainage schemes. It is, therefore, a magnificent outdoor laboratory for further research - for example, on past climatic changes, which have already been partly revealed by pollen analysis.

Among the interesting plants of Tregaron are the beautiful Marsh Andromeda (Andromeda polifolia), the Crowberry (Empetrum nigrum), normally found at much higher altitudes, and the Royal Fern (Osmunda regalis), which has been eliminated by collectors and gardeners from most of its more accessible haunts.

The breeding birds include the Blackcock, Dunlin, Corncrake, Whinchat, Grasshopper Warbler, Redpoll and two colonies of Blackheaded Gulls. The most interesting ornithological feature, however, is the use of the bog by a flock of up to 500 of the recently distinguished race of Greenland White-fronted Geese, which have here their only regular important wintering area in England and Wales. Polecats are the most interesting of the local mammals.

Research proposed under the Management Plan includes a detailed investigation into the vegetation of the Reserve and survey of the fauna. Particular consideration has been given to Estate Management and to the Conservancy's obligations towards farming neighbours. Conservation measures aim to ensure the natural development of the outstanding western raised bog.

The Reserve is the most southerly known locality in the British Isles of the Large Heath Butterfly (Coenonympha tullia Muell). A Warden Naturalist is in residence near this Reserve.

Monks' Wood National Nature Reserve - 387 acres (155 hectares) in Huntingdonshire, established in 1953 and 1954 (owned).

A few centuries ago the raised plateau of heavy clays bordering the Huntingdonshire fenlands carried a great forest of Ash and Oak rich in many forms of wild life. The largest surviving fragment is now the Monks' Wood Nature Reserve.

Early in the nineteenth century the wood became famous among entomologists through the discovery there in 1828, for the first time in Britain, of the Black Hairstreak Butterfly (Strymonidia pruni). All four other species of British Hairstreak and many other interesting butterflies, including the Purple Emperor, continued to attract entomologists until the 1914-18 war, when as many as 20 male Purple Emperors could be seen on the wing. The wood was at that time maintained in perfect condition on a 20-year rotation of coppice cutting. Disaster overtook it about 1920 when wholesale felling of the timber was carried out by Canadian lumbermen.

The trees showed considerable powers of recovery, but the scrub woodland and thickets which replaced the original tall Oak forest had nothing like its botanical or zoological value. It was, however, lovingly preserved by an entomologist, Mr. H. Neaverson, until the Nature Conservancy acquired it in 1953, by which time the Second World War had left further scars in the shape of two large clearings designed for potato fields. Cultivations failed and the clearings have now reverted to grassland; these conditions are being maintained by periodic mowing.

Although the Purple Emperors seem to have become extinct, and also the Duke of Burgundy Fritillaries, the wood still has a remarkable range of butterflies and of moths, including all the Hairstreaks, the White Admiral and the Comma Butterfly, which first appeared about 1935.

The management of the Nature Reserve is designed to secure the eventual re-establishment of tall forest to maintain the best possible conditions for the survival of the utmost variety of insect life. Ornithologically and botanically the wood, although interesting, contains nothing out of the ordinary. It will in future be partly used as an experimental area for the



new research station to be built by the Nature Conservancy on an adjoining site for the study of woodland conservation and management procedures, effects of toxic chemicals on wild life, vertebrate populations, and conservation research generally. Students from the post-graduate Conservation Course at University College London will also do part of their field training here.

Moor House National Nature Reserve - 10,000 acres (4,000 hectares) in Westmoreland, established in 1952 (owned).

On the ridge of the Pennines and extending down the bleak moorland slopes to the east is the 10,000-acre Nature Reserve of Moor House.

The mountain mass is built up of many thin beds of Carboniferous Limestone, shale and sandstone, arranged in a recurring pattern. The limestone beds include many mineral veins, some of them rich in lead which was extensively worked in the eighteenth and early nineteenth centuries. Barytes and fluorspar are still being extracted. Almost all the rock is capped by boulder clay or solifluxion deposits, and these again are hidden almost entirely beneath a thick blanket of peat, varying in depth up to 14 feet. Up to altitudes of about 2,400 feet the basal layers of the peat often contain the stumps of trees, some of them quite large. They are relics of a period more than 6,000 years ago, when the climate was probably warmer and less favourable to the growth of peat bogs than that of the succeeding millennia. Signs of human occupation at these high altitudes, and the remains of wild cattle, also suggest a less inhospitable environment during that phase of pre-history.

The climate, which has probably been broadly similar for at least 2,000 years, can be described as severe and has been compared to that at sea-level in Iceland.

Although the extent and thickness of peat bog may be ascribed to the nature of the climate, yet the detailed character of the peat vegetation and of the landscape as a whole as we see it today is a monument to human ignorance and mismanagement. Mining, for example, has left spoil heaps which even a century later remain toxic to vegetation and animal life. Centuries of sheep grazing have destroyed the woodland which even under the present climate could have occupied the steeper, and therefore better drained, slopes of the valley-sides and the more fertile alluvial soils of the broader valley bottoms.

Overgrazing has spoilt the quality of the grassland which replaced these trees, so that the ground has been taken over by poor and rank moorland plants. Burning of the peat bog has largely dissipated such potential fertility as it may once have possessed, and has encouraged its natural tendency to erosion. As a result, much of the peat blanket is now heavily eroded.

The Reserve is primarily dedicated to the study of plant and animal ecology of upland peat moors, but in addition it provides excellent opportunity for geological research, as within the boundary is exposed the complete stratigraphical succession of the North Pennine Carboniferous rocks.

Among researches in progress are the measurement of run-off of water from areas of natural and artificially drained bog, observations on the effects of grazing on the vegetation and on the possibilities of restoring higher grades of vegetation by giving temporary protection from grazing pressure, research on the balance between loss and gain of soil nutrients, attempts to renew the growth at high altitudes of trees, such as Birch, Scots Pine, Rowan and Bird Cherry, experiments in diversifying moorland vegetation and arresting the deterioration of peat by planting selected species on experimental plots and detailed studies of the invertebrate fauna.

This research programme is being assisted by a number of authorities interested in high altitudes, including the Wear and Tees River Board, the Meteorological Office, the Forestry Commission, the University of Durham and a number of agricultural organizations. While it will probably be a long time before full-scale results are obtained, the early indications suggest that much can be done in highland Britain to improve fertility and shelter not only for plants and wild animals, but also as a source of wealth and of relief from over-pressure on our limited land resources.

The Field Station has living accommodation for a small resident staff and for a limited number of visiting scientists. There is a Warden in residence.

Newborough Warren-Ynys Llanddwyn National Nature Reserve - 1,470 acres (588 hectares) in Anglesey, established in 1955, 1956, 1959 and 1960 (part owned, part leased).

The great sand dunes of Newborough Warren represent one of the most recent transformations of the British coastline. Tidal inundation and sand movement seem to have begun to encroach on the fields of Newborough only just over 600 years ago when 168 acres were destroyed so thoroughly by sea and sand as to render it useless for agriculture. Although so modern physiographically, the Reserve rests on some of the oldest rocks in Britain, those which outcrop at Llanddwyn Island being a variety of metamorphosed rocks of the Gwna Series of the Pre-Cambrian Mona Complex, and including hornblende schist and volcanic rocks interbedded with grits, phyllites, quartzite and limestone.

A detailed study of Newborough Warren made during 1950 and 1953 traces the history of the growth of the dunes and shows that, although they are still advancing inland at over a foot a year, the system as a whole is at present in a relatively stable phase, and this also applies to other dune systems round the coasts of Great Britain. Research is being maintained at Newborough and elsewhere in order to throw light on the cycles of relative stability and instability which these dune systems exhibit. Newborough Warren has also been the scene of particular efforts to map the vegetation, especially of the slacks or hollows left between the new ridges where ground water approaches the sand surface. These slacks are dominated by Creeping Willow (Salix repens) and are rich in plants, including some rarities.

The 60-acre island, Ynys Llanddwyn, forms the seaward end of a ridge of rocks underlying the Reserve, and separating the dunes towards the Menai Strait from those on the estuary of the river Cefni. The plants recorded on this island include the Bloody Cranesbill (Geranium sanguineum), the Gold Samphire (Inula crithmoides) the Sea Spleenwort (Asplenium marinum). The Reserve, which has a coastline some eight miles long, is of particular value for the study of stages of sand dune succession, including shifting and fixed dunes. Recent colonization on the Malltraeth sand by the Sea Poa or Sea Meadowgrass (Puccinellia maritima) is the latest of these developments.

Owing to disturbance and the robbing of nests, the former rich bird life had sadly diminished prior to the establishment of the Reserve and one of the aims of management is to provide conditions suitable for recolonization by Roseate, Common, Arctic, and little Terns. Strict wardening during the breeding season is necessary to protect breeding populations.

The Management Plan is also designed to conserve other examples of the distinctive dune and slack fauna and flora and to assess predation and competition among birds and mammals. A census of populations of breeding birds and an assessment of breeding success of prey species is being carried out. Other studies include those on the Vole population and Short-eared Owls, on the water regime and on the effectiveness of various plant species to fix sand dunes.

The habitat is being diversified by the excavation of pools, thus introducing open water which is being colonized by aquatic fauna. This Reserve is looked after by a Warden Naturalist.

Old Winchester Hill National Nature Reserve - 140 acres (56 hectares) in Hampshire, established in 1954 (owned).

In spite of its fairly small size (140 acres) the Reserve of Old Winchester Hill (which adjoins a fine iron-age camp on the chalk downlands) has a great variety of aspects, as the hill slopes steeply away from the camp to the south, to the west and to the north and northeast. Most of it is rough chalk grassland, but there are patches of well-grown Yew and other chalk-loving trees. On the southern slopes there is a growth of Juniper, which has become uncommon since so much chalk downland has been reclaimed for agriculture. On the brows facing towards the southwest the soil has been leached so that the Ling, which needs acid conditions, has been able to invade the chalk grassland.

The disappearance of rabbits after myxomatosis in 1955 helped to check erosion in the neighbourhood of their warrens and to permit an exceptional flowering of orchids and other attractive plants, but it aggravated the invasion by Hawthorns and other woody vegetation which rapidly encroached on the grassland, creating a problem for management.

The Management Plan has provided for three paddocks by fencing out the Yew woods and these are now regularly grazed by sheep in the winter months so as to maintain the downland under permanent grass cover with the associated fauna. This is one of the primary objects of the Management Plan, together with the conservation of the typical woodland types: Beech, Yew and Hazel.

Transects have been set up on this and a series of other grassland Reserves to be regularly observed in order to trace changes in the composition of vegetation, particularly those resulting from myxomatosis and the disappearance of rabbits. The recent improvements of road access have brought large numbers of visitors in cars. The use of the Reserve by picnickers, gypsies and for military training has created considerable problems. The help of the Local Authority and public opinion has been enlisted and a new system of wardening has been devised to ensure the maximum co-operation in the use of the Reserve as a public open space. Seven voluntary Wardens have been recruited and are working during the times of greatest public pressure. The Reserve is under the supervision of a Warden Naturalist.

Orfordness-Havergate National Nature Reserve - 514 acres (205 hectares) in Suffolk, established in 1954 (part leased, part Nature Reserve Agreement).

Four miles of shingle spit of immense physiographical interest on the east coast stretching northeast from its tip at North Weir Point comprises the National Nature Reserve of Orfordness with the adjoining island of Havergate. The Royal Society for the Protection of Birds (who own the island) warden the entire Reserve and provide transport, while the Nature Conservancy undertake research on problems other than ornithological and contribute to the heavy cost of protection against the sea.

The Reserve is very inaccessible for the ordinary holiday-maker and has few attractions. It is, therefore, a very suitable area to use for scientific and conservation work which requires complete absence of disturbance by the public.

The outstanding attraction of Havergate Island is the colony of Avocets which established itself there in 1947 when four pairs are thought

to have reared eight young. In 1948 six pairs settled, but only three young were reared, largely because of rats. In 1956, 79 pairs reared at least 50 young. This growth of the colony is very remarkable when it is borne in mind that the Avocet needs peculiar saline conditions with plenty of shallow water over a muddy bottom in order to obtain its food.

The Avocets apparently benefited in their initial colonization from the presence of a large number of breeding Black-headed Gulls which helped to give protection against Crows and other predators. They in turn have helped to provide the conditions to attract a colony of Sandwich Terns, the first to be formed so far as is known in Suffolk. About 30 pairs of them bred on the Island in 1951 and by 1954 the colony had increased to about 150 pairs. This is the only Sandwich Tern colony in England which is not directly facing the sea. Almost certainly the exceptional protection at Havergate has induced them to accept a breeding site which they would otherwise reject as unsuitable. About 100 pairs of Common Terns breed on Havergate and a similar number have bred at North Weir Point where 129 nests with eggs were found in 1953. In 1959, about 100 pairs of Common Tern and 15 pairs of Little Tern nested at North Weir Point.

The sheltered waters of Havergate have become a complete year-round sanctuary for ducks and other wildfowl. The total number of species of birds recorded within the Reserve now stands at 154.

Havergate is also of interest as being the type locality, and only haunt, of a new spider named Praestigia duffeyi after its discoverer. These semi-marine spiders live on the saltings close to the observation post maintained to enable bird watchers to study the Avocets without disturbing them. The provision of such observation posts, which are quite cheaply constructed and are built to a special design is an important recent development in Nature Reserve management. It is the key to the problem of enabling considerable numbers of visitors to see shy birds without creating so much disturbance as to drive them away. The sea-banks serve the important secondary purpose of enabling observers to gain access to the observation posts without showing themselves to the birds.

Orfordness is also of great interest as illustrating the stages in plant colonization from bare, loose shingle with a few pioneer plants, to consolidated areas covered with vegetation. Four enclosures have been set up to study changes in the shingle vegetation.

The interest of this part of the Suffolk coast has been well known to physiographers for a long time. Recent topographic and hydrographic surveys close to North Weir Point will throw light on the evolution of shingle spits. A special feature of this work is the study of the movement of beach material using radioactive tracers.

Rhum National Nature Reserve - 26,400 acres (10,560 hectares) in Inverness-shire, established in 1957 (owned).

Being about 8 miles in both breadth and depth Rhum is the second largest of Britain's Nature Reserves and the largest wholly owned by the Nature Conservancy.

Rhum is the product of intense volcanic action, which has given it a remarkable mountain skyline dominated by Askival (2,659 feet) and other mountains, which gain in impressiveness as they rise within a mile or two of the sea and within sight of the Skye Cuillins and other famous peaks. The geology is of great interest and complexity, with Torridonian sandstone giving place to ultra-basic rocks. The interpretation of the geological events is still in dispute.

Rhum is noted for its rare plants, including Thlaspi alpestre, and for its mammals, including two island races, the Rhum Mouse (Apodemus hebridensis hamiltoni) and the Hebridean Vole (Microtus agrestis exsul). The most conspicuous mammals are, however, the large herd of Red Deer and the Grey Seals. Among birds Rhum has its quota of Golden Eagles and a unique large mountain-top breeding colony of Manx Shearwaters, nesting well over 2,000 feet.

The main object of management is research directed at recreating the natural characteristics of the island so that it may be restored to the highest level of biological productivity that can be sustained naturally, measured in terms of population levels and species composition of the appropriate flora and fauna. This includes experiments to discover

how best to improve fertility and obtain the maximum long-term biological yield from the soil. Diversification of the habitat by re-establishment of scrub or woodland cover mainly of native tree species is being successfully undertaken.

This Reserve is the headquarters of the Conservancy's Red Deer Research Programme, providing as it does a self-contained herd of some 1,500 adult beasts. The programme consists of an annual census in which stags, hinds and calves are counted and mapped separately, and simultaneously studies are made of the breeding biology and longevity of the species. The management of the herd necessitates an annual culling of the stock, which provides extensive material for studies of size, weight, antler form, parasites and other problems such as methods of aging Red Deer and the biological implications of game cropping.

Other research includes meteorological and climatological observations and a programme of geological, physiographical and pedological research. The island is particularly fitted for research purposes as it has a long history of freedom from disturbance, and is ideally suited for scientific investigations requiring complete quiet and immunity from interference.

A Warden and Estate staff are resident on the island, on which there is limited accommodation for research workers.

Roudsea Wood National Nature Reserve - 287 acres (115 hectares) in Lancashire, established in 1955 (Nature Reserve Agreement and lease).

Roudsea Wood was chosen as a Reserve because of the astonishing range of different conditions exhibited in less than 300 acres. Two low ridges, one of Carboniferous Limestone and the other of Silurian Bannisdale Slates, form the main part of the Reserve, divided by a shallow valley. The eastern fringe is formed by a typical moss or flat peat moor. On the north flows the river Leven, on the west is farmland, and to the southwest the oak wood passes through a rapid transition into salt marsh fringing the extensive tidal flats of the Leven estuary.

Along the limestone ridge grow Yews, flanked by Oak and Ash and carpeted in May by the flowers of Lilies of the Valley. On the slate grows a typical Lake District oakwood which used to be managed as



coppice but has been allowed to come up again to high forest during the past half century. Estate records and maps going back more than 100 years show how the former Roudsea tarn has become overgrown and filled up. The tarn is still interesting for its insects and plants, among which is the Yellow Sedge (Carex flava), which grows nowhere else in Britain. Some of the wood has a south-country richness about it, and this impression is helped by the amount of Hazel coppice and the occurrence of Lime (Tilia cordata), Spindle, Buckthorn, Dogwood and Guelder Rose. The Oaks are mainly sessile. Among the other trees are Alder, some Scots Pine, Sycamore, Birch, Wych Elm, Holly, Hawthorn and Rowan.

The variety of the Reserve is further illustrated by the list of birds, including (on the adjoining flats) Oystercatcher, Curlew, Ringed Plover and a number of breeding pairs of Shelduck, while in contrast the wood contains such species as Bullfinch, Wood Warbler, Jay, Tawny Owl, Woodcock and Nightjar, Willow Warblers being the commonest breeding birds. Among mammals, Roe Deer are notable.

The research programme envisages a comprehensive inventory of its plant and animal life, including even the most obscure invertebrates. Studies already carried out cover millipedes and centipedes, ants, Hemiptera (plant bugs), slugs and snails and several other groups. This is also the scene of some of the Nature Conservancy's studies on the breakdown of litter and of the associated fauna, which involves analysing the nutrients in the litter and how they are used as the first stage in the pyramid of animal life which is based on woodland. Techniques of assessing populations of invertebrates are also being tested here and comparative studies are being made of different methods of forest regeneration, including the effects of attacks by the caterpillars of Tortrix viridana on the supply of acorns.

The Management Plan is also designed towards the creation (or re-creation) of a high forest of indigenous trees from the present coppice regime with an under-storey of Spindle, Guelder, Buckthorn, Blackthorn, Bird Cherry, Hawthorn and Hazel. Roudsea Wood is within twelve miles of the Conservancy's Merlewood Research Station and is therefore much used by the scientific staff engaged on fundamental ecological research. There is a resident Warden.

St. Kilda National Nature Reserve - 2,107 acres (843 hectares) in Inverness-shire, established in 1957 (leased).

While some British Nature Reserves represent no more than a fragment or a worn relic of their former grandeur, St. Kilda is by any standards a great nature monument. No other sea cliffs in Great Britain rise so high sheer out of the ocean. Conachair on Hirta stands up over a quarter of a mile above the waves, while two other islands of the group, Boreray and Soay, are both over 1,200 feet.

Having escaped burial under the great British ice-cap during successive glaciations, St. Kilda is equally impressive for the antiquity of its flora and fauna. It has probably been one of the North Atlantic's greatest sea-bird colonies continuously for many centuries. It still possesses its unique bird, the St. Kilda Wren, and one unique native mammal, the St. Kilda long-tailed field mouse, and also its peculiar ancestral race of sheep, the Soay sheep, which now lives wild as indeed do the Blackfaces on Boreray, unshepherded since the island became uninhabited in 1930. Several colonies are now known of Leach's Petrel, a fork-tailed species rare on this side of the Atlantic.

St. Kilda is famous for its immense and very ancient colony of Fulmars, larger petrels on which the inhabitants mainly depended for meat, oil and feathers. The Gannets also have here their largest colony in the world, which had about 44,526 pairs in 1959. 7,660 pairs of Kittiwakes and 13,850 pairs of Guillemots were counted in 1959. But the most numerous by far of St. Kilda's nesting birds is the Puffin.

The Management Plan provides for ecological research into animal populations and for investigations to be made into the anatomy, genetics and evolution of the endemic fauna. Studies will also be made on bird migration, on invertebrate populations together with the vegetation, marine conditions, climatology and archaeology.

This Reserve is managed in close co-operation with the National Trust and the Service Departments. The Reserve is wardened from April to September under short-term temporary arrangements.

Scolt Head National Nature Reserve - 1,821 acres (728 hectares) in Norfolk, established in 1954 and 1958 (leased).

Scolt Head Island, on the north coast of Norfolk, is one of the oldest Nature Reserves in England, having been acquired for the National Trust in 1923. It is also one of the Reserves which have been most thoroughly studied by scientists, particularly from Cambridge University. Investigations have been made of the growth of the dunes, of the movement of beach material, of the evolution of the salt marshes and of the vegetation, invertebrates, mammals and birds; this research has been published in the Scolt Head Handbook edited by Professor J. A. Steers of the Department of Geography, Cambridge University. A revised edition of the Handbook has been published in 1960.

In managing this Reserve the Nature Conservancy has the advice of a committee which represents the National Trust, the Norfolk Naturalists' Trust (both of whom own part of it and lease these to the Conservancy) as well as the Conservancy and local inhabitants. There is a full-time Warden who lives on the mainland close to the Island, and limited accommodation is available for naturalists, some of whom also live in the hut on the Island while doing field work there.

The Reserve is about four miles long and consists of a series of dune ridges, in places very well developed, over-lying shingle; between the dunes and the mainland lie extensive salt marshes, which are completely submerged at high tide. The shape and size of the Island are continually changing and during this century there has been a considerable extension to the west.

It is on this westward point that the main colony of breeding sea-birds is located. Just before the Island became a Nature Reserve there were no Sandwich Terns breeding and Common Terns were reduced to some 17 pairs. Under protection, the numbers rose rapidly and in addition to a much stronger colony of Common Terns, which has at times reached about 1,000 breeding pairs, Sandwich Terns have also bred in considerable numbers in many years. In 1958, 1,200 pairs of Common Tern and 324 nests of Sandwich Tern were recorded. Since then, however, the Sandwich Tern colony has shifted outside the Reserve, probably owing to excessive visiting. Little Terns also breed regularly in

some numbers. In winter the Island is frequented by a large number of immigrant species, including Snow Buntings and Shore Larks.

Ecologically the Island is of immense interest owing to the exceptionally favourable conditions for tracing the different zones and the successive colonizations of different plant communities. It is also the home of a large number of plants of the dunes, shingle and salt marshes, and the flowering of some of these was spectacularly assisted by the disappearance of the large rabbit population following myxomatosis in 1955.

Experimental work completed in 1958 on the salt marsh vegetation resources for the Brent Goose has revealed that these birds make use of a much wider range of salt marsh foods at Scolt than has been generally supposed. In conjunction with this work, control of Cord Grass (Spartina), using herbicides, has been carried out on the lower parts of the main autumn feeding marsh of the Geese, as the principal food plants, Eel Grass (Zostera) and the green Alga (Enteromorpha), were threatened by the rapid spread of Spartina.

Recent experiments have been made with radio-active elements inserted into pebbles, the object being to trace the rate and direction of drift of the pebbles under the sea by the use of a boat carrying a Geiger Counter, and thus to help to interpret the coast-shaping forces. A further method which is being used is the direct examination of the seabed, using skin-diving equipment.

The great North Sea Surge of 31 January 1953 came completely over the middle of the Island and resulted in a large breach which has been filled in by the planting of Marram Grass and by suitable coast defence works.

Skomer Island National Nature Reserve - 722 acres (288 hectares) in Pembrokeshire, established in 1959 (owned).

Skomer is the largest of the islands off the Pembrokeshire Coast. It is part of a low ridge of mainly volcanic rocks interbedded with sediments, the Skomer Series, of Ordovician age, extending westward through Skomer and Grassholm. Each year great numbers of sea-birds breed on Skomer,

as well as a strong colony of Atlantic Grey Seals. The most notable breeding species is the Manx Shearwater, a bird scarcely found on the mainland, but breeding in tens of thousands on Skomer and Skokholm. The Puffin colony is probably the second largest in the British Isles. Guillemots, Razorbills and several species of Gull also breed. Skomer is thus among the most important sea bird stations in England and Wales. The island is also noted for the Skomer Vole (Clethrionomys glareolus skomerensis) which differs from the Common Bank Vole in its larger size, extreme tameness and brighter colour.

The plants of the island are also of particular interest, the ground vegetation having developed under conditions of extreme maritime exposure giving rise to characteristic plant communities. Thrift, Bluebells, Vernal Squill and Campion often make spectacular displays of colour.

Management of the island is directed towards safeguarding the scientific interest. Research will be carried out on grazing effects and studies made of the rabbit, seal and bird populations. There is a resident Warden and limited accommodation is available for scientists.

Woodwalton Fen National Nature Reserve - 514 acres (205 hectares) in Huntingdonshire, established in 1954 (leased).

During the wholesale destruction of the old fen habitats caused by drainage and reclamation, a small out-of-the-way area some three miles west of Ramsey in Huntingdonshire escaped total ruin, partly because it was at intervals dug for turf or peat as fuel, partly because the rough litter growing on it was cut as hay or was grazed by livestock, and partly because such agriculture as was practised amounted literally to no more than scratching the surface. Early this century the old fenland management on these lines ceased to function and tall reeds spread extensively. In turn the reed was succeeded by dense carr, chiefly of sallow willows, and eventually by scrub woodland which threatened to transform the whole fen into an uninteresting damp forest.

The Woodwalton Fen Reserve forms a broad rectangle immediately to the west of the Great Raveley Drain. Although some 25 miles from the sea, this fen is nowhere more than about two feet above sea-level and the drastic

drainage and pumping necessary to protect the adjoining farmlands make it increasingly difficult to maintain a high enough water-table for the requirements of the aquatic and fenland fauna and flora. The tendency of the fen to dry out is mainly responsible for its invasion by woody vegetation.

After a detailed botanical survey, the Conservancy set in hand extensive works to raise and maintain the water level and to check and reverse the encroachment of fen by woodland and scrub vegetation. Dykes were cleaned out, sluices were installed and peat cutting was resumed to permit scientific observation on the process or recolonization by plants. At the present time, work on water levels is being aided by the results of levelling surveys carried out by the Geography Department of Cambridge University and by the Middle Level Commissioners.

Aquatic plants flourished and a rare hybrid pondweed (Potamogeton fluitans) was re-discovered after being considered extinct for many years; while in July 1955, a Dutch member of the International Ecological Commission, during a short visit to the fen, detected Myriophyllum alterniflorum, which has not been recorded in Huntingdonshire since about 1830. The Fen Violet (Viola stagnina), whose range at Woodwalton was rather local before bush clearance began, now appears in abundance on certain sites where tall, woody growth has recently been removed. Heavy floods in December, 1954, enabled the fen to re-absorb a great deal of moisture to the benefit of the neighbouring farmlands, which were relieved of large quantities of flood water. Shortly afterwards, myxomatosis among rabbits set in train further extensive ecological changes and enabled many previously rare plants to flower as never before. On certain compartments of the Reserve, however, it has become necessary to curb by cattle grazing the growth of coarse vegetation in the absence of the rabbit.

Woodwalton is famous for its insects and particularly for the Large Copper Butterfly, one of the most beautiful insects in Britain. The original British race became extinct following the drainage of Whittlesey Mere a century ago. The present stock which belongs to the Netherlands race, Lycaena dispar batavus, was introduced in 1927. Efforts to introduce it to

other areas have hitherto failed, but the Large Coppers at Woodwalton can be seen on the wing in some numbers in July of each year. Recent management of the Large Copper Butterfly on the fen has involved counts of the eggs and caterpillar populations on marked plants of the Great Water Dock (Rumex hydrolapathum), the insect's food plant; an effort is also being made to establish a second colony on a different part of the Reserve. Many very rare moths and other insects have been taken in the fen, which is a well-known resort of collectors, although access requires an official permit. The more characteristic marsh birds, such as the Short-eared Owl, which used formerly to breed, have ceased in recent years, but it is hoped that they can be attracted again with the increasing open area resulting from scrub clearance.

Although called a fen, Woodwalton was probably a Sphagnum bog with local areas of fen flushes up to the time of the general fenland drainage. Cutting has in many places removed the Sphagnum peat and exposed the alkaline fen peat of an earlier period underlying it. This has produced interesting differences in the flora and the fauna.

The experience of Woodwalton shows that even when apparently irreparable deterioration has occurred, it is sometimes possible to resurrect the previous conditions, given the right type of management.

There is a resident Warden at the Reserve with a labour force of three fen men which is supplemented periodically by the Conservation Corps of the Council for Nature. Limited accommodation is available for visiting scientists. In the management of the Reserve the Conservancy has the advice of a committee of which the Society for the Promotion of Nature Reserves provides approximately half the members.

The Management Plan is directed to increasing the area of open fen in the light of increasing knowledge of water tables, peat stratigraphy and plant ecology; and to re-excavating and equipping the dyke system so that water distribution can be controlled throughout the fen.

Yarner Woods National Nature Reserve - 360 acres (144 hectares) in Devon, established in 1952, 1956 and 1958 (owned).

Yarner Wood in Devon is one of the richest of the Oak woodlands flanking the high ground of Dartmoor. With its streams and valleys, its

steep slopes and plateaux and its wide variety of vegetation, ranging from tall Oak forest to scrub Oak with much Holly and Rowan, and with its fringe of heather moor and bog, it makes an ideal experimental area for the researches of the Nature Conservancy into management of semi-natural woodland. Yarner, like most surviving examples of primaeval woodland, has deteriorated very greatly through the centuries as a result of over-cutting of timber for construction and charcoal, over-grazing and browsing by intruding livestock, the indiscriminate planting of alien species for amenity, and a great deal of general neglect, culminating in a disastrous fire in 1942.

Although so varied the wood contains no rarities and can therefore be used for scientific experiments without fear of doing harm to scarce species. Basic experiments are designed to ensure that enough trees of native species are able to grow successfully to their full stature to replace in due course the largely distorted and degenerate existing specimens and to bring the whole wood up to the standard of the best surviving parts of it, where some tall and well-grown Oaks and other trees show what the wood might be like. Experimental plots are small, mostly of half an acre or an acre, and are planted on an elaborate plan to test out the capabilities of the different trees, particularly Oak, Beech and Alder, and also to compare the results of planting in cleared areas as against planting under the existing canopy or relying on natural regeneration, which has in modern times been rather poor. Other experiments include the intensive provision of nesting boxes for woodland insect-eating birds and these have resulted in immediate colonization by Pied Flycatchers, which have never within human memory or record had a breeding colony so far south in England. Buzzards, Ravens and all three species of Woodpeckers are among the other nesting birds. Geologically, the Reserve is just off the edge of the Dartmoor granite and consists almost entirely of Culm measures of carboniferous age.

The Management Plan provides for extensive use of the wood for experimental purposes but also ensures that adequate samples of the varied natural habitats will be retained. Research on small mammals has been carried out by Exeter University. This was the first National Nature



Reserve to have a Management Plan which incorporated a silvicultural working plan. The Plan, in operation since 1954, has now been revised and the second 5-year period has started.

There are two resident Wardens, and limited accommodation for scientific workers is available.

Other National Nature Reserves

<u>Name, Year Declared and Method of Establishment</u>	<u>Acreage (in acres)</u>	<u>Access and Restrictions (except where otherwise stated permits to visit are not required)</u>
Allt Rhyd-y-Groes, Carmarthen 1959 (Leased)	46	Access restricted. Permits required.
Arne, Dorset 1954 (Leased)	9	Permits to visit required for the whole Reserve. Statutory Bird Sanctuary.
Aston Rowant, Oxfordshire 1958 (Owned)	70	Permits to visit required for parts away from public foot-path.
Axmouth-Lyme Regis Undercliffs, Devon 1955 (Part owned, part leased, part Nature Reserve Agreement)	794	Permits to visit required for parts away from public foot-path.
Blean Woods, Kent 1953 and 1959 (Owned)	81	Permits to visit required for whole Reserve.
Blelham Bog, Lancashire 1954 (Leased)	5	-
Bridgwater Bay, Somerset 1954 and 1958 (Part owned, part Nature Reserve Agreement)	6,076	Statutory Bird Sanctuary. Permits to visit required for Stert Island. Byelaws confirmed 1959.
Bure Marshes, Norfolk 1958 (Nature Reserve Agreements)	1,019	Permits to visit required for whole Reserve.
Cader Idris, Merioneth 1955 (Nature Reserve Agreement)	969	Permits to visit required for enclosed woodland.
Castor Hanglands, Soke of Peterborough 1954, 1955 and 1960 (Leased)	221	Permits required to visit, except for Ailsworth Heath.
Cavenham Heath, Suffolk 1952 and 1958 (Part Nature Reserve Agreement, part owned)	208	Permits required to visit Cavenham Pools' Heath - unrestricted access to the rest of the Reserve.
Clairinsh, Stirling 1958 (Nature Reserve Agreement)	15	-
Coed Camlyn, Merioneth 1959 (Nature Reserve Agreement)	57	Permits required to visit the whole Reserve.
Coed Dolgarrog, Caernarvon 1959 (Leased)	170	Permits required to visit parts of the Reserve away from the rights of way.

<u>Name, Year Declared and Method of Establishment</u>	<u>Acreage (in acres)</u>	<u>Access and Restrictions (except where otherwise stated permits to visit are not required)</u>
Coed Gorswen, Caernarvon 1959 (Leased)	33	Permits required to visit parts of the Reserve away from the rights of way.
Coed Rheidol, Cardiganshire 1956, 1958 and 1960 (Owned)	89	Permits to visit required for parts of the Reserve away from the rights of way.
Coed Tremadoc, Caernarvonshire 1957 (Part Leased)	49	Permits to visit required for whole Reserve. Special permit required for rock climbing.
Coom Rigg Moss, Northumberland 1960 (Leased)	88	Permits to visit required for whole Reserve.
Cothill, Berkshire 1956 (Leased)	4	Permits to visit required for whole Reserve.
Craig Cerrig Gleisiad, Breconshire 1957 and 1958 (Nature Reserve Agreements)	698	Landowner's permission to enter must be obtained.
Craigellachie, Inverness-shire 1960 (Nature Reserve Agreement)	642	-
Craig-y-Cilau, Breconshire 1959 (Leased)	157	Permits required to visit the caves.
Cwm Glas, Crafnant, Caernarvon 1960 (Nature Reserve Agreement)	38	Permits required to visit enclosed woodland.
Cwm Idwal, Caernarvonshire 1954 (Leased)	984	-
Fyfield Down, Wiltshire 1956 (Leased)	612	Permits to visit required for parts of the Reserve away from the rights of way.
Glen Diomhan, Arran, Bute 1956 (Nature Reserve Agreement)	24	-
Gower Coast, Glamorgan 1958 (Leased)	116	-
Haaf Gruney, Shetland 1959 (Nature Reserve Agreement)	44	-
Hales Wood, Essex 1955 (Leased)	20	Permits to visit required for the whole Reserve.
Ham Street Woods, Kent 1952 and 1953 (Owned)	240	Permits to visit required for the whole Reserve.

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<u>Name, Year Declared and Method of Establishment</u>	<u>Acreage (in acres)</u>	<u>Access and Restrictions (except where otherwise stated permits to visit are not required)</u>
Hartland Moor, Dorset 1954 and 1958 (Leased)	214	Permits to visit required for the whole Reserve. Statutory Bird Sanctuary. Danger from unexploded bombs.
Hermaness, Shetland 1955 and 1958 (Nature Reserve Agreement)	2,383	-
Hickling Broad, Norfolk 1958 (Nature Reserve Agreements)	1,204	Sailing and use of the Broad, unrestricted. Permits required for adjoining sanctuary area.
High Halstow, Kent 1957 (Nature Reserve Agreement)	131	Permits to visit required for parts away from the right of way.
Holme Fen, Huntingdonshire 1952 (Owned)	640	Permits to visit required for whole Reserve.
Inchnadamph, Sutherland 1956 (Nature Reserve Agreement)	3,200	Authority required to visit the Reserve in late summer and autumn.
Invernaver, Sutherland 1960 (Nature Reserve Agreement)	1,363	Unrestricted access.
Isle of May, Fife 1956 (Nature Reserve Agreement)	140	-
Kingley Vale, Sussex 1952, 1953 and 1955 (Owned)	230	Danger from unexploded bombs.
Kirkconnell Flow, Kircudbright 1959 (Nature Reserve Agreement)	383	-
Knocking Hoe, Bedfordshire 1958 (Nature Reserve Agreement)	22	Permits to visit required for whole Reserve.
Ling Gill, Yorkshire 1958 (Owned)	12	-
Loch Druidibeg, South Uist 1958 (Owned)	2,577	Permits required during the bird breeding season.
Lullington Heath, Sussex 1956 (Leased)	155	Permits to visit required for parts away from public footpaths.
Morden Bog, Dorset 1956 and 1959 (Leased)	367	Permits to visit required for the whole Reserve. Statutory Bird Sanctuary.
Morfa Harlech, Merioneth 1958 (Leased)	445	Permits to visit required for whole Reserve.

<u>Name, Year Declared and Method of Establishment</u>	<u>Acreage (in acres)</u>	<u>Access and Restrictions (except where otherwise stated permits to visit are not required)</u>
Morton Lochs, Fife 1952 and 1956 (Owned)	59	Permits to visit required for parts away from the roads. Byelaws confirmed 1956.
North Fen, Lancashire 1955 (Leased)	4	-
North Rona and Sula Sgeir, Ross-shire 1956 (Nature Reserve Agreement)	320	-
Noss, Shetland 1955 (Nature Reserve Agreement)	774	-
Rannoch Moor, Perthshire 1958 and 1960 (Owned)	3,704	-
Rassal Ashwood, Ross-shire 1956 (Nature Reserve Agreement)	202	-
Rhinog, Merioneth 1959 (Owned)	991	-
Rodney Stoke, Somerset 1957 (Owned)	86	Permits to visit required for parts away from public foot-path.
Rusland Moss, Lancashire 1958 (Nature Reserve Agreement)	30	Permits to visit required for whole Reserve.
Sands of Forvie, Aberdeenshire 1959 (Leased)	1,774	Authority required to visit Reserve during breeding season and in late summer and autumn.
Silver Flowe, Kirkcudbright 1956 (Leased)	472	-
Strathy Bog, Sutherland 1960 (Leased)	120	-
Swanscombe Skull Site, Kent 1954 (Owned)	5	-
Tentsmuir Point, Fife 1954 (Owned)	92	-
Thetford Heath, Suffolk 1958 (Nature Reserve Agreement)	225	Permits to visit required for whole Reserve.
Tring Reservoirs, Hertfordshire 1955 (Leased)	49	Permits to visit required for parts of the Reserve away from the rights of way.

<u>Name, Year Declared and Method of Establishment</u>	<u>Acreage (in acres)</u>	<u>Access and Restrictions (except where otherwise stated permits to visit are not required)</u>
Tynron Juniper Wood, Dumfriesshire 1958 (Leased)	12	-
Weeting Heath, Norfolk 1958 (Nature Reserve Agreement)	338	Permits to visit required for whole Reserve.
Westleton Heath, Suffolk 1956 (Owned)	117	Permits to visit required for parts away from the rights of way.
Winterton Dunes, Norfolk 1956 (Nature Reserve Agreement)	259	Permits to visit required for parts away from public footpaths.
Wren's Nest, Worcestershire and Staffordshire 1956 and 1957 (Nature Reserve Agreements)	74	-
Wybunbury Moss, Cheshire 1955, 1957 and 1959 (Owned)	27	Permits to visit required for whole Reserve.
Wychwood, Oxfordshire 1955 (Nature Reserve Agreement)	647	Permits to visit required for whole Reserve.

Note: Bird Sanctuaries referred to above are those established under legislation before and continued by the Protection of Birds Act 1954.

Other statutory nature reserves

Local nature reserves

<u>Name, Year Declared and responsible Local Authority</u>	<u>Acreage</u>	<u>Access and Restrictions</u>
Aberlady Bay, East Lothian 1952 (By Agreement) East Lothian County Council	1,439	Unrestricted access.
Castle Eden Denes, Durham 1954 (By Agreement) Durham County Council	517	Access restricted to definite footpaths.
Drigg Dunes and Gullery Nature Reserve, near Ravenglass, Cumberland 1954 (By Agreement) Cumberland County Council	583	Visitors should apply to: The Clerk of the Council, The Courts, Carlisle.

<u>Name, Year Declared and responsible Local Authority</u>	<u>Acreage</u>	<u>Access and Restrictions</u>
Fairburn Ings, Yorkshire 1957 (By Agreement) West Riding of Yorkshire County Council	618	Permits to visit obtainable from the County Planning Department, or the Chief Warden.
Farndale, Yorkshire 1955 (By Agreement) North Riding of Yorkshire County Council	2,500	Numerous local voluntary Wardens advise on access during Daffodil season.
Gibraltar Point, Lincolnshire 1952 Lincolnshire (Parts of Lindsey) County Council	500	Unrestricted access.
Ruislip, Middlesex 1959 Ruislip-Northwood Urban District Council	11	Permits required to visit the Reserve.

Protection of Birds Act, 1954

Wildfowl refuges

<u>Name and Date of Order</u>	<u>Acreage</u>	<u>Managed by:</u>
Humber Wildfowl Refuge, Yorkshire and Lincolnshire 14th October, 1955	3,130	Humber Wildfowl Refuge Committee. (Access limited to essential permit holders)
Southport Sanctuary, Lancashire 8th May, 1956	14,500	Southport Sanctuary Committee.

Other statutory sanctuaries

<u>Name and Date of Order</u>	<u>Acreage</u>	<u>Managed by:</u>
Lady Isle Sanctuary, Firth of Clyde, Ayrshire, 1955	-	Scottish Society for the Protection of Wild Birds.
Fossil Marsh Sanctuary, Glasgow, 1956	68	Scottish Wild Birds Sanctuaries Trust

<u>Name and Date of Order</u>	<u>Acreage</u>	<u>Managed by:</u>
Wicken Sedge Fen Sanctuary, Cambridgeshire, 1957	-	
Loch Garten Bird Sanctuary, Inverness-shire, 1960	677	Royal Society for the Protection of Birds
Trethias Island Sanctuary, Cornwall, 1959	-	

Non-statutory nature reserves

Forest nature reserves

<u>Name, Date of Establishment and owning Authority with whom agreement made</u>	<u>Acreage</u>	<u>Access and Restrictions</u>
Beacon Hill, Aston Rowant, Oxfordshire 1959 Forestry Commission	13	Restricted access.
Blackcliff and Wyndcliff, Monmouthshire 1959 Forestry Commission	200	Unrestricted access.
Bramshaw, New Forest, Hampshire 1959 Forestry Commission	525	Access restricted within statutory forest inclosures to trackways and rides.
High Standing Hill, Windsor Forest, Berkshire 1956 Crown Estate Commissioners	45	Restricted access.
Mark Ash, New Forest, Hampshire 1959 Forestry Commission	226	Access restricted within statutory forest inclosures to trackways and rides.
Matley and Denny, New Forest, Hampshire 1959 Forestry Commission	2,577	Access restricted within statutory forest inclosures to trackways and rides.
Waterperry, Oxfordshire 1954 Forestry Commission	144	Restricted access.



GREECE

National Park

National Park of Olympus - 4,000 hectares (10,000 acres), located 100 km north of Larissa, established in 1938 by Royal decree. The park includes the peaks of the Olympus Mountains, the mythological home of the gods, with an altitude range from 750 metres to 2,917 metres. The mountain slopes are covered with light forests of pine, beech or broad-leaved evergreens; there are deep ravines with rocky slopes. The historical convent of St. Dionissos is located in the Park and owns part of the area. At present, effort is being made to acquire this land. The Park is administered by Forest Service of the Department of Agriculture through the Forest Inspector of Katerini. During World War II, the area could not be protected, but protection was resumed in 1953. Access to the Park is by various means of transportation. Several more national parks are planned.

Nature Reserves

Reserves are established for the protection of rare plants and animals. The following three are desert rocky islands which are inhabited by several types of chamois. Only scientists may visit them: Park of Antimylos, established in 1937; Park of Dias, established in 1936; Park of Gioura, established in 1950.

Park of Samarias - 800 hectares (2,000 acres), on the Island of Crete, established in 1953. The Park contains an area in the White Mountains between 800 metres and 2,200 metres, which was established for the protection of the rare chamois of Crete and of the vegetation which consists of cypress, live oak and Mediterranean scrub. The area is administered by the Forest Service from the town of Hania. Access is by motor boat from nearby villages.

## GUATEMALA

An Act of 1949 authorizes the Minister of Agriculture to declare certain regions of Guatemala as "Restricted Forest Zones" for a period of fifteen years, to prohibit cultivation of slopes having a steeper grade than 30 per cent, timber cutting, sedimentation of streams, grazing of livestock, and taking other conservation measures to protect and restore the soils and forests in watershed areas of the country. In 1955 the President exercised his power to take special action to protect the flooding of the city of Antigua, resulting from deforestation, by enforcing conservation practices. Also in 1955 a law was enacted to establish certain national parks, forests and sites; in 1956 several areas, including the volcanoes of the entire country from their craters to where a 30 per cent grade occurred in the upslope, were proclaimed restricted areas. The Minister of Agriculture has responsibility for the protected areas, including the national parks.

### National Parks

Atitlán National Park - the boundaries of this municipally-owned park, in the Department of Sololá, have not been fixed - established in 1955. Lake Atitlán is one of the most beautiful lakes in the world, bordered by active volcanoes and covered with verdant forests and grasslands. Many villages are located on the shores of the lake, each characterized by its individualistic costume and culture. The park is at an altitude of 1,558 metres, and supports pine, cypress and oak forests, with mosses and lichens, inhabited by deer and squirrels; an endemic species of grebe (Podilymbus gigas) is found only at Lake Atitlán. Because of its volcanic origin, the lake is very deep and the water appears almost black. Highways lead to the villages; launch service and accommodations are available.

Cerro del Baúl National Park - a municipally-owned park in the Department of Quezaltenango - established in 1955. This is a mountainous area, reaching an altitude of 2,407 metres, without river sources and covered with pine and broad-leaved trees. Recent eruptive geological formations are andecitic

and basaltic. Squirrels and rabbits inhabit the area, some mosses and lichens are present. The park may be reached by plane or automobile.

Cerro Miramundo National Park - 900 hectares (2,250 acres) in the Department of Zacapa. Shrubs and cacti cover the small hills; wildlife is represented by rabbit, wildcat and taltuza. The park is accessible by railroad and automobile.

El Pino National Park - 518 hectares (1,295 acres) in the Department of Guatemala. The park region is mountainous, reaching an altitude of 5,550 feet. Pine and cypress forest abound; rabbits, squirrels, wildcats and coyotes are found in the park. Access is by automobile.

El Reformador National Park - in the town of El Reformador (Department of El Progreso), this park is surrounded by a cultivated area in which henequén, corn, beans, tobacco and tomatoes are grown. The topography is uneven, with an altitude of 810 metres. There are no dominant trees; crystalline slate is found nearby. Rabbits and wildcats inhabit the region. Access is by automobile.

Laguna el Pino National Park - in the Department of Santa Rosa - established in 1955. The region is flat; the temperate climate is amenable to pine, cypress, broad-leafed trees, and moss and lichens. Rabbits and squirrels abound. Recent eruptive geological formations indicate the presence of andecite and basalt. Access is by automobile.

Los Aposentos National Park - over twenty-eight manzanas in the Department of Chimaltenango - established in 1955. The park is mountainous land covered with Montezuma pine. Four branches of the Río Guacalante, which crosses the park, have their source here. Some moss and lichens and Alnus jurullensis may be found; rabbits and squirrels inhabit the area. Cereal crops are cultivated on the park outskirts. Access is by automobile.

Río Dulce National Park - embraces the area of Lake Izabal and the Río Dulce from its mouth at the Atlantic Ocean to the ruins of San Felipe Castle - established in 1955. The boat trip up the river passes through some of the

most magnificent jungle country in Central America, a luxuriant growth of giant flowering trees, ferns, orchids and myriad other plants. It is famous for its tropical birdlife, including almost every species characteristic of such habitat, such as oropendulas, motmots, toucans, egrets and many others. Tapir, jaguar, howler monkey, deer and a variety of animals inhabit the forests and savannahs. The open plains of the park are covered with mahogany, Spanish cedar, San Juan (Vochysia guatemalensis) blood tree (Virola koschnyii), Marío (Callophyllum brasiliensis) and other broad-leaved trees. Several rivers rise in the park. Access is by air, rail or boat.

Santa Rosalia National Park - 4,061 hectares (10,153 acres) in the Department of Zacapa. Conifers and broad-leaved trees are typical of this area, with pine trees dominant. Wildlife, notably deer, mapache and tacuazin abound in this warm region. The adjacent area is cultivated. Access is by rail or automobile.

United Nations National Park - near the city of Amatitlán, in the Department of Guatemala - established in 1955. Its size is ten caballerias and fifty-seven manzanas. Altitudes in this mountainous park range from 4,000 to 5,500 feet. The area is deforested; cypress, eucalyptus, casaurina and other varieties of trees have been planted, and a few mosses and lichens are present. Rabbits, wildcats (gato monte), taltuza and tacuazín inhabit the park; cereal crops are cultivated on the outskirts. Access is by automobile.

Tikal National Park - in the tropical forest region of El Petén in northern Guatemala - established in 1955. The boundaries of the Municipality of Tikal form the park boundaries. The area is mountainous and has few streams. Forests of broad-leaved trees cover the region, the chief species are mahogany, Spanish cedar, Santa María and chicozapote (Achras zapota). The main wildlife species are deer, squirrel, puma, jaguar, wildcat, ocelot, tapir, cotuza (Sasuyprocta puctata), mapache (Procyon loto) and pizote (Nasua narica). Access is only by plane or horseback.

HIGH COMMISSION TERRITORIES

BASUTOLAND, BECHUANALAND PROTECTORATE, SWAZILAND

A game reserve was reserved in 1940 by the High Commissioner's Notice No. 107, covering 3,750 square miles in the Kgalagadi District of northwestern Bechuanaland. It was established to protect wildlife in an arid part of the Protectorate, especially gemsbuck, hartebeeste, springbuck, wildebeeste, eland and lion. The Rosop River no longer flows, and its channel is wooded with open stands of tall trees, providing a parkland. The reserve is uninhabited and adjoins the Gemsbuck National Park in the Union of South Africa.

A Union Government Game Ranger from the Gemsbuck National Park supervises the reserve on behalf of the Bechuanaland Protectorate Government. Entry of visitors into the reserve is controlled by the Game Ranger who is often available to accompany them.

Two bird sanctuaries were established in terms of High Commissioner's Notice No. 115 of 1947. They are located in the areas within a radius of one mile from the Magobane Dam in the Bamalete Reserve and the Bathoen Dam in the Bangwaketse Reserve.

HONG KONG

There are no areas specified as national parks or reserves in Hong Kong. However, certain areas are set aside for the protection of wild birds and mammals, in which hunting and the carrying of firearms is prohibited.

Tai Po Kau Forestry Reserve - the catchment area of the Tai Po Kau river.

Kowloon Reservoirs Direct Catchment Area - comprises the four Kowloon Reservoirs and the slopes of the hills draining directly into these reservoirs.

The whole of the island of Hong Kong.

The whole of the island of Cheung Chau.

Fanling Golf Course - and the area within 200 yards of the boundaries of the golf course.

An area in the Lam Tsun Valley.

## HUNGARY

### Administration of Parks and Reserves

All Hungarian parks and reserves are established by the National Nature Conservation Council, composed of scientists. The Council declares them protected areas or requests the Ministry of Agriculture to expropriate areas in return for compensation, then turning them over to the Council. The Council has nation-wide powers to set aside, protect, preserve and determine principles and policies for objects worthy of nature conservation, as well as power of law enforcement. The Council has financial autonomy with expenditures guaranteed by the state budget, and appoints its own staff.

As a central office, the Secretariat functions under the guidance of the secretary-general and his assistant. The field service is handled by the State Forest Management, which supervises the personnel directly engaged on the reservations.

The principles governing the administration of nature reserves differs in accordance with the nature of the reserve. Some of these are set aside solely for research work, and, to that end, the major task is to retain them in their original natural state. Others - such as arboreta - are set aside both for scientific purposes and the advantage and enjoyment of the public; consequently, aesthetic considerations are also met with respect to these. As far as the forest reserves are concerned, the nature and method of forest management are decided by the Nature Conservation Council, on the basis of the principle that priority should be given to preserving the forest rather than to economic interests.

Geological monuments and formations are likewise exempt from all economic interference; quarries, gravel or sand pits may not be opened. Council permission must be obtained to divert the water of protected streams and springs, to establish intake works, etc.

To ensure continuing research work, the Council has built lodging houses on major reservations situated far away from inhabited areas.

Guide service is provided for larger tourist groups. Illustrated handbooks are being published on flora, fauna and other features of the reservations. The Hungarian Academy of Sciences has published a complete scientific study of the reservation at Bátorliget. Lectures on nature conservation subjects are regularly included in the Hungarian Society for the Dissemination of Science.

In addition to the nature reserves listed below, there are minor areas and objects (ancient trees, springs, etc.) which have been placed under public control.

Parks, Reserves and other Areas

Tihany National Park - 68 hectares (1,700 acres) in the Lake Balaton region, established in 1952. The northern slope of Óvárhegy shows a cross-section of a once-active volcano; the park also contains nearly 100 rock cone geysers, two lakes, ramparts built during the bronze age and cave dwellings excavated by monks during the 12th century. There are eight reserves located within the national park boundaries, and an inhabited section owned by the population of Tihany. Good foot paths criss-cross the interior of the peninsula.

Kisbalaton (Little Balaton) Reserve (Strict Nature Reserve) - 1,403 hectares (3,508 acres) of marshlands on the southwest shore of Lake Balaton, established in 1951. Once covered with water, these marshes are now noted for their bird life, including Phalacrocorax carbo sinensis (cormorant), Ardea purpurea (purple heron), Egretta garzetta (little egret), Egretta alba (great white heron), Ardeola ralloides (Squacco heron), and other herons, as well as Platalea leucorodia (spoonbill) and Plegadis falcinellus (glossy ibis). Only research workers are permitted on the reserves during the hatching season; at other times an entry permit is required from the Nature Conservation Council which administers the area, serviced by the Forest Management.

Aggtelek-Jósvafó (Baradla stalagmite cave) - surface area of 788 hectares (1,970 acres) on the western border; the cave was reserved in 1945, the surface area in 1958. Over 15 km. long, the cave is notable for its enormous chambers and extraordinary stalactites and stalagmites. The cave labyrinth extends over the border into Czechoslovakia, where it is also protected. The reserve is administered by IBUSZ (tourist agency).



Békebarlang (Peace Cave) - 653 hectares (1,632 acres), established in 1953.

This recently discovered stalagmite cave and brook is contiguous to Aggtelek-Jósvafó. It is administered by IBUSZ (tourist agency).

Szalajkvölgy (Szalajka Valley) - 558 hectares (1,395 acres) in northeast Hungary, established in 1955. One-time centre of paleolithic culture of the Bükk Mountains, this reserve is a typical high mountain region with a deep valley. It is noted for containing the only rock spring in the country, and rare ferns growing on the stream banks.

Fehértó (White Lake) Park - 316 hectares (790 acres) in the southern section, established in 1939. Its lowland salt lakes and marshes provide refuge areas for migratory shore birds (avocet, stilt, Kentish plover, etc.). The park is administered by the Nature Conservation Council, with direct responsibility by the Forest Management. Only research workers are permitted during the hatching season; at other times Council permission is required for entry.

Melyvölgy-Melegmány Reserve - 186 hectares (465 acres) in the Mecsek mountain range near Pécs, established in 1957. The broken and crushed structure of trias limestone is clearly visible. Valleys cut through the region, interrupted with springs, brooks and several small waterfalls. The reserve contains several rare plants indigenous only to the Mecsek mountains: Sryopteris setifera, Helleborus odorus, Aremonia agrimonioides, Lathyrus venetus and Stachys alpina.

Yew Tree Forest - 213 hectares (532 acres) in Szentagal, established in 1951.

It preserves the remnants of the indigenous yew tree forests, about 400-500 metres above sea level.

Baláta Lake Reserve - 175 hectares (438 acres) in northwest Hungary, established in 1941. The lowland sand dunes provide wild fowl protection, and the reserve is the sole habitat in the country of the rare Vipera berus v. prester (black adder). The reserve is maintained for scientific purposes only.

Uzsapuszta Reserve - 116.2 hectares (291 acres) skirting the Lesence Valley, established in 1951. It contains dense juniper forests, as well as birch forests spotted with oak and beech.

Kisszénás Park - 97.5 hectares (244 acres) near Budapest, established in 1951.

Its principal features are the grassy, shrub-covered rocky fields and a dry warm climate; it represents the cradle of the Pannonian flora.

Mohostavak (Mohos Lake) Park - 91.7 hectares (229 acres) in the north east, established in 1952. It contains two lakes 120 metres above sea level, and is the only place in the country where Eriophorum vaginatum and Nephrodium cristatum grow.

Tisza Sasér Park - 84.5 hectares (211 acres), on the right bank of the Tisza River, established in 1951. Only 16 km. from Fehértó reserve, the willow and poplar groves provide habitat for Egretta Garzetta (little egret), Nycticorax nycticorax (night heron), Falco subbutea (hobby) and Falco vespertinus (red-footed falcon).

Tátika Beech Forest Reserve - 74.4 hectares (181 acres) in the Keszthely mountain range, established in 1953. It contains an indigenous beech forest more than 150 years old.

Ipolytarnóc Reserve - 58 hectares (145 acres) on the northern border, established in 1944. Its hummocks and ravines contain fossils dating from miocene times; also a huge silicified fir trunk (Pinus tarnociensis) and petrified remnants of coral, shellfish, shark teeth, etc. Plant fossils are indicative of a subtropic climate and resemble those growing along the Mexican and southern Chinese seashores.

Bátorliget Reserve - 51.5 hectares (129 acres) in the northeast, established in 1950. It preserves the primeval landscape of the Great Hungarian Plain. Ligularia sibirica and Trollius europaeus plants and the Lacerta vivipara lizard are found here, as well as thousands of species of butterflies and insects. It is administered by the Nature Conservation Council, under direct management of the Forest Service. A Council permit is required for entry.

Alcsut Park - 41.9 hectares (105 acres) in central Hungary, established in 1952. Planted in the 1820's, this arboretum contains deciduous and coniferous trees. It is considered one of the loveliest and most valuable arboreta in the country.

Sashegy (Eagle Hill) - 30 hectares (75 acres) in Budapest, established in 1958.

This reserve has elements of the warm dry Mediterranean and Russian steppes. Habitat of rare spiders (Microneta spinigera, Lathys falcigera, Zelotes hungaricus, Altella orientalis), Ablepharus kitaibeli lizard and Passalotus africanus (African acarus); it is also the sole habitat of several butterfly species. Administered by the Nature Conservation Council, this reserve is temporarily closed to the public for scientific reasons.

Zirc Park - 17.8 hectares (45 acres) in Zirc village, established in 1951.

Contains one of the oldest collections of trees in Hungary, remnants of the primeval forests of Bakony 130 years ago. It is administered by the Nature Conservation Council, but under Forest Management supervision.

Szelests Arboretum - 13.2 hectares (33 acres) at Szelests village, established in 1952. It contains rare species of coniferous trees and foreign species found nowhere else in Hungary. It is administered by the Nature Conservation Council.

Nagszénás Reserve - 12 hectares (30 acres) in north-central Hungary, established in 1951. It contains bald limestone crags, broken by many ridges and valleys, with plants remaining from the ice age, and is contiguous to Kísszénás Park.

Urkut Reserve - 6.2 hectares (16 acres), established in 1951. An abandoned mine, of special interest for geological research. It is administered by the Nature Conservation Council and serviced by the Forest Management.

Erdótelek Arboretum - 2.9 hectares (7 acres) in west-central Hungary, established in 1950. A model of reforestation in flatlands, administered by the Nature Conservation Council.

Várpalota Reserve - 1.2 hectares (3 acres) near Várpalota village, established in 1954. An abandoned fenced sand pit with remnants of petrified ocean fauna, 120 metres above sea level. It is administered by the Nature Conservation Council, whose permit is required for entry.

NOTE: Unless otherwise indicated, all areas are administered by the State Forest Management and are open to the public without permit.

INDIA

National Parks

Corbett National Park - 125 square miles in the Garhwal and Naini Tal Districts of the Uttar Pradesh Province - established in 1935. The park protects tiger, panther, sloth bear, elephant, spotted deer, hog deer, barking deer, sambhar, goral, pig, wild dog, hyena, porcupine, flying squirrel, pine marten, crocodile, python, red jungle fowl, kaleej pheasant, peafowl, black partridge, green pigeon, hill and emerald dove, hornbills and other wildlife.

Hacaribagh National Park - 150 square miles in Hazaribagh District of the Bihar Province - established in 1955. The park protects tiger, panther, bear, sambhar, barking deer, blue bull, pig, peafowl and jungle fowl.

Hailey National Park - 125 square miles in the Uttar Pradesh Province - established in 1935. Under the National Parks Act of 1935 of this Province, the Chief Conservator of Forests administers the Park; a management plan includes timber extraction by Forest Departments.

Kanha National Park - 97.7 square miles in Mandla District of the Madhya Pradesh Province - established in 1956. The park covers the upper Banjar Valley and contains swamp deer, spotted deer, sambhar, blackbuck, bison, tiger, panther and gaur (Bibos gaurus). The area is noted for its scenic and forest beauty and for its easy view of large herds of hoofed animals.

Shivpuri National Park - 61 square miles in Shivpuri District in the Madhya Pradesh Province. The park protects tiger, panther, bear, sambhar, spotted deer, blue bull, four-horned antelope, Indian gazelle, peafowl, spur fowl, and a variety of other birds.

Taroba National Park - 45 square miles in Chanda District of the Bombay Province - established in 1956 (sanctuary since 1935). The park protects tiger, panther, sambhar, spotted deer, and bison.

Tirap National Park - 800 square miles in the state of Assam by the northwest national boundary of India and China - established by Gazette Notification by the State of Assam. The Park comprises a remote area in an accessible mountain region, and is administered by the North East Frontier Agency.

## Sanctuaries

### Andhra Pradesh Province

Eturnagaram Sanctuary - 314 square miles in the Warangal District - established in 1953. The area contains tiger, panther, bear, bison, sambhar, spotted deer, blue bull, Indian gazelle, pig and crocodile.

Ikshawaku Sanctuary - 227.5 square miles in Nalgonda and Guntur Districts. The area contains tiger, panther, cheetah (probable), sambhar, barking deer, blue bull, blackbuck, four-horned antelope and giant squirrel.

Oawal Sanctuary - 500 square miles in Adilabad District. The area contains tiger, panther, bear, pig, bison, spotted deer, sambhar, barking deer, blue bull, blackbuck, etc.

Pakhal Sanctuary - 339 square miles in Warangal District - established in 1952. The area contains tiger, panther, bear, bison, sambhar, spotted deer, blue bull, India gazelle, pig and crocodile.

Pocharam Sanctuary - 50 square miles in Medak District - established in 1952. The area contains tiger, panther, bear and sambhar.

Shri Venkateshwara Sanctuary - 184 square miles in Chittoor and Guddapah Districts. The area contains bear, sambhar, spotted deer, black buck, pig and various birds.

### Assam Province

Garampani Wild Life Sanctuary - 2.29 square miles in Sibsagar District along the Goleghat-Dinapur Road - established in 1952. The area contains bison, deer, elephant and a few rhinoceros.

Kaziranga Sanctuary - 166 square miles in Sibsagar District along the south banks of the Brahmaputra River - established in 1908. The area contains about 300 Great Indian rhinoceros and large number of other wildlife such as elephant, wild buffalo, deer and a variety of birds.

North Kamrup Sanctuary - 105 square miles in Kamrup District along the north bank of the Brahmaputra River at the foot of the Bhutan Hills - established in 1905. The area contains rhinoceros, elephant, wild buffalo, bison, hog deer, swamp deer, barking deer, tiger, bear, pig, and other wildlife.

Pabha Sanctuary - 20 square miles in Lakhimpur District - established in 1941. The area contains wild buffalo and a variety of deer.

Sonai-Rupa Sanctuary - 85 square miles in Darrang District along the Abor foothills - established in 1934. The area contains elephant, bison, deer, a few rhinoceros, and a variety of birds.

#### Bihar Province

Bamiaburu Sanctuary - 50 square miles in Singhbhum District - established in 1946. The area contains tiger, panther, sambhar and birds.

Baresand Sanctuary - 22.94 square miles in Palamau District - established in 1946. The area contains tiger, panther, spotted deer, sambhar, bear, pig, bison, elephant, and various birds.

Dumka Damin Sanctuary - 35 square miles in Santhal Pargana District - established in 1938. The area contains panther, bear, deer, pig and other wildlife.

Koderma Sanctuary - 68 square miles in Hazaribagh District. The area contains tiger, panther, sambhar, barking deer, and bear.

Lat Sanctuary - 36 square miles in Palamau District - established in 1946. The area contains tiger, panther, bison, bear, sambhar, spotted deer, peafowl, jungle fowl and green pigeon.

Sasangdaburu Sanctuary - 7.5 square miles in Singhbhum District - established in 1936. The area contains tiger, elephant, bison, sambhar, spotted deer, barking deer, four-horned antelope and a variety of birds.

Tebo Sanctuary - 56 square miles in Singhbhum District - established in 1932. The area contains bison, sambhar, spotted deer, barking deer and various birds.

Bombay Province

Gir Sanctuary - 527.16 square miles in Amereli District. The area contains Indian lion, blue bull, sambhar, pig, bear, and hyena. This sanctuary is the only area where the Asiatic lion (Leo Leo persicus) now exists.

Radhanagari Sanctuary - 8 square miles in Kolhapur District. The area contains panther, bear, bison, sambhar and pig.

Himachal Pradesh Province

Kalatop and Khajiar Sanctuary - 18.03 square miles in Chamba District. The area contains scrow, goral, barking deer, koklas, kaleej, monal, chukor, black partridge, and other wildlife.

Renuka Sanctuary - 5.25 square miles in Sirmur District. The area contains tiger, sambhar, spotted deer, goral, barking deer, blue bull, kaleej pheasant, peafowl, chukor, grey partridge, black partridge, and other wildlife.

Simbalbara Sanctuary - 21.42 square miles in Sirmur District. The area contains the same wild life as Renuka Sanctuary.

Simla Sanctuary - 23.93 square miles in Mahasu District. The area contains musk deer, scrow, goral, bear, panther, Himalayan palm-marten, fox, monal, koklas, cheer and kaleej pheasants, black partridge, wood cock, and other wildlife.

Kashmir Province

Chununai Sanctuary - 16 square miles in Kashmir South District. The area contains black bear, musk deer, and various pheasants.

Dachigam Santuary - 55 square miles in Kashmir South District. The area contains Kashmir stag (Cervus elaphes hunglu), musk deer, panther, fox, black bear, brown bear, and pig.

Rajparin Sanctuary - 22.75 square miles in Kashmir South District. The area contains black bear, musk deer and pheasants.

Kerala Province

Neyyar Sanctuary - 50 square miles in Trichur District - recently established.

Periyar Santuary - 300 square miles in Kottayam District - established in 1940.

The area contains elephant, bison, sambhar, pig, tiger, bear, panther, monkeys, squirrel, wild dog and other wildlife.

Vazhani Cum Peechi Sanctuary - 49 square miles in Trichur District - recently established.

Madhya Pradesh Province

Dubri Sanctuary - 100 square miles in Panna District. The area contains sambhar, spotted deer, tiger, bear, pig, and other wildlife.

Kheoni Sanctuary - 20 square miles in Dewas District. The area contains tiger, panther, bear, sambhur, and spotted deer.

Maujhar Shikarganj - 15 square miles in Rewa District. The area contains tiger, sambhar, spotted deer, panther, blue bull, pig and other wildlife.

Panna Sanctuary - 315 square miles in Panna District. The area contains tiger, panther, hyena, sambhar, spotted deer, blue bull, and other wildlife.

Shikarganj A - 4 square miles in Rewa District. The area contains tiger, sambhar, spotted deer, panther, pig and other wildlife.

Shikarganj B (Naurhiya Sanctuary Block I) - 7 square miles in Sidh District.

The area contains tiger, bear, pig, sambhar, and spotted deer.

Shikarganj C (Naurhiya Sanctuary Block II) - 5 square miles in Umaria District.

The area contains tiger, bear, sambhar, spotted deer, pig, and other wildlife.

Shikarganj C (Naurhiya Sanctuary Block III) - 2 square miles in Umaria District.

The area contains tiger, bear, sambhar, spotted deer, pig, and other wildlife.

Siri Sanctuary - 6.14 square miles in Panna District. The area contains tiger, panther, hyena, sambhar, spotted deer, blue bull, and other wildlife.



Madras Province

Mudumalai Sanctuary - 124 square miles in Nilgiri District - established in 1938.

The area contains elephant, bison, tiger, panther, bear, spotted deer, barking deer, hyena, four-horned antelope, sambhar, Nilgiri tahr (ibex), grey langur, Malabar squirrel, mouse deer, civet cat, red mongoose, flying squirrel, wild dog, peafowl, grey jungle fowl, spur fowl, quail, partridge, green pigeon, Malabar trogon, black headed oriole and wood pigeon.

Vedunthangal Bird Sanctuary - 20 square miles around Vedunthangal Lake. The area contains cormorant, darter, egret, stork, heron, spoon bill, ibis, pelican, black winged stilt, coot, teal and little grebe.

Manipur Province

Keibul Lamjao Sanctuary - 20 square miles in Bishenpur Tehsil District - established in 1954. The area contains the rare brow-antlered deer or thamin (Rucervus eldii eldii).

Mysore Province

Bandipur Sanctuary - 310.34 square miles in Mysore District. The area contains elephant, bison, tiger, panther, sambhar, spotted deer, barking deer, bear, and a variety of birds.

Dandeli Sanctuary - 79.8 square miles in North Kanara District - established in 1949. The area contains tiger, panther, sloth bear, elephant, sambhar, spotted deer, barking deer, and mouse deer.

Jagar Valley Sanctuary - 35 square miles in Chikmagalur District. The area contains bison, sambhar, spotted deer, barking deer, mouse deer, tiger, panther, bear, pig, and a variety of birds.

Nagarhole Sanctuary - 11 square miles in Coorg District - established in 1955. The area contains tiger, panther, bear, elephant, bison, sambhar, spotted deer, barking deer, pig and porcupine.

Venugopal Wild Life Sanctuary - 310 square miles near the city of Mysore. The area contains undisturbed natural vegetation and wildlife. The sanctuary is administered by the Forest Department, Mysore.

#### Orissa Province

Balukhand Sanctuary - 5 square miles in Puri District - established in 1935.

Blackbuck is the main species of wildlife in the area.

Chandaka Sanctuary - 10.4 square miles in Puri District - established in 1935.

The area contains elephant, sambhar, spotted deer, bear, tiger, panther and bison.

Debrigarh Sanctuary - 5.5 square miles in Sambalpur District - established in 1932. The area contains tiger, panther, sambhar, blackbuck, bison and blue bull.

#### Rajasthan Province

Ban Vihar Sanctuary - 8 square miles in Bharatpur District - established in 1955.

The area contains tiger, panther, bear, sambhar, spotted deer, blue bull, Indian gazelle and pig.

Bhana Bird Sanctuary - in Bharatpur District. The area contains an abundance and variety of migratory birds.

Darrah Sanctuary - 40 square miles in Kotak District - established in 1955. The area contains tiger, panther, sambhar, spotted deer and blue bull.

Jaisamand Sanctuary - 40 square miles in Udaipur District - established in 1955.

The area contains tiger, panther, sambhar, Indian gazelle and pig.

Sariska Sanctuary - 16 square miles in Alwar District - established in 1955. The area contains tiger, panther, sambhar, Indian gazelle, blue bull, pig, peacock, spur fowl and jungle fowl.

Sawai Madhpur Sanctuary - 50 square miles in Sawai Madhpur District - established in 1955. The area contains tiger, panther, sloth bear, sambhar, spotted deer and pig.

Uttar Pradesh Province

Chandraprabha Sanctuary - 30 square miles in Varanasi District. The area contains introduced lion, sambhar, spotted deer, sloth bear, India gazelle, blue bull, pig, hyena, hare, wild dog, peafowl, grey partridge, quail and crocodile.

Govind Pashu Vihar - 368 square miles in Tehri District - established in 1955. The area contains tahr, scrow, Hiralayan black bear, goral, snow leopard, musk deer, bharal, brown bear, monal pheasant, chukor partridge, and other wildlife.

Kansrao Sanctuary - 29.2 square miles in Dehra Dun District - established in 1935. The area contains tiger, panther, bear, elephant, spotted deer, sambhar, barking deer, pig, wild dog, hyena, porcupine, python, jungle fowl, black partridge, peafowl, hornbill, and other wildlife.

Malan Sanctuary - 32.48 square miles in Garhwal District. The area contains panther, spotted deer, sambhar, barking deer, pig, kaleej pheasant, peafowl, jungle fowl, green pigeon, and other wildlife.

Nanda Devi Sanctuary - 125 square miles in Garhwal District - established in 1939. The area contains tahr, scrow, goral, Himalayan black bear, snow leopard, musk deer, bharal, brown bear, monal pheasant, and other wildlife.

Rajaji Sanctuary - 173 square miles in Saharanpur District - established in 1948. The area contains tiger, leopard, panther, bear, elephant, spotted deer, sambhar, barking deer, pig, wild dog, hyena, porcupine, python, jungle fowl, black partridge, peafowl, hornbill, and other wildlife.

West Bengal Province

Chapramari Sanctuary - 3.4 square miles in Jalpaiguri District - established in 1939. The area contains rhinoceros, tiger, elephant, bison, sambhar, barking deer, hog deer, buffalo, pig and various birds.

Gorumara Sanctuary - 3.3 square miles in Jalpaiguri District - established in 1940. The area contains rhinoceros, tiger, elephant, bison, sambhar, barking deer, hog deer, buffalo, pig and various birds.

Jaldapara Sanctuary - 36 square miles in Japlaiguri District - established in 1941.

The area contains rhinoceros, tiger, elephant, leopard, deer and pig.

Lothian Island Sanctuary - 14.67 square miles. The area contains tiger, spotted deer, pig, water lizard and a variety of birds.

Mahanadi Sanctuary - 49.12 square miles in the foothills of Darjeeling District - established in 1956. The area contains tiger, elephant, bison, sambhar, deer (barking, spotted and hog), pig and a variety of birds.

Senchal Sanctuary - 15.27 square miles in Darjeeling District - established in 1940. The area contains Himalayan bear, scrow, goral, barking deer and other wildlife.

INDONESIA

The 116 nature reserves of Indonesia are administered by the Department for the Protection of the Forest Service, which is giving force to the laws and regulations affording protection to the areas, which cover a little less than 2,200,200 hectares.

Strict Natural Reserves

1. Udjung Kulon-Panailan Nature Reserve - 41,120 hectares (102,800 acres), on two islands in western Java, established in 1921. This world-famous reserve is strictly protected and preserves a variety of unusual wildlife. A scenic area with jungles and seascapes, Udjung Kulon is especially important as the principal known habitat of the very rare Java Rhinoceros (R. Sondaicus) which has survived here because of protection from hunting and poaching, and which has benefited from the presence of tigers in the reserve. Pulau Panaitan is a volcanic area, difficult of access, with an extraordinary flora and a fauna which includes barking deer, chevrotain (Tragulus Kanahii) and other tropical animals.

<u>No.</u>	<u>Name</u>	<u>Total Area Hectares</u>	<u>Acres</u>	<u>Date Estab.</u>	<u>Explanation</u>
2	Rawa-Danu West Java	2,500	5,750	1921	Bird Sanctuary. Botanically remarkable, freshwater-swamp forest. Flora: <u>Elacocarpus littoralis</u> , <u>Glochidion nanogynum</u> , <u>Alstonia Spathulata</u> , <u>Nepenthes mirabilis</u> , <u>Cladium crassum</u> etc. (rare species).
3	Pulau-Dua West Java	8	200	1937	Sanctuary of large colonies of waterfowl, viz. <u>Egretta</u> spp; ibis, cormorant, duct etc. There are natural fishponds. Administered by Nature Conservation Service of the Botanical Gardens of Bogor.

<u>No.</u>	<u>Name</u>	<u>Total Area Hectares</u>	<u>Acres</u>	<u>Date Estab.</u>	<u>Explanation</u>
4	Pulau Bokor West Java	18	450	1921	Bird Sanctuary. Reserved in view of observing of the migration of fowl. Fauna: <u>Ducula rosacea</u> , <u>Myristicivora bicolor</u> , <u>Ptilinopus melanocaphalus</u> , <u>Dicrurus hottentottus</u> , <u>Pandion haliactus</u> .
5	Pulau Rambut West Java	20	500	1939	Bird Sanctuary. From natural historical point of view very interesting. Breeding place of protected fowl: White ibis, black ibis etc.
6	Muara Angke West Java	15.4	38.5	1939	Strict nature Reserve. Fauna: <u>Presbytis pyrrhus</u> , <u>Pteropus spp.</u> Flora: <u>Rizophora</u> , <u>Sonneratia</u> , <u>Melaleuca leucadendron</u> , <u>Ficus retusa</u> .
7	Telaga Warna West Java	23.25	58	1954	Strict nature reserve. Attractive lake. Recreational area.
8	Janlappa West Java	32	80	1956	Strict nature reserve. Typical West Javan lowland jungle, with rare species of wood: <u>Dipterocarpus</u> , etc.
9	Gunung Djagat West Java	126.7	316.75	1954	Strict nature reserve. Important for the science: primeval lowland jungle.
10	Takobak West Java	50	125	1919	Strict nature reserve. Mountainflora, very important for the science.
11	Tangkubanprahu, Pelabuhan Ratu West Java	22	55	1919	Geological Monument.
12	Sukawanjana-Pelabuhan Ratu West Java	33	82.5	1919	Strict nature reserve. Primeval lowland forest.

<u>No.</u>	<u>Name</u>	<u>Total Area Hectares</u>	<u>Acres</u>	<u>Date Estab.</u>	<u>Explanation</u>
13	Tjadas Malang West Java	21	52.5	1919	Strict nature reserve. Important for the botany and has a beautiful scenery. Flora: <u>A.o. Pteyanthes oriopoda</u> , <u>Taina elongata</u> J.J.S. and other rare species.
14	Tjimungkat West Java	56	140	1919	Strict Nature. Very remarkable for the zoological and botanical science; rich in fowl, hibernating birds, <u>Ficus</u> trees and remarkable rare species: Brugmansia clumps. Avifauna: Owls ( <u>Bubo orientalis</u> Horsf.) and hawks ( <u>Falco severus</u> Horsf.) etc. Mammals: A. Monkeys ( <u>Hylobates leusiscus</u> Kuhl, <u>Semnopithecus maurus</u> Kuhl, etc. b. Mustelidae ( <u>Herpestes Javanicus</u> Desm, <u>Arctogale leucotis</u> W. Blanf etc.
15	Tjibodas Gunung Gede West Java	1,040	2,600	1925	Strict nature reserve and Geological monument. Important for the science: Mountainflora (1400-1900 m. above sea level). Scenery: mineral spring and waterfalls. Administered by the Botanical Gardens of Bogor.
16	Tjibanteng West Java	447	1,117.5	1925	Strict nature reserve. With rare species of avifauna. Fauna: banteng ( <u>Bos sondaicus</u> ), deer ( <u>Rusa timorensis</u> ), etc.

<u>No.</u>	<u>Name</u>	<u>Total Area Hectares</u>	<u>Acres</u>	<u>Date Estab.</u>	<u>Explanation</u>
17	Dungus Iwul West Java	9	22.5	1931	Strict nature reserve, for the protection of several remarkable species of forestflora. A holy place for the natives. The origin of its name was given from the name of a species of palm (iwul-Corypha utan lamk.). Most frequent occurrence of woods are: Eugenia spp., oaks, chestnuts.
18	Junghuhn West Java	2.5	6.25	1919	Historical monument, with a sepulchral monument of Dr. F. Junghuhn.
19	Tjigenteng- Tjipanji I and II West Java	10	25	1919	Strict nature reserve. Important for the science: unspoiled and unique mountainflora.
20	Pendjalu West Java	16	40	1919	Strict nature reserve with aesthetical and scientific value. Scenery.
21	Telaga Patengan West Java	150	375	1919	Strict nature reserve. Lake.
22	Kawah Papandajan West Java	844	2,110	1924	Geological monument. Crater of a volcano. Beautiful scenery.
23	Telaga Bodas West Java	285	7.215	1924	Geological monument. Lake with sulphuric mud.
24	Peson-Subah I and II Mid-Java	20	50	1919	Strict nature reserve with scientific value; typical lowland vegetation.
25	Ululanang- Ketjubang Mid-Java	68.4	171	1922	Strict nature reserve for several species of jungle woods: <u>Diptorocarpus gracilis</u> , <u>Shorea javanica</u> <u>Hopea sangal</u> (rare species).



<u>No.</u>	<u>Name</u>	<u>Total Area Hectares</u>	<u>Acres</u>	<u>Date Estab.</u>	<u>Explanation</u>
26	Moga Mid-Java			1924	Strict nature reserve. Spring.
27	Tjurug Bengkawah Mid-Java			1924	Strict nature reserve. Waterfall.
28	Gutji Mid-Java			1924	Strict nature reserve. Mineral spring and a water- fall.
29	Telaga Randjung Mid-Java			1924	Strict nature reserve. Mountain lake.
30	Getas Mid-Java			1913	Strict nature reserve, for one tree only.
31	Gebungan Mid-Java	1.8	4.5	1924	Strict nature reserve with aesthetical and scientific value.
32	Sepakung Mid-Java	2.8	7.2	1933	Geological reserve. Telomojo-mountain. Scenery.
33	Pagerwunung Darupono Mid-Java	30	75	1933	Strict nature reserve for a beautiful natural forest of <u>Tectona grandis</u> ; clumps of jungle woods embellished by little streams. A recreational Park.
34	Keling I, II, III Mid-Java	60	150	1919	Strict nature reserve with aesthetical and scientific value.
35	Nusakambangan, Widjajakusuma Mid-Java	928	2,320	1937	Strict nature reserve. A "holy" species of wood: Widjojokusuma ( <u>Pisonia silvestria</u> ). Fauna has generally a divergent character and is not found in the mainland of Java. <u>Rafflesia patma</u> , a rare species. Remarkable <u>Barringtonia</u> formation

<u>No.</u>	<u>Name</u>	<u>Total Area Hectares</u>	<u>Acres</u>	<u>Date Estab.</u>	<u>Explanation</u>
36	Pringombo I and II Mid-Java	58	145	1920	Geological monument with natural historical value (the oldest geological formation found in Java).
37	Telaga Dringo Mid-Java			1940	Strict nature reserve. <u>Polygenum plebejum</u> R. Br., a rare species.
38	Telok Baron Mid-Java			1937	Strict nature reserve with typical South-coast flora.
39	Gua Nglirip East Java	3	7.5	1919	Strict nature reserve with natural historical value.
40	Gunung Pitjis East Java	27.9	69.75	1924	Strict nature reserve with natural historical and aesthetical value.
41	Sigogor East Java	190.5	476.25	1936	Strict nature reserve. Important for the science and aesthetics.
42	Besowo Gadungan East Java	7	17.5	1919	Strict nature reserve. Important for the science and aesthetics.
43	Manggis Gadungan East Java	12	30	1919	Strict nature reserve. Important for the science and aesthetics.
44	Lautan Pasir Tengger East Java	5,250	13,025	1919	Landscape conservation. Sea of sand in the Tengger mountain. Recreational object.
45	Ranu Kumbolo East Java	1,342	2,356	1921	Highest strict nature reserve of Java and one of the most beautiful objects for the natural historical science in an attractive surrounding.
46	Ranu Pani Regulo East Java	96	240	1922	Strict nature reserve with several species of jungle woods. Scenery.

<u>No.</u>	<u>Name</u>	<u>Total Area</u> <u>Hectares</u>	<u>Acres</u>	<u>Data</u> <u>Estab.</u>	<u>Explanation</u>
47	Ardjuno Ialidjiwo East Java	580	1,450	1928	Strict nature reserve with characteristic East-Javan alpine vegetation. Habitat of <u>Rusa timorensis</u> , <u>Cervulus muntjac</u> etc. Beautiful volcanic scenery.
48	Pulau Sempu East Java	877	2,192.5	1928	Strict nature reserve with aesthetical value. Primeval forest.
49	Ranu Darungan East Java	378	945	1936	Strict nature reserve with interesting plants and wildlife. Geography and ecology of the plants is different due to the climate. Scenery.
50	Gunung Abang East Java	50	125	1937	Strict nature reserve. Climate in dry season is vigorous. Forest Composition is characteristic. Swamp forest is similar to that in Siam, Burma and India.
51	Sungi Kolbu East Java	9	22.5	1919	Strict nature reserve. Formerly the flora was remarkable, now it has little value.
52	Watangan Fuger I East Java	4	10	1919	Strict nature reserve for the determination of flora by Dr. Koorders. Now it has little value.
53	Tjorahmanis Sempolan I-VIII East Java	16	40	1919	Strict nature reserve for the determination of flora by Dr. Koorders. Now it has little value.
54	Rogodjampi II East Java	8.5	21.75	1919	Strict nature reserve for the determination of flora by Dr. Koorders. Now it has little value.
55	Pantjur Idjen I-II East Java	4	10	1919	Strict nature reserve for the determination of flora by Dr. Koorders. Now it has little value.

<u>No.</u>	<u>Name</u>	<u>Total Area</u> <u>Hectares</u>	<u>Acres</u>	<u>Date</u> <u>Estab.</u>	<u>Explanation</u>
56	Tjeding East Java	2	5	1920	Strict nature reserve. geological Monument with beautiful scenery.
57	Nusa Barung East Java	6,000	15,000	1920	Strict nature reserve. Flora: <u>Cordia subcordata</u> , <u>Cycas revoluta</u> , <u>Pterocymbium</u> , <u>Ficus</u> spp. <u>Tareuna incerta</u> , <u>Entanda</u> <u>scandens</u> etc. Fauna: <u>Rusa timorensis</u> , <u>Ratufa</u> <u>bicolor albiceps</u> , <u>Gallus</u> <u>gallus bankiva</u> , <u>Sula</u> <u>leucogaster</u> , <u>Varanus</u> <u>salvator</u> , etc.
58	Kawah Idjen Merapi Ungup 2. East Java	2,560	6,400	1920	Strict nature reserve with scientific and aesthetical value
59	Saobi East Java	430	1,075	1920	Strict nature reserve. Important for the zoology; <u>Megapodius</u> spp., various woodpigeons and deer are found. Fauna: composition is remarkable, not less than 9 bird species a.o. a. <u>Rhyppedytes kangeanensis</u> ; b. <u>Centropus kangeanensis</u> ; Zoo-geographic remarkable.
60	Bawean (Noko Nusa) East Java			1941	Strict nature reserve. Nesting and breeding areas for salanganes ( <u>collocalia</u> spp.) <u>Sula</u> spp., <u>Terna</u> species.
61	Rafflesia Serbodjadi East Java	300	7,500	1936	Strict nature reserve. Habitat of Rafflesia's and orang-utans ( <u>Pongo pygmaeus</u> )
62	Atjeh Rafflesia monument "Arul Kumbar" and Atjeh Rafflesia monument "Sungai Djernih Munto".				Strict nature reserve. Habitat of <u>Rafflesia</u> <u>arnoldi</u> .

<u>No.</u>	<u>Name</u>	<u>Total Area</u> <u>Hectares</u>	<u>Acres</u>	<u>Date</u> <u>Estab.</u>	<u>Explanation</u>
63	Dolok Saut Mid-Sumatra	39	97.5	1924	Strict nature reserve. Origin habitat of <u>Pinus merkusii</u>
64	Baringin Sati West Sumatra	.2	.5	1921	Strict nature reserve for one "holy" baringintree ( <u>Ficus benjamina</u> ) only. (Sati means holy).
65	Lembah-Anai West Sumatra	221	552.5	1922	Strict nature reserve for scenery Canyon
66	G. Indrapura West Sumatra	12,530	31,325	1929	Strict nature reserve with mountain flora and fauna; 1800 m above sea-level; the highest mountain in Sumatra, besides wild animals rare species of plant is found (a.o. <u>Anaphalis javanica</u> ).
67	Batang Palupuh West Sumatra	3.4	8.5	1930	Strict nature reserve. Habitat of <u>Rafflesia arnoldi</u> .
68	Rimbopanti West Sumatra	3,500	8,750	1932	Strict nature reserve with remarkable woods and animals.
69	Lembah Harau West Sumatra	298	745	1933	Two canyons. (a) Harau Canyon; (b) Sarasah Bunsu canyon; 500-700 m in height; vertical rock-walls; floral composition interesting; two species of orchids are found: (a) golden <u>Spathoglottis</u> (b) <u>Liparis</u> . Remarkable woods. Fauna: insects and other lower animals a.o. the much sought-after butterfly <u>Ornithoprera Brookeana</u> . Scenery.
70	Sibolangit East Sumatra	115	287.5	1934	Strict nature reserve. Important for science and aesthetics
71	Dolok Tinggi Radja East Sumatra	167	416.5	1934	Strict nature reserve. Important for science and aesthetics

<u>No.</u>	<u>Name</u>	<u>Total Area</u> <u>Hectares</u>	<u>Acres</u>	<u>Date</u> <u>Estab.</u>	<u>Explanation</u>
72	Batu Gadjah East Sumatra	1	2.5	1934	Geological monument
73	Lau Debuk-debuk East Sumatra	7	17.5	1924	Strict nature reserve with a lake with sulphuric mud.
74	Batu Ginurit East Sumatra	0.5	1.25	1934	Historic monument. Carved stones.
75	Liang Balik East Sumatra			1936	Strict nature monument
76	Ulu Tiangko Mid-Sumatra			1919	Historic monument. Cave with remarkable remnants of human race; prehistory; important for the archeology, anthropology or ethnography
77	Rafflesia Despatah I/II. South Sumatra	29	72.5	1937	Strict nature reserve. Habitat of <u>Rafflesia arnoldi</u> R.Br.
78	Rafflesia Despatah	0.26	0.65	1932	Strict nature reserve. Habitat of <u>Rafflesia arnoldi</u> R. Br.
79	Tjawang I/II South Sumatra	0.22	0.55	1932	Strict nature reserve. Habitat of <u>Rafflesia arnoldi</u> R. Br.
80	Konak South Sumatra			1932	Strict nature reserve with remarkable aesthetical and scientific value.
81	Dusun Besar South Sumatra	11.5	28.75	1936	Strict nature reserve. Lake; habitat of <u>Vanda Hookeriana</u> orchids. Waterfowl. Administered by the Forest Service.
82	Bungamas Kikim South Sumatra	1	2.5	1919	Historic monument. Important for the Prehistory: Archeology, anthropology, ethnography. Stone axes and lanceheads are found.
83	Mt. Krakatau South Sumatra	2,500	6,250	1919	Strict nature reserve for the phytogeographical research. Volcanic islands in the Sunda Strait.

No.	Name	Total Area Hectares	Acres	Date Estab.	Explanation
84	Mandor West Kalimantan (Borneo)	2,000	5,000	1936	Strict nature reserve. Habitat of several kinds of orchids: a.o. <u>Vanda species</u> .
85	Lo-Pat-Foen-Pi West Kalimantan (Borneo)	8	20	1936	Strict nature reserve. Important for the botany.
86	Padang Luwai Southeast Kalimantan	1,080	2,700	1934	Strict nature reserve, with aesthetical and scientific value.
87	G. Lokon North Sulawesi (Celebes)	100	250	1919	Strict nature reserve. 1450 m. high. Volcanic cone of Mt. Lokon.
88	G. Tangkoko Batu Angus North Sulawesi (Celebes)	4,446	11,119	1919	Strict nature reserve. Habitat of <u>Sus babirusa</u> , <u>Anoa depressicornis</u> and <u>Megacephalon maleo</u> etc.
89	Tanggala North Sulawesi (Celebes)	125	312.5	1936	Strict nature reserve for the science and aesthetics.
90	Fanua North Sulawesi	1,500	3,750	1938	Strict nature reserve for protecting of the <u>Megacephalon maleo</u> .
91	Mas Popaja Radja North Sulawesi	22.4	56	1939	Strict nature reserve for protecting of turtles.
92	Bantimurung South Sulawesi	10	25	1919	Geological monument. Maros-mountain with stalactitic caves, ravines, underground rivers. Fauna: <u>Buceros rhinoceros</u> , <u>Cynopithecus niger</u> , <u>Anoa depressicornis</u> , <u>Rusa spp.</u>
93	Napobalano South Sulawesi	9	22.5	1919	Strict nature reserve with aesthetical and scientific value.
94	Sangeh Nusa Tenggara	10	25	1919	Strict nature reserve. A "holy" forest with pahala trees ( <u>Dipterocarpus Hasselti</u> )

No.	Name	Total Area Hectares	Acres	Date Estab.	Explanation
95	Gurung Api Maluku			1937	Bird sanctuary. Habitat of several kinds of nesting sea birds: Sula spp. Terna species, <u>Oceano droma</u> spp.
96	Lorentz, Irian W. Irian	320,000	800,000	1937	Strict nature reserve for the natural science, rich in fauna and flora up to the snowbelt, 4700 m high.

Nature Parks

I	Penandjung West Java	457	1,142.5	1934	Nature park. Habitat of Bantengs and <u>Rafflesia patma</u> . Beautiful scenery.
II	Tjikepuh West Java	10,000	25,000	Res.	Habitat of banteng, deer, peafowl, junglefowl, turtle, tiger, panther and various kinds of birds. Beautiful scenery.
III	G. Pongonan (Telogo Semurup) Mid-Java			1940	Nature park. Rich in swamp-vegetation and avifauna.
IV	Telogo Warno- Telogo Pengilon Mid-Java			1940	Geological monument. Particularly picturesque sulphur-formations; unique trembling bogs of solfatars; swamp-flora with subfossil vegetation and avifauna.
V	Baluran East Java	25,000	62,500	1937	Nature park. Refuge for banteng, deer, tiger, panther, etc.
VI	Banjuwangi-Selatan East Java	62,000	155,000	1939	Nature park. Refuge for banteng, deer, tiger, panther, etc.
VII	Gunung Loser North Sumatra	416,500	1,040,250	1934	Nature park. Important for the natural science and aesthetics. Habitat of elephant, rhinoceros, deer, tiger, etc.



<u>No.</u>	<u>Name</u>	<u>Total Area</u> <u>Hectares</u>	<u>Acres</u>	<u>Date</u> <u>Estab.</u>	<u>Explanation</u>
VIII	Kluet North Sumatra	20,000	50,000	1936	Nature park. Important for the nature historical science and aesthetics.
IX	S.M. Langkat (Wilhelmina-keten) consisting of Sikundur Reserve Z. Langkat Reserve W. Langkat Reserve East Sumatra	213,285	534,962.5	1938	Nature parks for protecting orangutan ( <u>Pongo pygmaeus</u> ), elephant, serow, deer, tiger, tapir, ( <u>Tapirus indicus</u> ) etc.
		79,100	197,750	1938	
		82,985	217,462.5	1938	
		51,900	131,750	1938	
X	Berbak Mid-Sumatra	190,000	475,000	1935	Nature park for protecting of the South Sumatran Swamp forest with big game a.o. rhinoceros, tapirs, wild buffaloes, etc.
XI	Sumatera-Selatan I South Sumatra	356,800	892,000	1935	Nature park with <u>Dicororhinus sumatronsis</u> , elephants, deer, serows, tapirs, mouse-deer, Pigtailed Macaques ( <u>Macaca nemestrina</u> ) gibbons, etc. Habitat of <u>Rafflesia arnoldi</u> .
XII	Wai Kambas South Sumatra	130,000	325,000	1937	Rhinoceros and elephant refuge
XIII	Kota Waringin/ Sampit Southeast Kalimantan	350,000	875,000	1936	Nature park with at least three typical species of animals for Kalimantan e.g. the orang-utan, <u>Nasalis larvatus</u> and <u>bantenga</u> . Possibly: rhinoceros.
XIV	G. Palung Southeast Kalimantan	30,000	75,000	1937	Nature park for natural science and aesthetics
XV	S.M. Koetai Southeast Kalimantan	306,600	766,500	1936	Habitat of rhinoceros, Banteng, deer, etc.
XVI	Pati Mid-Sulawesi	1,500	3,750	1936	Deer refuge

<u>No.</u>	<u>Name</u>	<u>Total Area</u>		<u>Date</u> <u>Estab.</u>	<u>Explanation</u>
		<u>Hectares</u>	<u>Acres</u>		
XVII	S.M. Bali Nusa-Tenggara	20,000	50,000	1941	Particularly intended for the protection of the "white starling" ( <u>Leucopsar rotschildi</u> ), tiger, deer and ox indigenous to Bali.
XVIII	P. Rintja Nusa-Tenggara	15,000	37,500	1938	Nature parks for the protection of the giant monitor of Komodo ( <u>Varanus komodoensis</u> )
XIX	P. Padar Nusa-Tenggara	1,500	3,750	1938	Nature parks for the protection of the giant monitor of Komodo ( <u>Varanus komodoensis</u> )
XX	G. Rindjani Nusa-Tenggara	40,000	100,000	1941	Nature park with mineral springs containing carbonic acid. Flora: Photinia, etc., Fauna: Deer, mouse-deer etc.

IRELAND

All parks in Ireland are established by federal legislation. They are administered by the Commissioners of the Office of Public Works, subject to the direction of the Minister of Finance.

Bourn Vincent Memorial Park - 10,550 acres (4,220 hectares) in southwestern Ireland - established by the Bourn Vincent Memorial Park Acts of 1932. The park comprises a wooded area surrounding the Middle Lake, considerable farm and forest land, and a wide expanse of mountain terrain west of the Lakes of Killarney. The State farms the lowlands; pedigreed cattle are kept, and red and Japanese deer have been stocked in the area. Seasonal hunting by permit is allowed. Vehicular traffic in the park is limited to bicycles and hackney horse vehicles.

Phoenix Park - 1,752 acres (700 hectares) northeast of Dublin - established by the Phoenix Park Act of 1925. Completely enclosed by a wall, the park is maintained for recreation. A herd of fallow deer is maintained. Twenty acres are enclosed for an ornamental flower and water garden, and twenty acres are enclosed as a zoological garden. Facilities are provided for polo, and horse racing. There are numerous access points by road.

## ITALY

The four national parks of Italy were established under separate laws which are not particularly uniform. At present, the National Research Council is studying a system of general regulations which would incorporate all of the national parks in a general legal framework.

Abruzzi National Park - 29,160 hectares (72,000 acres), in central Italy, established in 1923. The park is situated almost in the heart of the Marsica region. Its territory, dominated by the high summits of Monte Marsicano (2,232 metres), Argatone (2,151 metres), Campitello (2,021 metres) and Monte Petroso (2,247 metres), consists of thick woodlands alternating with steep escarpments, rocks with deep caverns, and rugged crags. To the right and left of the road following the course of the Alto Sangro, which intersects it, the park presents a typical glacial landscape, with glacial cirques or ravines and common and pseudo-stratified moraines with a certain amount of erratic matter. The whole region abounds in Carsican phenomena and there are frequent gullies, such as those of Macchia Arvana (12 metres deep) and of Campolongo and Monte Cappella (22 metres deep).

The park's flora is extremely interesting, both because of the species peculiar to the region's mountains and because of the officinal plants found in it; in spring, the meadows and mountain slopes are covered by an infinite variety of flowers. Among the herbaceous species are: Rumex nepalensis, Saponaria bellidifolia, Alyssum rupestre, Ranunculus alpestris, etc.; among the tree species: the beech, the black pine of Villetta Barrea, the white pine, the yew and, in the lower zones, the oak, the bitter oak, the maple and the hornbeam.

There is a wealth of fauna, predominantly Alpine, but having special features due to the modifying influence of the environment. Of the most common species, the chamois (Rupicapra ornata), confined to the group of mountains between Opi, Civitella, Alfedena, Villetta Barrea and Settefrati, is easily distinguished from the Alpine species. The Abruzzi bear (Ursus arctos marsicanus) is likewise easily distinguishable from the Alpine bear. It is known that roebuck still live in the vast beech forests of the park. Four

species of mustelidae exist - the weasel, the polecat, the marten and the stone marten, of which the last three have become very rare. Two species of felines are found: the wild cat (extremely rare) and the lynx (still rarer, if not completely extinct); there are also the fox (in abundance), the badger, the otter (rare) and the wolf.

The park is managed by an autonomous semi-State body.

Circeo National Park - 7,445 hectares (18,400 acres), southeast of Rome, established in 1934. The main object of the government's action in establishing this park in the Pontine region (province of Latium) was the separation, for protective purposes, of a strip of the well-known maritime forest of Terracina from the rest of the area which was being reclaimed and cultivated. To that strip it was decided to add, for the preservation of flora, natural beauties and palaeontological and archaeological features, the whole of the Circeo promontory, after which the park was named. The Circeo extends like a long ridge from north-west to south-east, broken by picturesque clefts. This formation divides it into ten peaks or hills (highest altitude, 541 metres).

The park may be divided into three main floral areas: the first includes the State Forest of the Circeo, the second the Tumuleti "zone", and the third the Circeo massif. The first area - which is the largest - consists mainly of a forest of bitter oaks and broad-leaved oaks and a certain number of Mediterranean pines. The second area, covering the dunes of recent formation, is that, predominantly, of shrub specimens and some specially planted trees. The prevailing species are: Pinus pinaster, Acacia saligna, Juniperus sabina, Juniperus macrocarpa, and others. The third area is that of the vegetation covering the Circeo massif. It contains many botanical species, and is of special interest because it marks the extreme limits of Chamaerops humilis, which grows wild there.

The park's fauna was abundant before the reclamation project, consisting as it did of wild boars, foxes, badgers, porcupines, stone martens, martens, weasels, polecats, squirrels, hares and wild rabbits. Reclamation and settlement have reduced the animal population, which has to

some extent taken refuge in the State forest sanctuary. The sea-waters, and the lakes in the interior, abound in various kinds of edible fish.

The park is administered by the State Forestry Commission. There are two small towns in the park, and a considerable acreage within the park is in private or governmental ownership; about 25 per cent of the land is taken up by roads, canals and inhabited settlements. Thorough scientific study of the area is now under way by university professors. The park is accessible by motor transportation, and accommodations are available. A museum of anthropology and marine biology is planned.

Gran Paradiso National Park - 56,000 hectares (140,000 acres), in northwestern Italy, established in 1922. The park is situated in the centre of the great arc formed by the Graian Alps and the Apennines. The mountain ranges of the Gran Paradiso include some imposing peaks, more than 3,500 metres high and sparkling with glaciers which are among the most extensive in Italy. The basic formation of the area is a series of strata and banks of gneissic rock, partly of the gravel and augite type, and partly granitoid.

The flora of the park is typical of the Alpine zone, its chief characteristics being morphological and physiological peculiarities such as dwarf growth, creeping habits, the disproportion between hypogeous and epigeous development, the brilliance of the flower colorings, the frequent presence of special growths with protective functions, and the brevity of the growth cycle. Among the herbaceous plants are Artemisia, Achillea, Hieracium, Mathiola, Viola, Campanula, Androsace and Potentilla. Among the trees most represented in the park are the European larch, the red fir, the Siberian pine and the white pine.

The fauna includes all the species peculiar to the snow zone (from 4,000 to 3,000 metres high) and the Alpine zone (3,000 to 2,000 metres) of the Italian mountains. Only a few of the species typical of the lower Alpine zone (from 2,000 to 1,000 metres) are represented. Among the Ungulata are: the steinbock (Capra ibex) and the chamois; among the carnivora: the ermine, the weasel, the stone marten, the fox, the marten, polecat, badger, and, in the low-lying waterways, the otter; among the rodents: the graceful snow-mouse (chionomys nivalis Martins), the elegant dormouse, the marmot, the squirrel,

the Alpine hare and, on the southern slopes of the lower Alpine zone, the common hare; among the birds: the royal eagle, Alpine swift, mountain swallow, wall-creeping woodpecker, wren, water-ouzel, Alpine blackbird (Turdus alpestris) of the conifer woods; among the fish may be mentioned the trout and the bullhead.

There are a few small settlements in the park, and livestock is grazed in certain sections. There are several hydroelectric dams in the park, and some timber cutting occurs. Licenses for controlled hunting of chamois and ibex are issued as a means of biological regulation of the population in the absence of natural predators such as wolf and lynx. Considerable scientific research is undertaken, and important scientific publications have been issued. Shelters and camping sites are provided, and a few seasonal hotels run on a small basis. 390 km. of paths and trails have been provided. The park is administered by an autonomous body.

Stelvio National Park - 95,361 hectares (235,600 acres), in northeastern Italy, on the Swiss frontier, established in 1935. Geologically, the park exhibits a vast range of different formations, some of them clearly identifiable and others revealed by only the barest indications.

Various levels of vegetation may be distinguished in almost all zones. The lowest level consists of a belt of permanently cultivated land and meadows, with woods of limited extent. The tree species represented on this level are the birch, alder and Norway pine in the rocky areas where the soil is poor. Above this level is another of tall forests, consisting mainly of red fir and larches, often intermingling. Higher up is a belt of Siberian pine and larch, with the first species predominating as the altitude increases until there are only woods of pines which, however, become gradually more sparse until they are reduced to a few isolated specimens at the highest altitude (2,400 metres above sea level). Another even higher belt, which can be regarded as a zone of transition between the tree groups of the mountain levels and the Alpine pastures, is covered with shrubs including the green alder, rhododendron, a few willows, and myrtles. The final level is that of the high Alpine pastures, which is often found, in favourable conditions, at an altitude of 3,000 metres or over.

The majestic conifer forests and the vast crags under the glaciers have always been an ideal habitat for the larger species of wild animal life, including the stag, the chamois and the roebuck. Since the end of the war, the whole region has been gradually re-stocked, so that at present the stags number about 500, the roebuck more than 1,000 and the chamois about 100, in addition to which there are very large numbers of grouse, mountain pheasants and marmots. The brown bear appears from time to time and, very occasionally, the steinbock.

Alterations in the natural environment have been slight, except for the impoundment of several artificial lakes for hydroelectric purposes. A number of settlements are in the park and near its boundaries. 60 per cent of the land is private or communal property. Because of its scenic magnificence, the park receives a large number of visitors who use accommodations in the inhabited settlements and health resorts. It has been suggested that the boundaries be modified to join this park with the Engadine Park in Switzerland. The park is administered by the State Forestry Commission.



## JAPAN

The National Parks Law of 1931 set the precedent for the establishment of the national parks and quasi-national parks of Japan. The system includes nineteen national parks, embracing 4,364,516 acres (1,745,806 hectares), of which 63.1 per cent is land owned by the State, 16.7 per cent is owned by the prefectures, cities, towns and villages, and 20.2 per cent is privately owned.

These are areas of the greatest natural scenic beauty, administered by the National Parks Division in the Ministry of Health and Welfare. The Natural Parks Deliberative Council, comprised of scholars and appropriate governmental experts, advises the Minister of Health and Welfare on pertinent matters. Two non-governmental organizations, the National Parks Association of Japan and the Nature Conservation Society of Japan, co-operate with official agencies in an advisory capacity.

The quasi-national parks are administered by the local prefectures, in co-ordination with the Minister of Health and Welfare and the Council. They include about 525,000 hectares of scenic areas, of which 37.6 per cent is State-owned, 15.2 per cent is owned by the local governments, and 47.2 per cent is privately owned. A large proportion of the government land is under the Forestry Bureau.

In contrast to the situation in the United States, Canada and other countries where most or all of the land within national parks is owned by the federal government, the mixture of land-ownership in the Japanese national parks has led to a pattern of zoning. The parks are divided into special protection areas, special areas, and general areas, designated by the Minister of Health and Welfare. The Minister, and the Governor of the respective prefectures in the case of quasi-national parks, regulate the activities permitted within each category.

The special protection areas are those in which primeval conditions are maintained. Special areas preserve natural beauty whether it possesses the primeval character or not; these comprise the largest parts of the parks. Without permission of the Minister or Governor, building construction, mining, water development projects, livestock grazing, collecting of specimens, and other specified activities are prohibited in the special areas. General areas may be

used for agricultural, forestry or other purposes under less rigid restrictions, and visitor accommodations and recreational activities are contained in them.

Scientific research is carried out in national parks and quasi-national parks by staff members of the National Parks Division, by members of the Council, universities and others. Publication based on such research is issued by the National Parks Association of Japan.

Ten public and private museums have been established in the national parks, and exhibits are planned for installation in administration offices and ranger stations.

Guided field trips and lectures are presented to visitors, especially during the "Movement for the Communion with Nature" from 21 July to 20 August. The parks are easily accessible from centres of population, and some 30 million people visit them annually.

#### National Parks

Akan National Park - 87,498 hectares (218,745 acres), in eastern Hokkaido - established in 1934. The region is occupied by active volcanoes and the famous caldera lakes of Akan, Kutcharo and Mashu, and other mountain lakes and hot springs. Virgin conifer forests characteristic of caldera regions are mixed with rhododendrons, yezo azalea and birches. The spherical green Marimo weed (Aegagropila sauteri kützing), endemic to Lake Akan, is of scientific interest. Brown bears, squirrels, Ezo snow rabbits and other wildlife inhabit the park, which is also the home of the primitive Ainu people.

Aso National Park - 73,087 hectares (182,717 acres), in central Kyushu - established in 1934. Mt. Aso has a vast atrio or basin formed by the sinking of its crater, ringed with high mountains, and with five dormant and active volcanoes within the basin. To the north in the park, the Kuju volcanic block forms a gigantic plateau, with many peaks, abounding in alpine plants. Between the two mountain elevations stretches a grassland wilderness. Parts of the park are under cultivation, and the Aso basin supports a large human population which is dependent on the adjacent land for its livelihood.

Bandai-Asahi National Park - 189,661 hectares (474,153 acres), in Honshu-- established in 1950. The park is in three disconnected sections. In the north, the Mt. Gasson volcano dominates the Asahi range; Mt. Iida, in the central section, is a granite peak clad with virgin forests, and Mt. Azuma and Mt. Adatura are volcanic. Mt. Bandai, in the south, blew up in 1888 in a tremendous eruption, and produced some of the largest dammed volcanic lakes in the world. Broadleaved and conifer forests cover the mountain slopes, and bears, monkeys and antelopes (Capricornis crispus temminck) inhabit the Iida and Asahi areas. Several villages with cultivated lands are located on the plateaus near Mt. Bandai, and Lake Inawashire is a source of hydroelectric power.

Chichibu-Tama National Park - 121,600 hectares, (304,000 acres), northwest of Tokyo, - established in 1950. Sedimentary ranges, ravines, rivers and forests characterize this park, affording spectacular scenic vistas. Dense groves of dwarf bamboo carpeted with mosses are overtopped with virgin pine, and spruce fir forests. A number of villages are located within the park.

Chubu Sangaku National Park - 169,768 hectares (424,420 acres) in Honshu - established in 1934. Known as the Japan Alps, the towering peaks in this park, interspersed with beautiful gorges, are covered with verdant forests. On the summits, alpine flowers grow amid the perpetual snows. One Hundred mountain huts and trails serve alpinists, and campgrounds and excellent accommodations are provided. Skiing conditions are exceptional on some of the slopes.

Daisen National Park - 12,403 hectares (31,008 acres), on the central sea-coast of the Sea of Japan in the Chugoku District - established in 1936. Mt. Daisen is a conical peak rising 1,713 metres above sea level. Its lower elevations are covered with pine forests, above which stand virgin beeches, while the summit is heavily clad with snow. Many other mountains are in the park, and there are extensive grassy plains. As is true of other parks in Japan, there are important religious shrines here, and the beauty of their settings has been safeguarded by the shrine authorities. Mountaineering and skiing are popular sports, and good accommodations are available.

Daisetsuzan National Park - 231,929 hectares (579,823 acres), in central Hokkaido - established in 1934. This largest of the national parks protects the "roof of Hokkaido"; three large groups of volcanoes and part of the Ishikari mountain range. Vast alpine meadows stretch across the higher elevations, and the slopes are covered by virgin conifer forests of exceptional beauty. The landscapes formed by cliffs, gorges, lakes and waterfalls are famous. The Mt. Tokachi area contains the finest ski slopes in Japan. Yeso brown bears (Ursus arctos yesoensis) are numerous, and the rare crying hare (Ochotona hyperborea yesoensis) finds its only habitat in Japan here. There are a number of villages in the park.

Fuji-Hakone-Izu National Park - 94,814 hectares (237,035 acres), 60 km. west of Tokyo - established in 1936, enlarged in 1938 and 1955. One of the most beautiful symmetrical volcanic cones in the world, Mt. Fuji has been interwoven into the religious, social and artistic life of the Japanese since time immemorial. It rises 3,776 metres directly from the sea, surrounded by virgin forests, and five scenic lakes, while vast plains spread out from its base. The Mt. Hakone area includes several volcanic peaks, hot springs and rivers. The volcanic Izu Peninsula is noted for its hot springs. Mountain climbing (especially on Mt. Fuji), camping, boating, riding, golf and other recreational activities attract some 12 million people to this park, which has excellent accommodations.

Ise-Shima National Park - 52,036 hectares (130,090 acres), on the Shima Peninsula, Honshu - established in 1946. The peninsula and submerged coastline is bordered with an archipelago of beautiful islands, and the park is well-forested. The Grand Shrine of Ise has been the national centre of religious worship since early Japanese history. The adjacent bays are famous for their pearl farms. Boat excursions, fishing, hiking and riding are available, and accommodations are excellent.

Jo-Shin-Etsu Kogen National Park - 188,915 hectares (472,288 acres), 120 km. northwest of Tokyo - established in 1949. The Tanigawa mountain range in the northeastern section of the park is a terrain of rugged cliffs; to the south stretch plateaus and volcanoes, of which Mt. Asama is the highest active volcano in Japan today. The Mt. Myoko - Mt. Togakushi volcano

complex is reserved as a separate part of the park to the northwest. Hot springs are numerous. Forests of larches, white birches and other species cover the plateaus and lower slopes. Skiing and mountain climbing are exceptionally good here.

Kirishima National Park - 21,660 hectares (53,900 acres), in southern Kyushu - established in 1934. The park contains twenty-three volcanoes, some of which are active, others extinct with caldera lakes. Many hot springs occur. Dense evergreen forests grow on the slopes and large azaleas (Rhododendron kiusianum) are scattered here and there over the summits. Several important religious shrines are found here, with giant cryptomeria trees.

Nikko National Park - 110,698 hectares (351,745 acres), 100 km. north of Tokyo - established in 1934. Some of the most superb scenery in Japan is found in the Nikko volcano area, the great peaks interspersed with lakes and marshes, great forests of broadleaved trees and conifers, carpets of alpine plants, and an abundance of birds, mammals and colourful insects. Waterfalls are numerous. The Nasu area of active volcanoes rises in the northern part of the park. A number of temples are in the park, including the famous Toshogu Shrine. Except for the Oze region in the northwest, one of the largest high-elevation moorlands in Japan and which is maintained as a strictly primeval area, access by automobile is provided to scenic places through much of the park. A number of villages are located in the park, and Lake Chuzenji provides hydroelectric power.

Rikuchu Kaigan National Park - 8,614 hectares (21,535 acres), in northern Honshu - established in 1955. The park consists of 90 km. of Pacific Ocean coastline. The northern part is uplifted with 100-metre cliffs and rocky islands rising from the sea. The southern part is submerged, with cliffs 250-metres high sheltering sandy beaches. The area is covered with pines and deciduous trees, and forms the northern limit for subtropical flora. Birdlife is very abundant, and several of the small coastal islands have been designated as national monuments to protect their nesting.

Saikai National Park - 24,324 hectares (60,810 acres), in western Kyushu - established in 1955. The park includes a portion of dendritic submerged coastline and myriad small islands, facing the mainland of China. The Kujuku islands dot the serene waters and support a subtropical forest growth that has been protected for centuries. A larger island, Hirado Island, is hilly, affording magnificent scenic views. Offshore, the Goto archipelago presents unusual phenomena of volcanic geology, the principal features being protected within the park. Because of the number of good harbours, this region marked the sites of the first contacts between Japan and western civilization. The best way to explore the park is by boat.

Seto Naikai National Park - 65,910 hectares (164,775 acres) on the Inland Sea, off Hiroshima - established in 1934. The park includes about 600 islands and islets and part of the coastlands, providing spectacular seascapes. The islands were produced by intersected faults followed by volcanic activity. Tidal rapids flow in tremendous torrents through the four straits leading from the ocean to the Inland Sea, and violent whirlpools form in Naruto Strait. Fishing villages and terraced farmlands add to the picturesque scenery. Fine views are afforded from hills and peaks bordering the shore. A number of ancient religious shrines are centres of pilgrimage. Mt. Takasaki-yama is the habitat of about 450 Japanese monkeys. Many resorts are located in this area, and boat cruises are available. Swimming, fishing, hiking and camping are favourite forms of recreation.

Shikotsu-Toya National Park - 98,660 hectares (246,650 acres), in south central Hokkaido - established in 1949. A remarkably beautiful region of volcanoes and caldera lakes, this park is one of the most scenic areas in Japan. A number of the volcanoes have erupted recently, one, the Showa Volcano, having been created in 1944. Virgin conifer forests cover the park, the Yezo-spruce forest around Lake Shikotsu being especially impressive. Alpine flora is outstanding. The park is inhabited by brown bears, Yezo squirrels, Japanese sables, weasels and migratory birds. Hydroelectric power is generated in the park, and some agriculture occurs. Hot spring resorts attract visitors, and the park affords excellent mountaineering, skiing, boating and fishing.

Towada-Hachimantai National Park - 83,351 hectares (208,378 acres), in northern Honshu - established in 1936 and 1956. The northern section of the park includes Lake Towada, a famous double caldera lake of exceptional beauty, the headwaters of the scenic Oirase River, and the Hakkoda volcanoes. The lake and river are bordered by a magnificent growth of primeval deciduous forest, while the volcanoes are clad with dense conifers and alpine flora. The Hachimantai section embraces a range of striking volcanoes and a magnificent plateau, supporting virgin conifer forests, with many hot springs. Tourist accommodations are excellent, especially in the Towada section, and skiing conditions in the Hachimantai section are exceptionally good.

Unzen-Amakusa National Park - 25,600 hectares (64,000 acres), in western Kyushu - established in 1934. The northern Unzen unit of the park consists of the plateau of Mt. Fugen-dake and other volcanic peaks, with many hot springs, overlooking the Sea of Ariake. The area is noted for its azaleas, box-trees and deciduous forests. The Amakusa section is on an archipelago, a more gentle landscape, and contains a number of villages and historical relics of Christianity in Japan. Accommodations are good, and golfing, horseback riding, camping and hiking are favourite pastimes.

Yoshino-Kumano National Park - 55,378 hectares (138,435 acres), in southern Honshu - established in 1936. Mt. Yoshino rises in the northern end of the park, famous for its cherry blossoms and Yoshino Shrine. Southward extends the rugged Omine mountain chain and the great Mt. Odai-ga-hara plateau, with its dense forests, gorges and cascades. These are of sedimentary strata, rare in Japan. The Kamano Seacast is bordered by innumerable rocky islets of great beauty, and replete with historical interest. Due to its warm climate, this park is becoming increasingly popular among holiday-makers.

Quasi-National Parks

<u>Name</u>	<u>Location</u>	<u>Area</u>		<u>Date Established</u>	<u>General Characteristics</u>
		<u>Hectares</u>	<u>Acres</u>		
Abashiri	Hokkaido	37,412	93,530	1958	Coastline, with shallow lakes and dunes; arctic flora; seabirds; seals; relics of Ainu culture.
Akiyoshidai	Honshu	4,534	11,335	1955	Karst geology, with limestone caves and springs; primeval Choja-ga-mori forest. Guided interpretive service.
Ashizuri	Shikoku	5,543	13,858	1955	Coastal landscape, with islets, caves, reef coral; virgin evergreen forests; seabirds, monkeys.
Biwa-ko	Honshu	109,982	274,955	1950	Lake Biwa, largest fresh water lake in Japan, and surrounding region including Mt. Ibuki. Historical relics; large human population.
Genkai	Kyushu	9,710	24,275	1956	90 km. along Sea of Genkai, with beaches, pine groves; 20 islets; Itoshima Peninsula; historical relics.
Hakusan	Honshu	47,359	118,398	1955	Small volcanic peaks; gorges, waterfalls, fossil forests; bears, antelope ( <u>Capricornis</u> ) and other wildlife inhabit virgin forests; religious shrines, temples.
Ishizuchi	Shikoku	10,687	26,708	1955	Fault mountain range; scenic gorges and peaks.
Izu Shichito	Honshu	27,815	69,538	1955	Chain of active volcanic islands, with crater lakes, lava cliffs, cascades, hot springs, beaches, archaeological relics; zoological and botanical gardens. Local inhabitants in forestry, agriculture, and mining.



Quasi-National Parks

<u>Name</u>	<u>Location</u>	<u>Area</u>		<u>Date Established</u>	<u>General Characteristics</u>
		<u>Hectares</u>	<u>Acres</u>		
Kinko-wan	Kyushu	14,107	36,768	1955	Kagoshima Bay, Sakura-jima Island, and heads of peninsulas; one active volcano, caldera Lake Ikeda, hot springs; sub-tropical vegetation.
Kita-nagato-kaigan	Honshu	8,030	20,075	1955	170 km. along Sea of Japan, with 60 islets; varied geological features; virgin forests.
Kongo-Ikoma	Honshu	15,625	39,063	1958	Cretaceous sandstones and horst hills; natural beech forest; astronomical museum on Mt. Ikoma; ancient shrines and temples.
Mikawa-wan	Honshu	8,153	20,383	1958	An inland bay, and islets, with hills and dunes; monkeys, cormorants and other wildlife; shrines and temples; forests are commercially managed.
Minami Bo-so	Honshu	5,660	13,900	1958	Coasts of Boso Peninsula, Tokyo Bay; natural sea-beach botanical exhibits; habitat of <u>Ostichthys japonicus</u> , a species declared a national monument; aquarium and experimental forest.
Nichinan Kaigan	Kyushu	4,643	11,608	1955	Warm coastal area; with islets; sub-tropical plants; monkeys; wild horses on Toi-misaki Cape; botanical gardens.
Onuma	Hokkaido	9,469	23,673	1958	Active volcano and scenic lakes.
Sado-Yahiko	Sado Island, in Sea of Japan	49,030	115,075	1950	Unusual features of island vulcanism; natural forests.

Quasi-National Parks (continued)

<u>Name</u>	<u>Location</u>	<u>Area</u>		<u>Date</u>	<u>General Characteristics</u>
		<u>Hectares</u>	<u>Acres</u>	<u>Established</u>	
Sanin-kaigan	Honshu	8,939	22,348	1955	Eroded coast of Sea of Japan, with spectacular tunnels and cliffs, and sand dunes.
Sui-Go	Honshu	25,314	63,285	1959	Lower reaches of Tone River, with lakes, swamps, and varied flora; two religious shrines; bird refuge; agriculture practised.
Wakasa-wan	Honshu	14,825	37,063	1955	Seashore headlands and embayments and islets, with sea birds. Amanohashidate granitic gate is one of Japan's most famous scenic beauties; Five Lakes of Mikata; shrines and temples.
Yaba-Hida-Hikosan	Kyushu	108,809	272,023	1950	Adjacent to Aso National Park; complex scenic volcanic geology; religious relics; biological research laboratory.

In addition to the national parks and quasi-national parks, Japan has many other reservations to protect and administer natural features. There are 5 integral reserves, 141 geological reserves, 515 botanical reserves, 109 zoological reserves, 93 forest reserves, and 285 regions designated as wildlife sanctuaries, totalling 84,780 hectares (211,950 acres).

## KENYA

The Royal National Parks and National Reserves of the Colony and Protectorate of Kenya are established under the provisions of Acts and Ordinances dating from 1945. A total of 21,000 square miles are administered by the Trustees of the Royal National Parks of Kenya, who may appoint a Board of Management and personnel for the respective national parks and reserves. The annual administrative appropriation is £100,000, of which £30,000 is derived from visitor revenue, and approximately £8,800 is provided for development.

These reservations protect an extraordinary variety of scenery and fauna, and preservation of the wildlife species is their primary purpose. Economic development of adjacent lands, poaching (principally by Africans) which threatens to decimate a large proportion of the wild animals both within and outside protected areas in Kenya, and the complexities of the interrelationships between the native human population and wildlife, urgently require more adequate scientific research and information to provide successful management. A small Fauna Research Unit has been approved recently. The Trustees are concerned about the present insufficiency of staff, resources and funds for efficient administration, and the inadequacy of tourist facilities and accommodations.

In national parks, total protection of wildlife is the major objective. The Trustees exercise direct control. Except in the Nairobi Royal National Park, only park personnel reside permanently in any national park. Unless permission is granted under the authority of the Trustees, it is unlawful to possess any weapon, explosive, trap or poison; to kill or otherwise disturb any animal or nest; to set fire to or to cut any vegetation; to introduce any animal, including domestic animals, or vegetation; or to prospect or mine minerals in any national park. With the consent of the Legislative Council of the Colony and of the Trustees, the Governor may alter the boundaries of a national park.

National Reserves are a combination of forest reserves and game reserves in which no hunting is permitted. Although many are suitable for national park status, they cannot be so established because of prior or overriding claims of tribesmen who own or use the land. The Trustees have been granted complete or partial control or certain specific rights through which they endeavour to protect the fauna and flora in so far as possible within the requirements of the Provincial Administration and with recognition of legitimate human interests in the area. Effort is being made to design a method of providing more security for wildlife management in these areas.

### National Parks

Aberdare Royal National Park - 228 square miles in southwestern Kenya -

established in 1950. The park encompasses a high mountain zone, with dense forests, bamboo and moorland with a variety of alpine plants. It has an abundant population of elephant, buffalo, rhinoceros, bushbuck and other wildlife, including the rare bongo antelope. Fairly intensive human settlement, both native and European, surrounds the park on all sides. There is a main road from the northern to the southern side of the Aberdare Range which crosses a saddle at 10,508 feet, and subsidiary roads. The park is administered jointly with the Mount Kenya Royal National Park, fifty miles to the east with a joint staff of one Senior European Warden and thirty African Rangers.

Mount Kenya Royal National Park - 227 square miles in central Kenya on the

equator - established in 1949. It is dominated by Mount Kenya, which rises to an elevation of 17,040 feet and includes many glaciers, tarns and glacial moraines, while at the forest edge is a considerable zone of high moorland. The park boundary is on the 11,000 feet contour. Many rare and unusual species of alpine plants occur, as well as numbers of birds, small rodents, and other animals characteristic of higher elevations; large animals are not found. Although surrounded by native and European farming lands, the park is accessible only by foot and by animal transportation. Due to the activities of Mau Mau terrorists, it has been closed to the public for a long period. It is administered jointly with the Aberdare Royal National Park.

Nairobi Royal National Park - 44 square miles in southwestern Kenya near the city

of Nairobi - established in 1946. Most of the park is covered with open plains where grasslands alternate with tree savannah, the latter predominantly acacia. The western edge is somewhat thickly forested, and deep river valleys occur in the eastern portion. Elevations range from 5,000 to 6,000 feet. Although the park itself is not large enough to be a complete ecological unit and its wildlife populations depend for survival on the Ngong National Reserve contiguous on the south and west, it is one of the most famous places in Africa to see wildlife. Nine Somali families have a life right to reside in the park. The suburbs of Nairobi, including livestock pasturage to the east

and Masai land to the south, encroach closely on the boundaries. A resident staff of a European Senior Warden and an Assistant Warden, and thirty-four African Rangers is supplemented by a panel of honorary European Wardens. More than one hundred miles of roads serve the park. The park is closed at night and during April, May, November and half of December. No overnight accommodations are available. Educational publications are issued and conducted tours may be arranged. In 1958, 106,787 visitors used the park.

Tzavo Royal National Park - 8,034 square miles, in southeastern Kenya - established in 1948. The largest stronghold of wildlife in Kenya, the park protects a large and varied fauna, notably elephant, rhinoceros, hippopotamus, buffalo, and many species of antelope. It is semi-arid, with fairly dense brush, and two principal rivers. The elevation ranges from 2,000 to 7,000 feet, the western portion including a volcanic zone with many lava flows and cones. This zone contains the famous Mzimi Springs, where some fifty million gallons of water gush out daily from beneath a lava ledge, which provides a dramatic exhibit of hippopotomuses. The baobab is the largest tree in the park, and many varieties of euphorbia and acacia occur. Some of the several native tribes that live on all sides of the park represent a serious poaching menace which threatens the survival of wildlife not only here but in all of East Africa. The park is reached by main road from Mombasa, and 500 miles of roads lie within the park. Three safari lodges have been built. The park is closed at night and during April, May, November and December.

#### National Reserves

Amboseli National Reserve - 1,259 square miles on the central southwestern boundary of Kenya. - established in 1948. Mount Kilimanjaro, the permanently snow-clad loftiest peak in Africa, dominates the level volcanic ash plains of the reserve. The reserve lies at approximately 4,000 feet above sea level. The extremely arid landscape is interspersed by a series of swamps and springs which attract large concentrations of wild animals. The belts of acacia forest provide shelter. Films produced by motion picture companies have brought fame to this reserve. The Trustees have been granted certain specific

rights for the protection of fauna and flora, and have assigned a Senior European Warden, two Assistant Wardens, and eighteen African Rangers to the area. It is native land, vested in the Native Lands Trust Board and subject to the general direction of the Provincial Commissioner in charge. Being within the Masai Land Unit, the reserve is subjected to considerable pressure and competition for livestock water and grazing. Attempts are being made to educate the Masai regarding the virtue of wildlife preservation, and they receive a share of the reserve's revenue. Two roads lead to the reserve from Nairobi, and there are accommodations for forty visitors.

Mara National Reserve - 250 square miles, on the southwestern boundary of Kenya - established in 1950. Vast populations of wildlife range over open rolling plains, fringed on the west by a high escarpment, and broken by many rivers and streams. This is one of the most impressive pristine environments remaining in Africa. The reserve is part of the Masai Land Unit and is continually under dispute between the interests of domestic livestock and wildlife. Utilization of the ranges by livestock is drastically limited, however, by the presence of the tsetse fly and ticks carrying east coast fever. The Game Warden for the Southern Masai District supervises specific rights granted to the Trustees for the preservation of fauna and flora within the reserve. It can be reached only by a full safari, but a number of expeditions and scientific surveys have visited the reserve.

Marsabit National Reserve - 10,280 square miles in northern Kenya - established in 1948. The reserve was established to protect a varied fauna (which includes substantial populations of species not found in large numbers elsewhere in Africa) and to some extent the flora, especially on the mountain ranges. Among the notable animals are many reticulated giraffes, grevy zebra, and the northern race of ostrich. The semi-desert terrain is covered with thornbush, and is bisected by two ranges of mountains, the Matthews and Ndotos. In the far northeast the desert is broken by the volcanic Marsabit Mountain. Elevations range from 2,000 to 8,000 feet above sea level. There is very little rainfall, but the reserve includes a section of the eastern shore of Lake Rudolph. It is Crown Land over which several resident tribes have vested rights. There is constant competition between tribal

livestock and wildlife. The protective rights granted the Trustees are administered by a Senior European Warden, an Assistant Warden, and nineteen African Rangers. Two main roads lead to the reserve from Nairobi, and two lodges are available.

Ngong National Reserve - 455 square miles south of Nairobi - established in 1950. Established as an adjunct to Nairobi Royal National Park, the reserve is an essential migratory zone for the wildlife inhabiting the Park. Flat rolling plains studded with acacia trees rise in the west to the Ngong hills, from 5,000 to 8,000 feet above sea level. Part of the reserve descends into the Great Rift Valley to 2,500 feet. Few roads have been constructed, but one circling the Ngong Hills provides remarkable views of the Great Rift Valley. There are no accommodations for tourists. Like other reserves, it is subjected to pressure for grazing Masai cattle and for other forms of development. Protection of the fauna and flora is administered by the Warden and staff of Nairobi Royal National Park.

West Chyulu National Reserve - 145 square miles in northern Kenya adjoining Tsavo Royal National Park on the west - established in 1948. The Western Chyulu ranges are of relatively recent volcanic origin, and the scenery is particularly beautiful. The cinder and ash subsoil is covered by a lush growth of grass and belts of forest. Elevations range from 4,000 to 7,000 feet. There is no surface water, although rainfall is heavy in season. The population of large animals is not large and is migratory in character. While native pressures for livestock grazing are considerable, since it is within the Masai Land Unit, the land is not utilized extensively by cattle. There are no accommodations for visitors, and the reserve is not open to the public at present. A road is being constructed along the crest of the mountain range.

The Royal National Parks of Kenya include several areas of archeological significance.

Fort Jesus Royal National Park - protects a 17th century Portuguese fort on the Indian Ocean.

Gedi Royal National Park - protects one of the best ancient Arab ruined cities on the East Africa coast, built in the 13th century.

Olorgesaille Royal National Park - in the Great Rift Valley, the park preserves an outstanding middle Pleistocene living-site of hand-axe man, with his artifacts, and prehistoric animal fossils.



MALAYA

King George V National Park - 1,760 square miles in northeastern Malaya - established in 1938. The area includes Malaya's highest mountain (7,186 feet), a wide plateau with unusual plant formations, and many rivers and limestone outcrops. Most of the part is covered with dense tropical rain forest, which contains most of the Malayan fauna and many species of fish.

The park was established under the Pahang Enactment No. 2 of 1939, Kelantan Enactment No. 14 in 1938, and Trengganu Enactment No. 6 in 1938. Ownership of park land is vested in the states of Pahang, Kelantan and Trengganu. A Board of Trustees administers the park, with a Chief Game Warden in charge. No hunting or trapping of animals is permitted.

Access is by river in outboard motor-boats. There are many jungle trails, but most of the part is inaccessible to tourists. Accommodations for about thirty people are available, as well as guide services for all visitors.

Templar Park - 3,000 acres (1,200 hectares) in northwestern Malaya - established in 1955. The principal feature of the park is the limestone mass of Bukit Takun. There is good forest on the slopes. The low-lying land is mainly abandoned tin mine and rubber cultivation areas now covered with dense undergrowth.

The park was established as a Botanical Garden and Public Park by Gazette Notification No. 104 in 1955, and is administered by the Friends of Templar Park Committee under the chairmanship of the Minister of Rural Development. Access is by road.

## MAURITIUS

The National Reserves comprise portions of Crown forest lands set aside to preserve representative areas of upland indigenous climax forest. They were established under the Ancient Monuments Ordinance and the Ancient Monuments and National Reserve Ordinance of 1944.

A national reservation is "any forest, park, garden or other open space, the preservation of which is a matter of public interest by reason of the aesthetic, geological, historical, archaeological, or scientific interest attaching thereto."

### National Reserves

The National Reserves are administered by the Conservator of the Forest Department. Individual reserves are protected and maintained by the field staff of the Forest Ranges where they are located and under the direct care of the Forest Section Officers. Restoration of a pure association of indigenous plants, by eradication of all exotics, and maintenance thereafter in a natural condition, is being carried out under the supervision of the Assistant Conservator of Forests. The total area of all Reserves is 4,879 acres (1,983 hectares). The individual native forest types selected as National Reserves are suitable to mountainous terrain as a rule, varying in elevation from 800 to 2,500 feet.

Bel Ombre - 2,271 acres (919 hectares). The area contains intermediate montane high forest climax type, with ebony.

Cabinet - 44 acres (18 hectares). A montane dry forest type on steep slopes dropping into Tamarin Gorge.

Corps de Garde - 224 acres (91 hectares). Of complex floristic composition, the area includes exposed dry montane thicket forest.

Macabe and Mare Longue - 1,253 acres (507 hectares). The area contains an upland climax high forest on lateritic soils near Black River Gorges.

Ferrier - 4 acres (1.5 hectares). The Reserve contains upland wet forest types in marshy areas. Many species are endemic or of great rarity.

Petrin - 170 acres (69 hectares). The area contains exposed forest in the initial stages of succession, especially heath vegetation. Several endemic species of Pandanus occur in nearby marshy areas.

Pouce - 170 acres (69 hectares). Contains exposed upland thicket types on the slopes of Pouce Mountain.

Ste. Marie and Cocotte - 404 acres (164 hectares). The Reserve contains exposed upland wet forest climax type of mossy forest.

Round Island - 374 acres (159 hectares). Twenty miles southwest of Mauritius - established in 1957. The Reserve was set aside to protect endemic flora and fauna, including species peculiar to the Island, and a volcanic formation rising abruptly from the sea.

The Island is inhabited by: Tropical sea birds - Red-tailed Tropic-bird (Phaeton rubricauda), White-tailed Tropic-bird (Phaeton lepturus), Wedge-tailed Shearwater (Puffinus pacificus), and the Trinidad Petrel (Pterodroma arminjoniana), which breeds only in Trinidad and on Round Island. There are specialized flora, notably Mascarena revanhanii and also two snakes which may be considered living fossils, Bolyeria multicarnata and Casarea dussumieri, as well as six species of lizards, including Geckos phelsuma guentheri and Gymnodactyles serpensinsula and a number of insect species endemic to the Island.

A heavy toll of the bird population is taken by fishermen and goats and rabbits introduced to the Island have destroyed much of the indigenous vegetation. The Fisheries Officer of the Department of Agriculture, responsible for protection of the Reserve, is attempting to correct these problems. Access is by boat in calm weather.

MEXICO

Alejandro de Humboldt National Park - 1,080 hectares (2,700 acres) in Guerrero on the Pacific coast - established in 1936. The distinguishing features of the park are its landscape vistas, characterized by mountain slopes and peaks, cliffs and plains. Of special interest is the Cacalotenango waterfall. Access by motor.

Balneario de los Novillos National Park - 54 hectares (135 acres) at Villa Acuña in Coahuila near the United States border - established in 1940. It is a broad desert region and contains the only grove of trees within the area. A stream runs through the park. The communal lands of Ejido Las Cuevas are developed within the park, and federal irrigated lands are near the boundary.

Barranca de Cupatitzio National Park - 535 hectares (1,338 acres) in Michoacán in central Mexico - established in 1938. The Cupatitzio River has its source in the park. A notable topographical feature is La Rodilla del Diablo (The Devil's Knee). The subtropical vegetation, mixed with pines and coffee trees, provides beautiful landscapes.

Barranca de Chapultepec National Park - 26 hectares (65 acres) in Morelia - established in 1937. Land for the park was donated by individuals and the Municipality of Cuernavaca. Natural springs are the chief characteristics of the park, which also contains a nursery established by the Forestry Service.

Benito Juarez National Park - 2,700 hectares (7,250 acres) near the city of Oaxaca in southern Mexico - established in 1937. The park is the source of the Huayapan and San Felipe del Agua rivers, and has forests of natural beauty.

Bosencheve National Park - 15,000 hectares (37,500 acres) in the State of Mexico and Michoacán - established in 1940. Privately owned lands are contained within the park area. A lake and mountain peak, Laguna del Carmen and Cerro de Zacatones, are the principal features; pine forests abound.

Canon del Río Blanco National Park - 55,690 hectares (139,225 acres) in Veracruz - established in 1938. The Río Blanco has its source within the park, which contains forests characteristic of cold and temperate regions.

Cerro de las Campanas National Park - 58 hectares (145 acres) in Querétaro - established in 1937. The Cerro de las Campanas peak is a distinguishing feature of the park not only for its geographic characteristics but also because of its historical significance. It is the scene of the downfall of the second empire and the final triumph of the Republic and its reform laws.

Cerro de la Estrella National Park - 1,100 hectares (2,750 acres) in the Federal District of Mexico at Ixtapalapa - established in 1938. The park is distinguished by a promontory in the centre of the Valley of Mexico, and is reforested with eucalyptus trees.

Cerro de Garnica National Park - 968 hectares (2,320 acres) in the Municipality of Queréndaro - established in 1936. Pine forests and beautiful landscapes characterize the park. Cerro Mirador peak is a notable feature.

Cofre de Perote National Park - 11,707 hectares (29,268 acres) in Vera Cruz - established in 1937. The mountain Cofre de Perote in the park rises to 4,282 metres. On its slopes pine forests abound.

Coyoacán Historical National Park - 584 hectares (1,460 acres) in Coyoacán D.F. - established in 1938. This park was the seat of the colonial government of New Spain, which was established by Cortes before Mexico City had been founded, and contains buildings dating from that time. The area also has pre-colonial historical interest - it was the site of an Indian village, since buried by lava from Ajusco volcano. Another feature of outstanding interest is that the park contains Mexico's first large-scale tree nursery.

Cumbres de Majalca National Park - 4,774 hectares (11,933 acres) in Chihuahua - established in 1939. The irregular nature of the terrain is a park feature. A board composed of local citizens administers the park.

Cumbres del Ajusco National Park - 920 hectares (2,300 acres) in the Federal District of Mexico - established in 1936. Located in a cool climate zone, the park's distinguishing features are the mountain range that divides the Valley of Mexico from the Valley of Cuernavaca and Xitle Volcano. /...

- Cumbres de Monterrey National Park - 246,500 hectares (616,255 acres) in Nuevo Leon - established in 1939. The geological formation of the Sierra Madre Oriental Range is of principal interest; thick pine forests cover the mountain slopes.
- Desierto del Carmen National Park - 529 hectares (1,323 acres) in the Municipality of Toluca - established in 1942. The park contains vegetation characteristic of cold climates, and serves to protect the natural beauty.
- Desierto de los Leones National Park - 1,911 hectares (4,778 acres) near Mexico City - established in 1917. The park's main feature is the Convent of the "Carmelitas-Descalzos" (Barefoot Nuns), constructed in 1607 and now in ruins. The park belongs to the Federal District.
- El Chico National Park - 1,835 hectares (3,588 acres) in the Municipality of Mineral del Chico - established in 1898. The climate is mild, and there are thick forests of oyamel (Abies religiosa).
- El Cogorron National Park - 25,000 hectares (57,500 acres) in San Luis Potosí - established in 1936. The park is known for its springs, gorges and the Aerolito Dam.
- El Potosí National Park - 2,000 hectares (5,000 acres) in San Luis Potosí - established in 1936. The park is characterized by numerous mountains that give rise to many streams.
- El Sabinal National Park - 7 hectares (18 acres) in Nuevo Laredo near the United States border - established in 1938. Forests of cypress are to be found in the park.
- El Sacromonte National Park - 10 hectares (25 acres) just north of Mexico City - established in 1939. The park's principal feature is a monument-temple dating from colonial times.
- El Tepeyac National Park - 1,500 hectares (3,750 acres) in the Federal District - established in 1937. The park has eucalyptus groves and a partial view of Mexico City.
- El Tepozteco National Park - 24,000 hectares (50,000 acres) a short distance south of Mexico City - established in 1937. The park protects archaeological treasures of the region, and also protects the natural features.

Fuentes Brotantes de Tlalpan National Park - 129 hectares (223 acres) in Tlalpan, D.F. - established in 1936. Principal feature of the park is the presence of many springs throughout the area.

Grutas de Cacahumilpa National Park - 1,232 hectares (3,080 acres) in Guerrero - established in 1936. The caves constitute the principal feature of the park, the "Grande" (Great Cave) and "Chica" (Little Cave) having underground formations that are known throughout the world. The source of the Amacuzao River is found in the park, and the terrain is mountainous.

Insurgente Miguel Hidalgo y Costilla National Park - 1,836 hectares (4,590 acres) in the municipalities of Ocoyoacac and Cuajimalpa, D.F. - established in 1936. This area was the scene of one of the early battles of the war of independence. The park abounds in springs, and there are oyamel forests in this region of mountainous terrain and occasional open plains.

Iztaccíhuatl-Popocatepetl National Park - 25,679 hectares (64,198 acres) in the states of Puebla, Morelos and Mexico - established in 1935. The principal features of the park are two extinct volcanoes rising to over 5,000 metres. Their wooded slopes abound in scenery of extraordinary beauty and are popular hiking and mountain climbing areas.

Jose Maria Morelos National Park - 1,803 hectares (4,508 acres) in Morelia - established in 1939. The park contains extremely mountainous and hilly terrain, with many springs.

La Malinche National Park - 39,426 hectares (98,665 acres) in Tlaxcala and Puebla - established in 1938. La Malinche is the mountain that is the main feature of the park. The vegetation is characteristic of cold climates.

Lago de Camécuaro National Park - 14 hectares (44 acres) in the Municipality of Tangancícuaro - established in 1940. There are many springs in the park, as well as beautiful stands of cypress.

Lagunas de Chacahua National Park - 14,187 hectares (35,468 acres) on the Pacific coast in Caxaca - established in 1937. Noted principally for its lagoons, the park borders an area that was once the centre of the Mixtec Kingdom at the time of the Conquest.

Lagunas de Zempoala National Park - 4,790 hectares (11,975 acres) in Morales - established in 1936. Chiefly noted for its lagoons, the park contains coniferous pines and meadows.

Los Remedios National Park - 358 hectares (975 acres) in the Municipality of San Bartolo - established in 1938. The park contains eucalyptus groves planted to reforest bare ground suffering from erosion.

Los Mármoles National Park - 23,500 hectares (58,750 acres) in Hidalgo - established in 1936. The park includes San Vicente Canyon and Tengandó hill.

Lomos de Padierna National Park - 670 hectares (1,675 acres) in the Federal District - established in 1938. The park was established to conserve the scene of a famous battle of the North American Intervention. It includes a gorge, canyon and mountain.

Molino de Flores National Park - 49 hectares (123 acres) in the Municipality of Texcoco - established in 1937. The park preserves historical monuments, such as the Bath of Metzhualcóyotl, chapels and historical buildings; as well as the forest of the area. The Coxcacuaco River flows through the park.

Nevado de Colima National Park - 22,000 hectares (55,000 acres) in the municipalities of Guzmán City and Cauauhtémoc - established in 1936. Its principal feature is an active volcano; there are two zones of vegetation ranging from the subtropical lower region to the pines and evergreen oaks of the higher slopes.

Nevado de Toluca National Park - 67,000 hectares (167,500 acres) in the Municipality of Zinacantepec - established in 1936. The principal topographic feature is the Nevado de Toluco Mountain with an altitude of 4,570 metres, with beautiful lagoons in its extinct crater. Forests of pine and oyamel are found on its slopes.

Pico de Orizaba National Park - 19,750 hectares (49,375 acres) in Puebla and Veracruz - established in 1936. The park contains Mt. Orizaba (altitude 5,700 metres), the highest peak in Mexico; there are some trees of great size on the slopes.



Pico de Tancítaro National Park - 29,316 hectares (73,290 acres) in Michoacán - established in 1940. The park contains an old volcano which has a shower of lava dust around its base.

Rayón National Park - 34 hectares (85 acres) in Michoacán not far from the Pacific coast - established in 1952. The park site was the battlefield where the Rayón brothers fought in the War of Independence. El Gallo mountain is one of its principal features.

Sierra de San Pedro Mártir National Park - 63,000 hectares (137,500 acres) in Baja California - established in 1947. There are several streams and gullies in the park; also the San Pedro mountain ridge.

Xicotencatl National Park - 800 hectares (2,000 acres) northeast of Mexico City - established in 1937. The park serves to protect historical monuments, particularly the convents and temples of Tlaxcala and its surroundings. Reforestation is one of the purposes of management.

Zoquiapan National Park - 10,000 hectares (25,000 acres) in the State of Mexico - established in 1930. There are pine forests and mountainous terrain in the park.

MOROCCO

National Parks

There are two national parks in Morocco which are administered by the Forest Service.

Tazekka National Park - 580 hectares (1,450 acres), located 21 km from the town of Taza, established in 1950. The park comprises the high area of the Jbel Tazekka Mountain, rising to 1,979 metres in the Middle Atlas Mountains. The Park receives a high rainfall due to condensation and is covered with forest, including a stand of Atlantic cedars and other interesting plants. While some grazing and taking of wood occur, the small size of the area permits good enforcement of regulations. Wild animals are well protected also because the Park is included within a game reserve. Access is by motor transportation. The Taza tourist office assists in the administration of the Park.

Toubkal National Park - 36,000 hectares (90,000 acres), 60 km south of Marrakech, established in 1942. The Park comprises an area of the High Atlas Mountains with several high peaks over 3,500 metres, including Mt. Toubkal at 4,167 metres. The flora consists mainly of scrub forest and juniper at the higher altitude, a forest of old live oaks, and many interesting endemic plant species. Fauna include squirrel, mouflon, mountain gazelle, porcupine and endemic lake trout. Despite regulations, nomadic shepherds bring in their flocks which cause overgrazing. The edge of the Park is accessible by motor transportation, but only trails are contained in its boundaries. The Office du Tourisme and private groups assist in building trails and refuges.

Reserves

Derousa Reserve - 200 hectares (500 acres). The phytogeographic area contains a forest which is preserved as a reminder of natural arid condition in a now irrigated plain. It is a total reserve which is within a National Forest. The Reserve is administered by the Forest Service in collaboration with scientific organizations.

The Administration of Forests and Water has recently established numerous forest reserves where afforestation of indigenous trees is being undertaken as well as reserves for the reclamation of dune and drift sand areas. Fishing is prohibited in certain sectors and encouraged in others, and hunting is only allowed during specified seasons.

Historical Monuments or sites

Feni-Mellal, contains olive trees

Lake Sidi-Ali, the site around the Lake includes an old stand of cedars

Marrakech, contains palm groves .

Sidi-el-Messhour, contains the sacred forest

## NEW ZEALAND

The National Parks Act of 1952 provides that upon the recommendation of the National Parks Authority to the Minister of Lands, the Governor-General may, by Order-in-Council, declare certain types of land to be a national park. Boundaries may be altered only by a similar Order-in-Council upon the Governor-General's hand. There is a provision for compulsory acquisition of private lands, if other negotiations fail.

The National Parks Authority is responsible for the over-all administration and control of all parks, operating within the framework of the Lands and Survey Department.

### National Parks

#### North Island

Egmont - 80,976 acres (32,390 hectares), established in 1900. The park contains one of the world's most symmetrical mountains, Mt. Egmont, sacred to the Maori people. There are dense subtropical forests, a sphagnum moss swamp, and fine waterfalls. Vegetation from sea level to snow line can be found within 20 miles or less. There are some endemic birds (kiwi, rifleman, fantails, etc.) and prolific insect life. Access is by road, with hiking trails and good skiing available. There are 14 ski huts and hostels available.

Tongariro - 161,552 acres (64,620 hectares), established in 1894. The first of New Zealand's national parks, it contains three active volcanoes, native forests, treeless plains covered with native tussock, and Ruapehu, the highest mountain on North Island, with small glaciers. Its basin contains Crater Lake, which normally is hot. Access is by road. There are public and private huts and lodges, and facilities for skiing, golf, tennis and bowling, as well as clearly marked hiking trails.

Urewera - 455,410 acres (182,124 hectares), established in 1954. Largely undeveloped, the park includes mountain ranges, impressive bluffs and waterfalls, and dense virgin forest. Fauna includes the kiwi and other bush

and fresh-water birds. Excellent fishing is available in Lake Waikareiti, which is Maori-owned and not a portion of the park, although surrounded by it. Access is by boat and tracks. A hotel has been built on the lake.

Westland - 328 square miles, established in 1960. The area contains dense native forests, glaciers, lakes, and the western slope of the Alpine Chain, rising from sea level to over 11,000 feet. Access is by road, and walking tracks are available.

#### South Island

Abel Tasman - 43,059 acres (13,223 hectares), established in 1942. The park contains coastal and elevated country along the shores of Tasman Bay, and some small off-shore islands and reefs. Most of the park is covered with virgin forests, and has golden sand beaches. Access is by road and boat, and some camping facilities are provided.

Arthur's Pass - 239,152 acres (95,660 hectares), established in 1929. This is a portion of the Southern Alps with virgin forests, glaciers, and the headwaters of the Waimakariri and Otira rivers. The park contains a wilderness area of 29,990 acres (11,996 hectares) where no buildings or ski tows may be erected, no horses or vehicles of any kind permitted, and no roads, tracks or trails except foot paths shall be constructed, in accordance with the National Parks Act. Bird life includes the kea or mountain parrot and the large grey kiwi. Access is by road and rail. Ski tows and huts are available.

Fiordland - 2,922,853 acres (1,169,141 hectares), established in 1952. The park is known for its mountainous forests and fiord-indented coastline, numerous waterfalls, lakes and rivers. The lower mountain slopes are covered with virgin forest. The area is the only remaining habitat of the flightless rail or takahe (Notornis mantelli), until recently believed to be extinct, of which fewer than 100 exist, and the rare kakapo (Strigops habroptilus), a semi-flightless parrot. The park contains the greatest

number of characteristic New Zealand birds, and seals are becoming increasingly numerous. Access is by road, airplane, and boat. Two hotels and many camping sites are available.

Mt. Cook - 172,979 acres (69,191 hectares) established in 1953. The park contains a portion of the Southern Alps with 17 peaks above 10,000 feet, many glaciers (including the 18-mile long Tasman Glacier), montane scrub and alpine growth. It was established to provide recreational facilities as well as protection of natural features. Access is by road and airplane. Many private and park huts, good skiing and mountaineering are available.

Nelson Lakes - 139,836 acres (55,934 hectares), established in 1956. The park contains two lakes surrounded by mountainous country covered with dense virgin forest. Access is by road. Boating, fishing and skiing facilities are available.

#### Other Areas

In addition to the National Parks, in 1959 there were 967 scenic and historic reserves, totalling 855,139 acres (342,056 hectares). The following bird sanctuaries have also been established:

Little Barrier Island - 6,960 acres (2,784 hectares)

Cape Kidnappers' - 32 acres (12.4 hectares), gannet colony

Kapiti Island - 4,300 acres (1,720 hectares)

White Heron colony at Westland - 1,910 acres (764 hectares). Also habitat of royal spoonbills.

NORTH BORNEO

Kinabalu Memorial Forest Reserve - in north-western North Borneo, established in 1958. The Reserve comprises a sloping area (elevation ranging from 6,000 to 13,455 feet) of Mt. Kinabalu and contains all the transitional stages of mountain flora from equatorial forest to rock. The Governor in Council established the Reserve under the Forest Ordinance and is responsible for its administration through the Conservator of Forests. Routine inspections are carried out by Forest Department personnel; no field personnel are assigned to the area. The management objective is the preservation of the unique flora. Inhabitants of specified villages may remove forest products. It is hoped that research will be carried out by the Forest Department and other sources. The Reserve is accessible by motor transportation from Jesselton and a government house at Ranax.

NORWAY

There are no national parks in Norway. However, areas are set aside to achieve the essential purposes ascribed to a national park; the most important of these areas are included in this list. They are administered by the Directorate for State Forests. Oslo, with the exception of Borrehaugene and the Rød Forest which are administered by the University of Oslo.

Borrehaugene - located at Borre, Vestfold County.

The Gutulia Area - 800 hectares (2,000 acres), located near Femund Lake, Hedmark County, contains primeval forests of Norway pine, marshes and moors.

The Ormtjernkampen Area - 450 hectares (1,125 acres), located at Gausdal, Oppland County, contains spruce, fir, primeval forest and moors.

The Pasvik Valley Area - (boundaries not yet established). Located at South-Varanger, Finnmark County, contains Norway pine primeval forests.

The Rød Forest - 35 hectares (88 acres), on Tjøme Island, Vestfold County, contains conifer forest, hardwood forest, foliferous brushwood and coast vegetation.

The Vaggetem Area - 500 hectares (1,250 acres), located at South-Varanger, Finnmark County, contains pine-barrens.



POLAND

National parks in Poland are established under the Nature Protection Act of 1949 by ordinances issued by the Council of Ministers on the recommendation of the Minister of Forestry. Adjustments in their boundaries or legal status, are made by legislative acts of the Council of Ministers. They are administered by Superintendents subordinate to the Nature Protection Board of the Ministry of Forestry, and staffs of Vice-Superintendents, museum specialists, wardens and other field personnel. The national park budget for 1959 was 11,680 zł (\$486,666).

According to the state of the forests, some parts of the national parks are given strict protection to preserve wildlife and natural features in their completely original state, or partial protection is given under management to restore original natural conditions by appropriate cultivation and protective practices. Under these policies, hunting, fishing, capturing of killing wildlife, destroying or removing vegetation, mining, and other practices may be prohibited.

Scientific research is being carried out by many institutions headed by the Polish Academy of Sciences. Some national parks contain permanent research stations subordinated to the Scientific Institutes. Scientific and popular reports and leaflets are issued to arouse public interest in the national parks and nature protection programme.

National Parks

Babiagóra National Park - 1,642 hectares (4,105 acres), in southern Poland, protected since 1924, established as a national park in 1954. The park was established to preserve all natural features of high mountain scenery in the most southwardly extending mountain range of Western Beskid. The Western Beskid is the second highest mountain range in Poland, the Tatra mountains being the highest. The park includes the mountain range of Babia Góra with its highest summit of 1,725 metres (4,105 feet). An area of 970 hectares is under strict protection; the remaining part of the area is under partial protection. The mountain range of Babia Góra consists of sandstone which is easily decomposed by erosion. The well-preserved forests include fragments of the ancient Carpathian Forests, which are of great

scientific importance. There are no villages within the park or in the near vicinity. 1,520 hectares of total park area is owned by the Government, and 122 hectares belong to private owners living in the surrounding villages. No other protected area is contiguous to the Polish side of the park; along the State frontier with Czechoslovakia the adjacent territory is to be protected. Access is by railroad and bus, and travel in the park is restricted to foot trails. A botanical museum is being prepared. In the vicinity of the park is a shelter house accommodating sixty persons, and there are three campgrounds.

Bialowieza National Park - 5,073 hectares (12,683 acres), in northeastern Poland, protected since 1919, established as a national park in 1947. The park was established to preserve the fragment of primeval lowland forest unique in Europe. 4,716 hectares of the area is under strict protection; the remaining part is under partial protection. Mixed forests of completely virginial character cover the central part of the forest territory of the Puszcza Bialowieska. The forests of the park display varied natural forms and species of forest associations ranging from pine forests, numerous mixed forests, to typical marsh associations. The most characteristic forest type of the park is Carpinetum in which hornbeam (Carpinus betulus) is the main tree and the constituent of the lower wood storey. In higher storeys of the forests appear, besides the huge spruces, deciduous tree species. The abundance of tree species in the multi-layered lower storey of forests, as well as that of shrub undergrowth, is very great. The rich variety of the ground vegetation; with its many species under strict protection, is outstanding. Because of being excluded from forest management practices, the park forests constitute splendid habitat for wildlife. This includes the rare European Bison (Bison bonasus), elk (Alces alces), and tarpan horse (Equus caballus). Attempts are made at present to reintroduce the bison in a free state in its formerly original forest domains. Birdlife is abundant. There are no villages within the park area, and all of the area is owned by the Government. The park extends partly along the eastern boundary of the State Reserve on the territory of USSR. In the park are a botanical garden and museum and a

research station of the Virgin Forest Investigation Department of the Polish Academy of Sciences. The park is served by railroad, and tourist travel in the park is by trail with guides. Accommodations for 300 persons are available.

Holy Cross Mountains National Park - 6,054 hectares (15,135 acres), in southeastern Poland, protected since 1932, established as a national park in 1950. The park comprises the entire mountain range of Lysogóry, which is the highest chain of the Holy Cross Mountains. The range is composed of quartz and soft upper cambrian slate and is in the class of the oldest mountains in Europe. The main species of the forests are fir, beech, and spruce. Many virgin stands of these species are preserved, with a natural stand of Polish larch (Larix Polonica). Rocky dispersions denuded of forest cover occur in the forests and are a peculiarity of the area. Cultivated fields belonging to the inhabitants of surrounding villages are contiguous to the park boundaries, and there are some enclaves in the midst of the park. The park museum displays many flora and fauna exhibits and a geological survey of the region. The park is accessible by motor transportation; a highway leads across the park. Accommodations are available.

Kampinos National Park - 40,684 hectares (101,710 acres), in the immediate vicinity of Warsaw, including a protected zone of 18,500 hectares (46,250 acres), established in 1959. The park contains a dune area which is covered with forests and situated in the fork of the Vistula and Bzura Rivers. The remainder of the original forest (Puszcza Kampinowska) is located in the park as well as many natural features that are protected for their scientific and historical values. Parabolic dunes are characteristic features of the area. Elk have been reintroduced into the park. Two rare birds, the grey heron (Ardea cinerea) and the crane (Megalornis grus) nest in the area. The remains of prehistoric dwellings, national memorials, and a cemetery are contained in the park. 18,500 hectares (46,250 acres) of park land is in private ownership. There are thirty villages in the protected zone. A field station of the Institute of Ecology

of the Polish Academy of Sciences has been established in the park, and a museum is being organized. Many roads and trails are provided, and a shelter house is in the vicinity.

Karkonosze Mountains National Park - 5,509 hectares (13,773 acres), in southwestern Poland, established in 1959. The park extends on the northern slope of the ancient mountain chain of Karkonosze which rises to 1,604 metres (3,818 feet). The chain is composed of granite, with rounded summits due to erosion. Features of the area include post-glacial rocky cirques, erosion forms, high mountain lakes, and waterfalls. The climate of the mountains is especially severe. Associations of alpine flora are represented among the characteristic mountain plant zonations. The components of the forests are beech (Fagus silvatica), fir (Abies pectinata), spruce (Picea excelsa) and others. The ruins of a Slavonic castle of the Middle Ages is located on a summit. The park adjoins the southern slopes of Karkonosze mountains at the National Border; this area will presently be turned into a Czechoslovakian national park. The park is accessible from railway stations and by motor transportation. The area contains numerous motor roads and trails. Accommodations are available.

Ojców National Park - 1,440 hectares (3,600 acres), in northern Poland, protected since 1925, established as a national park in 1955. The park contains the deep and picturesque valley in jura formations of the Pradnik River and its affluent Saspówka, with steep banks rising to sixty metres. The area is covered with forests that include fragments of beech and beech-fir forests as well as maple, the latter being very rare. A special reserve (.10 hectares, or .25 acres) contains the only stand of the endemic birch of Ojców (Betula oycoviensis). Vegetation relics of the warm post-glacial period have been preserved. Rare plants (associations of kserothermic vegetation) are present due to the micro-climate of the valley, e.g. (Prunus fruticosa), (Stipa pennata), and others. The characteristic rock forms include vertical obelisks, pylons, cliffs, and many caves inhabited by bats. One village is situated in the park. The park is accessible by motor transportation and a highway runs through the area. Accommodations are available.

Pieniny Mountains National Park - 2,232 hectares (5,580 acres), in southern Poland along the Czechoslovakian frontier, protected since 1921, established as a national park in 1954. The park was established to protect an area of river breaking through the mountain chain characterized by its great natural value and scientific significance and the beauty of the scenery. 650 hectares are under strict protection, the other part of the area is under partial protection. The park area comprises the mountain chain of Pieniny with its highest summit Trzy Korony. The area is especially interesting because of the canyon of the Dunajec River breaking through the gorge in Pieniny. The precipitous rocky slopes of the mountains are covered with exceedingly well mixed forests with a rich composition of plant associations. The Pieniny mountains are built of hard limestone. The Dunajec River when breaking northward through the mountain gorge displays a picturesque scenery with fantastic cliffs. Peculiar to the park are the endemic plants Panacetum zawadzkii and Juniperus sabina. The fauna of Pieniny mountains, represented by numerous species of animals, is also very rich. An interesting species of insect (Parnassius apollo) appears only in the Pieniny area. Attractive features of the area are the ruins of castles crowning the summits of craggy rocks. There are no villages within the park area. Access is by rail and bus. A special attraction is the opportunity for punting on the Dunajec River through the Pieniny gorge. A museum has been constructed in the park. Near the park is a shelter house accommodating 100 persons.

Tatra Mountains National Park - 21,556 hectares (53,890 acres), in northern Poland, established in 1954. The park comprises the Tatra Mountains which is the highest rocky part of the Carpathian mountain chain. The core of the Tatra mountains is granitic, with associated sedimentary formations. There are many lakes, caves, precipices and picturesque valleys. The area is covered with typical highland forests of fir, beech, and spruce mixed with maple and larch. The upper forest region contains mountain pine (Pinus montana) and associations of alpine flora. The Tatra forests are virgin only in some parts. Pinus cembra is peculiar to the park. Wildlife

includes the ibex, marmot and bear. 11,295 hectares (28,238 acres) are in private ownership. The grazing of cattle and sheep on a portion of the private land as well as the various uses of State forests for the benefit of local inhabitants causes difficulties in the preservation of natural features. The park is in close proximity to the Czechoslovakian National Park along the State frontier. A Regional Tatra Museum with natural history exhibits is situated in Zakopane. The park is accessible by motor transportation, and a highway and trails are located in the park. Accommodations are available.

Wielkopolski National Park - 10,309 hectares (25,773 acres), including a protected zone of 5,600 hectares (14,000 acres), in northwestern Poland, established in 1957. The park contains a characteristic moraine area of forests and post-glacial, gutter lakes situated on the border of the original bed of the Warta River. The area is covered with mixed forests, the composition of which was changed by mismanagement. The main species is pine (Pinus silvestris) with a small admixture of spruce (Picea excelsa) and deciduous species. Some small fragments of virgin forest with oak (Quercus pedunculata) have been preserved. The vegetation of lower layers has preserved its typical elements of mixed forest and is composed of many rare species under protection. Many rare species of wildlife inhabit the area. The park is a recreation centre for the nearby town of Poznań. The inhabitants of surrounding villages own 166 hectares (415 acres) in the park. An Ecological Station of the Research Institute of Forestry and a botanical museum are located in the park. The park area is accessible by several train stations and a network of motor roads. Accommodations are available.

REPUBLIC OF GUINEA

Monts Nimba Strict Nature Reserve - 13,000 hectares (32,500 acres), on the international boundaries with Liberia and the Ivory Coast, established in 1944. The reserve was established to protect all the natural resources of the part of the Monts Nimba mountain chain within Guinea. The range rises to 1,752 metres, and is a magnificent wilderness area. The lower slopes, up to about 500 metres, are covered with native forests, the upper heights being covered with meadows. This reserve, with Mt. Kenya, is the only known habitat of the very rare viviporous toad Nectophrynoides, the species here being occidentalis and occurring in the high meadows above 1,000 metres.

The boundaries of the reserve are completely closed; there are no human habitations in it, and entrance for accredited missions is granted by the Director of the Institut National de Recherches et de Documentation de la République de Guinée, which administers the reserve and a scientific research station there.

An allocation of 700,000 Guinea francs has been provided by the Administrative Region of N'Zérékoré, and the International Union for Conservation of Nature and Natural Resources has contributed 847,191 Guinea francs. A Government appropriation of 250,000 Guinea francs was budgeted for 1960.

A Superintendent and thirty-five guards supervise the reserve and research station.

## SARAWAK

The one national park in Sarawak was established under the National Parks Ordinance of 1954 by proclamation of the Governor in Council and the Resident of the District. Boundaries may be altered in the same manner. The Sarawak National Parks' Trustees are empowered to administer national parks and to appoint a Board of Management for specific areas. The objective is to maintain the area as a nature reserve in as natural a condition as possible. Mining, grazing, destroying or injuring fauna and flora and similar exploitation is not permitted without special permission of the Trustees.

Bako National Park - 10.3 square miles on the coast of Sarawak near Cape Po, established in 1957. The Park is bounded on three sides by coastlines of sandy bays and small coves, most of which are backed by bold sandstone cliffs. Although the Park is nearly all forest, the highest point being 800 feet, considerable stretches of open country (padang) occur and many parts afford wide panoramic views. A considerable variation in the sandy soil is associated with an equally wide variation in the vegetational types. Mammals include wild pig, mouse deer, several species of monkey and gibbon. There is a fair selection of birds, including migratory waders along the shore. The inhabitants of a nearby village are permitted to remove poles from a small strip along the sea coast. The Park boundaries adjoin the Bako Communal Forest (3.4 square miles) which is utilized for forest products.

Field personnel consists of two Malay park rangers. The funds for 1959 were \$M15,000 (\$4,950). Research is carried out by independent scientists, forest personnel, and the Curator of the Sarawak Museum. Details concerning the research are published in the Annual Report of the Trustees. The Park is accessible by water transportation. There are no roads in the park. A rest house, foot trails and guided tours by park rangers are available.



SINGAPORE

Nature Reserves

There are five nature reserves in Singapore, which were given legal status under the Nature Reserves Ordinance No. 15, of 1951, that prescribe the purposes as: the propagation, protection and preservation of indigenous fauna and flora; the preservation of objects and places of esthetic, historical or scenic interest; and study of and research into matters relating to the fauna and flora in their natural environment. The reserves are managed by a Board of Trustees under the chairmanship of the Director of Botanic Gardens. Field personnel consist of four rangers and nine labourers. A separate staff of rangers is maintained by the City Council in the Water Catchment Area.

Bukit Timah Reserve - 184 acres (74 hectares) near the City of Singapore, established approximately 1883. The reserve comprises a forest lowland covering Bukit Timah, which is a granite hill at an altitude at the summit of 581 feet. It is the type locality for a great many plant species, and probably on a density basis more new species have been found there than any other place in the world.

Kranji Reserve - 50 acres (20 hectares) on Straits of Johore on the north side of the island, established in 1883. The reserve is typical of a climax mangrove vegetation where the pioneering and land building characteristics of the mangrove complex is in the process of changing to an association of dry land plants.

Labrador Nature Reserve - 11 acres (4 hectares) located just outside of the western entrance to the docks, established in 1951. The reserve comprises a cleft face and is one of the most scenic spots of Singapore's shore. The flora include Dipteris conjugata, seldom found in Malaya below 3,000 feet, Nepanthes rafflesiana and Nepanthes gracilis and hybrids between them, and an assortment of more common offshore plants. The area is a favourite picnic site.

Pandan Reserve - 1,373 acres (549 hectares) on banks of Jurong and Tandan Rivers on the southwest side of Singapore Island, established approximately 1883. The flora of the area is typical of the pioneering and tidal mangrove association. In 1931 the area was practically cleared, with further cutting to the regenerated timber during the last war. The reserve is threatened with prawn pond development.

Water Catchment Area - 4,006 acres (1,602 hectares) near the City of Singapore, established in 1951. The reserve comprises the watershed of the three city water service reservoirs and contains some interesting fresh water swamp forest and small blocks of virgin lowland forest, but most of it is covered by secondary forest in the process of regeneration.

SOUTH WEST AFRICA

Game Reserves

- Reserve No. 1 - in the process of being deproclaimed.
- Reserve No. 2 - description below.
- Reserve No. 3 - "Sperrgebiet" (completely inaccessible).
- Reserve No. 4 - "Sperrgebiet" (completely inaccessible).

Estosha Pan Nature Reserve - 26,000 square miles in northwestern South West Africa.

The reserve is a level area covered with bush that surrounds the Pan proper (1,400 square miles). The Pan border contains trees, especially marulas, although the center is devoid of life. The game most abundant is springbuck, zebra and blue wildebeeste. Enormous herds may be seen at times around the water-holes. Gemsbuck is widespread, but usually occurs in small herds. Elephants and flamingoes are often seen in the thousands. The reserve is open from May to November; access is by motor transportation, including 400 miles of roads within the area. Two rest camps are available.

ST. VINCENT

Forest Reserves

The following forest reserves are governed by the Crown Lands Forest Reserves Order, S.R. and O. No. 76 of 1948.

Colonarie Forest Reserve - 4,496 acres (1,398 hectares), comprises a catchment area of the Colonarie River, including the peak Petit Bonhomme and its foothills in the Parish of Charlotte.

Mesopotamia Forest Reserve - 1,006 acres (402 hectares), comprises a catchment area of the Yambou River including the peaks Petit St. Andrew and Grand Bonhomme in the Parish of St. George.

Soufriere Forest Reserve - 13,500 acres (5,400 hectares), comprises an area on Soufriere Mountain with its foothills and the mountainous interior of the Parishes of St. David and Charlotte.

The following forest reserve is governed by the King's Hill enclosure ordinance of the Revised Laws of St. Vincent, 1926.

King's Hill Forest Reserve - 55 acres (20 hectares) in the Parish of St. George.

Bird Sanctuaries

The following areas have been declared bird sanctuaries and are governed by S.R. and O. No. 43 of 1947.

Government House Grounds - 20 acres (8 hectares)

Milligan's Cay - 2 acres (.8 hectare)

Rammier Island - 4 acres (1.6 hectares)

Young's Island - 8 acres (3.2 hectares)

## SWEDEN

There are fifteen national parks in Sweden, covering roughly 10,000,000 acres, established to preserve certain large scenic areas in their natural state, or in an essentially unaltered condition. They are of two different types - virgin areas and old man-made landscapes.

The national parks of Sweden were established under the National Park Act of 1909. In 1952 the Nature Conservation Act was authorized, under which the national parks are in the care of and administered by the Crown Domains Board. Direct management is exercised by Crown foresters and forest rangers in the rangerships concerned. Only three special superintendents are employed.

The Crown Domains Board, in consultation with the Academy of Sciences, issues directions for the use of the national parks and establishes management plans for currently or formerly inhabited national parks where the timber must be felled and thinned to preserve the appearance of an established pattern of cultivation. The national parks are supported financially by revenue from this felling, supplemented by Crown Domains Funds, amounting to 130,000 kronor (\$26,000) in 1959.

The Nature Conservation Act of 1952 also regulates the use of the landscape (gravel pits, transmission lines, roads, etc.) and provides for the preservation of beautiful natural scenery in general, stipulating penalties for littering, prohibiting use of objectionable advertising, and for similar protective measures.

Nature Monuments and National Monuments - natural objects or areas can be set aside that are considered worthy of protection as being important to the diffusion of knowledge of the nature of the country, its beauty and its character. These may be on private land as well as on land belonging to the Crown. In 1959, there were 318 protected areas of about 7,500 acres and about 5,900 specific features protected. These were mainly trees.

Crown Reserves (Domain Reserves) - The Board of Crown Lands and Forests has authority to protect important objects and set aside reserves on land belonging to the Crown. Extensive areas, usually primeval but also including meadow grounds and other types, have been placed under the same protection as the National Monuments. Since 1909, 648 areas totalling 75,500 acres have been protected.

The Swedish Society for Conservation of Nature (Svenska Naturskydds föreningen) - Through the medium of the Swedish Foundation for Nature Conservation, SNF strives to acquire especially valuable nature monuments. The twelve areas belonging to the Society cover about 10,250 acres. Overnight huts are provided on two of the areas, Aktse and Lilla Karlsö.

Bird Sancturaries - Through a Royal Proclamation concerning the protection of animals, bird sanctuaries may be set aside. The regulations often state that the reserves are not open for visitors during the breeding season, (usually 1 April to 30 June), and limit the shooting rights. Seventy-one areas of 1,250,000 acres have been set aside, the largest being Sjaunja (725,000 acres), Svaipa, and Mittådalen.

#### National Parks

Abisko National Park - 12,500 acres (5,000 hectares) in northern Sweden - established in 1909. The park comprises the Abiskojokk (Jokk River) valley with deep canyons and surrounding mountain slopes. The valley is covered by meadow-birch forest and the slopes clad with pine up to tree-line, with many mountain meadows above. This is the only Swedish habitat of Platanthera parvula; bird life is also unusually abundant. The Swedish Tourist Association owns 22.5 acres in the park where it maintains a tourist station, but otherwise the park is maintained in an undisturbed state. The Lapps have the right to pasture reindeer and to hunt and fish in the park. The Abisko Scientific Station is located immediately outside the park boundary, and material collected by permission in the park has provided the basis for many scientific reports.

Ångsö National Park - 188 acres (75 hectares), in southwestern Sweden - established in 1909. The park comprises the Baltic island of Ångsö, designated to preserve an old pattern of cultivation. The park consists of coniferous forestland, deciduous hillsides, enclosed pastures, bare grassland areas and a croft with buildings and some cultivated land. Access is by boat.

Blå Jungfrun National Park - 165 acres (66 hectares) off the coast of southeastern Sweden - established in 1926. The park is a rocky island of red granite, protected mainly because of the lichens and mosses. Bird life is abundant along the beaches, and the area is noted for its insects and other invertebrates. Access is by boat, and overnight accommodations for four people are available.

Dalby Söderskog National Park - 90 acres (36 hectares), on the southern extremity of Sweden - established in 1918. The park was set aside to preserve a southern deciduous forest. Spring and summer flora is very rich, with ash and elm beginning to predominate over oak and beech. Specified felling illustrates natural development of forest types, with elm and hazel forests predominant. The other and larger portion is managed so that oaks are favoured in certain areas, and beech in others. The area shows marked signs of human habitation. Access is by highway.

Garphyttan National Park - 270 acres (108 hectares), in southern Sweden - established in 1909. The park preserves the cultivated fields and meadows around a farmstead belonging to an independent miner (bergmansgård) and surrounding woods. The hayfields and meadows, with a wealth of wild-flowers, are managed to retain their appearance of 100 years ago. Access is by motor highway.

Gotska Sandön National Park - 920 acres (368 hectares), off the southeastern coast - established in 1909. The park is an area of sand dunes bound by practically undisturbed stands of pine. Marked by climatic extremes, the park contains numerous rare insects of Sweden. Access is by boat, and overnight facilities are available.

Hamra National Park - 68 acres (27.2 hectares), in central Sweden - established in 1909. The park contains protected primeval pine and spruce forest on moraine land at an elevation over 1,300 feet above sea level. Access is by nearby road and railway station.

Muddus National Park - 123,000 acres (49,200 hectares), in northeastern Sweden - established in 1941. The park was established to preserve a large continuous area of forest and marsh in the coniferous forest region, much of

it primeval. Marshland occupies 45 per cent of land, with many lakes and tarns where the Whooping Swan (Cygnus cygnus) breeds. A small bear population lives in the park. The Lapps have the right to pasture reindeer and to hunt and fish. Access is by motor road. The park contains trails and huts.

Norra Kvill National Park - 68 acres (27.2 hectares), in southeastern Sweden - established in 1927. The park preserves an area of primeval coniferous forest, mostly old pine with some spruce, in boulder-strewn morain country rising to a mountain top. Access is by motor road.

Peljekaise National Park - 36,500 acres (14,600 hectares, in northwestern Sweden - established in 1909. The park comprises the slopes of Peljekaise Mountain (2,697 feet) and its western spurs. The park is mainly mountain birch forest with marshes and lakes. Low-alpine vegetation is present. Three Lapp families inhabit the park during the summer, but leave no noticeable traces. Access is by motor road.

Sarek National Park - 475,000 acres (190,000 hectares), in northwestern Sweden - established in 1909. The park preserves a large area with distinctive high-fell scenery, flora and fauna. Containing several mountain peaks, 70 glaciers, high plateaus and valleys, the park is mainly bare fells with alpine areas. The delta of the Rapa River at the head of Lake Laidaure is especially scenic. Bear, lynx, wolf and wolverine inhabit the area. There is a Lapp encampment inside the southern border that is used during the summer. Tent accommodations only are permitted in the park, but indoor facilities are available at Kvikkjokk nearby.

Sonfjället National Park - 6,750 acres (2,700 hectares), in central Sweden - established in 1909. The park protects an area of southern fells, and is a habitat for bear. Coniferous forests, both pine and spruce, predominate, with a narrow belt of mountain birch just below the fell line. Access is by motor road.

Stora Sjöfallet National Park - 345,000 acres (138,000 hectares), in central Sweden near the Norwegian frontier - established in 1909. Altitude in the park varies from 1,230 to 6,603 feet. It contains a series of waterfalls,



mountain ranges with glaciers, sparse forests and extensive meadows and moors in the higher regions. The park borders Sarek National Park on the south and the Sjaunja bird sanctuary on the north. The hereditary rights of the Lapps are respected. Visitor accommodations are available at the Saltolukta Tourist Station near the boundary. Access is by boat from the railroad station at Luleluspén.

Töfsingdalen National Park - 3,413 acres (1,365 hectares), in west-central Sweden - established in 1930. The area is primeval pine and spruce forest on ground-moraine land with large boulders and rich herbaceous undergrowth. The park is surrounded by State forests. The Lapp rights are respected. The nearest motor road ends at Grövelsjön, 15 km. from the park boundary, where there are accommodations for 100 visitors.

Vadvetjäkko National Park - 6,125 acres (2,450 hectares), in northern Sweden - established in 1920. The park preserves an area of high fell scenery, flora and fauna, as well as marshes, small lakes and low ridges. Most of the park is in the treeless alpine zone, but it includes some sparse forests of birch (Betula tortuosa). Lapps pasture some reindeer, and hunt and fish. Access is by boat and trail. Tents are available.

#### National Monuments

Borga Hage National Monument - 233 acres (93.2 hectares), on Öland Island off the southeastern coast - established in 1932. The park contains a southern Swedish forest of fine deciduous trees, rich bush and wildflower growth, managed so glades of oak trees are favoured. Access is by footpaths.

Lulejarve National Monument - 1,500 acres (600 hectares) in central Sweden - established in 1946. The area preserves primeval pine and spruce forests, to be kept undisturbed.

Österplana Heath National Monument - 90 acres (36 hectares) in southwestern Sweden - established in 1957. The monument contains a limestone heath on an isolated rock mass more than 8 miles long and 4 miles wide, with steppe vegetation, especially Areneria gothica. Thirty privately owned estates comprise the area, which is administered by the Skäråborg County Nature

Conservation Society under regulations issued by the county government.  
Access is by motor road.

Stenshuvud National Monument - 270 acres (108 hectares) in the southern extremity of Sweden - established in 1931. The area is a southern deciduous forest rich in hornbeam, and seashore meadows. The Stenshuvud cliff overlooks the Baltic Sea. It is a recreation area for summer visitors and local people. Access is by motor road and there are camping facilities.

Stigsbo Rödmosse National Monument - 108 acres (43.2 hectares) in southeastern Sweden - established in 1958. The area contains a peat bog with surrounding quagmires, and is partly covered with dwarf pines.

#### Domain Reserves

Bubergät Domain Reserve - 5,675 acres (2,270 hectares), in northwestern Sweden - established in 1958. The area preserves ancient primeval stands of pine and spruce and a large birch forest that grew following a fire 55 years ago, on peaks and hills. Access is by motor road.

Gotska Sandön Domain Reserve - 7,918 acres (3,167 hectares), on the Baltic near Stockholm - established in 1950. The reserve consists of sand dunes, some covered with pines, others still moving. A large number of rare species of beetles are found here. The reserve borders Gotska Sandön National Park, and is accessible by boat from Färösund.

Reivo Domain Reserve - 21,750 acres (8,700 hectares), in northeastern Sweden - established in 1958. The area contains geological formations of the Quaternary type and varied primeval forest stands, consisting of nearly all types of trees found in Lappland, including 500-year-old pines and 300-year-old spruces. There is a reindeer separation compound with Lapp tents within the reserve. Access is by two motor roads.

Skärälid Domain Reserve - 230 acres (92 hectares), on the northern extremity of Sweden - established in 1956. The reserve protects the Skärå valley, a geological fault with steep walls up to 262 feet high. Most of the area is

covered with beech forest, which is to remain undisturbed. A hotel is located near the eastern end of the valley.

Tjuoltavuobme Domain Reserve - 3,750 acres (1,500 hectares), in northwestern Sweden - established in 1952. The area contains the largest connected stand of primeval birch forest in the country, with many herbs. Bears are found in the region. Sarek National Park is two kilometres to the north.

## SWITZERLAND

### National Park

The Swiss National Park - 16,870 hectares (42,175 acres) along the Italian border in the County of Grisons - established in 1914; enlarged and reorganized by a new decree in 1959. The park comprises an area in the very rugged central Alps and touches on the dolomitic eastern Alps. The altitude ranges from 1,500 metres to 3,173 metres and the climate is very dry. There are many endemic plants and interesting animals. The park is administered by the National Park Commission under the Federal Department of the Interior. It is treated as a total reserve with scientific aims. Public access is by a road which runs through the area. Many trails are located in the area.

### Small Natural Reserves

There are many small natural reserves in Switzerland that have been protected for long periods.

Two of the most important are:

The Forest of Aletsch - located below the Aletsch Glacier which contains a forest of Arole pine. The Swiss League for the Protection of Nature has rented the area for 100 years.

The Virgin Forest Derborence - located in the free District of Haut-de-Cry in the Canton of Valais. It is owned by the above League.

TANGANYIKA

National Park

The National parks in Tanganyika are established under the National Parks Ordinance of 1959 by proclamation of the Governor with consent of the Legislative Council; boundaries may be altered in the same manner. Mining is permitted with consent of the Governor; no hunting or removal of vegetation is permitted. A Board of Trustees is responsible for the administration. Facilities are provided for independent research workers. An annual report is published. Several Game Reserves or parts of the reserves have been proposed to be converted into national parks. The national parks are established for the protection of all natural features. The press, annual reports and radio are used to encourage public interest.

Serengeti National Park - 4,450 square miles, located in northern Tanganyika, established in 1940 and 1959. The Park comprises an area of open plains, savanna, acacia bush, riverine thickets and rocky ridges and outcrops ranging in elevation from 3,700 to 7,300 feet above sea level. It provides the habitat for the largest remaining assemblage of ungulates in Africa (about 400,000 head) and covers their annual migrations, extending over 300 miles. With these vast herds, comprised mainly of wildebeest, zebra, topi and Thomson's gazelle, an exceptionally large number of carnivores (lion, leopard, cheetah) is associated. Mineral prospecting and mining (there is one small gold mine) are permitted. Inhabitants to the southwest and northwest of the Park take a toll of the wildlife when it crosses the boundaries. Controlled hunting areas have been established on the periphery of the Park to keep this activity in reasonable check. The Park is bounded on the east by the Ngorongoro Conservation Area and on the north, in Kenya, by a game reserve. The field staff consists of a Director, a warden, a deputy warden, two park rangers, twenty park guards and four guides, together with clerical staff. The annual budget is £50,000 (\$140,000). Access is by motor and air transportation. A safari lodge and guides are available.

### Conservation Area

Ngorongoro Conservation Area - 2,500 square miles, located in northeastern Tanganyika, established in 1959. A very wide range of ecological conditions is to be found in the area, from dry treeless plains, through thorn bush, rain forest and bamboo to montane moorland having an exceptionally interesting flora. Fauna on the high ground includes rhino, buffalo, elephant, leopard, mountain reedbuck and giant forest hog. The plains wildlife is similar to Serengeti National Park. The montane avifauna contain a number of distinct or rare species. The principal feature is the volcanic massif of the Crater Highlands rising to over 11,000 feet from the floor of the main and Lake Eyasi branches of the Rift Valley at 3,300 feet. The area includes the Olduvai Gorge, well known from the research into prehistoric sites by Dr. L.S.B. Leakey. The majority of the area is exclusively inhabited by Masai pastoralists, ranching some 135,000 head of cattle.

The area was established by Ngorongoro Conservation Area Ordinance No. 14 of 1959. Boundaries may only be altered by proclamation of the Governor with the consent of the legislature. Its purposes are to conserve and develop the area's natural resources primarily in the interests of the Masai inhabitants, but with due regard to the preservation of (natural features) flora and fauna, the latter being fully protected. A Conservation Authority under the Minister for Natural Resources is responsible for the administration. The field staff consists of: 6 Water Development, 16 Game Department, 18 Forest and 8 Veterinary Department personnel. Funds for 1960/61 are £17,643 (\$49,400). A grant of £20,000 (\$56,000) over two years has been made available by the Nuffield Foundation for research into pasture and range management. Access is by motor transportation, and guides and vehicle accommodations are available.

### Game Reserves

The Game Reserves of Tanganyika are established under the Fauna Conservation Ordinance Cap. 302. Boundaries may be altered only by the Governor in Council of Ministers. The areas are established primarily for the conservation and protection of game and flora and are administered by the Game Warden of the Game Department

of the Ministry of Natural Resources. The annual funds for the Department are £100,000 (\$280,000). The field management is the responsibility of the Game Rangers within whose ranges they are situated, assisted by a staff of game assistants and game scouts. A Game Department biologist advises the field management personnel. Management objectives are: (a) preservation of material for scientific study, (b) maintenance of stocks of native animals to replenish hunting areas, and (c) conservation of the areas which may in due course prove suitable for conversion into national parks.

Research workers are given every possible assistance, including accommodations at the Game Ranger's rest house or camp. Reports on the Reserves are included in the Annual Report of the Game Department. Bush track access to Reserves is being improved gradually. Entry into most reserves requires a permit and applicants should be properly experienced, guided and equipped. No tourist facilities are provided. A programme of public education is carried among rural populations adjacent to the Reserves by a Game Assistant.

Biharamulo Game Reserve - 450 square miles on the western shore of Lake Victoria, established in 1959. The area comprises heavily wooded rolling plains and rocky escarpments from lake level at 3,720 to 5,000 feet. The brachystegia and acacia woodlands mark the extreme northern range of sable antelope, Lichenstein's hartebeest, common reedbuck and Sharp's steinbuck. The small area of lake shore includes crocodile, hippo and waterfowl. The Reserve is tsetse-infested and uninhabited. Access is by motor transportation.

Gombe Stream Game Reserve - 61 square miles on the shore of Lake Tanganyika south of the boundary with Ruanda-Urundi, established in 1945. The area comprises a narrow strip of precipitous mountain country, from the lake shore at 2,534 feet to over 5,000 feet, and contains brachystegia woodland on the fan slopes and a thick gallery forest on the numerous streams and downland on the mountain summits. Fauna include chimpanzee, red colobus monkey, buffalo, waterbuck, bushbuck and leopard. Local fishermen are allowed to establish seasonal camps on the lake shore for drying their catches. Access is by boat and by a mountainous footpath.

Katavi Plain Game Reserve - 650 square miles in southwestern Tanganyika, forty miles east of Lake Tanganyika, established in 1951. The Reserve contains an area of brachystegia woodland and thornbush with large open grassy plains and lakes. Fauna include very large herds of buffalo, hippo, elephant, reedbuck, topi, eland, roan antelope, waterbuck, lion and leopard. Two permanent camps established by the International Red Locust Control Service are located in the Reserve. The timber of the woodlands is exploited in concessions under the control of the Forest Department. Access is by motor transportation.

Kilimanjaro Game Reserve - 720 square miles, located in upper northeastern Tanganyika, established in 1951 (reserve previously during German rule). The reserve comprises the summit area of the magnificent Mt. Kilimanjaro between 6,000 feet at forest line to the mountain summit at 19,340 feet and contains rain forest, moorland, tundra and icefields. Fauna include Abbott's Duiker, elephant, buffalo, rhino, leopard, eland, colobus and blue monkeys and various forest and high altitude species of birds and flora of special interest. There is utilization and development of forest products under the control of the Forest Department. Access is by motor transportation and five huts for climbing parties are available.

Lake Manyara Game Reserve - 375 square miles in northeastern Tanganyika, established in 1957. The reserve comprises an area of the steep rocky escarpment of rift wall with three rivers flowing into Lake Manyara and contains half of the Lake. Between the rift wall (6,000 feet) and the Lake (3,150 feet) are swamp and gallery forests, acacia woods, meadowland and the saltings, reed beds and soda flats of the lake margin. Fauna include elephant, buffalo (often in large numbers) hippopotamus, rhino, Bohor reedbuck, impala, white-bearded wildebeest, zebra, Thomson's and Grant's gazelle, oryx, waterbuck, lion and leopard. The Lake is frequented by thousands of waterfowl and waders, including vast numbers of pelicans and flamingoes. Fishermen have been allowed to camp seasonally in the area. It is hoped that it will be possible to keep animals of the Reserve from raiding the crops of settlements to the north and south by fencing. Access is by motor transportation and a hotel is under construction in the vicinity.



Mkomazi Game Reserve - 1,350 square miles, in northeastern Tanganyika, established in 1951. The Reserve comprises a very arid area lying between 600 and 5,500 feet as isolated hills, with an average altitude of 2,000 feet, and contains open plains and thorn-bush with a semi-desert flora. Fauna include lesser kudu, oryx, gerenuk, rhino, elephants, buffalo and the larger carnivora. Access is by motor transportation and a rest house is available. The Reserve adjoins the Royal Tsavo National Park of Kenya along part of its northern boundary.

Mt. Meru Game Reserve - 99 square miles in northeastern Tanganyika 30 miles west of Mt. Kilimanjaro, established during previous German rule, redesignated in 1951. The Reserve comprises the upper part of the mountain above the forest line from 5,500 feet to the summit at 14,979 feet and contains rain forest, bamboo, cedar, heath and the volcanic cone and crater. Fauna include colobus monkeys, giant forest hog, rhino, elephant, buffalo, bushbuck, tree hyrax, lammergeyer and other montane avifauna. The lower slopes below the reserve are very heavily populated by natives. The forest belt, which is also Forest Reserve, is exploited for various produce and some glades are under cultivation for pyrethrum pending reafforestation. Access is by foot and one track.

Rungwa River Game Reserve - 7,822 square miles in south-central Tanganyika, established during German rule, redesignated in 1951. The Reserve contains rolling heavily wooded plains with a number of isolated hills and rocky ridges with an average elevation of 4,500 feet. The inaccessible tsetse-infested brachystegia woodlands and swampy valleys of the Reserve maintain fauna which include sable and roan antelope, greater kudu, elephant, and buffalo. There are a number of settlements along the western border of the Reserve on a motor road and an isolated village on Rungwa River itself in the centre of the Reserve.

Selous Game Reserve - 11,512 square miles in south-central Tanganyika, reserved during German rule, redesignated in 1951. Situated in the junction of three streams that form the Rufiji River, the Reserve contains brachystegia woodlands with open grassy floodplains and riverine growth; patches of dense

forest occur in isolated portions. The area is predominantly an elephant reserve but also contains numerous hippo, buffalo, Nyasa wildebeeste, Lichenstein hartebeest, sable antelope, greater kudu, eland, lion and leopard, and many other species in smaller numbers. There are a few small human settlements in the northern portion of the Reserve.

Tarangire Game Reserve - 525 square miles in northeastern Tanganyika, established in 1957. The acacia thornbush and thicket of the Reserve, heavily tsetse infested, with intervening floodplains, are the habitat of elephant, buffalo, rhino, wildebeest, impala, waterbuck, oryx, Coke's hartebeest, zebra, eland and lesser kudu. A Game Department ecological research station is established on the Reserve.

## THAILAND

The five natural parks and a botanical garden in Thailand were established under the Forest Reserves Act of 1943. The Director General of the Royal Forest Department formulates policies within the provisions of pertinent acts and orders, and promulgates regulations for management, protection and use of the parks. The areas are administered by the Silvicultural Division, Royal Forest Department. The major purposes of the natural parks are public recreation and the protection of wildlife.

Doi Intanon Natural Park - 32,617 acres (13,047 hectares) in northwestern Thailand provisionally declared in 1959. The Park is situated on the highest mountain in Thailand (2,580 metres). The area includes the sources of many important rivers, famous waterfalls and virgin mountain vegetation (highly valuable for scientific research). At present, there is no budget allocated for the Park. A management plan is to be formulated to preserve the natural features.

Erawan-Waterfall Natural Park - 500,130 acres (200,052 hectares) west of Bangkok, provisionally declared in 1959. The Park includes many beautiful waterfalls, rivers and mountain scenery, virgin evergreen vegetation and abundant wildlife. At present, no fund has been allocated for the Park. A management plan will be made to preserve natural features for recreational attraction.

Khao-Yai Park - 511,991 acres (204,796 hectares) northeast of Bangkok, under consideration for establishment. The Park is composed of many mountain ranges that are the headwaters of an important stream. The area also contains three beautiful waterfalls and abundant wildlife. Large population centres are in close proximity to the Park. At present, no fund is allocated for the Park. A management plan will be made to preserve natural conditions for recreational attraction. Access is by automobile and hiking.

Pukadeung National Park - 86,123 acres (34,449 hectares) in northeastern Thailand, established in 1947. The Park preserves a wilderness of mountain vegetation with a rock garden type of formation. The area includes a mountain plateau (1,350 metres) with undulating land and pine forests of (Pinus khasya) and (Pinus Merkusii), the latter predominating at lower altitude with splendid growth of rhododendrons. Birds, deer, leopards and other wildlife inhabit the Park. A village is located three kilometres from the foot of the mountain on which the Park is situated. At present, no funds are allocated to the Park. A management plan was drawn in 1947. Members of the Royal Forest Department engage in scientific research in the Park. Permission is required for the collection of fauna and flora. Public access is by hiking from the foot of the mountain, and overnight accommodation for ten persons is available at Park headquarters.

Tung Slang Luang Natural Park - 271,810 acres (108,724 hectares) in northwestern Thailand, provisionally declared in 1959. The park features include rivers, waterfalls and mountain scenery. Tigers, leopards, deer, elephants, birds, rodents and other wildlife inhabit the area. A variety of species of flora, including Pinus, Dipterocarpus and Quercus, are present. No human influences affect the virgin areas. There is a small annual budget allocated for the Park. A management plan will be adopted for scientific, educational and recreational purposes. Public access is by automobile and hiking.

Pukae Botanical Garden, Saraburi - 1,500 acres (600 hectares), 124 km north of Bangkok, established in 1941. The Garden was established with the primary objectives of planting as many species of trees and shrubs of economic, aesthetic and medicinal value as possible, including exotic species which are considered of economic importance. The secondary objective is for educational and recreational purposes. At present, the area contains forty-six blocks comprising 6,332 trees of 918 species with signboards showing local and scientific names. The garden is in close proximity to population centres.

Scientific research is done by botanical garden personnel and the nearby Silvicultural Experimental Station conducts experiments on silvicultural

characteristics of various species. A budget is provided for developing the Garden. A botanical collection is located at the herbarium of the Royal Forest Department, Bangkok. Public access is by motor transportation from Bangkok.

## TUNISIA

There are no national parks in Tunisia but some areas have been given protection as forest reserves.

The State Park of Bou-Hedma - 13,000 hectares (32,500 acres) in the southern half of Tunisia half-way between Gafsa and the Mediterranean Sea - established in 1936. The park comprises a plateau area ninety metres to 821 metres high, which includes a remnant of gum tree (Acacia) parkland with some interesting animal species. The area is administered by the Forest Service. The main problem is the presence of the local human population, which should be relocated. Access is by an excellent road crossing the park.

### Forest Reserves

Ain-Draham Forest Reserve - 1,300 hectares (3,250 acres); timber exploitation and cattle grazing are permitted.

Bou-Kornine Forest Reserve - 900 hectares (2,250 acres); no exploitation of timber is permitted.

## TURKEY

The national parks in Turkey are designated by the General Directorate of Forestry, subject to the approval of the Minister of Agriculture - under Turkish Forestry Law 6831, promulgated in 1956. They are designed to protect nature and ensure the beauty of the country, to meet the recreational needs of the people, to provide for scientific research, and to encourage tourism. Provision is made also for the reservation of historical and archaeological sites in co-operation with the Ministry of Education and the General Directorate of Tourism.

Those national parks that are intended primarily to preserve nature and the natural landscape and to serve recreational needs are selected on the basis of their natural peculiarities, their accessibility by automobile, and the presence of conditions suitable for camping, aquatic or winter sports, mountain climbing, and similar pursuits. National parks designed to attract tourists are selected because of some outstanding natural, historical or archaeological feature and are developed more intensively to serve the needs of travelers.

The Turkish Forest Service assigns personnel to manage the parks, and co-operates with the University of Istanbul, Ankara University and the Ankara Forest Research Institute to further scientific study in the parks.

### National Parks

Karatepe-Arslantas National Park - 10,297 acres in south-central Turkey, sixty km. from the Mediterranean Sea and 360 km. from the Syrian border - established in 1958. High elevation red oak - red pine forests and coppices are inhabited by roedeer, wolf, jackal, wild swine, marten, partridges, eagles, hawks and other animals. Outstanding Hittite epitaphs, mosaics and reliefs and relics of Phoenician and pre-Christian Roman civilizations are protected and an historical museum has been established. A 3595-acre protection forest adjoins the western and southern boundaries of the park. Within the park the inhabitants of six village districts farm on village-owned open land and cause damage to some park forests. 50,000 to 60,000 visitors are accommodated annually in and near Adana and at a motel within the park.

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Soğuksu National Park - 2525 acres, 80 km. northwest of Ankara - established in 1959. The park protects the forested watershed adjacent to the noted thermal springs of Kizilcahamam, and is managed to encourage soil conservation and reforestation measures to control erosion and to correct damage from overgrazing and shifting wood-cutting. It is inhabited by wolf, fox and boar, and many species of landbirds. A hotel and facilities for camping and picnicking are being provided and a botanical museum is planned. An estimated 70,000 to 80,000 people visit the springs and the park annually.

Yozgat Pine Forest National Park - 660 acres in central Anatolia - established in 1958. The park preserves a representative example of the indigenous pine and oak forests which covered Anatolia 400 to 500 years ago. It is surrounded by agricultural land. Reforestation is being undertaken in co-operation with the local inhabitants. Facilities to encourage tourism are planned.

Manyas Bird Paradise National Park - 130 acres on the northeastern shore of Manyas Lake, in Balikesir, established in 1959. A grove of willows and shoreline reeds provides nesting habitat for 2,000 pairs of cormorants, egrets and other herons, spoonbills and glossy ibises. Many other species of birds occur on migration and in winter. The Institutes of Istanbul University conduct scientific studies and 5,000 people visit the park annually to see the birdlife.



## UGANDA PROTECTORATE

### National Parks

The two national parks in Uganda were established under the Ordinance of 1952 by proclamation of the Governor after consultation with the local government and with the consent of the Legislative Council. Boundaries may be altered by proclamation of the Governor with the consent of the Council and the Trustees. The latter are appointed by the Governor to control and maintain the national parks and to ensure preservation of animal and plant life in its natural state. They are also concerned with area preservation for local recreation and park development as international tourist attractions.

Permission of the Trustees is required to kill or capture any animal or disturb any egg or nest, and to introduce any domestic animal or vegetation. Arms, ammunition, explosives, traps and poisons may not be brought into the national parks without permission of the warden. Written consent of the Governor in Council, (after consultation with the Trustees), is required for prospecting or mining.

Large-scale poaching is a grave threat to the future of the parks' wildlife, and available funds do not permit development of roads over large sections, a necessity for effective anti-poaching measures.

Total personnel employed in 1959 included one director and chief warden, three park wardens, twenty-six administrative personnel, 106 assistant wardens, rangers and guides and seventy-nine others. The 1959-60 budget was £69,950.

Murchison Falls National Park - 1,504 square miles, in northwestern Uganda - established in 1952. The park includes Murchison Falls, one of the most impressive waterfalls in the world, and the Victoria Nile, containing the main concentration of crocodiles remaining in Uganda. In addition, its banks support a large hippopotamus population. The park is mostly open grassy plains and contains large numbers of all the principal species of African wildlife: elephant, rhinoceros, lion, leopard, buffalo, etc. Native settlements exist close to the boundary in places, and poaching is at times a serious menace.

Queen Elizabeth National Park - 764 square miles, 272 miles west of Kampala - established in 1952. It includes the Kazinga channel joining Lake Edward to Lake George, and the park is adjacent to the Albert National Park in the Congo. It contains tropical forests, an old volcanic crater area, swamps and open grassland, which support most African big game animals - elephant, buffalo, lion, leopard, hippopotamus, etc. A few fishing villages are in the park, and a number of villages are near the border. Poaching is a serious menace. The number of hippopotami have had to be controlled because of their overgrazing of the pasturage.

#### Game Reserves and Animal Sanctuaries

Game reserves and animal sanctuaries are established under the Game Ordinance of 1959 by declaration of the Minister of Natural Resources. Boundaries are altered in the same manner. In game reserves the conservation of wildlife is paramount; human settlement and economic development are not permitted without written authority of the game warden. In animal sanctuaries the protection of all or particular species of wildlife is regarded as essential for their survival; human settlement is permitted.

Only persons holding a special permit from the Minister of Natural Resources are allowed to kill or capture any animal in a game reserve, or any animal under protection in the sanctuaries.

Tribal hunting is permitted with the consent of the District Commissioner and the game warden. Nets, snares, poison or poisoned weapons may be used by natives without special permission. The area, mode of hunting, species and sex of animals taken is specified in the order.

The Game Warden, head of the Game and Fisheries Department, is responsible for administration. A game ranger is in charge of each range, with a staff of approximately twenty. One of the most difficult tasks is the control of large-scale and commercial poaching, which threatens the future of many species, such as the rare white rhinoceros.

Aswa Lolim Game Reserve - forty square miles, in northwestern Uganda - established in 1959. Mainly dry savannah country, the reserve provides essential seasonal

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grazing for the Uganda Kob, which ranges from the Murchison National Park adjacent, and also for elephant, buffalo, hartebeast and smaller species of antelope.

Kigezi Game Reserve - 200 square miles, in southwestern Uganda - established in 1952. The area is open grassland and tropical forest, containing a variety of plains game and forest-dwellers. It serves as buffer for Queen Elizabeth National Park from thickly settled areas to the south.

Toro Game Reserve - 202 square miles, in southwestern Uganda - established in 1946. Savannah country and swamp, it contains a variety of wildlife, including elephant, buffalo, lion, leopard and hippopotamus. A fishing village is located on the shore of Lake Albert within the reserve; cutting of firewood and drying of fish occur.

Debastien Animal Sanctuary - 760 square miles, thirty miles west of the Kenya frontier - established in 1958. The sanctuary contains a considerable variety of plains game - buffalo, lion, leopard. Controlled hunting of a limited number of animals by selected licence holders is permitted to preserve the balance of nature and prevent overgrazing. Settlement is permitted, but mainly by local tribes that are seasonal and nomadic. A considerable number of cattle graze in the area at certain times of the year.

Dufile Game Sanctuary - four square miles.

Elephant Sanctuary, at Acholi - 1,350 square miles.

Entebbe Animal and Bird Sanctuary - twenty square miles, near Lake Victoria.

Gorilla Sanctuary, Kigezi - Seventeen square miles, in southwestern Uganda.

Hippopotamus and Elephant Sanctuary, Bugungu - 183 square miles.

Jinja Animal and Bird Sanctuary - .03 square miles.

White Rhinoceros Sanctuaries, west bank of Nile River - 250 square miles.

## UNION OF SOUTH AFRICA

The five national parks of the Union of South Africa were established under the National Parks Act of 1926 by proclamation of the Governor-General under the joint resolution of Parliament. Areas of Crown land may be added to the national parks in the same manner; Acts of Parliament are required for the removal of land from the parks. The Governor-General appoints the National Parks Board of Trustees which controls the national parks, and establishes policies and promulgates regulations governing the management, protection and use. The parks are administered by a Director with a staff of 192 white and 880 native. The annual appropriations total £37,500, plus governmental loans and special allocation of funds amounting to £330,000, and a special donation of £80,000.

Research is carried out by park personnel. A biological staff of four is located at Kruger National Park and one biologist is assigned to the Cape National Park; research by independent scientists is encouraged, and facilities and accommodations are provided for them. The results of research are published in the Board's official scientific journal "Koedoe". The Board also issues educational publications. An extensive program of public education about the parks is conducted.

### National Parks

Addo Elephant National Park - 16,889 acres (6,756 hectares) in the southern extremity of the Cape of Good Hope Province - established in 1931. Between the Suurberg Mountains and the Sondag River valley, the park contains an area of practically impenetrable bush which provides a habitat for 28 rare Addo elephants (Loxodonta a. africana). Protection of these animals is the primary objective of management, and eleven miles of fence prevents their wandering onto agricultural lands adjacent to the park; visitors may observe them at night from a special platform. Eleven species of antelope, extirpated by hunting, have been reintroduced, and arrangements are being made to restock rhinoceros and hippopotamus. The scarce Cape buffalo (Syncerus caffer) occurs in the park, and an abundance of other mammals, birds and reptiles. The flora is profuse, and herbaceous and succulent plants form a dense

carpet under the bush. Research is done by the Board's biologist for the Cape Province parks. Access is by motor transportation.

Bontebok National Park - 6,333 acres (2,533 hectares) in the western extremity of the Cape Province - established in 1959. Resembling a wide-brimmed basin, the park area is a plateau which gradually slopes toward a level plain, and provides a habitat for the last surviving herd of 110 bontebok antelope (Damaliscus pygargys). The plateau is fairly rocky, while the plain is of a sandy nature and well drained, bounded by the Breede River on the south. The area has a summer and winter rainfall of 30 inches per year. Other notable animal species include the grey rhebuck, grey duiker and steenbuck. The principal flora species are Acacia, Podocarpus, Rhus, Aloe, Eragrostis and Ehrarta. Observations and investigations are conducted by the three park personnel. The park is accessible by railway transportation. Accommodations will be constructed.

Kalahari Gemsbok National Park - 4,250 square miles in northwest Cape Province - established in 1931. The park lies within the vast region of Kalahari sand-veld which covers the heart of the sub-continent. The sand is bright red and is deposited in great longitudinal dunes. The maximum rainfall is five inches a year, and the desert conditions provide habitat for endemic fauna, notably the Kalahari lion, springbuck and gemsbuck, and many other species of animals and birds characteristic of Kruger National Park. Acacia is the predominant tree genus, and a variety of shrubs, ephemeric annuals and grasses occur. A small family of true Bushmen live in the park. There is a research laboratory at park headquarters. Accommodations for motoring visitors are available at two rest camps. The Board of Trustees exercises game protection rights on 4,300 square miles of adjacent land within the Bechuanaland Protectorate.

Kruger National Park - 7,340 square miles in eastern Transvaal - established as the Sobi Game Reserve by President Kruger in 1892, and as a national park in 1936. This great wildlife sanctuary occupies almost one-fifth of the Union, and is bounded on the south and north by the Crocodile and Levubu rivers respectively, and to the east by the Lebombo Mountains and the boundary of

Mozambique. Visitors are accommodated in well-equipped rest camps and camping sites where they remain during the night hours. At dawn the camp gates are opened, and the visitors explore the park on more than 1,000 miles of roads. From the roads, they have an opportunity of seeing almost every species of South African fauna in its natural habitat, from watery hideouts where hippopotomuses and crocodiles live, to rich pastures filled with many kinds of antelope and other plains animals, while in the bush are troops of elephants. Lions are common, and other carnivores are to be seen at close range. The abundance and variety of mammals, birds and reptiles is extraordinary. Much of the park is open veld, while other parts have growths of dense bush and open forests, with an abundance of flowering plants. The park may be reached by train or automobile, and tours are arranged by safari companies.

Mountain Zebra National Park - 3,547 acres (1,418 hectares) in eastern Cape Province - established in 1937. In this mountainous region a small troop of the very rare mountain zebra (Equus hippotragus zebra) is protected. During the past five years the troop has nearly doubled itself. Apart from the zebra, other animals which were indigenous in the Karroo regions during the previous century, have been reintroduced into the park, such as springbok, blesbok, black wildebeeste, eland, mountain reedbuck, grey rehbuck, klipspringer, bushbuck, etc. These animals thrive under the improved conditions of veld management and water conservation. The park is not yet open to the public, mainly because it is the intention of the National Parks Board of Trustees to, first of all, give these animals a fair chance to re-establish themselves in this area.

#### Provincial Nature Reserves

##### Cape of Good Hope Province

There are various municipal nature reserves in the Cape Province under control of the local authorities and advice of the Advisory Committee for Nature Conservation of the Cape Province. A well-known reserve of this kind is the Bakens Rivier, in the centre of Port Elizabeth. There are a number of other reserves proclaimed by Divisional Councils (Table Mountain and Cape Point near

Cape Town, the Robberg near Plettenberg Bay, etc.). This Province excels in strict forest reserves, where indigenous trees are protected. No fewer than 61 forest reserves have been proclaimed in the indigenous forest areas along the Garden Route from Port Elizabeth to Mossel Bay.

Cape of Good Hope Nature Reserve - 26.83 square miles on the southernmost tip of the Cape Peninsula. The reserve was established under the Nature Reserves Ordinance of 1939 for the preservation of fauna and flora, and the Divisional Council of the Cape administers it. The boundaries may be extended by the Council with the approval of the Administrator. The reserve contains a rock-strewn veld of the savannah type, ranging to mountainous in parts, containing numerous types of wildlife. Access is by motor transportation.

#### Natal Province

Game reserves, nature reserves and parks may be established under the Natal Parks, Game and Fish Preservation Ordinance No. 35 of 1947 by the Administrator, who may modify their boundaries by Provincial Proclamation. The Natal Parks, Game and Fish Preservation Board is responsible for their administration. The primary objective of management is the complete conservation of the wildlife habitat. Research is facilitated and educational activities include brochures and films.

Dhlinza Forest Nature Reserve - 461 acres (184 hectares) - established in 1952.

The area contains an indigenous evergreen gallery forest. Bushbuck and innumerable bird species are present.

Enseleni Nature Reserve - 725 acres (290 hectares) - established in 1948. The reserve contains riverain forest patches in open thornveld, and is of botanical interest.

False Bay Park - 5,553 acres (2,221 hectares) - established in 1944. The area contains open woodlands and coastal jungle. Fauna includes nyala, hippopotamus, crocodile and shore birds.

Giant's Castle Game Reserve - 59,605 acres (23,842 hectares) - established in 1903 (expanded and defined in 1952). The reserve contains rugged open

grassland of the high Quathlamba Drakensberg range, including several high peaks such as Giant's Castle (altitude 10,868 feet), and the headwaters of the Mooi and Busman's rivers. Many kinds of highland antelope inhabit the area, including eland, rhebuck, oribi and mountain reedbuck. The leopard is also well represented. Native guides are available.

Himeville Nature Reserve - 120 acres (48 hectares) - established in 1956. The reserve contains open sourveld grasslands and an inland fishing lake.

Hluhluwe Game Reserve - 57,000 acres (22,800 hectares) in Zululand - established in 1951. Nearly every species of wildlife which has its habitat in Zululand may be seen in the reserve, including the white rhinoceros, black rhinoceros, kudu, inyala, impala, waterbuck, wildebeeste, zebra, buffalo and many smaller species. Rest huts are available.

Kamberg Nature Reserve - 5,515 acres (2,206 hectares) - established in 1951. The reserve contains open grassland in the foothills of the Drakensberg Range, including valleys of the upper Mooi River, renowned for trout fishing. Rest huts are available.

Kosi Bay Nature Reserve - 50 acres (20 hectares) - established in 1950. The reserve contains an open lakeside grassveld. Camp sites are available.

Krantzkloof Nature Reserve - 1,106 acres (442 hectares) - established in 1950. The reserve contains a deep gorge filled with thorny coastal jungle of botanical interest. A fine bird population is present.

Loteni Nature Reserve - 5,300 acres (2,120 hectares) - established in 1953. The reserve contains mountainous open grass highlands in the Drakensberg Mountains. Eland, mountain reedbuck, grey rhebuck, oribi and other wildlife occurs. Rest huts are available.

Ndumu Game Reserve - 24,000 acres (9,600 hectares) - established in 1924 and modified in 1947. The reserve comprises thorn savannah, Ficus riverine forest and a large lake. It contains hippopotamus, large populations of crocodile, inyala and small game. No accommodations are available.



Nkuzi Game Reserve - 62,000 acres (24,800 hectares) - established in 1912. The reserve contains open thornveld savannah and Ficus forest, and supports large populations of inyala and impala and some black rhinoceros. Rest huts are available.

Oribi Gorge Nature Reserve - 4,406 acres (1,762 hectares) - established in 1950. The reserve contains a deep gorge of coastal forest. Wildlife includes leopard, bushbuck and blue duiker. Rest huts are available.

Richards Bay Park - 975 acres (390 hectares) on the north coast - established in 1945. The reserve contains coastal dune bush interspersed with open grassland. Open camp sites are available.

Richards Bay Game Reserve - 2,000 acres (800 hectares) of water - established in 1935. The reserve contains an estuarine lagoon, with mangrove scrub supporting an extensive waterfowl population.

Royal Natal National Park - 20,000 acres (8,000 hectares) - established in 1916. The park contains some of the finest scenery in the Drakensberg Mountains, and is comprised of highland sourveld with some forest patches. Notable features are the amphitheater of Mount-aux-Sources (11,150 feet) and the headwaters of the Tugela River. Grey rhebuck and mountain reedbuck, as well as other species, inhabit the park. It contains representative Bushman paintings. Accommodations, including a modern hotel, are available.

Rugged Glen Nature Reserve - 1,882 acres (753 hectares) - established in 1950. The reserve contains an area of mountainous open grassveld slopes with patches of indigenous evergreen forest. Typical highland sourveld fauna and flora are present, including grey rhebuck and white tailed gnu.

St. Lucia Game Reserve and Park - 122,090 acres (47,836 hectares) - partially established as a game reserve in 1897, modified and extended in 1939. A large part of the area consists of St. Lucia Lake and its estuary system on False Bay, which afford fine fishing, boating and swimming. The terrain supports coastal scrub and jungle. It offers sanctuary to three or four large herds of hippopotami and is inhabited by many kinds of birds, especially waterfowl. Guided tours are available, as are rest huts.

Sordwana Bay Park - 1,020 acres (408 hectares) - established in 1950. The park contains an area of bushy coastal dunes reserved as a wildlife sanctuary. Camp sites are available.

Umfulozi Game Reserve - 72,000 acres (28,800 hectares) - established in 1897. The reserve contains an area of rolling thornveld and provides the only sanctuary for the square-lipped rhinoceros (Ceratotherium sinum) in the Union of South Africa. Black rhinoceros also inhabit the area. Guided tours are available.

Umlalazi Nature Reserve - 2,240 acres (896 hectares) - established in 1948. The reserve contains a coastal dune forest of botanical interest. The fauna includes bushbuck, duiker and bush pig. Camp sites are available.

#### Orange Free State Province

Franklyn Game Reserve - 489 acres (196 hectares) in the city of Bloemfontein - established in 1928 by Council Resolution. The reserve is an area of hills with luscious growth of bush and grass, and protects a population of springbok, blesbok, zebra, eland, duiker, steenbok and rhebok. The City Council of the Municipality administers the area.

Pretorius Kloof Nature Reserve - 63 acres (25 hectares) in the outskirts of Bethlehem - established in 1922. The reserve is a mountainous area with numerous tree species and includes Lake Athlone and a scenic ravine. Fauna include steenbok, duiker, various species of waterfowl, guinea fowl, pheasants and weaver birds. The reserve is administered by the Municipality of Bethlehem.

Willem Pretorius Game Reserve - 21,111 acres (52,778 hectares) established in 1956. The reserve comprises open plains, mountains and bush, including well-wooded kloofs in the Doornberg Range. The Allemanskraal Dam is in the reserve. Most of the animal species (Blesbuck, springbuck, black wildebeest, red hartebeest, eland, zebra and impala) have been transferred from the Somerville Game Reserve, which was deproclaimed, to this reserve. The land is owned by the Union Government, and the reserve is under the Provincial

Administration, assisted by the Advisory Board on Nature Conservation and Public Resources. Accommodations are available.

### Transvaal Province

The nature reserves are established under the Provincial Game Ordinance of 1949 and Ordinance No. 9 of 1940 by proclamation of the Administrator who may alter the boundaries (with the exception of Honnet). The reserves are administered by the Nature Conservation section of the Provincial Government of Transvaal.

Barberspan Nature Reserve - 8,940 acres (3,576 hectares) - established in 1954.

The reserve is an ornithological research station in an area of plains, and includes a portion of the shores of Lake Barberspan. The thousands of birds, including flamingo, pelican, fish eagle, spurwing and Egyptian goose, and various species of ducks, nest or spend the winter there. Migration studies and banding are in progress. Accommodations are privately operated; angling is a popular pursuit.

Berghoek Nature Reserve - 1,750 acres (700 hectares) - established in 1954. The reserve protects part of the Drakensberg Range. The primary objective is to protect the fauna and flora, including reed mountain reedbuck, oribi and klipspringer.

Hans Merensky Nature Reserve - 10,230 acres (4,092 hectares) - established in 1954.

Fifteen miles from Kruger National Park, the area comprises dense savannah and mountains of the Black Hills Range on the Great Letaba River. Flora consists mainly of bushveld tree species, and there is a variety of wild animals. A hot springs is located in the park. An effective game fence has been erected and water conservation measures instituted. The area is to be developed into a bushveld holiday resort.

Honnet Nature Reserve - 4,690 acres (1,876 hectares) - established in 1939. The reserve is an area of savannah and mountains and includes the Tshipise Hot Spring. The reserve is administered by the Mineral Baths Board of Trustees. Access is by motor; there are numerous accommodations.

S. A. Lombard Nature Reserve - 9,330 acres (3,732 hectares) - established in 1949.

Eland, blesbuck, buffalo, grey duiker, red hartebeeste, springbuck, impala and other animals inhabit the reserve. Wildlife research is undertaken with a view to distribution among farmers, and serological research. A fully equipped laboratory is located on the reserve. Access is by motor transportation.

Loskop Dam Nature Reserve - 31,440 acres (12,416 hectares) - established in 1940.

This area of mountains and savannah was set aside to protect the wildlife on four farms bordering the Loskop Reservoir on the Olifant River, and as a recreational area. Many species of birds and mammals inhabit the reserve, and a large portion west of the dam has been fenced and is being stocked with game animals. Among the plants are cycads and the very rare Encephalartos. Access is by motor; there are no roads in the reserve, and the farms are not open to the public.

N'jелеle Nature Reserve - 50 acres (20 hectares) - established in 1954. The

reserve is a small peninsula of dense savannah or bushveld extending into the N'jелеle Reservoir on the N'jелеle River.

Ohrigstad Dam Nature Reserve - 6,320 acres (2,568 hectares) - established in 1954.

The reserve is a mountainous area around the Ohrigstad Reservoir on the Ohrigstad River, and provides sanctuary to oribi and grey rhebuck. Access is by motor.

Percy Fyfe Nature Reserve - 6,190 acres (2,476 hectares) - established in 1954. The

reserve is dense savannah, rising to mountainous. Management objectives include water and soil conservation, and the breeding and distribution of blesbuck among the farmers.

Vaaldam Nature Reserve - 63,280 acres (25,312 hectares) - established in 1954.

Reserved for an angling resort, the area is grassy plain typical of Transvaal highland on the Vaal Reservoir on the Vaal River. Fishing facilities are being constructed; only day camping sites are available. Access is by motor.

Vertroosting Nature Reserve - 60 acres (24 hectares) - established in 1957. The

reserve is part of the Drakensberg Range. Protection is restricted to the only stand of Kniphofia in Transvaal.

Municipal Nature Reserves

A number of nature reserves are administered by municipalities in the three Provinces. Among the more extensive are:

Lydenburg Nature Reserve - 18,666 acres (7,464 hectares) in Transvaal. An area of plains, mountains and valleys, it was reserved to protect a variety of wildlife.

Van Riebeeck Nature Reserve - 11,153 acres (4,461 hectares) southwest of Pretoria - established in 1937. The reserve comprises high-veld, the Rietvlei Reservoir and the sources of the Hennopa River. A number of species of mammals and birds inhabit the reserve.

UNITED STATES OF AMERICA

National Park System

In the nineteenth century, the United States awakened to the devastation resulting from ruthless exploitation and to the danger she might rapidly exhaust the resources on which her well-being and survival depend. An early move in this awakening was the transfer to the State of California, in 1864, of the Yosemite Valley and the Mariposa Grove of Sequoia gigantea for protection and public enjoyment; they were added to Yosemite National Park in 1906. The origin of the concept of national parks under federal ownership, however, was conceived in 1870, when the Doane-Washburn Expedition investigated reports of the wonders of the Yellowstone. Discussing ways to exploit this region under the homestead laws, one member, Cornelius Hedges, proposed rather that it should be in the possession of all the people forever. The legislation they drafted to create the world's first national park, Yellowstone Park, was signed by President Grant in 1872.

By 1959, the system included 180 areas encompassing 22,918,073 acres, of which 22,483,695 were in federal ownership. Most of the land so reserved was originally part of the public domain. In addition, large tracts have been donated to the national park system by some of the states, and as gifts from individuals.

The establishment of national parks is always done by the Congress, and unless boundary adjustment provisions are provided in the original act, it requires an Act of Congress to change their boundaries or to modify the basic protection given them. National parks have been defined as spacious land and water areas of nationwide interest established as inviolate sanctuaries for the permanent preservation of scenery, wilderness, and natural flora and fauna in their natural condition. By 1959, 29 national parks had been reserved encompassing 13,455,378 acres, most of them large in size, 20 comprising more than 100,000 acres each.

National monuments are established by specific Acts of the Congress, or under the Antiquities Act of 1906 which provides power to the President to reserve federal lands for the protection of objects of historic, prehistoric and scientific interest. By proclamation, the President can thus act without delay

to safeguard assets in danger of despoilment. In 1933, jurisdiction over all national monuments, which had up to then been administered by several different federal agencies, was assigned to the National Park Service. The system includes 83 national monuments (9,129,537 acres), 33 of which protect natural areas of scenic and scientific importance. Twenty national monuments preserve remains of the aboriginal Indian cultures, mainly in the southwestern states, but also in other parts of the country. The remaining thirty relate to the history of white man's domination of the continent. The National Park Service also administers 52 national historical parks, military parks, battlefield parks and sites, and memorials. Three national parkways have been inaugurated. The system also includes the Cape Hatteras National Seashore Recreation Area in North Carolina; the Theodore Roosevelt National Memorial Park in the badlands of North Dakota, and the National Capital Parks in the District of Columbia, Maryland, Virginia and West Virginia, and three large reclamation reservoirs.

The National Park Service was established within the Department of Interior by an Act of Congress on 25 August 1916, to administer the reserved areas assigned to its jurisdiction "by such means and measures as conform to the fundamental purpose of said parks, monuments and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." This directive has provided the safeguard protecting the national park system from exploitation for profit or development for public use that would contravene the primary objective of preserving their natural or historical feature.

All wildlife, including predators, are protected from hunting on the principle that the native species should follow their natural behaviour patterns as unmodified by human activity as possible.

The Park Service respects livestock grazing privileges extant at the time lands are brought under its jurisdiction, and continues them through the lifetime of the permittee's immediate heirs; grazing is being reduced by the purchase of these rights and other means.

In 1956, Park Service Director Conrad L. Wirth announced a 10-year, \$459,000,000 park conservation, improvement and development programme, "Mission 66", to meet the conditions anticipated in 1966 when an estimated 80,000,000 people would be visiting their parks annually. The appropriation for the fiscal year 1960 was \$79,722,000. A moderate fee is charged by the Park Service for entrance of automobiles into certain national parks and other areas, and for use of elevators in caverns. The Park Service also receives contributions from foundations and individuals for particular purposes, and for acquisition of private lands lying within the system.

From its beginning, the National Park Service has developed the role of interpreting its areas, not merely to provide factual information about scenic features, wildlife, geology, botany, history or archeology, but to stimulate the visitor to widen his interests and knowledge of basic truths through understanding the experiences available in these natural and historical reservations. Such visitor facilities as roads, trails and campgrounds, and utilities, are provided by the Park Service. Hotels and lodges, cabins, restaurants, automobile services, busses, pack horses and other services for which a charge is made are under private management.

Surveys have been made of the remaining stretches of natural shoreline along the Atlantic and Pacific Oceans, the Gulf of Mexico and the Great Lakes, to determine localities which might be brought under Park Service jurisdiction or under state or local governments. The National Park Service serves as consultant to the states on park and recreational planning, and in general represents the federal interest in such matters. In all of its activities, the Park Service is guided by the statutory Advisory Board on National Parks, Historic Sites, Buildings and Monuments.

#### National Parks

Acadia National Park - 42 square miles, on the Atlantic Coast in Maine, established as a national monument, 1916; as Acadia National Park, 1919. Acadia is dominated by the mountainous uplift of Mount Desert Island. The park also includes part of the Schoodic Peninsula across Frenchman Bay,



and the smaller Isle au Haut. Place names reflect the early French colonization of the New World. Mount Desert Island remained remote and inaccessible until the mid-nineteenth century, when it became a popular vacation area. The mixed conifer and hardwood forest is a boreal extension of the ancient Appalachian woodlands that range northward along the mountain folds from Tennessee and Georgia. It is an eroded landscape of rounded mountains, great sea cliffs and headlands, and glaciated rock. The Schoodic Peninsula and Isle au Haut provide magnificent seaward views. Seabirds and forest wildlife are abundant, and the sea beach and tidal pools are inhabited by myriad invertebrates. Excellent roads encircle and traverse the park, and 50 miles of trails have been built. Campgrounds have been established. Many types of accommodations are available at Bar Harbor and other nearby villages.

Big Bend National Park - 1,117 square miles, on the Mexican border of Texas, established in 1944. The great bend of the Rio Grande River extends 107 miles along the park boundary, cutting through three stupendous 1500-foot canyons - Santa Elena, Mariscal and Boquillas - in some of the most spectacular desert scenery in the United States. Vast arid basins, gouged by deep arroyos that glow with intensely-coloured strata, support many species of cactus, yuccas, and other xerophytic plants. It is the habitat of characteristic desert birds and mammals. In the centre of these flatlands soar the spectacular Chisos Mountains, with mesas and buttes, eroded into castle-like summits and promontories as they rise 4,000 feet above the basin floor. To the east, the Sierra del Carmen guards the border of the park, and to the south the range of the Fronteriza disappears into the vastness of Mexico. Ascending these ranges, the basin flora gradually gives way to cooler piñon pine, ponderosa, oak and juniper forests and bare treeless summits. The fauna has Mexican affinities, and many species of birds, mammals, and reptiles, found here occur in no other national park of the United States. Establishment of a contiguous part of Mexico as an international park has been strongly advocated. Overnight accommodations are being increased under the Mission '66 program, and campgrounds are provided. Good roads penetrate parts of the park, but it retains its essential character as wilderness.

Bryce Canyon National Park - 56 square miles, in southern Utah, established as a national monument, 1923; as a national park, 1928. A vast amphitheater has eroded from the side of the Paunsagunt Plateau, sculptured by rain, frost and running water into an enchanted exhibit of vivid ochre-orange spires and columns. A 17-mile drive borders the rim, and horseback and foot trails wind down through the fantastic pinnacles and walls. These are recent rock formations, laid down during the past 60 million years. Eastward is spread a panorama of valleys carpeted with sagebrush and valleys dark with evergreen forests. Above the rim of the canyon, ponderosa pines are abundant, mixed with other conifers and aspen, and the forest floor is carpeted with wildflowers. Mule deer and smaller mammals, and many birds inhabit the park. A lodge and inn are located in the park, and a campground is available. The park is served by bus.

Carlsbad Caverns National Park - 49,448 acres (19,779 hectares), in southeastern New Mexico, established as a national monument in 1923; as a national park, 1930. The explored part of the largest known caverns in the world extends 23 miles and to a depth of 1,320 feet. Three miles of trails lead visitors through arching chambers of brilliant formations, stalactites, stalagmites, gleaming columns and translucent draperies, illuminated by hidden lights. At nightfall, during the summer, millions of bats of eleven species spiral upward from the cave. They migrate south in winter. The surface area supports a variety of semi-arid plants and wildlife. Accommodations are available in nearby towns.

Crater Lake National Park - 250 square miles, in the Cascade Range of Oregon, established in 1902. The caldera of 12,000-foot Mt. Mazama, which collapsed in an ancient eruption, contains a lake twenty square miles in area, an expanse of intense blue, surrounded by colourful cliffs rising 500 to 2,000 feet above the surface. Around the rim are open forests of western hemlock, whitebark pine, and Shasta fir, while at lower elevations are stands of Douglas fir, ponderosa pine and sugar pines. Small mammals are numerous, and blacktail and mule deer and black bear are found, as well as many species of birds. A thirty-five mile road encircles the rim of the crater, and many trails penetrate other parts of the park. Overnight accommodations and a campground serve visitors, and launches and rowboats are available.

Everglades National Park - 2,300 square miles, at the southern tip of Florida, established in 1947. The vast, level, drowned "River of Grass", supports a wealth of tropical flora and fauna unique in the United States. Broad expanses of saw grass marsh are interspersed with hammocks of dense jungle growth, picturesque stands of palm and cypress, and mangrove forests along the coastal margins. The park includes Florida Bay and many islands and islets known as keys. It is especially famous for its birdlife. Large colonies of white ibis and wood ibis, egrets and other herons, including the scarce roseate spoonbill, nest in great rookeries; many other species are found in abundance, some of them nowhere else in the United States. Cougar, black bear, manatee, white-tailed deer, and other mammals occur, as do many species of snakes and such reptiles as the American crocodile and alligator. The park is maintained as a wilderness. Only one road enters it to serve Flamingo, at the tip of the mainland, where a boat marina and limited accommodations are available. Visitor facilities are plentiful in towns near the park. The park is best explored by boat, and boat tours are conducted in the park by the National Audobon Society.

Glacier National Park - 1,583 square miles, in northern Montana, established in 1910. The park is contiguous with Canada's Waterton Lakes National Park, and they were dedicated together as an international Peace Park in 1932. The park contains some of the most spectacular scenery in the Rocky Mountains, with towering peaks and glaciers rising above great canyons, lakes and virgin conifer forests. The display of wildflowers is one of the attractions of the park, the blooms changing with the seasons. Wildlife is abundant and varied, including mountain goats, bighorn, moose, wapiti, mule and white-tailed deer, grizzly and black bear, pine marten, fisher, wolverine, beaver and other species. The Going-to-the-Sun highway crosses the continental divide, and more than 1,000 miles of trails lead into the more remote parts of the park. A number of excellent lodges and campgrounds are located within the park. The park may be reached by railroad as well as by automobile.

Grand Canyon National Park - 1,009 square miles, in northern Arizona, established in 1919. The Grand Canyon of the Colorado River is a 217-mile gorge, four to eight miles wide, one mile deep, cutting through the Coconino Plateau. Tremendous pediments, mesas and buttes are carved in multicoloured rocks of warm reds and ochres contrasting with blue shadows in the recesses. Half of the canyon is in the national park; the lower gorge is in Grand Canyon National Monument. The range in elevation provides great variation in animal and plant life. Within the canyon itself the ecology is that of the sonoran desert, while on the cooler plateau rims 6,000 to 8,000 feet above sea level are pinyon and ponderosa pines and wildlife of the montane zone. Geologically, the strata are a record of the earth's history from Precambrian times through the Paleozoic eras. Visitors are accommodated on both the south and north rims, famous for their spectacular views, and served by excellent roads. A railroad also serves the south rim. Mule trips into the canyon are available, and hiking trails are provided. The Havasupai Indians live in Havasu Canyon within the park, and the Navajo and Hopi Indian Reservations are to the east.

Grand Teton National Park - 484 square miles, in northwestern Wyoming, established in 1929, enlarged in 1950. The Grand Tetons are an isolated glaciated mountain range rising above a great sagebrush basin known as Jackson Hole, and are a few miles south of Yellowstone National Park. The peaks are superbly beautiful and afford excellent climbing. They are reflected in Jackson Lake and other lakes, and their slopes and moraines as well as the valley floor, contain dense stands of lodgepole pine and other conifers, aspen and willow. Wildlife is abundant, notably elk, moose, deer, beaver, and other mammals and a variety of birds, including the rare Trumpeter Swan. Hiking and riding trails penetrate the wilderness, and roads serve parts of the park. There is an airfield in Jackson. Excellent lodges and dude ranches are within or near the park, and campgrounds are provided.

Great Smoky Mountains National Park - 720 square miles, in western North Carolina and eastern Tennessee, established in 1940. The park contains several of the highest peaks (over 6,000 feet above sea level) in the eastern Appalachian Mountains, and the ranges are covered with the last substantial remnant of primeval southern hardwood forests. One hundred and thirty species of trees occur in the park, and outstanding displays of rhododendrons and azaleas are seen. Wildlife has increased under protection, and deer, bear, wildcats and other mammals, and many birds inhabit the park. The Appalachian Trail, which extends along the mountains from Georgia to Maine, crosses the park, and many other hiking trails are provided, with shelters at intervals. Motor roads traverse the park, but most of it retains its wilderness character. In one section, log cabins and farm buildings characteristic of the pioneer life have been rehabilitated. Campgrounds are available within the park boundaries, and hotels and lodges are in towns nearby.

Hawaii National Park - 270 square miles on the islands of Hawaii and Maui, in Hawaii, established in 1916. The two sections will be redesignated as separate national parks in 1961. On Hawaii, the park contains two active volcanoes, Mauna Loa, 13,680 feet above sea level, and Kilauea, 4,000 feet above sea level; Haleakala, on Maui, rising 10,032 feet, has been dormant for 200 years. A magnificent tropical rain forest stands on Kilauea, and is the habitat of many endemic species of birds. Mauna Loa supports more open forests, including unique flora. In the crater of Haleakala, one of the largest known, is found the extraordinary silversword plant. Air and boat service is available to the islands, and the park areas are reached by automobile. Campgrounds are available, and there are overnight lodges on Kilauea and Haleakala.

Hot Springs National Park - 1.5 square miles in the Ouachita Mountains of Arkansas, reserved in 1832 and as a national park in 1921. Forty-seven hot springs provide therapeutic facilities, and elaborate hotels and lodges serve visitors. The park includes representative Ozark hills and woodlands, with numerous birds and other wildlife. A campground is provided.

Isle Royale National Park - an island in Lake Superior, Michigan, covering 210 square miles, established in 1940. Isle Royale was submerged in glacial times, re-emerging as the level of the lake fell. It is covered by a thick mixed conifer-hardwood forest with dense undergrowth of smaller trees, shrubs and flowers. The predominant animal is the moose, and coyotes, snowshoe rabbits and beavers and other small mammals are numerous. Two hundred species of birds have been recorded. The island and its environs played a leading role in early fur trade explorations. The waters adjacent to the island are famous for sport fishing. Eighty miles of foot trails are available, with shelters and campgrounds. Two lodges are on the island. Access is by motor launch.

Lassen Volcanic National Park - 163 square miles, in northeastern California, established in 1916. Mount Lassen is the most recently active volcano in the continental United States (outside of Alaska and Hawaii), and erupted many times between 1914 and 1917. It is one of the large peaks of the Cascade Range, rising 10,453 feet above sea level, and exhibits many aspects of vulcanism. The scenery is spectacular, and includes several beautiful lakes, evergreen forests and wildflowers. Black-tailed and mule deer are common, as are small mammals and birds. Hiking, horseback riding, skiing, camping and fishing are popular pursuits.

Mammoth Cave National Park - 78 square miles, in southwestern Kentucky, established in 1941. One hundred and fifty miles of caverns have been explored to a depth of 360 feet. They contain stalactites, stalagmites, drapery formations, gypsum crystals, rivers, waterfalls and lakes. Bats are abundant, and cave crickets, blind crawfish and the eyeless cavefish occur. Five hardwood forests cover the surface of the park, and are inhabited by many mammals and birds. The two rivers that traverse the surface are used for boating. One hotel is within the park, and campgrounds are available.

Mesa Verde National Park - 80 square miles, in southwestern Colorado, established in 1906. The park consists of a large mesa standing 2,000 feet above the plain, gashed by canyons and covered by a heavy conifer forest.

It was established to preserve the most outstanding Indian relics in the United States. Occupied from about 1 A.D. to 700 A.D. by the Basketmakers, who lived in pit houses, and continuously until about 1300 A.D. as a pueblo culture, many ancient buildings remain; the most notable is Cliff Palace, with 200 living rooms, 23 kivas, and 8 floor levels, built in one great overhang. Many mammals and birds inhabit the park, and bighorn sheep and turkey have been re-established. Hiking, horseback riding and camping are favorite activities, and one lodge has been built in the park.

Mount McKinley National Park - 3,030 square miles, in southcentral Alaska, established in 1917. Mount McKinley, rising 20,300 feet above sea level, in the Alaska Range, is the highest peak in the North American continent. It is perpetually blanketed with snow and ice, and active glaciers descend the valleys. The lower slopes support subarctic spruce forests to the perma frost tundra, dominated by willow and birch. The park is a wilderness habitat of abundant wildlife, caribou, Dall sheep, moose, Toklat grizzly bear, and smaller mammals, and myriad nesting shorebirds, waterfowl and boreal species of birds. One hundred miles of road in the park afford spectacular views of the mountains and opportunity for observing wildlife, while crosscountry travel on foot is relatively easy and safe. One hotel is within the park, and there are several campgrounds. The park may be reached by railroad, automobile or airplance.

Mount Rainier National Park - 377 square miles, in the Cascade Mountains of Washington, established in 1899. The park surrounds the superb 14,410 foot volcanic peak of Mount Rainier, with its mantle of glacial ice including 25 active glaciers. Below flower-clad mountain meadows, the deep conifer forests encircle the mountain and descend the valleys. The view of Mount Rainier at dawn or sunset is one of the most famous scenes in America. More than 50 species of mammals and 130 species of birds have been recorded, including bears, mountain goats, cougar, and deer. The park affords excellent mountaineering and skiing, and a 90-mile trail encircles the peak, with shelter cabins at intervals. Excellent roads are provided for motorists, although most of the area is undisturbed wilderness. Overnight accommodations are available in and near the park.

Olympic National Park - 1,321 square miles, on the Olympic Peninsula in northwestern Washington, established in 1938. The Olympic Mountains are a wilderness of peaks, glaciers and forested valleys. On the western slope stands the most luxuriant rain forest in North America, a jungle of gigantic spruces and firs, carpeted with moss and ferns. Wildlife is abundant, the most notable species being the rare Roosevelt Elk, of which about 6,000 inhabit the park. Several large lakes are fed by swift streams plunging from the summits. Included in the park is a fifty-mile strip of primitive Pacific coastline. A limited number of roads penetrate parts of the park, and 600 miles of trails provide access by foot or horseback. Campgrounds are available, and cabins and lodges are in and near the park.

Platt National Park - 1.5 square miles, in southern Oklahoma, established in 1906. A perimeter drive affords views of wooded hills rising from the Great Plains toward the Arbuckle Mountains. In former times, Indian tribes used the cold mineral-water springs. Several modern pavilions have been built. Camping, swimming and picnicking are permitted. A small herd of bison is maintained in the park.

Rocky Mountain National Park - 405 square miles, in Colorado, established in 1915. The eastern ranges of the Rocky Mountains include 65 peaks rising above 10,000 feet, exhibiting a remarkable record of glaciation, and some of the most beautiful scenery in the United States. Many trails lead through forested canyons to lakes and vales, and the Trail Ridge Road crosses the continental divide above 12,000 feet. Wildlife is varied and abundant, including herds of elk, deer and bighorn sheep, many beaver, and other mammals, and myriad birds. Campgrounds, lodges and cabins are available in and near the park.

Sequoia and Kings Canyon National Parks - 1,314 square miles in the Sierra Nevada ranges of California; Sequoia National Park was established in 1890, Kings Canyon National Park in 1940. The two parks are contiguous, and protect some of the finest wilderness regions in the western mountains. Descending westward from the peaks of the crest are deep, broad canyons



clad with conifers, with rushing rivers and magnificent scenic views. Both parks include outstanding groves of Sequoia gigantea, the largest trees in the world. Horseback riding and packing trips are favoured ways to penetrate the remote heights, and good roads serve parts of the lower elevations. Wild animals inhabit the parks in numbers. Campgrounds, lodges and cabins are provided.

Shenandoah National Park - 302 square miles, in Virginia, established in 1935.

The Blue Ridge, a section of the Appalachian Mountains, is a beautiful, gentle mountain crest, covered with verdant deciduous and conifer forests, especially famous for the brilliant colouring of its foliage in autumn. The Skyline Drive follows the crest through the park and leads southward as the Blue Ridge Parkway to the Great Smoky Mountains National Park. The Appalachian Trail and other trails provide access to glades and promontories. The park is noted for its birdlife; under protection, mammals are increasing. Campgrounds are available, and there are several lodges in the park.

Virgin Islands National Park - 9,485 acres on St. John Island, in the U.S.

Virgin Islands, established in 1956. This beautiful Caribbean Island is covered with tropical vegetation and second growth trees, famous for its scenic mountain trails and quiet coves with their open beaches. Swimming, fishing, skindiving, and underwater photography are popular pursuits. Campground facilities are provided, and hotels are located in adjacent communities. Access is by boat from St. Thomas.

Wind Cave National Park - 44 square miles, in the Black Hills of South Dakota,

established in 1903. The surface of the park is prairie grassland, supporting a herd of bison, antelope, elk, deer and prairie dogs (Cynomys ludovicianus), and characteristic birds. Wind Cave has been explored for ten miles, and is noted for its unusual formations known as boxwork; it also contains large underground rooms. A campground is provided, but no hotels or cabins are in the park.

Yellowstone National Park - 3,472 square miles, in northwestern Wyoming, Montana and Idaho, established in 1872. The first national park, Yellowstone is a wonderland of forested mountains, canyons, waterfalls, and lakes. Its 3,000 geysers are world-famous. The park is a sanctuary for many kinds of animals, including thousands of elk, herds of deer, antelope and bison; bighorn sheep; black and grizzly bears; and countless smaller mammals and some 200 species of birds, among them the Trumpeter Swan. While good roads serve the park, most of it is wilderness, accessible by foot or horseback. Boating and fishing are permitted. Hotels, cabins and campgrounds are provided.

Yosemite National Park - 1,189 square miles, in the Sierra Nevada of California, established in 1890. The Yosemite Valley is one of the most awe-inspiring canyons in the world, its sheer walls rising in domes, pinnacles and escarpments more than 4,000 feet from the valley floor, and plunging waterfalls descending from them. Beyond the valley extends a vast wilderness of towering peaks, their slopes covered with dense conifer forests, and alpine meadows above. The park includes groves of Sequoia gigantea and a variety of other trees. Seventy-eight species of mammals and 200 species of birds have been recorded. Seven hundred miles of trails are available, and several good roads, one of which crosses the mountains. Pack and saddle horses may be obtained, and camping facilities and overnight accommodations are excellent. In winter the park is enjoyed by skiers.

Zion National Park - 224 square miles, in southern Utah, established in 1919. Brilliantly-coloured sheer-wall canyons rising about 4,000 feet above the valley floor, dissect the plateau desert country of Utah. Well-forested, and mostly an undisturbed wilderness, the park is the habitat of many kinds of birds and animals. A scenic drive affords spectacular vistas of towering monoliths and rock formations. The park includes a number of prehistoric Indian relics. Campgrounds and overnight accommodations are available in and near the park.

National Monuments (83) 9,129,537 acres, 3,651,815 hectares

Natural Areas

<u>Name</u>	<u>Location</u>	<u>Area</u>		<u>Date Established</u>	<u>General Characteristics</u>
		<u>Acres</u>	<u>Hectares</u>		
Arches	Utah	34,250	13,700	1929	Eroded arches, pinnacles, in desert.
Badlands	South Dakota	111,530	44,612	1939	Eroded sedimentary badlands; many fossils; short-grass prairie ecology.
Black Canyon of the Gunnison	Colorado	14,206	5,682	1933	Sheer-walled canyon in San Juan Mountains region.
Capitol Reef	Utah	39,173	15,669	1937	Colorful sedimentary sandstone cliffs dissected by a narrow gorge along Fremont River.
Capulin Mountain	New Mexico	680	272	1916	Asymmetrical recently extinct volcanic cinder cone.
Cedar Breaks	Utah	6,172	2,469	1933	Vast natural amphitheatre eroded into variegated Pink Cliffs 2,000 feet thick; wildflowers.
Channel Islands	California	18,167	7,269	1938	Santa Barbara and Anacapa Islands (1,120 acres land area) offshore from southern California, to protect sea lion and seabird rookeries.
Chiricahua	Arizona	10,646	4,258	1924	Tertiary rhyolitic monoliths and other geological features; arid mountains, desert and montaine ecology with Mexican affinities.

Natural Areas (cont'd)

<u>Name</u>	<u>Location</u>	<u>Area</u>		<u>Date</u>	<u>General Characteristics</u>
		<u>Acres</u>	<u>Hectares</u>	<u>Established</u>	
Colorado	Colorado	17,693	7,077	1911	Canyons, monoliths, in arid mesa region, bison.
Craters of the Moon	Idaho	48,184	19,274	1924	Volcanic phenomena.
Death Valley	California-Nevada	1,907,760	763,104	1933	Desert wilderness; geological, botanical, faunal features; pioneer history.
Devils Tower	Wyoming	1,347	539	1906	865-foot exposed volcanic intrusion.
Devils Postpile	California	798	319	1911	Basaltic lava columns rising as high as 60 feet.
Dinosaur	Utah-Colorado	209,744	83,898	1915; enlarged 1938	Spectacular canyons of Green and Yampa Rivers; quarry of dinosaur fossils.
Glacier Bay	Alaska	2,274,595	909,838	1925	Large tidewater glaciers, fjords; post-glacial forests; abundant wildlife, especially several species of bears.
Grand Canyon	Arizona	198,280	79,312	1932	Lower part of Grand Canyon, including inner gorge.
Great Sand Dunes	Colorado	36,740	14,596	1932	Shifting aeolian dunes at foot of Sangre de Cristo Mountains; among the largest and highest dunes in the United States.
Jewel Cave	South Dakota	1,275	510	1908	Limestone caverns with fine calcite encrustations.
Joshua Tree	California	557,935	223,174	1936	Stand of Joshua Tree ( <i>Yucca brevifolia</i> ); sonoran desert ecology.

Natural Areas (cont'd)

<u>Name</u>	<u>Location</u>	<u>Area</u>		<u>Date Established</u>	<u>General Characteristics</u>
		<u>Acres</u>	<u>Hectares</u>		
Katmia	Alaska	2,697,590	1,079,036	1918	Active volcanoes; Valley of Ten Thousand Smokes; subarctic conifer forests; Alaska Brown Bear and other wildlife.
Lava Beds	California	46,239	18,496	1925	Volcanic geology; semi-arid mountain ecology; site of Modoc Indian War of 1873.
Lehman Caves	Nevada	640	256	1922	Ornamented limestone cavern in isolated Snake Range.
Muir Woods	California	504	202	1908	Virgin stand of Coastal Redwood ( <u>Sequoia sempivirens</u> ).
Natural Bridges	Utah	2,650	1,060	1908	Three natural bridges, the highest 222 feet above stream bed, with span of 261 feet.
Oregon Caves	Oregon	480	192	1909	Limestone caverns, with Jeffrey pine forest on surface.
Organ Pipe Cactus	Arizona	330,874	132,350	1937	Outstanding exhibit of unique sonoran desert plants and wildlife.
Petrified Forest	Arizona	94,161	37,664	1906	Extensive exhibit of petrified wood, Indian ruins, and part of colorful Painted Desert.
Pinnacles	California	14,498	5,799	1908	Volcanic and other geological features, with spire formations 500 to 1,200 feet high.
Rainbow Bridge	Utah	160	64	1910	Largest, most beautiful natural arch known, in Escalante desert, rising 309 feet over stream bed.

Natural Areas (cont'd)

<u>Name</u>	<u>Location</u>	<u>Area</u>		<u>Date</u>	<u>General Characteristics</u>
		<u>Acres</u>	<u>Hectares</u>	<u>Established</u>	
Saguaro	Arizona	63,284	25,314	1933	Saguaro forest and other succulent cacti.
Sunset Crater	Arizona	3,040	1,216	1930	Volcanic cinder cone with summit crater formed just prior to 1100 A.D.
Timpanogos Cave	Utah	250	100	1922	Colorful limestone cave on Mount Timpanogos.
White Sands	New Mexico	146,535	58,614	1933	Gypsum dunes 10 to 45 feet high; wildlife showing adaptation to environment.

Archaeological Areas

<u>Name</u>	<u>Location</u>	<u>Area</u>		<u>Date</u>	<u>General Characteristics</u>
		<u>Acres</u>	<u>Hectares</u>	<u>Established</u>	
Aztec Ruins	New Mexico	27	11	1933	Excavated 12th century Indian town.
Bandelier	New Mexico	27,103	10,841	1916	Prehistoric Indian homes of later Pueblo period, in canyon-slashed slopes of Pajarito Plateau.
Canyon de Chelly	Arizona	83,840	33,536	1931	More than 400 cliff dwellings dating as early as 1066 A.D., in magnificent canyon scenery on Navajo Indian Reservation.
Casa Grande	Arizona	473	189	Reserved 1892; established as N.M., 1918	Unique adobe tower probably built by Salados Indians in the 1300's in earlier Hohokam settlement.
Chaco Canyon	New Mexico	21,509	8,604	1907	Thirteen major Indian ruins; hundreds of smaller ruins.
Effigy Mounds	Iowa	1,204	482	1949	Large Indian mounds in shapes of birds and other animals.
Gila Cliff Dwellings	New Mexico	160	64	1907	Cliff dwellings in centre of Gila Wilderness area.
Hovenweep	Utah-Colorado	505	202	1923	Unique towers built in 12th century.
Montezuma Castle	Arizona	842	337	1906	Outstanding cliff dwelling dating from about 1100 A.D.
Mound City Group	Ohio	68	27	1923	Twenty-four ceremonial burial mounds of Hopewell people, dating from about 1000 A.D.

Archaeological Areas (cont'd)

<u>Name</u>	<u>Location</u>	<u>Area</u>		<u>Date Established</u>	<u>General Characteristics</u>
		<u>Acres</u>	<u>Hectares</u>		
Navajo	Arizona	360	144	1909	Three of largest known cliff dwellings; Betatakin, Keet Seel, and Inscription House, dating from 13th century.
Ocmulgee	Georgia	683	273	1936	Mounds built by farming Indians, dating from 10th century.
Pipestone	Minnesota	7	2.8	1937	Quarry from which Indians obtained materials for ceremonial peacepipes.
Tonto	Arizona	1,120	448	1907	Salado Indian cliff dwellings, in Salt River valley, dating from about 1350 A.D.
Tuzigoot	Arizona	43	17	1939	Outstanding pueblo containing 110 rooms; flourished between 1000 and 1400 A.D.
Walnut Canyon	Arizona	1,879	752	1915	200 small cliff dwellings, dating from 1000 to 1200 A.D.
Wupatki	Arizona	35,693	14,277	1924	Pueblos built by several tribes, dating from about 1100 A.D.; desert ecology.



Other Units of National Park System Protecting Natural Features

<u>Name</u>	<u>Location</u>	<u>Area</u>		<u>General Characteristics</u>
		<u>Acres</u>	<u>Hectares</u>	
Theodore Roosevelt National Memorial Park	North Dakota	70,374	28,150	Badlands along Little Missouri River, with abundant wildlife.
National Capital Parks	District of Columbia, Virginia, Maryland, West. Va.	40,948	16,379	Park system of the nation's capital, comprising 780 units.
Cape Hatteras National Seashore Recreational Area	North Carolina	28,500	11,440	Atlantic coastal beach; migratory waterfowl.

Pennekamp Coral Reef Reserve - 97.5 square statute miles (75 square nautical miles) in Florida, established by Presidential proclamation, 1960; administered by Florida Board of Parks and Historic Memorials. The area was established to protect an exceptional underwater coral reef, reef fishes and associated marina life. Destruction of natural features of the reef and adjacent waters and spear fishing are prohibited.

Other Units of National Park System Protecting Natural Features (cont'd)

Recreational Areas Established on Reservoirs

<u>Name</u>	<u>Location</u>	<u>Area</u>		<u>Date</u>	<u>General Characteristics</u>
		<u>Hectares</u>	<u>Acres</u>	<u>Established</u>	
Coulee Dam	Washington	39,400	98,500		Franklin D. Roosevelt Lake, on the Columbia River, 151 miles long, with 600 miles of shoreline. Wildlife abundant. State game laws apply. Motorboating permitted. Campgrounds available.
Lake Mead	Arizona and Nevada	3,000 sq. mi.			Lake Mead, formed by Hoover Dam, 115 miles long, with 550 miles of shoreline; and Lake Mohave, formed by Davis Dam, 67 miles long, on Colorado River, in scenic desert country. Wildlife abundant. Swimming, motor boating, fishing. Campgrounds, marina.
Shadow Mountain	Colorado	29 sq. miles		1952	Shadow Mountain Lake and Lake Granby, part of the Colorado-Big Thompson Project, on the southwestern boundary of Rocky Mountain National Park. Elk, deer, and other wildlife common. Boating, fishing, hiking, horseback riding. Campgrounds.

### Fish and Wildlife Service Refuges

During the second half of the nineteenth century the respective states began to enact game laws to control the ruthless slaughter of wildlife but enforcement was weak until national sentiment stimulated more effective protection under state game and conservation commissions. The vigorous interest taken by the Federal Government in wildlife restoration has been a primary factor in the success of this programme. On 1 July 1885, the Branch of Economic Ornithology was established in the Division of Entomology, United States Department of Agriculture; it became the Bureau of Biological Survey in 1905.

Reservation of federal land as National Wildlife Refuges was accomplished initially by Executive Orders of the President, the first refuge being the three-acre Pelican Island off the east coast of Florida established by Theodore Roosevelt in 1903. Many early bird sanctuaries, however, were created by the National Audubon Society, a citizens' organization, to preserve egret rookeries in the south.

Under the Migratory Bird Treaty Act of 1918, the Bureau was given power to extend federal protection to avian species that migrated between Canada and the United States; in 1937 a similar treaty with Mexico broadened this power. The Migratory Bird Conservation Act was enacted in 1929, providing broad legislative authority for refuge acquisition and development, and some funds were appropriated for the programmes. The 1940 Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere extended the application of certain protective measures to those American republics ratifying the treaty.

In 1939, the Biological Survey was transferred to the United States Department of the Interior and in 1940, together with the Bureau of Fisheries, became the Fish and Wildlife Service; in 1958, it was reorganized as the Bureau of Sport Fisheries and Wildlife, a part of the United States Fish and Wildlife Service. As of 30 June 1960, the Bureau administered 280 National Wildlife Refuges containing 28,506,105 acres. The revival of formerly drastically decimated species of larger animals and waterfowl to substantial population levels has been due in significant measure to these refuges, as well as to the protection afforded by the National Park system and state game reserves and improved laws.

A Partial List of the Larger Refuges Administered by the  
 Bureau of Sport Fisheries and Wildlife

National Wildlife Ranges

<u>Name</u>	<u>Location</u>	<u>Area</u>		<u>Date Established</u>	<u>General Characteristics</u>
		<u>Acres</u>	<u>Hectares</u>		
Arctic National Wildlife Range	Alaska	8,900,000	3,560,000	1960	Grizzly and polar bears, Dall sheep, wolverines, wolves, caribou; eastern Brooks Range and Arctic coast.
Izembek	Alaska	415,360	166,144	1960	Ducks, geese, brown bears, caribou; Aleutian chain.
Kuskokwim	Alaska	1,871,000	748,400	1960	Waterfowl, furbearing mammals; arctic tundra in northwestern Alaska.

Big Game Refuges and Game Ranges

Cabeza Prieta Game Range	Arizona	860,000	344,000	1939	Mexican antelope, Gaillard bighorn, peccary; sonoran desert.
Charles Sheldon Antelope Range and Refuge	Nevada- Oregon	543,898	213,559	1936	Pronghorn antelope, mule deer, sage hen, waterfowl; sonoran desert.
Desert Game Range	Nevada	188,415	75,366	1936	Pronghorn, Nelson bighorn, mule deer; sonoran desert.
Fort Niobrara National Wild- life Refuge	Nebraska	14,401	5,760	1912	Bison, Texas, long- horned cattle, elk, beaver, upland birds.
Fort Peck Game Range	Montana	375,238	150,095	1936	Pronghorn, Rocky Mt. bighorn, deer, elk, upland game birds; sagebrush basin.

Big Game Refuges and Game Ranges (cont'd)

<u>Name</u>	<u>Location</u>	<u>Area</u>		<u>Date Established</u>	<u>General Characteristics</u>
		<u>Acres</u>	<u>Hectares</u>		
Hart Mountain National Antelope Refuge.	Oregon	239,933	95,973	1936	Pronghorn, mule deer, upland birds; sagebrush plateau.
Kenai National Moose Range	Alaska	2,057,197	822,879	1941	Kenai moose, brown bear, Dall sheep, mountain goat, furbearers, birds; rugged wilderness of mountains, swamps, lakes and river.
Kodiak National Wildlife Refuge	Alaska	1,815,000	726,000	1941	Kodiak bear (world's largest carnivore), deer, waterfowl, colonial seabirds; forested Kodiak Island.
Kofa Game Refuge	Arizona	660,000	264,000	1939	Gaillard bighorn, sonoran desert wildlife and flora, including rare <u>Washington fillifera</u> palm.
Little Pond Oreille National Wildlife Refuge	Washington	41,708	16,683	1939	Upland birds, deer, black bear.
National Bison Range	Montana	18,541	7,416	1908	300 to 400 bison, elk, deer, Rocky Mountain bighorn; high prairie.
National Elk Refuge	Wyoming	23,790	9,536	1912	Winter range of southern Yellowstone elk herd, trumpeter Swan, sandhill crane, beaver; in Jackson Hole basin adjacent to Grand Teton National Park.
National Key Deer Refuge	Florida	6,744	2,697	1954	Rare dwarf key deer, spoonbills, Great White Heron; on Florida Keys.

Big Game Refuges and Game Ranges (cont'd)

<u>Name</u>	<u>Location</u>	<u>Area</u>		<u>Date</u>	<u>General Characteristics</u>
		<u>Acres</u>	<u>Hectares</u>	<u>Established</u>	
Nunivak National Wildlife Refuge	Alaska	109,384	43,353	1929	Muskox, reindeer, shorebirds; tundra.
Pribilof Islands Reservation	Alaska	50,163	20,065	1910	Established to protect endangered fur seals, which had increased to 1.5 million animals in 1959; controlled harvesting under Bureau of Commercial Fisheries; colonial seabirds.
San Andreas National Wildlife Refuge	New Mexico	57,215	22,886	1941	Nelson's bighorn, deer, birdlife; sonoran desert.
Simeonof National Wildlife Refuge	Alaska	10,442	4,177	1958	In southeastern part of Shumagin Island chain; sea otters.
Sullys Hill National Game Preserve	North Dakota	994	397	1914	Bison, elk, deer, geese.
Wichita Mountains Wildlife Refuge	Oklahoma	59,019	23,607	1905	Bison, elk, deer, pronghorn, longhorn cattle, turkey, rare Mississippi kite, waterfowl; upland prairies and mountain range.

Migratory Bird Refuges - General

Aleutian Islands Wildlife Refuge	Alaska	2,720,235	1,088,094	1913	Fifty major islands extending 1,200 miles from Unimak to Attu; active volcanoes, Pacific coastland Arctic tundra; rare sea otters, colonial seabirds, shorebirds, waterfowl, bears, whales, seals.
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Migratory Bird Refuges - General (cont'd)

<u>Name</u>	<u>Location</u>	<u>Area</u>		<u>Date</u>	<u>General Characteristics</u>
		<u>Acres</u>	<u>Hectares</u>	<u>Established</u>	
Bering Sea Wildlife Refuge	Alaska	41,113	16,445	1909	Eiders and other sea ducks, alcids, arctic foxes; tundra.
Great White Heron Wildlife Refuge	Florida	2,127	851	1938	Great white heron, spoonbill, key deer; mangrove keys.
Okefenokee Wildlife Refuge	Georgia	330,973	132,389	1937	Cranes, ibises, egrets, limpkins, alligators, furbearers; primeval bald cypress swamp.
Santa Ana Wildlife Refuge	Texas	1,981	792	1943	Remnant of tropical forest on Rio Grande River; tree ducks, chachalacas, and other birdlife with Mexican affinities.

Migratory Bird Refuges - Waterfowl

Arkansas Wildlife Refuge	Texas	47,261	18,904	1937	Sole wintering ground of rare Whooping Crane; abundant wintering waterfowl, migratory landbirds and shorebirds; spoonbill, egret and heron rookeries; deer, peccary; peninsula on Gulf of Mexico.
Bear River Wildlife Refuge	Utah	64,899	29,960	1928	Vast marshes of Bear River delta on Great Salt Lake; millions of nesting and migratory ducks and geese; 200 species of birds recorded; furbearers.
Cape Romain Wildlife Refuge	South Carolina	34,716	13,886	1932	Atlantic coastal marshes and islands; waterfowl, shorebirds, rails, loggerhead turtles, furbearers.

Migratory Bird Refuges - Waterfowl (cont'd)

<u>Name</u>	<u>Location</u>	<u>Area</u>		<u>Date</u>	<u>General Characteristics</u>
		<u>Acres</u>	<u>Hectares</u>	<u>Established</u>	
(Delta Wild- life Refuge	Louisiana	48,832	19,533	1935	Vast marshes on coast of Gulf of Mexico; major wintering grounds of Blue, Snow and other geese; abundant ducks, herons, rails and other birds; muskrats.
(Lacassine Wildlife Refuge		31,125	12,410	1937	
(Sabine Wild- life Refuge		142,717	57,086	1937	
Kentucky Woodlands	Kentucky	65,759	24,303	1938	Upland hardwood forests; eastern turkey, grouse, waterfowl.
(Lower Klamath Sacramento Tule Lake	California	21,460	8,584	1908	Vast restored marshes on Pacific waterfowl flyway; millions of geese and ducks, white pelicans, shorebirds, herons, upland birds, waterfowl.
		10,776	4,310	1937	
		37,337	14,934	1928	
(Des Lacs Lower Souris Upper Souris	North Dakota	18,881	7,552	1935	River marshes in northern prairies, restored to provide waterfowl nesting, feeding and wintering grounds; prairie chickens, sharptailed grouse.
		58,694	23,477	1935	
		32,084	12,833	1935	
Loxahatchee	Florida	145,477	58,190	1951	Subtropical swamp created by diked reserve, waterfowl wintering ground; limpkin, rare Everglade kite.
(Malheur Upper Klamath	Oregon	184,747	73,898	1908	Restored river marshes on Pacific waterfowl flyway; abundant birdlife, antelope, muskrat, beaver.
		12,533	5,013	1928	
(Mattamuskeet Swanquarter	North Carolina	50,178	20,071	1934	Atlantic flyway wintering grounds for waterfowl, especially whistling swan; furbearers.
		15,501	6,200	1932	



Migratory Bird Refuges - Waterfowl (cont'd)

<u>Name</u>	<u>Location</u>	<u>Area</u>		<u>Date</u>	<u>General Characteristics</u>
		<u>Acres</u>	<u>Hectares</u>	<u>Established</u>	
Red Rock Lakes	Montana	39,944	15,977	1935	Lakes and marshes on continental divide; principal United States breeding ground of rare trumpeter swan; Shiras moose, furbearers.
White River	Arkansas	116,302	46,520	1935	Bottomland hardwood forest; abundant waterfowl, herons, turkeys, songbirds, furbearers.

## VENEZUELA

The national parks and natural monuments in Venezuela are administered by the Minister of Agriculture and Livestock, in co-operation with the Town and Country Planning Office of the Ministry of Public Works. Planning is co-ordinated with regional and nationwide projects relating to urban and suburban developments, industrial centres, construction of dams and reservoirs, etc.

In 1959, the government appointed a National Park Advisory Board, which assists the Minister of Agriculture in matters relating to the establishment and administration of national parks and other protective areas. Organization of a new Department of National Parks within that Ministry is under way. A specific law on Nature Protection and National Parks is being drafted.

In addition to the national parks and natural monuments already established, described below, a considerable number of additional reservations are contemplated and under study.

### National Parks

Henry Pittier National Park (Rancho Grande National Park) - 90,000 hectares (225,000 acres) in the Cordillera de la Costa near the Caribbean Sea, established in 1937. The park comprises primeval forest, mainly rain forest or the "forests in the clouds", and contains a rich animal life, especially birds, including many species of humming birds. This outstanding park was established mainly due to the personal efforts of the late Henry Pittier, one of Venezuela's foremost naturalists, who succeeded in convincing the government that the destruction of the mountain forests in that area would result in drought in the lowlands of the Aragua Valley, particularly in the town of Maracay, and would accelerate the desiccation of Lake Valencia, Venezuela's largest inland lake. Trails are being opened, and campgrounds are being prepared.

Sierra Nevada de Mérida National Park - 160,000 hectares (400,000 acres), in the Venezuelan Andes near Colombia, established in 1952. The park comprises high mountainous land, wooded in the lower parts, with spectacular snow-covered peaks, the loftiest of which is Pico Bolívar (16,500 feet),

and a great number of small glacier lakes, some of them situated amidst highly interesting paramo vegetation. A cable car has been installed for transportation of visitors from the valley to the mountain tops.

Guatopo National Park - 90,000 hectares (225,000 acres), in north central Venezuela, established in 1958. The park was established as an urgent measure to secure new water resources for the capital of the country, Caracas, which suffers severely from insufficiency of its water supply. A great part of the area of Guatopo National Park, which used to be heavily forested, has been destroyed by agriculture and annual burning. In the eastern part of the park, which includes the Cerro Azul (Blue Peak) of 4,600 feet, the forest cover is generally intact, and includes primeval forest similar to that of "Rancho Grande".

Avila National Park - 80,000 hectares (200,000 acres), between the Caracas Valley and the shore of the Caribbean Sea, established in 1958. The Avila National Park includes altitudes varying from 300 to 9,000 feet (Pico Naiguatá), and keeps a dense forest cover on the upper part and on the northern slopes facing the sea. The declaration of Avila National Park was a necessary step in order to secure a recreation area for the 1,500,000 population of Caracas, a town which lacks a minimum of urban parks and green space; it also meant the protection of a few smaller streams essential to the water supplies of the city. Trails are being opened and campgrounds are being prepared. A cable car has been installed for the transportation of visitors from the valley to the mountain tops.

Yurubí National Park - at the headwaters of the Yurubí River, in the State of Yaracuy, established in 1960. This area was reserved to protect the watershed of the source of water for the town of San Felipe.

#### Natural Monuments

Alexander von Humboldt Natural Monument - in the State of Monagas, established in 1949. A huge underground formation in a mountain range of calcarean origin, near the village of Caripe in the northeast of the country, this monument is also being called the Guácharo Caves, because of the numerous population of Guácharo birds (Staetornis caripensis), which were first described by Humboldt, a century and a half ago.

Arístides Rojas Natural Monument - in the State of Guárico, established in 1949.

This monument is an isolated rock formation of outstanding beauty some 4,500 feet high, called the "Morros de San Juan", situated near the town of San Juan de los Morros.

Cerro de María Lionza Natural Monument - in the State of Yaracuy, in northern Venezuela, established in 1960. The Cerro María Lionza is a hillside related to an ancient legend of the regional folklore.

VIRGIN ISLANDS

The government of the Virgin Islands is in the process of establishing a national park and forest reserve of approximately 92 acres (35 hectares) in the Sage Mountain area, Tortola, and two small nature reserves of 20 acres (8 hectares) and 5 acres (2 hectares) respectively on the coast of Virgin Gorda. These areas will be established officially when the National Parks Bill, which is in draft form at present, is enacted.

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