SPECIAL SCIENTIFIC FACILITIES  None

PRINCIPAL REFERENCE MATERIAL  A large body of published and unpublished material exists. The Nature Conservancy Council have produced a number of descriptive leaflets, information sheets and an educational handbook for parties visiting the dune area.

STAFF  1 warden

BUDGET  Expenses met by the Nature Conservancy Council with assistance from the West Wales Naturalists' Trust

LOCAL PARK ADMINISTRATION  Regional Officer (South Wales) The Nature Conservancy Council, Plas Gogerddan, Near Aberystwyth, Dyfed, Wales, UK.
UNITED KINGDOM

NAME Loch Leven National Nature Reserve

TYPE NP

BIOTIC PROVINCE 2.4.2

LEGAL PROTECTION Fully protected as National Nature Reserve (but trout fishing permitted)

DATE ESTABLISHED 1964

GEOGRAPHICAL LOCATION Part of the eastern end of the central valley of Scotland, south of the Ochil hills, Kinross: N 56°12'; W 3°22'

ALTITUDE 107 metres

AREA 1597 ha

LAND TENURE Managed by the Nature Conservancy Council under a Nature Reserve Agreement with private owners

PHYSICAL FEATURES A shallow loch of 13.3 sq. km with maximum depth of 25 m and mean depth 3.9 m, in glacial sand and till overlying Devonian sandstone. Very exposed both to west and east and subject to strong wave action. The catchment is largely arable and improved grassland. The shoreline is sand or small stones with sand covering 40% of the lake floor to 3 m, below which the sediment is mud. A naturally base-rich lake subject to accelerated eutrophication due to increased use of nitrate fertilizers in surrounding farmland. High phosphate levels maintained by sewerage have caused prolonged and dense algal blooms.

VEGETATION The landward section of the reserve has old pine plantations (2.1.2.1), ungrazed grasslands (5.3.1) and mesotrophic mire (3.2.3.4). There is an interesting range of ruderal species in the strand-line vegetation. Emergent vegetation is now confined to a few scattered areas but sparse submerged macrophytes have shown considerable recovery since previous decline, with fennel-leaved pondweed Potamogeton pectinatus now dominant. The emergents include reed Phragmites communis, reed-grass Phalaris arundinacea and scattered common spike rush Eleocharis palustris.

NOTEWORTHY FAUNA The large population of waterfowl is the most important element, constituting the largest population of breeding ducks in Britain. The reserve is also an important moult ing refuge and a staging post on migration with up to 15,000 pink-footed geese Anser brachyrhynchus arriving in autumn. Over 500 pairs each of mallard Anas platyrhynchos and tufted duck Aythya fuligula nest on St. Serf's Island. Wintering species include whooper swans Cygnus cygnus, greylag geese Anser anser, mallard, teal Anas crecca, pochard Aythya ferina and goldeneye Bucephala clangula. The loch is renowned for its trout Salmo trutta, about 20,000 kg being caught by anglers annually. Perch Perca fluviatilis, pike Esox lucius, sticklebacks Gasterosteus aculeatus and brook lamprey Lampetra planeri are among the other fish species.

ZONING None

DISTURBANCES OR DEFICIENCIES Eutrophication from run-off from agricultural land and town sewerage. Considerable changes in flora and fauna during last 30 years may be due to nutrient enrichment.
TOURISM  Access restricted under Bylaws, only 3 points of public access. The adjacent Vane Farm Centre of the Royal Society for the Protection of Birds, with full information and educational facilities, includes an observation hut and a nature trail.

SCIENTIFIC RESEARCH  Site of a major UK International Biological Programme project on productivity and production processes in the food chain. This included projects on bathymetric survey and mapping, sediment analysis, radiation, Loch circulation, nitrogen and phosphorous budgets, insecticides in fish, fluctuations in phytoplankton and benthic algae, macrophytes, duck population, biology and parasitology. Research continues on biotic fluctuations and related management problems.

SPECIAL SCIENTIFIC FACILITIES  None

PRINCIPAL REFERENCE MATERIAL

STAFF  1 warden

BUDGET  All expenses met by the Nature Conservancy Council

LOCAL PARK ADMINISTRATION  The Regional Officer (East Scotland) The Nature Conservancy Council, 12 Hope Terrace, Edinburgh EH9 2AS, Scotland, UK.
UNITED KINGDOM

NAME  Rannoch Moor National Nature Reserve

TYPE  NP  BIOTIC PROVINCE  2.8.2

LEGAL PROTECTION  Fully protected as National Nature Reserve

DATE ESTABLISHED  1958

GEOGRAPHICAL LOCATION  South-west Highlands, Perthshire: N 56°32'; W 4°45'

ALTITUDE  300-500 metres

AREA  1482 ha

LAND TENURE  Owned by the Nature Conservancy Council

PHYSICAL FEATURES  An intensely glaciated low lying area surrounded by uplands. Confused relief characterised by morainic and granitic knolls, peat filled depressions and numerous lochs (lakes) of varying size. Blanket bog (mire) is developed on the more gentle slopes, the intervening valleys being occupied by oligotrophic soligenous mires. Temperate moist oceanic climate.

VEGETATION  Blanket bogs have an abundance of purple moor grass Molinia caerulea, bog myrtle Myrica gale and sundew Drosera anglica, on gentle slopes as well as broad flats (3.2.3.2). Soligenous mires in valleys are dominated by bog-moss Sphagnum spp., and also support sedges Carex spp., and ling Calluna vulgaris, with cross-leaved heath Erica tetralix on the hummocks formed by the Sphagnum (4.1.1). Locally there are areas with well developed pool-hummock systems in undamaged Sphagnetum (4.3.1.2).

NOTEWORTHY FAUNA  The area supports a herd of about 200 red deer Cervus elaphus. The notable breeding birds are typical of treeless moorlands interspersed with lochs and bogs: red grouse Lagopus l. scoticus, golden plover Pluvialis apricarius, greenshank Tringa nebularia, dunlin Calidris alpina and short-eared owl Asio flammeus. The reserve has long been noted as a rich haunt of moorland insects including local northern dragonflies.

ZONING  None

DISTURBANCES OR DEFICIENCIES  None

TOURISM  Few visitors at present

SCIENTIFIC RESEARCH  Mainly directed to the maintenance of the existing range of bog structure and vegetation. A small fenced plot has been made to study establishment of Scots pine, birch and alder seedlings. Regular deer counts.

SPECIAL SCIENTIFIC FACILITIES  None

PRINCIPAL REFERENCE MATERIAL  Several published papers contain references to the vegetation of the reserve

STAFF  Under surveillance of Assistant Regional Officer

BUDGET  All expenses met by the Nature Conservancy Council

LOCAL PARK ADMINISTRATION  The Regional Officer (East Scotland) The Nature Conservancy Council, 12 Hope Terrace, Edinburgh EH9 2AS, Scotland, UK.
UNITED KINGDOM

NAME Inchnadamph National Nature Reserve

TYPE NP

BIOTIC PROVINCE 2.8.2.

LEGAL PROTECTION Fully protected as National Nature Reserve

DATE ESTABLISHED 1956

GEOGRAPHICAL LOCATION 20 km east of Lochinver, Sutherland: N 58°07'; W 4°56'

ALTITUDE 70-518 metres

AREA 1294 ha

LAND TENURE Managed by the Nature Conservancy Council under a Nature Reserve Agreement with the owners.

PHYSICAL FEATURES The majority of the reserve is composed of beds of Durness limestone, disrupted by thrusting and faulting, which form an undulating plateau between 228 m and 274 m bounded on north and south by entrenched valleys and to the west by 91 m high cliffs. Acid peat occupies hollows between limestone outcrops on the plateau. Eastwards the ground rises sharply to 518 m, culminating in Ben More Assynt, 983 m, just outside the reserve. Limestone karstic scenery, including caves, sinkholes, underground drainage and pavements.

VEGETATION Communities present include sub-montane scrub of myrtle-leaved willow Salix myrsinites and other Salix species (3.2.3.2); dwarf shrub cover of the high level limestones, composed of mountain avens Dryas octopetala, rock sedge Carex rupestris and moss campion Silene acaulis (4.1.1, 4.2.2); a limestone clint woodland flora and a rich limestone cliff flora at Traligill burn; and acid peat with abundant cloudberry Rubus chamaemorus and peat-loving alpines such as black bearberry Arctous alpinus, bearberry Arctostaphylos uva-ursi, crowberry Empetrum nigrum and heather Calluna vulgaris (4.4.1).

NOTEWORTHY FAUNA The typical West Highland mammal fauna includes mountain hare Lepus timidus, fox Vulpes vulpes, pine marten Martes martes, wildcat Felis sylvestris and red deer Cervus elaphus. Birds include golden eagle Aquila chrysaetos, red grouse Lagopus scoticus and golden plover Pluvialis apricaria, all of which have been recorded as breeding species. The area forms part of one of the few productive grouse moors remaining in the West Highlands.

ZONING None

DISTURBANCES OR DEFICIENCIES None noted

TOURISM Access restricted by owners; total visitor numbers remain small. The bone caves of the Allt nan Uamh valley are regularly visited and parties of geologists and botanists also make periodic visits. Caving parties carry out periodic explorations of the cave systems.

SCIENTIFIC RESEARCH Research on effects of fire and grazing on willow scrub and limestone pavement communities, mainly for management purposes under the present strictly controlled grazing and burning schemes.

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SPECIAL SCIENTIFIC FACILITIES
None

PRINCIPAL REFERENCE MATERIAL
The Guide to North West Scotland National Nature Reserves includes a brief description of the area. A number of scientific papers have also been published dealing with different aspects of the reserve.

STAFF
1 part-time warden

BUDGET
All expenses met by the Nature Conservancy Council

LOCAL PARK ADMINISTRATION
The Regional Officer (West Scotland), Nature Conservancy Council, Caledonia House, 63 Academy Street, Inverness IV1 1BB.
UNITED KINGDOM

NAME Humber National Wildfowl Refuge

TYPE NR

BIOTIC PROVINCE 2.4.2

LEGAL PROTECTION A Statutory Sanctuary under the Protection of Birds Act 1954

DATE ESTABLISHED 1955

GEOGRAPHICAL LOCATION Upper section of the estuary between Brough on the north bank and the mouth of the river Trent on the south bank: N 53°42'; W 0°40'

ALTITUDE Sea level to 5 metres

AREA 1270 ha

LAND TENURE Crown land

PHYSICAL FEATURES Tidal silt, sand flats and open water

VEGETATION Except for a very small area of saltmarsh, (5.5.2), the refuge is without emergent vegetation. Species of interest include: sea-club rush Scirpus maritimus, reed Phragmites communis, common salt-marsh grass Puccinellia maritima and creeping bent Agrostis stolonifera.

NOTEWORTHY FAUNA The refuge is the main roosting area on the river Humber of the pink-footed goose Anser brachyrynchus.

ZONING None

DISTURBANCES OR DEFICIENCIES

TOURISM The refuge is not in a tourist area. Entry on foot or by disembarking from a boat between 1 September and 20 February or the killing, taking, or injuring of wild birds are offences. Visitors must stay on the roads along the shore-lines.

SCIENTIFIC RESEARCH Regular winter wildfowl census and other ornithological observations

SPECIAL SCIENTIFIC FACILITIES None

PRINCIPAL REFERENCE MATERIAL Information on annual reports and wildfowl counts may be obtained from the Nature Conservancy Council

STAFF 1 seasonal warden

BUDGET The Nature Conservancy Council's expenditure on the warden's salary and on basic running expenses is about £1000 per annum

LOCAL PARK ADMINISTRATION The refuge is administered by a local committee on which the Nature Conservancy Council is represented. Enquiries to: The Regional Officer (North Region) The Nature Conservancy Council, Merlewood Research Station, Grange-over-Sands, Cumbria, UK.

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UNITED KINGDOM

NAME Abberton Reservoir Wildfowl Refuge

TYPE NR

BIOTIC PROVINCE 2.4.2

LEGAL PROTECTION Statutory Sanctuary under the Protection of Birds Act 1954. Included as a Category A Wetland in the international MAR List.

DATE ESTABLISHED 1967

GEOGRAPHICAL LOCATION 8 km SSW of Colchester, Essex: N 51°48'; E 0°51'

ALTITUDE 15-20 metres

AREA 1188 ha

LAND TENURE Owned by the Essex Water Company

PHYSICAL FEATURES This reservoir came into use in 1941. It has a water surface of some 485 ha and holds approximately 23,000 million litres. Although some water comes from the dammed Layer Brook, the majority is extracted from the river Stour and pumped 18 km to Abberton. There is a narrow concrete road around the periphery of the main part of the impoundment.

VEGETATION Most of the reservoir margin is lined by concrete but the section lying to the SW of the B.1026 road is fringed by a band of vegetation consisting of great reedmace Typha latifolia, reed canary grass Phalaris arundinacea and various rushes Juncus spp (5.5.1; 5.6.2; 3 & 4). The reservoir is bordered by farmland.

NOTEWORTHY FAUNA The reservoir is of outstanding importance as an autumn arrival point for very large numbers of migrants, and as a wintering ground for a large and varied population of dabbling and diving ducks. These include: mallard Anas platyrhynchos, teal Anas crecca, pochard Aythya ferina, shoveler Anas clypeata, smew Mergus albellus, goldeneye Bucephala clangula and gadwall Anas strepera. Widgeon Anas penelope, pintail Anas acuta, tufted duck Aythya fuligula, goosander Mergus merganser and mute swan Cygnus olor are also quite numerous.

ZONING A multiple use area but no details are given of specific zoning

DISTURBANCES OR DEFICIENCIES Well-controlled, see next section

TOURISM No water sports are allowed. Coarse fishing is allowed at four points by permit and a limited number of permits for bird-watching are also issued. There is a substantial hide at Double Gates Bay (Layer-de-la-Haye) from which visitors can view duck (a small charge is made), also a picnic site with a small pond. There are no footpaths provided away from public roads and access to much of the periphery is strictly controlled.

SCIENTIFIC RESEARCH A ringing station is run in co-operation with the Wildfowl Trust; 2-3000 duck are ringed annually, in addition to large numbers of other species.

SPECIAL SCIENTIFIC FACILITIES None

PRINCIPAL REFERENCE MATERIAL Accounts of ringing activities are published by the Wildfowl Trust

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STAFF The professional ringer acts as warden for the Bird Sanctuary and looks after the public access area provided by the Essex Waterworks Company.

BUDGET Running expenses are met by the Essex Water Company

LOCAL PARK ADMINISTRATION The General Manager, The Essex Water Company, 342 South Street, Romford, Essex, UK.
UNITED KINGDOM

NAME Glen Roy National Nature Reserve

TYPE NR

BIOTIC PROVINCE 2.8.2

LEGAL PROTECTION Fully protected as National Nature Reserve

DATE ESTABLISHED 1970

GEOGRAPHICAL LOCATION 30 km east-north-east of Fort Williams, Inverness-shire: N 56°56'; W 4°47'

ALTITUDE 137-823 metres

AREA 1167 ha

LAND TENURE Owned by the Nature Conservancy Council

PHYSICAL FEATURES The reserve covers the steep east-facing slope of Glen Roy and was established to protect a representative part of the famous "parallel roads" of the glen against changes in land use or land management which might be detrimental to the conservation of their scientific and visual interest. The interest of the "parallel roads" was first recorded by Pennant in 1776 and the scientific explanation of their origin, namely that they represented ancient glacial lake beaches caused by successive retreating ice dams, was postulated by the famous geologist Agassiz following his visit to Glen Roy in 1840.

VEGETATION Montane grasslands of acidic type and montane heaths dominated by Calluna vulgaris (4.1.1; 5.3.1). Grazed by sheep. Blanket mire is developed on the plateau areas and there are localised outcrops of calcareous rock with a fairly rich flora.

NOTEWORTHY FAUNA The reserve is frequented by red deer Cervus elaphus scoticus. Golden eagle Aquila chrysaetos and buzzard Buteo buteo are resident species.

ZONING None

DISTURBANCES OR DEFICIENCIES None noted

TOURISM Access to the reserve is by public road. A carpark and viewpoint has been provided to enable visitors to view the "parallel roads" conveniently. An information board is placed at the viewpoint and descriptive pamphlets are available from the Nature Conservancy Council's Office.

SCIENTIFIC RESEARCH Much geomorphological research has been undertaken on the reserve, and one of the main aims in establishing the reserve is to enable this to continue. All research projects have to be referred to the Nature Conservancy Council for approval, so as to protect the features of interest.

SPECIAL SCIENTIFIC FACILITIES None

PRINCIPAL REFERENCE MATERIAL A great number of references to the "parallel roads" feature of Glen Roy are to be found in the geological literature. A selected bibliography is included in the reserve management plan.
STAFF
1 part-time warden

BUDGET
All expenses met by the Nature Conservancy Council

LOCAL PARK ADMINISTRATION
The Regional Officer (East Scotland)
The Nature Conservancy Council, 12 Hope Terrace, Edinburgh EH9 2AS, Scotland, UK.
**NAME**  Hermaness National Nature Reserve  
**TYPE**  NR  
**BIOTIC PROVINCE**  2.8.2  
**LEGAL PROTECTION**  Fully protected as National Nature Reserve  
**DATE ESTABLISHED**  1955  
**GEOGRAPHICAL LOCATION**  North-west tip of Unst, the northernmost of the Shetland Isles: N 59°34' W 0°45'.  
**ALTITUDE**  Sea level to 200 metres  
**AREA**  965 ha  
**LAND TENURE**  Managed by the Nature Conservancy Council under a Nature Reserve Agreement with the owner.  

**PHYSICAL FEATURES**  The area comprises the whole of the Hermaness peninsula, including Muckle Flugga and its Out Stack, the most northerly point in Britain. The northern and western coasts of the peninsula are steep and rocky, composed of metamorphic gneiss of Precambrian age together with sheets and veins of granite in Neap and Daito cliffs. At the south end of the reserve the gneiss contains garnets and also kyanite for which there has recently been experimental mining. The moorland slopes gradually up to Hermaness Hill, the highest point, from which there is a fine view across Unst to the Shetland mainland.  

**VEGETATION**  A mixture of mat grass Nardus stricta and hard rush Juncus squarrosus forms an acidic grassland (5.3.2) over most of the area. On the east of the peninsula is a stretch of heather moorland with Calluna vulgaris (4.1.1). Patches of bog with small lochans (lakes) on flatter areas, such as Sothers Brecks, have abundant hummocks of bog moss Sphagnum spp., also more cotton grass Eriophorum angustifolium than the west Highland blanket mires of mainland Scotland. Coastal cliffs have populations of northern species, such aslovage Ligusticum scoticum and roseroot Sedum rosea, and also montane species at sea level such as moss campion Silene acutifolia. Marine vegetation includes the most northerly saltmarsh in Britain.  

**NOTEWORTHY FAUNA**  The commonest mammals inland are rabbits Oryctolagus cuniculus and long-tailed fieldmice or wood mouse Apodemus (= Sylvaemus) sylvaticus. Coastal areas have otter Lutra lutra, common seal Phoca vitulina and grey seal Halichoerus grypus which breed in coastal caves. A herd of 900 or more Shetland sheep graze cliff top maritime grasslands. Basking sharks Cetorhinus maximus are often seen offshore. Large numbers of seabirds include several breeding pairs of red-throated divers Gavia stellata, numerous fulmars Falmaris glacialis, gannet Sulia bassana (now more than 4500 pairs although the breeding colony was only established on Muckle Flugga in 1914), a steadily growing population of great skua Stercorarius skua (now numbering about 400 pairs having been reduced to 3 pairs in 1831) and declining numbers of arctic skua Stercorarius parasiticus (from 300 pairs in 1922 to 75 at present). A huge colony of puffin Fratercula arctica occupies most of the grassy cliff tops. Other breeding birds include golden plover Pluvialis apricaria, whimbrel Numenius phaeopus, dunlin Calidris alpina, Shetland starling Sturnus vulgaris zetlandicus, wren Troglodytes troglodytes zetlandicus and twite Carduelis flavirostris.  

**ZONING**  None
TOURISM Free access to the small number of visitors who come to this remote area.

SCIENTIFIC RESEARCH Monitoring of seabird populations

SPECIAL SCIENTIFIC FACILITIES None

PRINCIPAL REFERENCE MATERIAL None listed

STAFF None

BUDGET All expenses met by the Nature Conservancy Council

LOCAL PARK ADMINISTRATION The Regional Officer (East Scotland), The Nature Conservancy Council, 12 Hope Terrace, Edinburgh EH9 2AS.
NAME St. Kilda National Nature Reserve

TYPE NP

BIOTIC PROVINCE 2.8.2

LEGAL PROTECTION Fully protected as National Nature Reserve

DATE ESTABLISHED 1957

GEOGRAPHICAL LOCATION Atlantic continental shelf, 64 km west of North Uist, 160 km from mainland Inverness-shire: N 57°50'; W 8°31'

ALTITUDE Sea level to 390 metres

AREA 852 ha

LAND TENURE The archipelago belongs to the National Trust for Scotland, leased from them by the Nature Conservancy Council as a nature reserve. A small area on the main island of Hirta is sub-leased by the Council to the Ministry of Defence.

PHYSICAL FEATURES An off-shore archipelago consisting of the remains of a Tertiary ring volcano forming four major islands and a number of stacks, all extremely precipitous with cliffs rising nearly vertically to 400 m, except around the small area on Hirta which was the site of the former settlement. Both base-rich and base-poor rocks are present.

VEGETATION Typically sub-oceanic, modified by sea spray and the fertilizing effects of vast numbers of nesting seabirds. No trees. Dwarf shrub heath (4.1.1), dwarf shrub moss tundra (4.4.1), low bog (4.3.1.2), meadow (5.3.2), freshwater marsh (5.5.1; 5.6.3). Also biotically modified grassland, Plantago sward and cliff vegetation. Species recorded include the ferns moonwort Botrychium lunaria and adder's tongue Ophioglossum vulgatum, field felwort Gentianella campestris, lovage Ligusticum scoticum, least willow Salix herbácea and rose root Sedum rosea (all northern Atlantic species) and the arctic-alpine purple saxifrage Saxifraga oppositifolia. The sub-littoral zone supports a dense growth of Laminaria spp.

NOTEWORTHY FAUNA Endemic sub-species include field mouse Apodemus hirtensis and an ancient breed of the Soay sheep Ovis aries. A small number of grey seal Halichoerus grypus breed around the islands. Vast numbers of west Atlantic seabirds nest on the islands, including the largest and oldest colony of fulmar Fulmaris glacialis in the British Isles, Leach's fork-tailed petrel Oceanodroma leucorhoa and storm petrel Hydrobates pelagicus, the world's largest colony of gannets Sula bassana and still a great many puffins Fratercula arctica, though considerably fewer than in the past. The wren Troglodytes troglodytes hirtensis is an endemic sub-species.

ZONING None

DISTURBANCES OR DEFICIENCIES Used by the Ministry of Defence

TOURISM Seasonal working parties are taken out to the island by the National Trust for Scotland and occasional visitors are allowed to land from private vessels, mainly for scientific purposes.

SCIENTIFIC RESEARCH Considerable survey work, mainly on Hirta, during last 100 years. A multidisciplinary study of the Soay sheep is under way and research on seabird nesting colonies is encouraged.

WDNP IUCN © 1975 9(1)F Code: UNI(2),6.2
PRINCIPAL REFERENCE MATERIAL

A large bibliography is to be found in *St. Kilda Summer* by K. Williamson and J. M. Boyd.


STAFF

A part-time warden shared with the National Trust for Scotland (from April to mid-September inclusive)

BUDGET

All expenses met by the Nature Conservancy Council and the National Trust for Scotland

LOCAL PARK ADMINISTRATION

The Regional Officer (West Scotland) The Nature Conservancy Council, Caledonia House, 63 Academy Street, Inverness IV1 1EB, Scotland, UK.
UNITED KINGDOM

NAME Whiteford National Nature Reserve

TYPE NR

BIOTIC PROVINCE 2.4.2

LEGAL PROTECTION Fully protected as National Nature Reserve

DATE ESTABLISHED 1964 with additions in 1965 and 1966

GEOGRAPHICAL LOCATION Gower peninsula, south side of the Burry inlet, South Wales: N 51°36'; W 4°14'.

ALTITUDE Sea level to 24 metres

AREA 783 ha

LAND TENURE Leased by the Nature Conservancy Council

PHYSICAL FEATURES An area of estuarine flats, grazed saltmarsh and a dune-covered peninsula, forming an outstanding example of the dune series found along the coasts of South Wales. No solid geology is exposed, the superficial rocks being reduced to glacial till, peat, alluvium and blown sand.

VEGETATION The dunes support a sequence of maritime habitats ranging from pioneer strand flora with sand couch grass Agropyron junceiforme through marram grass Ammophila arenaria (5.2.4) to fully stabilized dune meadow with abundant dewberry Rubus caesius and creeping willow Salix repens and dune heath dominated by moss and lichens. Dune slack areas have a wide range of interesting species including early sand grass Mibora minima and golden dock Rumex maritimus. Three distinct types of saltmarsh community are dominated respectively by cord grass Spartina anglica, sea purslane Halimione portulacoides and common saltmarsh grass Puccinellia maritima.

NOTEWORTHY FAUNA The area and surrounding estuary are a natural haven for wildfowl including brent geese Branta bernica; pintail Anas acuta, wigeon A. penelope, shoveler A. clypeata, a few eider duck Somateria mollissima (present throughout the year at one of their most southerly stations in Britain). Large numbers of oystercatchers Haematopus ostralegus winter. The dunes and marshes offer food and shelter to many migrants, such as dunlin Calidris alpina and knot C. canutus. A rich and interesting invertebrate fauna includes the curious and rare beetle Eurynebria complanata on the beach and the isopod Armadillidium album on the dunes, the latter found in only four other British localities.

ZONING None

DISTURBANCES OR DEFICIENCIES Killing of large numbers of oystercatchers around the reserve (on grounds of cockle-predation) and big-scale human predation of cockles Cardium edule. Part of the reserve is used for agricultural purposes, including grazing by ponies.

TOURISM The Gower peninsula is readily accessible and used extensively for recreation. General pedestrian access allowed but permits necessary to visit some areas and for some activities.

WDNP IUCN © 1977 (1)F Code: UNI(2).6.3
SCIENTIFIC RESEARCH  Research with the objective of conservation management is carried out on the botanical, entomological and physiographic aspects of the area.

SPECIAL SCIENTIFIC FACILITIES  None

PRINCIPAL REFERENCE MATERIAL
Numerous publications on the flora and fauna. A leaflet is available for visitors describing the main features of the reserve.

STAFF  Resident National Trust warden and an estate worker

BUDGET  Expenses met by the Nature Conservancy Council but warden's salary paid by the National Trust.

LOCAL PARK ADMINISTRATION  The Regional Officer (South Wales), The Nature Conservancy Council, Plas Gogerddan, Aberystwyth, Dyfed.
UNITED KINGDOM

NAME    Sands of Forvie National Nature Reserve
TYPE    NR
BIOTIC PROVINCE  2.8.2

LEGAL PROTECTION  Fully protected as National Nature Reserve

DATE ESTABLISHED  1959

GEOGRAPHICAL LOCATION  Between Newburgh and Cruden Bay, Aberdeenshire coast: N 57°20'; W 1°58'.

ALTITUDE  Sea level to 53 metres

AREA  758 ha

LAND TENURE  Leased by the Nature Conservancy Council

PHYSICAL FEATURES  The area comprises extensive sand dunes to the north of the estuary of the River Ythan. At the southern end four main ridges of mobile sand and in the north three main sand ridges mostly stabilized by vegetation. The north end also has a rocky indented coastline.

VEGETATION  Good examples of characteristic northern dune system plant communities. The bryophyte flora is also rich and there are andalusite cliffs with a representative coastal flora. Dune slacks are notable, with dominant communities of creeping willow Salix repens, cross-leaved heath Erica tetralix, crowberry Empetrum nigrum and lichen-rich heaths of heather Calluna vulgaris and crowberry. Northern species such as dioecious sedge Carex dioica and clubmoss Lycopodium clavatum are well represented and a small saltmarsh supports a fair sample of northern saltmarsh flora.

NOTEWORTHY FAUNA  The area is noted for its large nesting population of eider Somateria mollissima and for breeding colonies of sandwich tern Sterna sandvicensis, common tern S. hirundo, arctic tern S. maccrura and little tern S. albifrons.

ZONING  None

DISTURBANCES OR DEFICIENCIES  None noted

TOURISM  Access by footpath from nearby public road to marked paths within the reserve.

SCIENTIFIC RESEARCH  Much work undertaken from nearby field station

SPECIAL SCIENTIFIC FACILITIES  Culterty Field Station of the University of Aberdeen is located nearby.

PRINCIPAL REFERENCE MATERIAL  Descriptive pamphlets available from the Nature Conservancy Council.

STAFF  One part-time warden

BUDGET  All expenses met by the Nature Conservancy Council

LOCAL PARK ADMINISTRATION  The Regional Officer (East Scotland), The Nature Conservancy Council, 12 Hope Terrace, Edinburgh EH9 2AS.

WDNP  IUCN © 1977 (1)F  Code: UNI(2)6.4
UNITED KINGDOM

NAME Cors Tregaron National Nature Reserve

TYPE NR BIOTIC PROVINCE 2.4.2

LEGAL PROTECTION Fully protected as National Nature Reserve

DATE ESTABLISHED 1955 with additions in 1957 and 1964

GEOGRAPHICAL LOCATION 25 km south-east of Aberystwyth, Cambria: N 52°6'; W 3°5'

ALTITUDE 160-166 metres

AREA 746 ha

LAND TENURE Managed by the Nature Conservancy Council under a Nature Reserve Agreement with the owner.

PHYSICAL FEATURES A complex of three raised peat-bogs and extensive river terraces on the site of a post-glacial lake. The River Teifi with several back-waters or 'flashes' meanders through the area. The scientific interest lies in the physiography of the site and the relatively unmodified bog communities.

VEGETATION A full range of plant communities associated with raised mires is present, including an active regeneration complex. These include Sphagnetum with localised heather Calluna vulgaris (4.1.1), areas of willow carr Salix (3.2.3.4) on old flooded peat diggings, fen-like communities near the river and flashes and an extensive Juncetum on the river terraces.

NOTEWORTHY FAUNA Mammals include polecat Mustela putorius and otter Lutra lutra. Considerable breeding and wintering populations of wildfowl and other aquatic birds, including the most southerly whooper swans Cygnus cygnus regularly wintering in Britain. The Greenland race of white-fronted geese Anser albifrons flavirostris now occur irregularly and in small numbers. The red kite Milvus milvus frequently feeds on the reserve and the hen harrier Circus cyaneus overwinters. The large heath butterfly Coenonympha tullia is here at its southernmost British station.

ZONING None

DISTURBANCES OR DEFICIENCIES None noted but the area is used by farmers for grazing sheep and ponies.

TOURISM Access by permit only. Facilities include observation tower on the periphery and fishing.

SCIENTIFIC RESEARCH Many projects on the botany and hydrology of the raised mire have been undertaken. Frequent visits by school and university parties for field studies.

SPECIAL SCIENTIFIC FACILITIES None

PRINCIPAL REFERENCE MATERIAL None listed
STAFF     No information

BUDGET    No information

LOCAL PARK ADMINISTRATION  Regional Officer (South Wales), The Nature Conservancy Council, Plas Cogerddan, nr. Aberystwyth, Dyfed, Wales.
UNITED KINGDOM

NAME Scolt Head National Nature Reserve

TYPE NR BIOTIC PROVINCE 2.4.2

LEGAL PROTECTION Fully protected as National Nature Reserve

DATE ESTABLISHED 1954

GEOGRAPHICAL LOCATION From Brancaster to Burnham Overy Staithe, including Scolt Head island, north Norfolk coast: N 52°57'; E 0°43'.

ALTITUDE Sea level to 20 metres

AREA 737 ha

LAND TENURE Owned by the National Trust and Norfolk Naturalists' Trust; leased and managed by the Nature Conservancy Council.

PHYSICAL FEATURES The reserve extends over a 9 km stretch of intertidal sand, mud, shingle, dunes and saltmarshes. An offshore shingle bank with several southerly recurves of different ages is capped by dunes. The landward areas between the recurves have developed also into a succession of variously aged saltmarshes.

VEGETATION Dune grassland occupies 90 ha and is dominated by sand couch grass Agropyron junceiforme, marram grass Ammophila arenaria and sand sedge Carex arenaria (5.2.4), depending on height above tide level and action of fresh-blown sand. Exceptionally favourable conditions exist for tracing successional colonization by plant communities of sand dunes and saltmarshes. Sea lavender Limonium bellidifolium and sea heath Frankenia laevis are common. Shrubby seablite Suaeda fruticosa is at the northern limit of its European distribution. Saltmarsh occupies 270 ha and is dominated by glasswort Salicornia spp., sea aster Aster tripolium, purslane Halimione portulacoides and saltmarsh grass Puccinellia marítima. Intertidal flats occupy 330 ha, mainly unvegetated but with seasonal growth of eel grass Zostera and green algae Enteromorpha and Vaucheria.

NOTEWORTHY FAUNA The area is a regional wildfowl refuge in which large numbers of brent geese Branta bernicla and duck winter. Waders stop to feed on spring and autumn passage. The area is famous for its breeding tern colonies of up to 4500 pairs of sandwich tern Sterna sandvicensis (estimated to be a twelfth of the world population) and 500 pairs of common tern S. hirundo.

ZONING None

DISTURBANCES OR DEFICIENCIES None reported

TOURISM Access mainly by boat from Brancaster Staithe or Overy Staithe. Access to ternery at extreme western end of the reserve is prohibited from May-July inclusive. The western section is otherwise mainly used for birdwatching, natural history and education purposes, while the eastern end is available to holiday makers.

SCIENTIFIC RESEARCH Research undertaken by many groups from universities; N.C.C. staff studies for management purposes. The coastal physiography has been particularly well studied.
SPECIAL SCIENTIFIC FACILITIES  Small laboratory on mainland

PRINCIPAL REFERENCE MATERIAL

STAFF  1 warden

BUDGET  All expenses met by the Nature Conservancy Council

LOCAL PARK ADMINISTRATION  The Regional Officer (East Anglia), The Nature Conservancy Council, 60 Bracondale, Norwich NOR 58B.
NAME Newborough Warren (Ynys Llanddwyn) National Nature Reserve

TYPE NR

LEGAL PROTECTION Fully protected as National Nature Reserve

DATE ESTABLISHED 1955

GEOGRAPHICAL LOCATION South-western corner of Anglesey, between the Briant estuary on the edge of the Menai Straits and the Cefni estuary: N 53°7'; W 4°24'.

ALTITUDE Sea level to 18 metres

AREA 633 ha

LAND TENURE Half owned by the Nature Conservancy Council and half leased by NCC from various owners. An additional 800 ha of foreshore leased annually on short term occupancy.

PHYSICAL FEATURES Both the Briant and the Cefni estuaries contain large areas (over 250 ha) of intertidal sand and mudflats. The major part of the reserve is, however, occupied by dunes up to 18 m high, facing the prevailing south-west winds. This system stretches up to 1.6 km inland progressing from unstable to stable dunes and fixed dune grassland. The Ynys Llanddwyn peninsula, of great geological interest, is cut off at high tides. Pools and saltmarsh around the Cefni estuary are of botanical, physiographical and ornithological interest.

VEGETATION A wide range of dune and saltmarsh communities. The dominant species is marram grass Ammophila arenaria on unstable dunes (5.2.2) and creeping willow Salix repens on lower stable dunes (4.2.3). Fixed dune grassland is also present (5.2.3). Dune slacks are dominated by creeping willow, white bent Agrostis stolonifera and rush Juncus articulatus. Saltmarsh dominants include Puccinellia maritima, glasswort Salicornia europaea and Juncus maritimus (5.5.2). An attempt is being made to control the small quantities of invasive cord grass Spartina anglica. Uncommon species include the helleboines Epipactis dunnensis and E. palustris, bee orchid Ophrys apifera, wintergreen Pyrola rotundifolia and maiden pink Dianthus deltoides.

NOTEWORTHY FAUNA Mammals include hedgehogs Erinaceus europaeus, rabbits Oryctolagus cuniculus (formerly very numerous with a marked influence on vegetation) hare Lepus europaeus, weasel Mustela nivalis and stoat M. erminea. Wildfowl and wader populations include up to 2000 duck in winter, mostly mallard Anas platyrhynchos, pintail A. acuta, wigeon A. penelope and teal A. crecca. Waders include oystercatcher Haematopus ostralegus, curlew Numenius arquata, redshank Tringa totanus and dunlin Calidris alpina. These are especially common in the brackish Cob pool.

ZONING None

DISTURBANCES OR DEFICIENCIES None noted, but shooting by permit allowed

TOURISM Beaches adjoining the area are a major tourist attraction. Assistance required by warden during tourist season. Peripheral zones and rights of way subject to pressure although main reserve is used mainly for educational purposes by schools and universities. Access away from rights of way is by permit only.
SCIENTIFIC RESEARCH Considerable studies of vegetation communities and quantitative aspects of their distribution. Monitoring programmes cover water table levels, wildfowl numbers and invasion by woody species.

SPECIAL SCIENTIFIC FACILITIES None

PRINCIPAL REFERENCE MATERIAL A management plan lists all sources of information up to 1965.

STAFF 1 warden

BUDGET All expenses met by the Nature Conservancy Council

LOCAL PARK ADMINISTRATION The Regional Officer (North Wales), The Nature Conservancy Council, Penrhos Road, Bangor, Caernarvonshire.
UNITED KINGDOM

NAME Minsmere (Nature Reserve) Site of Special Scientific Interest

TYPE NR BIOTIC PROVINCE 2.4.2

LEGAL PROTECTION Declared as a Site of Special Scientific Interest. A Category 'A' site in the Project MAR list of Wetlands of International Importance.

DATE ESTABLISHED 1948

GEOPGRAPHICAL LOCATION Suffolk coast, 3 km south of Dunwich: N 52°14'; E 1°3'.

ALTITUDE Sea level to 26 metres

AREA 611 ha

LAND TENURE Leased from private owner by the Royal Society for the Protection of Birds.

PHYSICAL FEATURES A river valley drained and reclaimed as a grazing marsh during the 19th century flooded as a war-time defence measure in 1940, and now comprising extensive reed beds and fresh-water meres. A 16 ha area of man-made brackish lagoons and islets known as 'The Scrape' is an important feature. The reserve slopes down from high ground at Westleton in the north to the Minsmere valley in the south. The eastern boundary is protected from the North Sea by a shingle beach and a clay embankment.

VEGETATION Nearly one third of the reserve lies in the river valley and is dominated by reed beds of Phragmites communis (5.6.2), but the marsh flora is poorly developed due to its recent origin. Marsh sowthistle Sonchus palustris is well established and expanding. The higher ground has heathland with scattered woods. Much of the heath is heather Calluna vulgaris, with bell heather Erica cinerea, bracken Pteridium aquilinum and gorse Ulex europaeus locally dominating (4.1.1). Woodlands of secondary origin are predominantly oak Quercus robur but have a good representation of Scots pine Pinus sylvestris and birches Betula pendula and B. pubescens (2.2.4).

NOTEWORTHY FAUNA Mammals found on the reserve include red squirrel Sciurus vulgaris, otter Lutra lutra and red deer Cervus elaphus. The area is of great ornithological importance with 100 breeding species and over 210 species recorded annually. These include significant breeding populations of bittern Botaurus stellaris, gadwall Anas strepera, marsh harrier Circus aeruginosus (for which this is now the only constant breeding station in Britain), increasing colonies of avocets Recurvirostra avosetta, terns Sterna sandvicensis, S. hirundo and S. albinucha, nightjar Caprimulgus europaeus, Acrocephalus warblers, nightingale Luscinia megarhynchos, red-backed shrike Lanius collurio and a large breeding population of bearded tit Panurus biarmicus. Because of its easterly situation the area provides an important rest and recuperation site for migrants, especially waders and waterfowl.

ZONING None

DISTURBANCES OR DEFICIENCIES None reported

TOURISM Access by permit only and limited to four days each week between April and mid-September. Permits issued by the Royal Society for the Protection of Birds.
SCIENTIFIC RESEARCH Includes methods of gull control, interaction of gulls and terns breeding together, studies of avocet ecology. Construction and control of areas of brackish water and shingle islets are being developed for new breeding and feeding sites for terns and waders. One of herbicides for reed control is also being studied.

SPECIAL SCIENTIFIC FACILITIES None

PRINCIPAL REFERENCE MATERIAL Regular reports appear in the R.S.P.B. journal 'Birds' and occasional papers in British Birds.

STAFF 3 full-time wardens plus 3 voluntary wardens from April to September

BUDGET All expenses met by the Royal Society for the Protection of Birds

LOCAL PARK ADMINISTRATION The Royal Society for the Protection of Birds, The Lodge, Sandy, Bedfordshire.
UNITED KINGDOM

NAME Braunton Burrows National Nature Reserve
TYPE NR BIOTIC PROVINCE 2.4.2

LEGAL PROTECTION Fully protected as National Nature Reserve

DATE ESTABLISHED 1964

GEOGRAPHICAL LOCATION Bideford Bay, North Devon: N 51°06'; W 04°12'

ALTITUDE Sea level to 30 metres

AREA 605 ha

LAND TENURE Sub-leased from Ministry of Defence (which retains rights of usage over 390 ha) by the Nature Conservancy Council. The surrounding sand-dune system of 1140 ha has been notified as a 'site of special scientific interest'.

PHYSICAL FEATURES A westward facing complex of dunes bounded on the north by the high land of Saunton Down and on the south by the estuaries of the Taw and Torridge rivers. The whole dune system is about 5 km long and 1.7 km wide, flanked on the west by the wide beach of Saunton Sands; it is c.15 m high to seaward and up to 30 m in places further inland.

VEGETATION A full sequence of foredune, stabilized dune and freshwater dune slack habitats is present. The dunes themselves are dominated by marram grass Ammophila arenaria (5.3.1, 5.2.4). Dune slacks support some notable species, including the round-headed club-rush Holoschoenus vulgaris, known for over 250 years since described by the 17th century botanist John Ray and for which this is one of three British stations. Also of interest are water germander Teucrium scordium, sea-knotgrass Polygonum maritimum, sharp rush Juncus acutus, shore dock Rumex rupestris and sand toadflax Linaria arenaria.

NOTEWORTHY FAUNA A focal point for migrant birds on the west coast of Britain and also supports a number of breeding species. They include teal Anas crecca, shelduck Tadorna tadorna, buzzard Buteo buteo, kestrel Falco tinnunculus, snipe Capella gallinago, redshank Tringa totanus, nightjar Caprimulgus europaeus, woodlark Lullula arborea and yellow wagtail Motacilla flava. A large number of invertebrates have been listed.

ZONING None

DISTURBANCES OR DEFICIENCIES Part of area is used for military training with vehicles restricted to trackways. The adjoining S.S.S.I. is partly leased as a golf course.

TOURISM A section of the North Devon coast which is attracting increasing numbers of visitors. At the northern end of the dune system a large resort, with chalets and car parks, is sometimes fully occupied in summer. There are two large car parks for visitors to the reserve, also two Nature Trails and boardwalks.

SCIENTIFIC RESEARCH Study of methods to reduce visitor damage to dunes and for rehabilitation of eroded areas. Other research by university scientists on plant and animal ecology of the area.

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SPECIAL SCIENTIFIC FACILITIES  None

PRINCIPAL REFERENCE MATERIAL  A Guide to the Nature Trails is available from the N.C.C. as are lists of all plant and animal species. Several publications deal with the biology and physiography of the area.


STAFF  1 warden

BUDGET  All expenses met by the Nature Conservancy Council

LOCAL PARK ADMINISTRATION  Regional Officer (South West Region), Nature Conservancy Council, Roughmoor, Bishop’s Hull, Taunton, Somerset.
UNITED KINGDOM

NAME
Rhinog National Nature Reserve

TYPE
NR

BIOTIC PROVINCE
2.4.2

LEGAL PROTECTION
Fully protected as National Nature Reserve

DATE ESTABLISHED
1959

GEOGRAPHICAL LOCATION
10 km east of Harlech: N 52°51'; W 3°58'

ALTITUDE
210-730 metres

AREA
597 ha

LAND TENURE
Owned by the Nature Conservancy Council

PHYSICAL FEATURES
An area near the centre of the anticline known as the Harlech Dome which displays the thickest section of Cambrian rocks to be seen in Britain. These very acid slates and grits form a rugged block-like topography from which the peaks of Rhinog Fawr and Rhinog Fach protrude, as the high points of the massif. The reserve embraces the peaks and the pass of Bwlch Drws Ardydwy between them.

A harsh desolate landscape is produced by the high proportion of unvegetated bare rock with steep crags and escarpments.

VEGETATION
Particularly noted for the luxuriant growth of heather Calluna vulgaris (4.1.1) covering much of the area. Associated species are few and mostly found in more open areas; they include bell heather Erica cinerea, bilberry Vaccinium myrtillus and mosses such as Hypnum cupressiforme. Other plant communities, where conditions are suitable, include acid grassland dominated by bent Agrostis spp. and fescue Festuca ovina, with wavy hair grass Deschampsia flexuosa (5.3.2) on better drained slopes, also patches of bracken Pteridium aquilinum; and small bogs on the more level areas, with cotton grass Eriophorum angustifolium and E. vaginatum, bog myrtle Myrica gale and Sphagnum moss among other major components (4.3.1.1).

NOTEWORTHY FAUNA
Mammals present include red fox Vulpes vulpes and feral goats Capra hircus. Grazing pressure by sheep Ovis is very low compared to other upland areas in Wales. Typical birds are buzzard Buteo buteo, red grouse Lagopus scoticus, black grouse Lyrurus tetrix, raven Corvus corax, wheatear Oenanthe oenanthe and ring ouzel Turdus torquatus.

ZONING
None

DISTURBANCES OR DEFICIENCIES
None reported

TOURISM
Lower valleys near reserve receive quite heavy tourist pressure during summer but visitation of the reserve is low due to poor access and difficult terrain. Most visitors keep to the tracks, only a small proportion making for the summits.

SCIENTIFIC RESEARCH
Studies of soils, vegetation and physiographic features by N.C.C. staff, also surveys of sheep, breeding birds and goats.

SPECIAL SCIENTIFIC FACILITIES
None

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Code: UNI(2).6.10
PRINCIPAL REFERENCE MATERIAL Scientific reports available from the N.C.C. files

STAFF Under surveillance of the Assistant Regional Officer

BUDGET All expenses met by the Nature Conservancy Council

LOCAL PARK ADMINISTRATION The Regional Officer (North Wales), The Nature Conservancy Council, Penrhos Road, Bangor, Caernarvonshire.
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<tr>
<th><strong>UNITED KINGDOM</strong></th>
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<tbody>
<tr>
<td><strong>NAME</strong></td>
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<tr>
<td><strong>TYPE</strong></td>
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<tr>
<td><strong>BIOTIC PROVINCE</strong></td>
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<tr>
<td><strong>LEGAL PROTECTION</strong></td>
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<td><strong>GEOGRAPHICAL LOCATION</strong></td>
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<td><strong>ALTITUDE</strong></td>
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<td><strong>LAND TENURE</strong></td>
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<td><strong>PHYSICAL FEATURES</strong></td>
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<td><strong>VEGETATION</strong></td>
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<td><strong>TOURISM</strong></td>
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<td><strong>SCIENTIFIC RESEARCH</strong></td>
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<td><strong>SPECIAL SCIENTIFIC FACILITIES</strong></td>
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<td><strong>BUDGET</strong></td>
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UNITED KINGDOM

NAME Invernaver National Nature Reserve

TYPE NR BIOTIC PROVINCE 2.8.2

LEGAL PROTECTION Fully protected as National Nature Reserve

DATE ESTABLISHED 1960

GEOGRAPHICAL LOCATION North coast of Sutherland about half way between Cape Wrath and Dunnet Head: N 58°31'; W 4°16'

ALTITUDE Sea level to 168 metres

AREA 551 ha

LAND TENURE Managed by the Nature Conservancy Council under a Nature Reserve Agreement with the owners.

PHYSICAL FEATURES A flat-topped 122 m high ridge with extensive bedrock outcrops of highly metamorphosed Moine schists including all transitions between garnetiferous mica schist to quartzite and granulite. Bound on east and west by sharply incised Borgie and Naver valleys and on the north by the sea. Fluvio-glacial terraces cover the flanks of the ridge and the northern end has been enveloped by dunes with blown sand reaching the ridge top. The coast has extensive sand flats on the foreshore.

VEGETATION Montane plant communities come close to sea level due to low temperatures and severe exposure. The blown shell sand supports montane calcicole plant communities with mountain avens Dryas octopetala, scented vernal grass Anthoxanthum odoratum, wood sorrel Oxalis acetosella and Yorkshire fog grass Holcus lanatus (5.3.1; 5.3.2). The acid peat of the ridge supports montane calcifuge communities with bog myrtle Myrica gale, bilberry Vaccinium myrtillus, cotton grass Eriophorum angustifolium, mat grass Nardus stricta and bearberry Arctostaphylos uva-ursi (4.4.1; 4.1.2, 4.1.1; 5.3.2). The mixing of these communities is of particular interest. A number of marine algae occur offshore.

NOTEWORTHY FAUNA A wide variety of animal habitats is present. The fauna is typical of West Highland deer forests with badger Meles meles, otter Lutra lutra, pine marten Martes martes, and wild cat Felis silvestris grampia. Bird predators include golden eagle Aquila chrysaetos, peregrine falcon Falco peregrinus and raven Corvus corax.

ZONING None

DISTURBANCES OR DEFICIENCIES Burning of moorland (now being brought under control); some local visitor pressure.

TOURISM The area is one of growing popularity, especially in the holiday months of July and August. Facilities include a centre, nature trails and car park. Access to the Drumrunie section is restricted from July to October.

SCIENTIFIC RESEARCH Studies directed to restoration of soils, woodland and animals. Changes of habitat following alterations in grazing regime are also under investigation.

SPECIAL SCIENTIFIC FACILITIES

Hutted accommodation for six persons, with laboratory.

PRINCIPAL REFERENCE MATERIAL

Two nature trail leaflets and one general one on Reserves of North West Scotland have been published by the N.C.C., which can provide a list of other relevant scientific and popular papers and articles.

STAFF

2 wardens

BUDGET

All expenses met by the Nature Conservancy Council

LOCAL PARK ADMINISTRATION

The Regional Officer (West Scotland), Nature Conservancy Council, Caledonia House, 63 Academy Street, Inverness IV1 1BB.

UNITED KINGDOM

NAME Blakeney Point Site of Special Scientific Interest

TYPE NR

BIOTIC PROVINCE 2.4.2

LEGAL PROTECTION Declared as a Site of Special Scientific Interest

DATE ESTABLISHED 1919

GEOGRAPHICAL LOCATION North Norfolk coast, east England: N 52°57'; E 1°00'

ALTITUDE Sea level to 6 metres

AREA 540 ha

LAND TENURE Owned and managed by the National Trust

PHYSICAL FEATURES A shingle and sand spit of considerable physiographic interest which leaves the mainland at Cley and extends 6 km westwards till, opposite Blakeney village, it curves southwards in a manner typical of the north Norfolk coast. At its end the spit forms the foundation of extensive ridges of sand dunes on the south side; substantial areas of salt marsh are also present.

VEGETATION 60 ha of dune grassland and sand/shingle grassland (5.2.4), dominated by sand couch Agropyron junceiforme, marram grass Ammophila arenaria and sand sedge Carex arenaria depending on height above high tide and sand stability. A 40 ha shingle ridge runs ESE from the Long Hills, about 20 ha of its southern aspect colonized discontinuously by perennial forbs of seablite Suaeda fruticosa, yellow horned poppy Glaucium flavum, sea campion Silene marítima, stonecrop Sedum acre and others. Salt marsh occupies 180 ha with glasswort Salicornia, sea aster Aster tripolium and sea lavenders Limonium vulgare, L. bellidifolium and L. binervosum (the two latter being at the northern limit of their range). Intertidal flats and mudbanks have seasonal growths of eelgrass Zostera and green algae.

NOTEWORTHY FAUNA Brent geese Branta bernicla frequent the area in winter; in summer it is noted for its breeding colony of common tern Sterna hirundo and for the largest British colony of little tern S. albifrons.

SPECIAL PURPOSE OF THE RESERVATION To safeguard a classic site for the study of coastal vegetation and succession, which has been known to botanists for many years.

ZONING None

DISTURBANCES OR DEFICIENCIES None reported

TOURISM The breeding terns are a popular attraction in summer and a small museum and information centre is located in the old lifeboat station. Access to the ternery when occupied is restricted to parties escorted by the warden. Considerable use of the reserve by school parties and ramblers.

SCIENTIFIC RESEARCH Studies of plant succession since 1920, with regular visits made by research workers from London University.

SPECIAL SCIENTIFIC FACILITIES None
PRINCIPAL REFERENCE MATERIAL


STAFF 1 warden

BUDGET All expenses met by the National Trust

LOCAL PARK ADMINISTRATION

The National Trust, East Anglia Regional Agent, Blickling, Norwich NOR 09Y.
UNITED KINGDOM

NAME Aberlady Bay Local Nature Reserve

TYPE NR

BIOTIC PROVINCE 2.8.2

LEGAL PROTECTION No information

DATE ESTABLISHED 1952

GEOGRAPHICAL LOCATION South shore of Firth of Forth, 22 km east of Edinburgh:
N 55°54'; W 2°30'

ALTITUDE Sea level to 30 metres

AREA 536 ha

LAND TENURE Managed by the East Lothian County Council by agreement with the owners.

PHYSICAL FEATURES A section of coast with an extensive area of sand and silt, much of it covered at high tide, bounded to the north by igneous rocks and to the south by sedimentary rocks of the carboniferous limestone series. Large raised beach deposits are also present.

VEGETATION A wide range of marine habitats support about 350 vascular plant species. Habitats include calcareous grassland (5.3.1), saltmarsh (5.5.2), fresh water marsh (5.5.1) and sand dunes, with interesting transitions between them. The dunes and slacks have marram grass Ammophila arenaria, sea rocket Cakile marítima, purple milk vetch Astragalus danicus and autumn felwort Gentianella amarella. Fresh water ponds and marshes have bogbean Menyanthes trifoliata, Parnassia palustris, bladderwort Utricularia vulgaris and many sedges Carex spp. In the large Intertidal saltmarsh one finds sea aster Aster tripolium, sea plantain Plantago marítima, arrow grass Triglochin marítima and saltwort Glaux marítima, giving way seawards to glasswort Salicornia and eelgrass Zostera.

NOTEWORTHY FAUNA An important wintering area for many waders and waterfowl; also noted for passage migrants of all kinds, particularly terns but including some rather sparsely distributed visitors to Britain such as Lapland buntings Calcarius lapponicus. The most northerly station in Britain for a number of invertebrates.

ZONING None

DISTURBANCES OR DEFICIENCIES None reported

TOURISM Visited for recreation by large numbers of Edinburgh citizens; much used for teaching purposes.

SCIENTIFIC RESEARCH None at present

SPECIAL SCIENTIFIC FACILITIES None

PRINCIPAL REFERENCE MATERIAL None

STAFF 1 part-time warden

BUDGET Expenses met by East Lothian County Council

LOCAL PARK ADMINISTRATION East Lothian County Council, County Buildings, Haddington, East Lothian, Scotland.

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Code: UNI(2).6.14
NAME: Tentsmuir Point National Nature Reserve

TYPE: NR

BIOTIC PROVINCE: 2.8.2

LEGAL PROTECTION: Fully protected as National Nature Reserve

DATE ESTABLISHED: 1954

GEOGRAPHICAL LOCATION: Southern shore of mouth of the Firth of Tay, 10 km SE of Dundee: N 56°25'; W 2°48'

ALTITUDE: Sea level to 7 metres

AREA: 520 ha

LAND TENURE: 50 ha owned by the Nature Conservancy Council, 470 ha managed under a Nature Reserve Agreement with the owners.

PHYSICAL FEATURES: A coastal area with extensive foreshore and off-shore sand-banks. To landward a series of sand dunes and slacks run roughly parallel to the coast. Most of the reserve has been formed by rapid lateral sand accretion during the last 50 years.

VEGETATION: The pattern of vegetation colonization across the dune system is of considerable interest. Embryo dunes are dominated by sea lyme grass Elymus arenarius and older dunes by marram grass Ammophila arenaria (5.3.1). Dune slacks are rich in both northern and southern species with an abundance of purple milk vetch Astragalus danicus, crowberry Empetrum nigrum and grass of Parnassia palustris. They contain an interesting development of alder Alnus, birch Betula and willow Salix scrub. Lichen and heath dunes are also present as are a few areas of fresh water marsh. Scots pine Pinus sylvestris is seeding from adjacent plantations and invading trees are removed (2.1.2.2).

NOTEWORTHY FAUNA: Breeding birds are few but the reserve is important for feeding and roosting of large numbers of migrants and wintering waterfowl and waders. These include autumn and winter concentrations of up to 16,000 eider duck Somateria mollissima. Invertebrate colonization has paralleled vegetation and a large and interesting variety of species has been recorded.

ZONING: None

DISTURBANCES OR DEFICIENCIES: None reported

TOURISM: Access on foot unrestricted under the local bylaws but increased public access is not encouraged, due to the vulnerability of the site to heavy pressure. Large forestry plantations form a useful buffer zone.

SCIENTIFIC RESEARCH: Long term studies of accretion and vegetation succession; also studies of invertebrate populations. Used by Dundee and St. Andrew’s Universities for teaching purposes.

SPECIAL SCIENTIFIC FACILITIES: None
PRINCIPAL REFERENCE MATERIAL
Mainly unpublished reports and papers

STAFF
1 warden

BUDGET
All expenses met by the Nature Conservancy Council

LOCAL PARK ADMINISTRATION
The Regional Officer (East Scotland), The Nature Conservancy Council, 12 Hope Terrace, Edinburgh EH9 2AS, Scotland.
UNITED KINGDOM

NAME Walberswick National Nature Reserve

TYPE NR BIOTIC PROVINCE 2.4.2

LEGAL PROTECTION Fully protected as National Nature Reserve

DATE ESTABLISHED 1972

GEOGRAPHICAL LOCATION East coast of East Anglia, 20 km south of Lowestoft: N 52°18'; E 1°58'

ALTITUDE Sea level to 20 metres

AREA 514 ha

LAND TENURE Nature Conservancy Council manages 452 ha under a Nature Reserve Agreement with the owners, leases a further 24 ha and owns the remaining 38 ha.

PHYSICAL FEATURES A gentle ridge between tidal mudflats of the River Blythe to the north and extensive reedbeds and shallow lakes (meres) of Westwood marshes to the south. Both valleys were formerly reclaimed for rough pasture but river walls have either become derelict or been breached for wartime defence and the areas have subsequently reverted to mudflats and reedbeds, though with some traces of former use. Acid heath predominates on the high ground between the valleys. Soils derive from Pleistocene sands and gravels overlying the Norwich Crag.

VEGETATION Extensive areas of acidic heathland (4.1.1), much dominated by bracken Pteridium aquilinum, with patches of heather Calluna vulgaris, and grass heath of bent Agrostis and festuca Festuca ovina, with an admixture of bell heather Erica cinerea, gorse Ulex europaeus and broom Sarothamnus scoparius. Some carr woodland, but most woods are 19th century plantations of oak Quercus robur, pine Pinus sylvestris and birch Betula pendula and B. pubescens (2.2.4), established for game covert purposes. Reedbeds are almost pure stands of reed Phragmites communis (5.6.2), some being cut annually for thatching material. Saltmarshes are dominated by sea purslane Halimione portulacoides, with some sea aster Aster tripolium, sea lavender Limonium vulgare and glasswort Salicornia (5.5.2).

NOTEWORTHY FAUNA Mammals include red squirrel Sciurus vulgaris and red deer Cervus elaphus. Ornithological interest centres on high breeding populations of bittern Botaurus stellaris, gadwall Anas strepera and water rail Rallus aquaticus, and the large numbers of waders and waterfowl feeding on the mudflats, particularly shelduck Tadorna tadorna, redshank Tringa totanus and dunlin Calidris alpina. The shelduck nests in the nearby heathland, as does the nightjar Caprimulgus europaeus and red-backed shrike Lanius collurio. Other breeding birds include a recent newcomer Savi's warbler Locustella luscinioides, numerous reed and sedge warblers Acrocephalus scirpaceus and A. schoenobaenus, and bearded tit Panurus biarmicus. Adders Vipera berus and lizards Lacerta vivipara are among other vertebrates. 250 species of lepidoptera have been recorded, including the white-mantled wainscot Nonagria neurica.

ZONING None

DISTURBANCES OR DEFICIENCIES None reported
TOURISM  15 km of public footpaths, bridleways and other tracks from which the reserve can be seen. Access away from these restricted to permit holders.

SCIENTIFIC RESEARCH  None at present

SPECIAL SCIENTIFIC FACILITIES  None

PRINCIPAL REFERENCE MATERIAL  A descriptive leaflet is available from the N.C.C.

STAFF  1 warden

BUDGET  Running expenses met by the Nature Conservancy Council but some management costs shared with the owners.

LOCAL PARK ADMINISTRATION  Regional Officer (East Anglia), The Nature Conservancy Council, 60 Bracondale, Norwich NR2 2BE.

WDNP   IUCN © 1977  (1)B

Code: UNI(2).6.16
UNITED KINGDOM

NAME Ainsdale Sand Dunes National Nature Reserve

TYPE MR

BIOTIC PROVINCE 2.4.2

LEGAL PROTECTION Fully protected by National Nature Reserve status, but see below under 'Tourism'.

DATE ESTABLISHED 1965

GEOGRAPHICAL LOCATION On the coast 8 km south of Southport, Lancashire: 
N 55°34' W 3°3'

ALTITUDE 5-25 metres

AREA 492 ha

LAND TENURE Owned and managed by the Nature Conservancy Council

PHYSICAL FEATURES A gently sloping foreshore area of sands, with mobile dunes characterised by marram grass and extensive lime-rich fixed dunes and dune slacks, some of which are more or less permanently wet. The dune system is tending towards an advanced degree of stabilization and is no longer accreting.

VEGETATION The Reserve is noted for the diversity of plant communities present on the dunes and slacks, including a number of rare species. Mobile dunes have marram Ammophila arenaria (5.2.2) and dune slacks typical marsh species (5.5.1). Introduced sea buckthorn Hippophae rhamnoides (3.2.3.1) is extensive and plantations of Corsican pine Pinus nigra ssp. laricio (2.1.2.1) cover about 120 ha.

About 380 species of vascular plant occur, rare or local species including grass of Parnassus Parnassia palustris, round-leaved wintergreen Pyrola rotundifolia ssp. maritima, dune helleborine Epipactis dunensis, sharp bulrush Scirpus americanus and Baltic rush Juncus balticus hybrid.

NOTEWORTHY FAUNA Diversity of plant communities is accompanied by an equally rich variety of vertebrates and invertebrates. Notable species include breeding colonies of natterjack toad Bufo calamita and sand lizard Lacerta agilis, the latter now extremely rare in the region.

ZONING Entire area zoned as Managed Natural Area.

DISTURBANCES OR DEFICIENCIES Natural coastal erosion.

TOURISM The foreshore is open to visitors but only accessible on foot. Limited recreational use is made of the area in summer. Visitors must keep to pathways in the pinewoods and dunes. A Nature Trail with the theme of dune ecology is visited by over 4000 schoolchildren annually as part of an important educational programme.

SCIENTIFIC RESEARCH The Reserve staff concentrates on management oriented research into conservation problems. Studies of ecology, flora, fauna and pine-wood soil microbiology are being undertaken by universities and colleges.

SPECIAL SCIENTIFIC FACILITIES No information

WDNP

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(1)F

Code: UNI(2).7.1
PRINCIPAL REFERENCE MATERIAL  A descriptive leaflet and bibliography for the Reserve are available from the North Regional Office of the Nature Conservancy Council.

STAFF  2 Wardens and an estate worker.

BUDGET  All expenses met by the Nature Conservancy Council.

LOCAL PARK ADMINISTRATION  The Regional Officer (North Region), The Nature Conservancy Council, Merlewood Research Station, Grange-over-Sands, Cumbria.
Mammals include hare Lepus europaeus and rabbit Oryctolagus cuniculus. A variety of wildfowl include whooper swan Cygnus cygnus, mallard Anas platyrhynchos, teal A. crecca, wigeon A. penelope and pintail A. acuta. Waders use the area on passage and there is a breeding colony of black-headed gull Larus ridibundus by the swamp and pool at the northern end of the reserve. Invertebrates, especially the Hymenoptera, are of interest.

ZONING Zoned as a managed nature reserve.

DISTURBANCES OR DEFICIENCIES None reported

TOURISM The Reserve is some distance from the nearest vehicular access point at its southern end, so is less heavily visited than that part of the foreshore system which lies outside the boundary to the south. Pressure from the public therefore only has slight effects.

SCIENTIFIC RESEARCH Management studies by staff cover sand dune movement, small mammal and wildfowl monitoring, and monthly counts of dead birds along the beach.
SPECIAL SCIENTIFIC FACILITIES None reported

PRINCIPAL REFERENCE MATERIAL None listed

STAFF No information

BUDGET No information

LOCAL PARK ADMINISTRATION The Regional Officer (North Wales), The Nature Conservancy Council, Penrhos Road, Bangor, Gwynedd LL47 2LQ.
UNIVERSAL KINGDOM

NAME Hickling Broad National Nature Reserve

TYPE NR

BIDIC PROVINCE 2.4.2

LEGAL PROTECTION Totally protected by its National Nature Reserve status but see under 'Tourism'.

DATE ESTABLISHED 1958

GEORGICAL LOCATION About 6 km inland from the Norfolk coast and 21 km north-east of Norwich: N 52°43'; E 1°34'

ALTITUDE Sea level to 5 metres

AREA 488 ha

LAND TENURE Partly owned by the Norfolk Naturalists' Trust and partly by a private owner. Managed by agreement with the latter and also subject to a Nature Reserve Agreement with the Nature Conservancy Council.

PHYSICAL FEATURES The reserve consists of two "broads", areas where peat cutting and probably also clay excavation have produced permanent but relatively shallow open water. The topography has subsequently been considerably modified by drainage and reclamation of surrounding low-lying areas and by embankment of the Broad and its associated waterways. The R. Thurne, a tributary of the R. Bure, is connected with the Broad. There are about 280 ha of open water with an average depth of 1.5 m.

VEGETATION Includes a small area of oak plantation Quercus robur (2.2.5), scrub and fen carr of alder Alnus glutinosus, Salix spp. and birch Betula pubescens (3.2.3.1) in drier parts of the marsh, widespread reedy swamps dominated by Phragmites communis and reedmace Typha angustifolia (5.6.2), and sedge beds of Cladium mariscus, (5.5.1). Rooted submerged aquatic species include pondweeds Potamogeton pectinatus, water milfoil Myriophyllum spicatum and maretail Hippuris vulgaris (5.6.3). Communities of naiad Najas marina and the seaweeds Nitellopsis obtusa and Cladophora sauteri are of interest, as are the fern Dryopteris cristata, stoneworts Chara spp. and other unusual aquatic species.

NOTEWORTHY FAUNA The bird fauna is renowned, resident species including a large flock of mute swan Cygnus olor, greylag goose Anser anser and Canada goose Branta canadensis. Other breeding species of note are bittern Botaurus stellaris, garganey Anas querquedula, gadwall A. strepera, little tern Sterna albifrons and kingfisher Alcedo atthis. Regular passage migrants include black-tailed godwit Limosa limosa, spotted redshank Tringa erythropus and ruff Philomachus pugnax. The area is one of the principal strongholds of the swallowtail butterfly Papilio machaon britannicus and is also important for a number of marsh dependent moths including Pelosia muscedera and P. obtusa.

ZONING Managed natural area

DISTURBANCES OR DEFICIENCIES The introduced coypu Myocaster coypus has adversely affected the ecological balance and in general the fragile nature of the ecosystem makes it very susceptible to damage from over-use and pollution of the area.

TOURISM Unrestricted access by boat but permit required to visit marshland areas. A "water trail" is available for visitors with boats and there are excellent bird watching facilities.

WDNP IUCN © 1977
SCIENTIFIC RESEARCH  No research currently under way.

SPECIAL SCIENTIFIC FACILITIES  None

PRINCIPAL REFERENCE MATERIAL

STAFF  A Warden and 2 marsh-men.

BUDGET  Management costs are met by the Norfolk Naturalists' Trust, assisted by an annual contribution from the Nature Conservancy Council, and are also to some extent offset by sales of reed and sedge, but no figures have been given.

LOCAL PARK ADMINISTRATION  Norfolk Naturalists' Trust, 72 The Close, Norwich, Norfolk.
UNITED KINGDOM

NAME Saltfleetby/Theddlethorpe Dunes National Nature Reserve

TYPE NR

BIOTIC PROVINCE 2.4.2

LEGAL PROTECTION Totally protected by its National Nature Reserve status.

DATE ESTABLISHED 1968

GEOGRAPHICAL LOCATION On the coast of Lincolnshire between Mablethorpe and Saltfleet haven: N 53°24'; E 0°14'.

ALTITUDE Sea level to 5 metres

AREA 440 ha

LAND TENURE 118 ha owned by the Nature Conservancy Council; the remaining 322 ha are leased by them from the Crown Estate Commissioners.

PHYSICAL FEATURES The Reserve stretches over a 7 km length of coast where established dunes and dune-slacks lie to landward and a wide expanse of saltmarsh is exposed at low tide. The dunes and saltmarsh are rapidly accreting and the area is regarded as an important research site for studying processes of coastal development.

VEGETATION Two types of scrub are present: sea buckthorn Hippophae rhamnoides, sometimes mixed with elder Sambucus nigra and hawthorn Crataegus monogyna, and a pure scrub of elder (3.2.3.1). Grassland of marram Ammophila arenaria occurs on dunes and mixed grassland of false oat Arrhenatherum elatius, sea couch Agropyron pungens and red fescue Festuca rubra occurs elsewhere (5.2.2; 5.2.3). Some areas of freshwater marsh are dominated by sea rush Juncus maritimus, with abundant Acrocladium cuspidatum moss, others by great pond sedge Carex riparia. Intertidal areas have sea purslane Halimione portulacoides, saltmarsh areas thrift Armeria maritima, sea lavender Limonium vulgare and the common saltmarsh grass Puccinellia maritima. Scarce and localized species include Blysmus rufus and the marsh pea Lathyrus palustris.

NOTEWORTHY FAUNA The avifauna is varied, with a considerable number of resident species, passage migrants and especially winter visitors. The marsh is occupied by the only Lincolnshire population of the natterjack toad Bufo calamita.

ZONING None; entirely 'managed natural area'.

DISTURBANCES OR DEFICIENCIES Much of the Reserve lies within the danger zone of bombing ranges used by the Royal Air Force.

TOURISM Access of the public to part of the area is restricted by the activities of the Ministry of Defence. Visitors should pay attention to signposts and observe the regulations posted up on noticeboards.

SCIENTIFIC RESEARCH Continuing observations on the development of dunes, dune slacks and their associated flora and fauna. Coastal accretion is also the subject of research.

WDNP IUCN © 1977 (1)F Code: UNI(2).7.4
SPECIAL SCIENTIFIC FACILITIES None

PRINCIPAL REFERENCE MATERIAL None listed

STAFF 1 part-time warden

BUDGET No information

LOCAL PARK ADMINISTRATION The Regional Officer (East Anglia), The Nature Conservancy Council, 60 Bracondale, Norwich NOR 58B.
NAME South Bank of the Swale Local Nature Reserve

TYPE NR BIOTIC PROVINCE 2.4.2

LEGAL PROTECTION No information

DATE ESTABLISHED 1969

GEOGRAPHICAL LOCATION About 4 km north of Faversham on N. Kent coast, opposite the eastern end of the Isle of Sheppey: N 41°21'; E 0°58'

ALTITUDE Sea level

AREA 420 ha

LAND TENURE Most of the Reserve is owned by the Crown Estate but leased to the Kent Trust for Nature Conservation, the remainder being the property of the Trust.

PHYSICAL FEATURES Part of a large estuarine ecosystem embracing both sides of the lower Thames estuary. The Reserve is at the eastern end of the Swale, an estuarine area separating the Isle of Sheppey from the mainland and consisting of an intertidal complex of sand, mud-flat, mussel beds and a narrow fringing shell beach. It is bounded on the north by the Swale channel and on the south by a sea wall enclosing marshes grazed by livestock and some arable land.

VEGETATION The intertidal flats support populations of the eel grasses Zostera angustifolia and Z. noltii, the only other common plants being green algae Enteromorpha spp. and small isolated clumps of cord grass Spartina anglica. Strand and shoreline plants on the southern edge of the Reserve include sea holly Eryngium maritimum, knotgrass Polygonum raii and sea-kale Crambe marítima. Brackish-water dyke areas have sea clubrush Scirpus maritimus and Phragmites and there is some saltmarsh along the Faversham creek supporting such species as glasswort Salicornia, sea aster Aster tripolium and Puccinellia grass. Scarce or local species include sea hog's fennel Peucedanum officinale, as well as Polygonum raii.

NOTEWORTHY FAUNA The mud flats form an important winter feeding area for birds including dark-bellied brent goose Branta b. bernicla (up to 1000), duck, especially wigeon Anas penelope, curlew Numenius arquata, redshank Tringa totanus, dunlin Calidris alpina and knot C. canutus. Intertidal invertebrates are numerous with over 350 recorded species, some very rare elsewhere in Britain. These include the polychaete Clymenella torquata and Sacoglossan sea slugs.

ZONING None

DISTURBANCES OR DEFICIENCIES Disturbance of intertidal sediments by bait diggers and of the shell beaches by casual visitors on foot and parties arriving by boat.

TOURISM Access normally limited to the sea wall. Recreational activities include angling, bird watching, rambling, sailing, bathing and wildfowling.

SCIENTIFIC RESEARCH The area is an important research and teaching area for marine biologists.

WDNP IUCN © 1977 (1)F Code: UNI(2).7.5
SPECIAL SCIENTIFIC FACILITIES None

PRINCIPAL REFERENCE MATERIAL Not listed, but a small number of papers have been published on the birds and on the plants and hydrography of the Reserve and a more extensive literature exists on the invertebrate fauna.

STAFF 1 Honorary Warden

BUDGET No information except that it is very small.

LOCAL PARK ADMINISTRATION The Kent Trust for Nature Conservation, P.O. Box 29, Maidstone, Kent.
UNITED KINGDOM

NAME Bure Marshes National Nature Reserve
TYPE NR Biotic Province 2.4.2
LEGAL PROTECTION Totally protected by its National Nature Reserve status.
DATE ESTABLISHED 1958
GEOGRAPHICAL LOCATION Between Wroxham and Ranworth, 13 km north-east of Norwich: N 52°41'; E 1°28'
ALTITUDE Sea level to 5 metres
AREA 413 ha
LAND TENURE Managed by the Nature Conservancy Council, under a Nature Reserve Agreement with the three separate private owners.

PHYSICAL FEATURES The Reserve comprises most of the unreclaimed fenland in the flood plain of the River Bure. It contains four "broads", which originated as flooded mediaeval peat diggings, most of the remaining area being later brought under management as shallow turf ponds, mown marshes or sedge beds. These activities ceased early in the 20th century and natural succession has resulted in vegetation changes. An extensive man-made dyke system has also been abandoned and become overgrown and silted up. Although well inland, there is a small tidal fluctuation.

VEGETATION A wide variety of fenland communities, due partly to the influence on the vegetation of tidal action and alkaline, nutrient-rich water. A small area of slightly higher ground on solid peat beds or the margins of the fen, supports woodland of oak Quercus robur, ash Fraxinus excelsior and alder Alnus glutinosa (2.2.5). Most of the Reserve, however, is covered by scrub growing on waterlogged peat, the main species being alder, willows Salix spp., birch Betula spp., berry-bearing or buckthorn alder Frangula alnus and bog myrtle Myrica gale. (3.2.3.3; 3.2.3.4; 3.2.3.1). Fresh water marsh is maintained by management and has reed Phragmites communis and fen sedge Cladium mariscus as dominants (5.5.1). Waterways have submerged rooted aquatics such as the yellow water lily Nuphar lutea, pondweeds Potamogeton spp. and water soldier Stratiotes aloides (5.6.3).
Uncommon species include a number of Umbelliferae and the ferns Dryopteris cristata and Osmunda regalis.

NOTEWORTHY FAUNA The otter Lutra lutra is the most noteworthy mammal resident in the Reserve. A wide variety of breeding birds includes grey heron Ardea cinerea, wildfowl such as the shoveler Anas clypeata, teal A. crecca and gadwall A. strepera, a large colony of common tern Sterna hirundo and kingfisher Alcedo atthis. A strong population of the swallow-tail butterfly Papilio machaon britannica, a subspecies now confined to the Broadland area, is present.

ZONING None; the whole Reserve is a 'managed natural area'.

DISTURBANCES OR DEFICIENCIES None reported

TOURISM Access restricted, partly because of the difficulty of the terrain. A railway-sleeper trail has been established in the fenland along the river, from which visitors can get a good idea of most of the habitats. About 10,000 people visit the Reserve every year.
SCIENTIFIC RESEARCH  Management-oriented research aimed at open fen and dyke maintenance. Many studies on the natural succession and alluvial stratigraphy have been undertaken, including those on the origins of the Broads. Current studies include the energy cycle and ecology of the swallow-tail butterfly and the coypu Myocastor coypus.

SPECIAL SCIENTIFIC FACILITIES  None reported.

PRINCIPAL REFERENCE MATERIAL

STAFF  A Warden and an estate worker.

BUDGET  Running expenses are met by the Nature Conservancy Council and a contribution towards the costs of some management operations by the landowners, but no figures have been given.

LOCAL PARK ADMINISTRATION  The Regional Officer (East Anglia), The Nature Conservancy Council, 60 Bracondale, Norwich NOR 58B.
UNITED KINGDOM

NAME Gibraltar Point and Skegness Local Nature Reserve

TYPE NR

BIOTIC PROVINCE 2.4.2

LEGAL PROTECTION Provided by a Sanctuary Order under the Protection of Birds Act 1954.

DATE ESTABLISHED 1952

GEOGRAPHICAL LOCATION 4 km of coastline on the north-west shore of the Wash, 5 km south of Skegness, Lincolnshire: N 53°06’; E 0°20’

ALTITUDE Sea level to 5 metres

AREA c. 400 ha

LAND TENURE Owned by Lincolnshire (Lindsey) County Council and managed jointly by it and the Lincolnshire Trust for Nature Conservation through a Committee.

PHYSICAL FEATURES The Reserve consists of sand and shingle spits which have repeatedly advanced seawards and to the south, producing distinctive parallel ridges with marshy re-entrants between. On the landward side the dunes have become well stabilized.

VEGETATION Parts of the area carry a scrub of sea buckthorn Hippophae rhamnoides with some admixture of elder Sambucus nigra and hawthorn Crataegus monogyna (3.2.3.1) or of elder only. Pure marram Ammophila arenaria grassland (5.2.2) and also mixed grasslands of false oat Arrhenatherum elatius, red fescue Festuca rubra and sea couch Agropyron pungens otherwise cover much of the Reserve. Intertidal vegetation includes sea-lavender Limonium vulgare, common saltmarsh grass Puccinellia maritima and sea purslane Halimione portulacoides. The site is the northern limit of several species including marsh mallow Althaea officinalis, shrubby sea-blite Suaeda fruticosa and cord grass Spartina maritima. A good range of Salicornia species are present together with a localized species of sea lavender, Limonium bellidifolium, and sea heath Frankenia laevis.

NOTEWORTHY FAUNA The Reserve is important for its avifauna. Large numbers of pink-footed geese Anser brachyrhynchus winter and the second largest flock of dark-bellied Brent goose Branta b. bernicla in Britain. The flats are one of the most important winter feeding and roosting areas for waders and the Point is well known for the numerous species of migrants that have been recorded, and caught and ringed in large numbers.

ZONING None; the whole Reserve has the status of a managed natural area.

DISTURBANCES OR DEFICIENCIES None reported

TOURISM About 200,000 visitors each year. Field displays and nature trails have been made available by the Lincolnshire Trust.

SCIENTIFIC RESEARCH Under continuous observation with regard to its physio- graphical development. Regular and detailed ornithological studies, Gibraltar Point having one of the longest established coastal Bird Observatories.
SPECIAL SCIENTIFIC FACILITIES  Field Centre available for both research and educational purposes.

PRINCIPAL REFERENCE MATERIAL  None listed

STAFF  A Warden

BUDGET  The Reserve is jointly financed by the Lincolnshire Trust for Nature Conservation Limited and the Lincolnshire (Lindsey) County Council, but no figures have been supplied.

UNITED STATES OF AMERICA

AREA  9,174,990 sq. km

POPULATION  211,438,900 (1974 estimate)

PARKS AND RESERVES LEGISLATION National parks and other categories of lands within the national park system are established by individual acts of Congress, except that the President may create national monuments on Federal lands by proclamation under the authority of the Antiquities Act of 8 June 1906. The National Park Service was established by the Act of 25 August 1916 to establish a National Park Service.

State parks and reserves have been established under State legislation (to be enumerated in a later issue of this sheet).

PARKS AND RESERVES ADMINISTRATION Administrative and regulatory authority over the national park system is delegated to the National Park Service through the Secretary of the Interior by the Act of 25 August 1916 and subsequent acts of Congress as set forth in Title 16, Code of Federal Regulation.


TOTAL AREA UNDER PROTECTION Total national park system comprises 12,570,022 ha, of which 11,748,752 ha are in Federal ownership. Thirty-eight national parks comprise 6,320,965 ha. Including all categories of sites admitted to the following list, the total area is 14,173,475 ha.

PROTECTED AREAS

1.1 Glacier Bay National Monument  1,310,000 ha
1.2 Katmai National Monument  1,270,000
1.3 Adirondacks Forest Preserve  961,600
1.4 Yellowstone National Park  899,139
1.5 Death Valley National Monument  836,836
1.6 Mount McKinley National Park  782,000
1.7 Badlands National Monument  604,730
1.8 Everglades National Park  566,796
2.1 Glacier National Park  410,058
2.2 Olympic National Park  362,848
2.3 Yosemite National Park  308,300
2.4 Big Bend National Park  286,575
2.5 Grand Canyon National Park  272,509
2.6 Biscayne National Monument  238,000
2.7 Joshua Tree National Monument  223,174
2.8 Isle Royale National Park  215,740
2.9 Great Smoky National Park  208,284
2.10 North Cascades National Park  202,000
2.11 Chugach State Park  198,082
2.12 Anza Borrego Desert State Park  188,000
2.13 Kings Canyon National Park  184,132
2.14 Sequoia National Park  154,744
2.15 Okefenokee National Wildlife Refuge  143,256
2.16 Canyonlands National Park  136,542
2.17 Organ Pipe Cactus National Monument  132,350
2.18 Grand Teton National Park  124,140
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**NOTE:** Numbers appearing in parentheses in the section on Vegetation are IUCN numbers taken from *A Working System for Classification of World Vegetation*, IUCN Occasional Paper No. 5.
Glacier Bay National Monument

**Legal Protection**
Total but mineral exploration and mining permitted under Act of 22 June 1936

**Date Established**
26 February 1925

**Geographical Location**
South-eastern Alaska, north-west end of Alexander Archipelago: N 58°10'-59°15'; W 135°15'-138°10'

**Altitude**
Sea level to 4666 metres

**Area**
1,310,000 ha

**Land Tenure**
Federal Government 1,309,987 ha; non-federal 92.7 ha

**Physical Features**
Glacier Bay is roughly a parallelogram 65 km by 75 km and is a sharply dissected rugged area. The landscape falls into 3 broad categories: land covered by snow, ice or bare rock (35%, 324 sq. km); land occupied by successional vegetation (30%, 278 sq. km) and land with more mature vegetation (35%, 324 sq. km). Marine areas include an inshore portion of the continental shelf, fjord systems of various depths and isolated salt water bodies or 'salt chucks'. Throughout the deglaciated areas freshwater in the form of small to medium size streams and ponds is abundant but many drainages are partially or completely blocked by ice. About 20 glacier fronts still meet the sea occasionally.

**Vegetation**
(1.1.9.3) Hemlock Tsuga spp., spruce Picea spp., devil's club coastal climax forest; (1.1.9.4) Pine Pinus spp., peatmoss - sedge Carex spp., bog; (2.1.2.3) Hemlock pine-false azaleas forest muskeg ecotone; (3.2.3.2) Alder Alnus, salmonberry-currant Ribes spp., sub-alpine avalanche chute brushland; (5.3.2) Sedge-blueberry Vaccinium spp., alpine meadow heaths; and rock encrusting lichen and moss barren alpine areas.

**Noteworthy Fauna**
28 terrestrial mammals and 8 marine mammals are present. Two of the latter, the finback whale Balaenoptera physalus and humpback whale Megaptera novaeangliae, are classified in the Red Data Book as vulnerable and endangered, respectively. Larger terrestrial mammals include wolf Canis lupus, brown bear Ursus arctos middendorffi, black bear Ursus americanus, wolverine Gulo g. luscus, river otter Lutra canadensis, Canadian lynx Felis lynx canadensis, black-tailed deer Odocoileus hemionus, moose Alces alces and mountain goat Oreamnos americanus. An unsuccessful attempt was made to reintroduce the sea otter Enhydra lutris in 1968. 210 bird species have been recorded but only 14 sea and 23 land birds can be considered common. The only endangered species is the peregrine Falco peregrinus. The fish fauna is abundant but has not yet been catalogued, although 237 species are known to occur in this part of Alaska.

**Zoning**
National Park Wilderness zoning is being held in abeyance pending study of mineral potential by US Geological Survey

**Disturbances or Deficiencies**
Mineral exploration and prospecting vary in intensity from year to year. No title to lands is given under mining regulations but the right to surface occupation can be procured.
TOURISM  Access by air or water, limited accommodation and services

SCIENTIFIC RESEARCH  Current research includes glaciological studies, general plant and animal surveys, fish inventory, survey of Tarr Islet biota, intertidal areas, marine and migratory birds, humpback whale.

SPECIAL SCIENTIFIC FACILITIES  The National Park Service offer logistic and communications support to research groups, subject to certain requirements.

PRINCIPAL REFERENCE MATERIAL

STAFF  11 full-time (superintendent, 2 rangers, 1 naturalist, 1 research biologist, 1 technician, 5 maintenance), 18 additional seasonally.

BUDGET  US$ 353,000 for 1975 fiscal year

LOCAL PARK ADMINISTRATION  Superintendent, Glacier Bay National Monument, Box 1089, Juneau, Alaska 99801, USA.
Katmai National Monument

**Type**: NP

**Legal Protection**: Total

**Date Established**: 24 September 1918

**Geographical Location**: Base of Alaska Peninsula: N 57°00' - 59°05'; W 153°10' - 156°10'

**Altitude**: Sea level to 2312 metres

**Area**: 1,270,000 ha

**Land Tenure**: Federal Government ownership, except for 5,27 ha

**Physical Features**: The area includes 3 of the 4 physiographic units in the Alaska Peninsula: the coastline along Shelikof straits, the Aleutian mountain range and the lake area around Lake Naknek. Over 160 km of ocean bays fjords and lagoons are backed by the glaciated peaks of the range and volcanic crater lakes. Behind this lies an interior wilderness including the Valley of Ten Thousand Smokes formed during an eruption in 1912 in which more than 28 km³ of volcanic material were ejected in 60 hours, 10 km being deposited in the valley which already had 213 m of volcanic tuffs. The eruption caused the collapse of Mount Katmai summit. The number of fumaroles has dwindled to a few but volcanic activity still continues at Mount Martin and Mount Trident.

**Vegetation**: (1.1.9.3) 25% Boreal forest occupying much of the areas below 650 m with white spruce Picea glauca, paper birch Betula papyrifera and balsam poplar Populus balsamifera; (1.1.9.3) 5% temperate coast forest along the Shelikof coast with Sitka spruce Picea sitchensis and balsam poplar; (3.2.3.1) 10% shrub thickets with alder Alnus crispa, A. sinuata, willows Salix sp., resin birch Betula glandulosa and bluejoint Calamagrostis between beach and forest, along streams and above the treeline; (5.3.2) 15% moist tundra with sedges Carex spp., Calamagrostis and dwarf shrubs of Alnus, Salix and Betula; (4.4.1) 20% alpine tundra with low heath, Empetrum, Dryas and Arctostaphylos; and 25% bare summits, sandbars etc.

**Noteworthy Fauna**: 6 species of marine mammals and 29 terrestrial mammals; former include beluga whale Delphinapterus leucas, grey whale Eschrichtius glauces, sea otter Enhydra lutris, fur seal Callorhinus ursinus, Steller's sea lion Eumetopias jubatus and harbour seal Phoca vitulina. Land mammals include brown bear Ursus arctos middendorffi, wolf Canis lupus, red fox Vulpes vulpes, wolverine Gulo gulo, lynx Felis lynx canadensis, moose Alces alces and caribou Rangifer tarandus. 137 bird species have been recorded: bald eagles Haliaeetus leucocephalus are a common breeding species, waterfowl nest along lakeshores and in the marshes, and spruce grouse Canachites canadensis and mallard Lagopus spp., are abundant in the uplands. Of 24 freshwater fish and 4 marine fish, the most important is the red or sockeye salmon Oncorhynchus nerka, Arctic charr Salvelinus alpinus and arctic grayling Thymallus arcticus are also present.

**Zoning**: None

**Disturbances or Deficiencies**: None reported
TOURISM 4 campgrounds with cabins or camps, but accommodation limited. 11,663 visitors recorded in 1974.

SCIENTIFIC RESEARCH Projects relating to geology, biology, history, archaeology and ecology are being or have been conducted. National Marine Fisheries Service has been studying salmon since 1940. Vulcanological research is in progress. Biological studies have been made on plant succession, microplants, brown bear behaviour and marine mammals. The Valley of 10,000 Smokes is used for simulated moon-walking exercises.

SPECIAL SCIENTIFIC FACILITIES None

PRINCIPAL REFERENCE MATERIAL
GRIGGS, R.F. 1922. The Valley of Ten Thousand Smokes. The National Geographic Society.

STAFF Permanent 3 (superintendent, ranger and maintenance), seasonal 13 (ranger, 5 technicians, 7 maintenance)

BUDGET US$ 166,700 for 1975 fiscal year

LOCAL PARK ADMINISTRATION Superintendent, Katmai National Monument, P.O. Box 7, King Salmon, Alaska 99613, USA.
UNITED STATES OF AMERICA

NAME Yellowstone National Park

TYPE NP

BIOTIC PROVINCE 1.8.2

LEGAL PROTECTION Total

DATE ESTABLISHED 1 March 1872

GEOGRAPHICAL LOCATION Central Rocky Mountains, north-west corner of Wyoming: N 44°08'–45°06'; W 109°49'–111°09'

ALTITUDE 1620–3462 metres

AREA 899,139 ha

LAND TENURE Federal Government owned

PHYSICAL FEATURES Broad, heavily forested, volcanic upland plateaux, bounded on all sides by high mountain peaks with continental divide passing north-west/south-east across southern portion. Geologically composed of pre-cambrian schist, granite and gneiss in the north, paleozoics in Gallatin range in the west, mesozoic on Mount Everts and extensive tertiary volcanism producing Absaroka range and plateaux, all extensively glaciated. Over 10,000 hydrothermal features, including 200 geysers. Average temperatures -7.7°C in January, 16.9°C in July; precipitation 635 mm, mainly as snow.

VEGETATION Estimated 80% of area covered with cold climate coniferous forest and 80% of forest composed of lodgepole pine Pinus contorta, with subalpine fir Abies lasiocarpa and Engelmann spruce Picea engelmanni of lesser importance. Remaining forest areas with Douglas fir Pseudotsuga menziesii and white bark pine Pinus albicaulis, also limber pine P. flexilis. Extensive sagebrush Artemisia tridentata areas and grasslands, on dry slopes and ridges, and wetland meadows alongside streams with Salix sp. Flora includes fringed gentian Gentiana thermalis, heart-leaved arnica Arnica cordifolia, balsamroot Balsamorhiza sagittata and glacier lily Erythronium grandiflorum.

NOTEWORTHY FAUNA Rich in large mammals including porcupine Erethizon dorsatum, coyote Canis latrans, black bear Ursus americanos, grizzly bear Ursus arctos horribilis (both present in considerable numbers), elk Cervus canadensis, mule deer Odocoileus hemionus, moose Alces alces, pronghorn Antilocapra americana, bison Bison bison and bighorn sheep Ovis canadensis (classed as vulnerable in the Red Data Book). Avifauna includes white pelican Pelecanus erythrorhynchos, trumpeter swan Olor buccinator (formerly regarded as an endangered species), Canada geese Branta canadensis, harlequin duck Histrionicus histrionicus, bald eagle Haliaeetus leucocephalus, osprey Pandion haliaetus and common raven Corvus corax. Sagebrush lizard Sceloporus graciosus is of interest. Cut-throat trout Salmo clarki are abundant.

ZONING None: regarded as strict nature reserve throughout, but see under 'Tourism'

DISTURBANCES OR DEFICIENCIES Mining activity along northern boundary may resume after many years cessation

WDNP IUCN © 1975 9(1)F Code: UNI(3).1.4
TOURISM  Entire area open to public but access and services limited in winter. Services include campgrounds, accommodation, interpretive centres.

SCIENTIFIC RESEARCH  Resident staff biologists conduct extensive studies of grizzly bears, bison, elk, fish and plant ecology. US Geological Survey monitors and researches into the thermal activity.

SPECIAL SCIENTIFIC FACILITIES  Research library of 8000 volumes

PRINCIPAL REFERENCE MATERIAL


STAFF  Total 236 (51 protection division; 7 interpretive division; 72 administration division; 106 maintenance division).

BUDGET  Total: US$ 5,338,400 (protection $ 1,026,200; interpretive $ 323,000; administrative $ 858,600; maintenance $ 3,130,600).

LOCAL PARK ADMINISTRATION  Superintendent, Yellowstone National Park, Wyoming 82190, USA.
NAME  Death Valley National Monument

TYPE  NP

LEGAL PROTECTION  Total but lands open to mining and mineral entry

DATE ESTABLISHED  11 February 1933

GEOREGICAL LOCATION  South-eastern California and south-western Nevada: N 35°39'-37°05'; W 116°22'-117°37'

ALTITUDE  89 metres below sea level to 3368 metres

AREA  836,836 ha


PHYSICAL FEATURES  Death Valley, the principal feature, is about 1300 sq. km lying below sea level (including the lowest land point in the western hemisphere). Rugged sparsely vegetated mountains border a north-south oriented valley, and are incised by numerous deep rocky canyons terminating valleyward in huge alluvial fans. The valley is drained internally by rivers which are ephemeral except for Salt Creek in the north. Continental dry climate with flash floods; maximum recorded temperature 57°C, minimum -9°C; average annual precipitation 42-127 mm.

VEGETATION  Estimated flora of 600 species with winter and spring blooming annuals of special interest, also 13 species of cactus. Lower and middle elevations dominated by shrubs such as creosotebush Larra divaricata, sagebrush Atriplex spp., bur sage Ambrosia dumosa, brittlebush Encelia spp., box-thorn Lycium andersoni, Mormon tea Ephedra spp., and blackbrush Coleogyne ramosissima. Trees include Utah juniper Juniperus osteosperma, one needle pine Pinus monophylla, bristlecone pine P. longaeva and limber pine P. flexilis. Approximately 21 species are endemic.

NOTEWORTHY FAUNA  51 species of native mammals, 36 reptiles, 3 amphibians and 6 fish. Noteworthy mammals include 10 species of bat, 3 species of rabbits and hares, 27 rodents; porcupine Erethizon dorsatum, coyote Canis latrans, kit fox Vulpes velox, grey fox Urocyon cinereoargenteus, ringtail or cacomistle Bassariscus astatus, spotted skunk Spilogale putorius, mountain lion Felis concolor, bobcat Felis rufa, mule deer Odocoileus hemionus and desert bighorn sheep Ovis canadensis nelsoni (the species as a whole is classified as vulnerable). More than 100 birds of the 307 recorded species are resident or occupy seasonal habitats. Rare or endangered species include prairie falcon Falco mexicanus, peregrine F. peregrinus and yellow-billed cuckoo Coccyzus americanus. Reptiles include the desert tortoise Gopherus polyphemus agassizi, another species rated in the Red Data Book as rare, 18 lizards including an endemic, the panamint alligator lizard Gerrhonotus panamintinus, and 17 snakes. Four of the 5 native species of pupfish Cyprinodon are endemic to Death Valley, C. diabolis being reduced to approximately 200 individuals and classified as an endangered species.

ZONING  None specifically applied

DISTURBANCES OR DEFICIENCIES  Mineral prospecting and mining activities; unlawful operation of off-road vehicles; presence of large numbers of feral donkeys Equus asinus.

WDNP  TUCN © 1975  9(1)F  Code: UNI(3).1.5
TOURISM  About 600,000 visitors per year, season running from 15 October to 30 April. Campground, museum and interpretive services.

SCIENTIFIC RESEARCH   Current research involves 53 investigators (mostly from universities) working on 64 projects: geology/geophysics 25; plant ecology/botany 18; animal ecology/zooology 20; other 1

SPECIAL SCIENTIFIC FACILITIES None

PRINCIPAL REFERENCE MATERIAL


STAFF  1974: 49 permanent and full-time (administration 13; protection 8; naturalists 2; maintenance 24; guides and aides 2); 62 seasonal full- or part-time; and 5 'intermittent' (November through April).

BUDGET  US$ 1,498,000 for 1975

LOCAL PARK ADMINISTRATION   Superintendent, Death Valley National Monument, Death Valley, California 92328, USA.
Mount McKinley National Park

**Type**: NP

**Legal Protection**: Total

**Date Established**: 26 February 1917

**Biotic Province**: 1.8.1

**Location**: South central Alaska, in the Alaska range separating the coastal lowland from the interior: N 63°20'; W 150°30'

**Altitude**: 457–6194 metres

**Area**: 782,000 ha

**Land Tenure**: Federal Government ownership

**Physical Features**: A unique and spectacular combination of geologic features including major earthquake faults, active glaciers and Mount McKinley, the highest peak in North America. McKinley's twin summit rises 4800 m above the surrounding landscape. Numerous iceflows radiate from the peaks, the longest being the 56 km Muldrow Glacier. The Denali fault system, which stretches for 2000 km across Alaska, and is associated with the Alaska Range, crosses the park separating the older from much younger rocks. Features associated with permafrost are present. Cold, wet and windy climate.

**Vegetation**: The treeline occurs at 823 m. Warm dry south facing slopes adjacent to river have white spruce Picea glauca, with paper birch Betula papyrifera, balsam poplar Populus balsamifera and quaking aspen P. tremuloides (1.1.9.3) and a ground cover of ericaceous shrubs and mosses. North-facing and permafrost underlain slopes have black spruce P. mariana, with paper birch, white spruce, tamarack Larix laricina and ericaceous shrubs (1.1.9.4). Moist foothill tundra has cottongrass Eriophorum sp., with dwarf shrubs, green alder Alnus crispa, dwarf birch Betula nana (4.4.1), while the drier tundra has low mats of mountain avens Dryas spp., grasses and sedges (5.4.1).

**Noteworthy Fauna**: 37 mammals include the wolf Canis lupus (a threatened species), red fox Vulpes v. fulva, grizzly bear Ursus arctos, wolverine Gulo g. hyleus, Canadian lynx Felis lynx canadensis and large and impressive ungulates such as the Alaska moose Alces alces, barrenground caribou Rangifer tarandus and Dall sheep Ovis dalli. The 130 recorded bird species include spruce grouse Canachites canadensis, ruffed grouse Bonasa umbellus and willow, rock and white-tailed ptarmigan Lagopus lagopus, L. mutus and L. leucurus. Long distance migrants include golden plover Pluvialis dominica, long-tailed jaeger Stercorarius longicaudus, arctic tern Sterna paradisaea, wheatear Oenanthe oenanthe and arctic warbler Phylloscopus borealis.

**Zoning**: Consists of zones 1, 2 and 3. (IUCN Occasional Paper No. 4)

**Disturbances or Deficiencies**: Prospecting and mining are allowed under the Act establishing the park. These activities still continue and will until the Act is amended.

**Tourism**: 161,037 visitors in 1974; 7 campgrounds on park road; controls on vehicle use and limited accommodation control visitor impact.
SCIENTIFIC RESEARCH  Current investigations include: impact of road use, grizzly bear-human interactions, wolf denning and behaviour, general biological studies of major mammals.

SPECIAL SCIENTIFIC FACILITIES  None

PRINCIPAL REFERENCE MATERIAL

STAFF  15 full-time (superintendent, 5 rangers, technician, 8 maintenance); additional 67 seasonal staff (31 uniformed naturalists, rangers, etc., 36 maintenance).

BUDGET  US$ 761,400 for 1975 fiscal year

LOCAL PARK ADMINISTRATION  Superintendent, Mount McKinley National Park, P.O. Box 9, McKinley Park, Alaska, USA.
NAME: Bedlands National Monument  

TYPE: NP

BIOTIC PROVINCE: 1.10.1

LEGAL PROTECTION: North unit: total; South unit: total, but with certain privileges retained by the Oglala Sioux tribe.

DATE ESTABLISHED: North unit: 25 January 1939, Presidential Proclamation; South unit: 8 August 1968, PL 90-468 (to include 53,946 ha additionally).

GEOGRAPHICAL LOCATION: South-western South Dakota: estimated coordinates N 34°30' - 44°10'; W 101° - 103°

ALTITUDE: 744-1000 metres

AREA: Total 604,730 ha (North unit 275,479 ha; South unit 329,251 ha)

LAND TENURE: North unit: 265,811 ha Federal, 9668 ha private; South unit: 116,090 ha Federal, 188,214 ha tribal, 24,947 ha private.

PHYSICAL FEATURES: Flat to gently rolling mixed prairie grasslands cut by wide, shallow, often terraced stream valleys. Interspersed with grasslands are dramatically contrasting barren badland formations with colourful spires and pinnacles, massive buttes and steep-walled gullies and canyons. The badland formations have abundant Oligocene fossils and exposures showing depositional and erosional features. Temperatures range from 46°C in summer to -34°C in winter; average yearly precipitation is 406 mm, falling May and June; humidity low.

VEGETATION: The badlands are usually barren of vegetation. About half the monument is covered with short to medium tall prairie grasses of the wheatgrass-grama-buffalo grass type, the predominant species being buffalo grass Buchloë dactyloides, blue grama Bouteloua gracilis and western wheatgrass Agropyron smithii. Other components are needle and thread grass Stipa comata, sedges Carex elocharis and C. filifolia and little bluestem grass Andropogon scoparius. About 50 species of graminoids occur.

NOTEWORTHY FAUNA: Abundant wildlife, the commonest smaller mammals being black-tailed prairie dog or marmot Cynomys ludovicianus, coyote Canis latrans and red fox Vulpes v. regalis. It is highly probable that the black-footed ferret Mustela nigripes (a rare and endangered species) still inhabits the area although there have been no recent sightings. Large ungulates include mule deer Odocoileus hemionus, white-tailed deer O. virginianus dacotensis, pronghorn antelope Antilocapra americana, bison Bison bison and Rocky Mountain bighorn sheep Ovis canadensis (a vulnerable species). More than 120 bird species and 25 species of reptiles and amphibians have been recorded.

ZONING: None

DISTURBANCES OR DEFICIENCIES: None at present

TOURISM: Cedar Pass Visitor Centre, with campground and facilities; another campground and a picnic area elsewhere.

WDNP IUCN © 1975 9(1)F Code: UNI(3).1.7
SCIENTIFIC RESEARCH  Cooperative agreement for study of prairie deer (US Forest Service, US Fish and Wildlife Service, National Park Service and South Dakota Fish, Game and Parks Department); also studies of prairie dog towns by a number of organizations.

SPECIAL SCIENTIFIC FACILITIES  None

PRINCIPAL REFERENCE MATERIAL


CLARK, J. Badlands Exploratory Project.


STAFF  Permanent employees: full-time 13 (superintendent, 2 administration, 5 rangers, naturalist, 4 maintenance), part-time 12 (2 clerical, 10 maintenance); 21 additional seasonal staff (3 rangers, 5 naturalists, 4 aides, 9 maintenance).

BUDGET  Total US$ 413,200 (administration $ 75,310; protection $ 73,550; interpretation $ 39,550; maintenance $ 224,790).

LOCAL PARK ADMINISTRATION  Superintendent, Badlands National Monument, Interior, South Dakota 57750, USA.
NAME Everglades National Park

TYPE NP-M

BIOTIC PROVINCE 3.6.4

LEGAL PROTECTION Total

DATE ESTABLISHED 6 December 1947

GEOGRAPHICAL LOCATION Southern tip of Florida peninsula, including most of the waters of Florida Bay: N 25°20'; W 81°

ALTITUDE See level to 2 metres

AREA 566,796 ha

LAND TENURE Federal Government ownership

PHYSICAL FEATURES The park is a shallow basin tilted to the south-west and underlain by extensive Pleistocene limestones with oolitic and bryozoan facies, the latter largely composed of Schizoporella floridans. Water is the dominant environmental factor, with annual precipitation often exceeding 1270 mm and periodic overflows from Lake Okeechobee to the north. The limestone is overlain with variable thicknesses of marl and peat, minimizing water loss downwards. Florida Bay is over 2000 sq. km of shallow water from 1.2-2.74 m deep with anastomosing mudbanks and unconsolidated calcareous sediments over the limestones. It is one of the most active areas of modern carbonate sedimentation. Temperatures moderate, but reaching 21°C-35°C in summer. Hurricane force storms occur and two-thirds of the park are periodically inundated.

VEGETATION 5 discrete vegetation types: hammocks (1.1.2.1, 8100 ha, 1.43%) or tree islands of mature hardwoods especially mahogany Swietenia mahagoni; mangrove forests (1.1.5, 93,150 ha, 16.43%) of Rhizophora mangle, Laguncularia racemosa and Avicennia nitida; pinelands (1.2.6; 1.1.9.2, 8505 ha, 1.5%) on elevated limestone outcrops, and with admixture of a local slash pine Pinus elliotti var. densa; bayheads (1.2.5.3, 10,125 ha, 1.79%) with isolated stands on or slight elevations of such species as bald cypress Taxodium distichum or the willow Salix caroliniana; and in the north and east sawgrass prairies and tree savanna (5.1.2.1, 3240 ha, 0.57%) dominated by sedge Cladium jamaicense. There are also five types of aquatic vegetation: inland freshwater "rivers" (5.1.1.5; 5.5.1, 188,325 ha, 33% including flood savannas); small scattered ponds; brackish water marshes; coastal marshes (5.5.2, 43,740 ha, 7.72%); and the marine sector in which turtle grass Thalassia testudinum, shoal grass Diplanthera wrightii and manatee grass Syringodium filiforme are the dominant grasses, and Caulerpa in deeper water and the family Codiaeaceae in the shallows are the more notable algae, the latter playing an important role in calcifying the substrate for encrusting by Rhodophyceae and coralline algae.

NOTEWORTHY FAUNA 25 native mammals occur including round-tailed muskrat Neofiber alleni struix, mink Mustela vison evergladensis, Florida cougar Felis concolor coryi (an endangered subspecies), manatee Trichechus manatus and latirostris (a vulnerable species). Over 300 bird species (many of limited distribution in the USA) have been recorded, notably the Everglades kite Rostrhamus sociabilis, short-tailed hawk Buteo brachyurus, bald eagle Haliaeetus leucocephalus, osprey Pandion haliaetus, peregrine Falco peregrinus, great white heron Ardea occidentalis, reddish egret Dichromansassa rufescens, wood ibis Mycteria americana, roseate spoonbill Ajaia ajaja, mangrove cuckoo Coccyzus minor
and many species typical of the Caribbean region. 60 known species of reptiles and amphibians occur, 23 being snakes: American alligator Alligator mississippiensis and the endangered American crocodile Crocodylus acutus and green turtle Chelonia mydas mydas are noteworthy.

ZONING  Strict natural areas and managed natural areas are identified

DISTURBANCES OR DEFICIENCIES  Effects of flood control canals interrupting drainage; impact of pesticides and aquifer depletion resulting from agriculture; and population growth and urban sprawl.

TOURISM  Over a million visitors annually since 1966; in 1972, 39% entered by boat and 35,000 trailers were used by a further 2%. About 24,000 students are now participating in Environmental Education programmes. Peak season is December to April.

SCIENTIFIC RESEARCH  About 100 studies are presently being undertaken, many with university collaboration.

SPECIAL SCIENTIFIC FACILITIES  Study collection of 25,000 specimens and reference library

PRINCIPAL REFERENCE MATERIAL  Over 50 works of reference have been published, but there is no single comprehensive account of the natural history.

STAFF  100 permanent full-time employees, augmented seasonally by 100 more

BUDGET  Approximately US$ 2,189,000 for administration, protection, natural science studies, interpretation and maintenance for 1974 fiscal year. An additional US$ 436,000 was appropriated for recreational facilities.

LOCAL PARK ADMINISTRATION  Superintendent, Everglades National Park, P.O. Box 279, Homestead, Florida 33030, USA.
UNITED STATES OF AMERICA

NAME: Glacier National Park
TYPE: NP

LEGAL PROTECTION: Total


GEOGRAPHICAL LOCATION: North-west Montana, northern Rocky Mountains, to Canadian border: N 48°15'-49°00'; W 113°15'-114°30'

ALTITUDE: 972-3185 metres

AREA: 410,058 ha

LAND TENURE: Federal Government ownership, except for approximately 500 ha still in private hands over which the park has jurisdiction and which the park is acquiring on a voluntary basis from the owners.

PHYSICAL FEATURES: Northern Rocky Mountains, composed of sedimentary strata of Precambrian age with major valleys and intervening ridges trending north-east to south-west and with a major thrust, the Lewis overthrust of Cretaceous age, bordering the park on the east and emphasizing the contrast between the park and the plains. Pleistocene glaciation has resulted in horn-shaped peaks, broad U-shaped valleys, hanging valleys, aretes, glacial lakes and cirques. 50-60 small cirque glaciers are of relatively recent post-Pleistocene origin. Mean annual temperatures vary from 4°C to 6°C and precipitation from 480-2500 mm, according to location west or east of the Continental Divide.

VEGETATION: West slope forest (191,143 ha, 46.6%) with lodgepole pine Pinus contorta-larch Larix occidentalis, cedar Thuja plicata-western hemlock Tsuga heterophylla and spruce Picea engelmannii-fir Abies lasiocarpa associations. The northern part of the west slope has remnants of ponderosa pine-bunchgrass associations. East slope forests are also mainly spruce-fir or fir-bunchgrass (67,647 ha, 16.5%), but with some aspen Populus tremuloides and cottonwood P. balsamifera at lower elevations. Alpine communities occupy 135,669 ha (33%) and consist of tundra, timberline and meadow communities. The remaining 12,540 ha (3%) are aquatic ecosystems.

NOTEWORTHY FAUNA: Includes black bear Ursus americanus, grizzly Ursus arctos, mountain lion Felis concolor, American elk Cervus canadensis, mule deer Odocoileus hemionus, white-tail deer O. virginianus, moose Alces alces, mountain goat Oreamnos americanus and bighorn sheep Ovis canadensis (a threatened species of limited range). Birds include the bald eagle Haliaeetus leucocephalus.

ZONING: 367,000 ha (89.5%), comprising three separate units, is being considered for classification as wilderness under the National Wilderness Act.

DISTURBANCES OR DEFICIENCIES: Airborne fluorides from a nearby aluminium plant at Columbia Falls, Montana, are causing unnatural accumulation of fluorides in a wide spectrum of the biota.

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Code: UNI(3).2.1
TOURISM Over 1 million visitors annually. Visitor accommodation and facilities include campgrounds, picnic areas, hotels, motels, interpretative programmes and naturalist services.

SCIENTIFIC RESEARCH A variety of basic studies relating to description and function of park ecosystems. Current projects include ungulates, grizzly bears, vegetation, visitor use and wildlife.

SPECIAL SCIENTIFIC FACILITIES None at present

PRINCIPAL REFERENCE MATERIAL


STAFF Total permanent staff 55, seasonal staff (July and August) 285

BUDGET Fiscal year 1975: US$ 417,600 for administration, resources management, visitor protection, interpretation and maintenance, US$ 104,000 from fee collection.

LOCAL PARK ADMINISTRATION Superintendent, Glacier National Park, West Glacier, Montana 59936, USA.
NOTEWORTHY FAUNA The coniferous montane/sub-alpine hemlock western fir occupy mountains area 362,848 WDNP IUCN disturbed or deficiencies As noted above, there are still 1317 ha of private land in reserve, which are however being acquired as funds permit.

TOURISM Approximately 2,000,000 visitors per annum, regulated to minimise impacts
SCIENTIFIC RESEARCH: Includes studies of Olympic marmot, Rocky mountain goat, Blue Glacier, human impact on backcountry camps and Ozette archaeological investigations; several are continuing.

SPECIAL SCIENTIFIC FACILITIES: Small research station maintained by University of Washington on the Blue Glacier, Mount Olympus.

PRINCIPAL REFERENCE MATERIAL:

STAFF: 75 permanent employees and 112 seasonal employees.

BUDGET: US$ 1,786,500 for 1975 fiscal year.

LOCAL PARK ADMINISTRATION: Superintendent, Olympic National Park, Port Angeles, Washington 98362, USA.
UNITED STATES OF AMERICA

NAME  Yosemite National Park
TYPE  NP
LEGAL PROTECTION  Total

GEOGRAPHICAL LOCATION  Central portion of the Sierra Nevada, central California; N 37°30'-38°13'; W 119°15'-120°00'

ALTITUDE  671-3964 metres

AREA  308,300 ha

LAND TENURE  Federal Government owned

PHYSICAL FEATURES  Yosemite is dominated by the Sierra Nevada, a tilted granite area; granite underlies most of the park and is exposed as domes, partial domes, knobs and cliffs. Exceptionally glaciated topography over nearly all the area, the most spectacular elements being the Yosemite Valley, a 914 m deep cleft carved by glaciers through a gently rolling upland. The sheer massive granite walls present a freshly glaciated appearance with little postglacial erosion. Many waterfalls add to this setting. Considerable climatic variation with mean temperatures varying from valleys to mountains by 20°C, precipitation from 1270-2652 mm.

VEGETATION  41.2% (127,150 ha) lodgepole pine Pinus contorta, with mountain hemlock Tsuga mertensiana, western juniper Juniperus occidentalis, western white pine Pinus monticola and whitebark pine P. albicaulis; sub-alpine areas 21.3% (65,560 ha) with red fir Abies magnifica, white fir A. concolor, jeffrey pine Pinus jeffreyi and quaking aspen Populus tremuloides; 18.3% (56,370 ha) alpine vegetation, with alpine willow Salix petrophila, perennial herbs, grasses and sedges; 17.6% (54,150 ha) mixed coniferous forest, with western yellow pine Pinus ponderosa, incense cedar Libocedrus decurrens, bigleaf maple Acer macrophyllum and others; 1.6% (5060 ha) chapparal, with chemise Adenostoma fasciculatum, Geanthen spp., Sierra mountain misery Chamaebatia foliolosa and poison oak Rhus diversiloba; and, finally, 0.04% (0.12 ha) of giant sequoia Sequoiadendron gigantea.

NOTEWORTHY FAUNA  Includes pika Ochotona princeps muiri, marmots Marmota flaviventris sierrae, ground squirrels Citellus beecheyi and C. beldingi, chickaree or American red squirrel Tamiasciurus douglasii albomarginatus, black bear Ursus americanus, the marten Martes americana sierrae, longtailed weasel Mustela frenata nevadensis. Wolverine Gulo g. luscus and bighorn sheep Ovis canadensis californiana are rated as endangered in California, only a few individuals remaining of the sheep, if any. The avifauna also includes two endangered or rare species, the southern bald eagle Haliaeetus I. leucocephalus and the American peregrine falcon Falco peregrinus anatum. The piute cutthroat trout Salmo clarki selenitex, a sub-species in the Federal endangered species list, has been introduced and the population now numbers about 200.

ZONING  None
DISTURBANCES OR DEFICIENCIES  Extreme visitor pressure, calling for development of modern accommodation facilities on a large scale, which has inevitably had a disurbing impact.

WDNP  IUCN © 1975  9(1)F  Code: UNI(3).2.3
TOURISM More than 2.3 million visitors annually. 1864 lodging units in summer, with capacity for 5130 people, and 2460 campsites housing 10,000. Facilities include stores, restaurant and sports facilities (including a ski resort and golf course).

SCIENTIFIC RESEARCH 56 projects are listed in a recent annual report: 9 geology/geomorphology; 22 animal ecology/zooology; 12 plant ecology/botany; 6 environmental (including human impacts); 1 archaeology; 1 human ecology.

SPECIAL SCIENTIFIC FACILITIES None

PRINCIPAL REFERENCE MATERIAL Selected from 4 page bibliography:

STAFF Permanent employees: approximately 150 year round, 100-300 seasonally. Concession employees: 450-1000.

BUDGET US$ 5 million

LOCAL PARK ADMINISTRATION Superintendent, Yosemite National Park, California 95389, USA.
UNITED STATES OF AMERICA

NAME Big Bend National Park

TYPE NP

BIOTIC PROVINCE 1.11.3

LEGAL PROTECTION Total

DATE ESTABLISHED 12 June 1944

GEOGRAPHICAL LOCATION South-western United States, west Texas on Mexican border: N 29°; W 103° (estimated)

ALTITUDE 564-2388 metres

AREA 286,575 ha

LAND TENURE Federal land except for 259 ha comprising both State and privately owned land

PHYSICAL FEATURES Vast expanses of fairly open Chihuahuan desert, enclosed on west, south and east by a bend of the Rio Grande, which also forms the border with Mexico. The Chisos mountains in the centre of the bend are an isolated volcanic stock rising above the desert and providing a unique habitat. Other rocks include massive ocean deposited limestones. Soils range from riverside floodplain silts to desert gravel and humus-rich gravel soils of the mountains. Temperatures high in summer but can be below 0°C in winter in mountains; rainfall 228-380 mm.

VEGETATION Grassland and shrub desert each occupy nearly 49% of area. Shrub desert adjacent to river floodplains, low hot areas with succulents, cactaceae and creosote bush Larrea davisicata. Grasslands in areas above shrub desert with grama grasses Bouteloua spp., Yucca spp., and sotol Dasylirion leiophyllum. Chisos mountains have a small area, 243 ha, with western yellow pine Pinus ponderosa and Douglas fir Pseudotsuga menziesii at highest elevations; otherwise Mexican pinyon Pinus cembroides, juniper and oak woodlands. Riverine areas support cottonwood Populus acuminata and Salix spp. Endemics include the stonecrop Willardia squamulosa (a genus otherwise confined to Mexico) and two agaves Agave scabra and A. chisoensis.

NOTEWORTHY FAUNA An endemic sub-species of whitetailed deer Odocoileus virginianus carminus occurs only in woodlands of this park. The colima warbler Vernivora crissalis is a rare species which nests in the Chisos mountains, otherwise only in the neighbouring Coahuila province of Mexico; it winters in western Mexico. One or two other birds and reptiles have not been recorded elsewhere in the USA while the Rio Grande river contains several endemic fish such as the so-called Chihuahuan shiner and Gambusia gagei which is rated as a threatened species. There are also two endemic land snails Humboldtiana edithae and Holospira yucatensis.

ZONING None

DISTURBANCES OR DEFICIENCIES None at present although effects of past over-grazing are still in evidence

TOURISM Facilities include campgrounds, lodges, orientation stations and trails

SCIENTIFIC RESEARCH 16 major long-term projects are currently in progress, including animal studies, geologic surveys and some plant studies; also a number of short-term projects.

WDNP IUCN © 1975 9(1)F Code: UNI(3).2.4
SPECIAL SCIENTIFIC FACILITIES  2 research stations in fairly constant use; study collection and library at park headquarters

PRINCIPAL REFERENCE MATERIAL  Many books, theses and papers on Big Bend have been published. The best known include The Big Bend of the Rio Grande (Maxwell), The Big Ben and Wildflowers of the Big Bend country (Warnock), but no dates or other publication details have been supplied.

STAFF  55 permanent staff (6 administrative, 5 interpretation, 12 protection and 32 maintenance) and varying numbers of temporary and seasonal staff usually hired during the busy summer season.

BUDGET  US$ 1,000,000

LOCAL PARK ADMINISTRATION  Superintendent, Big Bend National Park, Texas 79834, USA.
NAME: Grand Canyon National Park

TYPE: NP

BIOTIC PROVINCE: 1.8.2

LEGAL PROTECTION: Total

DATE ESTABLISHED: 26 February 1919, by Act of Congress

GEOGRAPHICAL LOCATION: Northern portion of the State of Arizona: N 36°; W 112°
(park headquarters)

ALTITUDE: 518-2793 metres

AREA: 272,596 ha. By an Act of 3 January 1975, this park and the Grand Canyon National Monument (Code 3.9) were amalgamated, 35,000 ha were excised and added to Havasupai Indian Reservation, and Kaibab National Forest, Lake Mead National Recreation Area and Marble Canyon National Monument were incorporated, bringing the total area of the newly constituted Grand Canyon National Park up to 493,000 ha. This will be reflected in the next revision of the relevant sheets.

LAND TENURE: Federal Government owned

PHYSICAL FEATURES: A twisting gorge formed by the Colorado river and dividing the park into a North Rim and South Rim overlooking the spectacular canyon, with the lower, dissected inner canyon area between the two. The horizontal strata exposed in the canyon date from Permian limestones and sandstones of the plateau, through carboniferous, Cambrian limestones and sandstones to Precambrian schist at the base, these oldest rocks approaching 2000 million years in age. Altitudinal range provides a variety of climate and habitat from desert to montane.

VEGETATION: Ranges from montane forests above the North Rim with blue spruce Picea pungens and Rocky Mountain maple Acer glabrum down through forests of Douglas fir Pseudotsuga menziesii, white fir Abies concolor and aspen Populus tremuloides at 2500 m, and transitional forests of western yellow pine Pinus ponderosa and gambel oak Quercus gambelii, to upper Sonoran desert with Utah juniper Juniperus osteosperma, pinon pine Pinus edulis and sagebrush Artemisia spp., and lower Sonoran with yucca and cactaceae at 610 m.

NOTEWORTHY FAUNA: The Kaibab squirrel Sciurus kaibabensis is an endemic species. Larger mammals include the coyote Canis latrans, mountain lion Felis concolor, mule deer Odocoileus hemionus and three sub-species of the big horn sheep Ovis canadensis canadensis, O. c. nelsonii and the desert bighorn O. c. mexicana. Rare or threatened birds include the California brown pelican Pelecanus occidentalis, californicus, southern bald eagle Haliaeetus leucocephalus, prairie falcon Falco mexicanus, peregrine falcon F. peregrinus anatum and spotted owl Strix occidentalis. The Grand Canyon rattlesnake Crotalus viridis abyssus is endemic to the park area. Threatened fish include the Colorado river squawfish Ptychocheilus lucius, humpback chub Gila cypha and little Colorado spinedace Lepidomeda vittata.

ZONING: None

DISTURBANCES OR DEFICIENCIES: Pressures from commercial interests, hydroelectric developments and noncompatible uses. A large feral donkey population may threaten the desert bighorn sheep and riparian ecology.
TOURISM
2.5 million visitors per annum; campgrounds and motels

SCIENTIFIC RESEARCH
Major study under way to determine the natural role of fire in forests of North Rim and another on ecological and social impact of river-running on the Colorado river. Resource inventory pilot study.

SPECIAL SCIENTIFIC FACILITIES
Ecological Studies Laboratory at park headquarters, South Rim, and North Rim Field Station available to contracted investigators; 4 designated 'research stations' within park.

PRINCIPAL REFERENCE MATERIAL

STAFF
100 permanent (1 superintendent, 8 unit managers, 14 professional specialists, 9 interpreters, 38 maintenance, 18 law enforcement, 12 clerical).

BUDGET
US$ 2,485,000

LOCAL PARK ADMINISTRATION
Superintendent, Grand Canyon National Park, PO Box 129, Grand Canyon, Arizona 86023, USA.
UNITED STATES OF AMERICA

NAME  Isle Royale National Park

TYPE  NP

BIOTIC PROVINCE  1.4.1(1.2.1)

LEGAL PROTECTION  Total

DATE ESTABLISHED  3 April 1940

GEOGRAPHICAL LOCATION  An island in Lake Superior, Michigan: N 47°50'-47°15'; W 88°20'-89°20'

ALTITUDE  183-425 metres

AREA  218,273 ha, of which 54,167 ha is land

LAND TENURE  Donated to the Federal Government by the State of Michigan

PHYSICAL FEATURES  A series of parallel ridges with valleys in between; dotted with bogs and inland lakes varying in size from less than 0.5 ha to Siskiwit Lake of over 2428 ha. Bare rock is evident along shorelines and the island is covered with second growth vegetation. 24 km from the nearest mainland and little affected by outside influences.

VEGETATION  Climax forest of sugar maple Acer saccharum and yellow birch Betula alleghaniensis with a ground cover of thimbleberry Rubus parviflorus dominates drier areas. Some virgin stands of 220-year-old maple still exist. In moist depressions the climax forest is of paper birch Betula papyrifera, balsam fir Abies balsamea and white spruce Picea glauca, interspersed with big tooth aspen Populus tremuloides, white cedar Thuja occidentalis, dogwood Cornus stolonifera, red maple Acer rubra, pines Pinus banksiana, P. strobus and P. resinosa, black spruce Picea mariana and yew Taxus canadensis. The bogs include sundews Drosera spp., and pitcher plant Sarracenia purpurea. There is a small colony of the disjunctive species, devil's club Oplopanax horridum, at eastern point of the island.

NOTEWORTHY FAUNA  Mammals include snowshoe hare Lepus americanus, red squirrel Tamiasciurus hudsonicus, beaver Castor fiber canadensis, deer mouse Peromyscus maniculatus, muskrat Ondatra zibethicus, timber wolf Canis lupus (an endangered species; 30 on the island), red fox Vulpes v. fulva, mink Mustela vison, otter Lutra canadensis, lynx Felis lynx canadensis (now rare) and moose Alces alces. 197 bird species include loon Gavia immer black duck Anas rubripes, merganser Mergus merganser, bald eagle Haliaeetus leucocephalus and osprey Pandion haliaetus (both now rare), herring gull Larus argentatus (very common) and pileated woodpecker Dryocopus pileatus (uncommon and local). Migrants and accidentals of nearly all midwestern bird species have been recorded.

ZONING  99% to be zoned as wilderness; 1% for development and use by man

DISTURBANCES OR DEFICIENCIES  The island has reached maximum visitor carrying capacity and management objectives placing a limit of 22,000 visitors per year have been approved.

TOURISM  30 small campgrounds, trails and lodges available; 3 seaplane landing zones; all wheeled vehicles prohibited
SCIENTIFIC RESEARCH  Major studies include wolf-moose relationship (now in 16th year), prehistoric fire survey, vegetation succession, and the ecology of moose and of the fir forest.

SPECIAL SCIENTIFIC FACILITIES  Minimal facilities with tented research camps but special quarters for winter wolf-moose study (Purdue University); some servicing for approved research projects of high priority.

PRINCIPAL REFERENCE MATERIAL  Full lists of publications on various topics are provided on request by park authorities.

STAFF  18 permanent staff (6 administration; 4 protection; 4 maintenance; 4 rangers); 81 seasonal staff (6 administration; 34 protection; 32 maintenance; 9 rangers).

BUDGET  About US$ 828,000 annually (administration $ 122,000; protection $ 170,000; maintenance $ 320,000; rangers $ 216,000)

LOCAL PARK ADMINISTRATION  Superintendent, Isle Royale National Park, 87 N. Ripley Street, Houghton, Michigan 49931, USA.
UNITED STATES OF AMERICA

NAME Great Smoky Mountains National Park

TYPE NP

BIOTIC PROVINCE 1.4.2

LEGAL PROTECTION Total

DATE ESTABLISHED 15 June 1934 by Act of Congress

GEOGRAPHICAL LOCATION South-eastern USA, astride State boundaries of Tennessee and North Carolina; Southern Appalachian mountains: N 35° 22'-35° 50'; W 83°-84°

ALTITUDE 304-2024 metres

AREA 208,284 ha

LAND TENURE Government owned following purchase and donation

PHYSICAL FEATURES North-east trending ridgeline of Great Smoky Mountains with 16 peaks over 1829 m and lesser ridges forming radiating spurs. Topography consists of moderately sharp-crested ridges with steep sides, separated by deep V-shaped valleys forming a complex drainage system with many fast flowing clear mountain streams. Highest point is Clingmans Dome near centre of park. Tendency to landslides: the water table is everywhere close to surface. Warm humid summers and fairly mild winters; precipitation averaging 1626 mm but increasing with altitude. Traces of early pioneer settlement.

VEGETATION Over 14,000 ha of red spruce Picea rubens - balsam fir Abies fraseri forests, mainly over 1370 m, with hemlock Tsuga canadensis at lower elevations; (1.1.9.3): deciduous and mixed forests, 184,751 ha, featuring closed forests of white oak Quercus alba, northern red oak Q. rubra and black oak Q. velutina, open oak-pine, with white pine Pinus strobus and other pines on ridges, sheltered areas, with sugar maple Acer saccharum and tulip-tree Liriodendron tulipifera, and hardwood forest, with red maple Acer rubrum and the fir Abies fraseri, over 1370 m; (1.2.4). Also scrub and grasslands over small areas; (3.1.1.4; 5.3.1).

NOTEWORTHY FAUNA Varied, with 50 mammal species, 200 bird species, 77 reptile and amphibian species and 72 fish species recorded. Black bear Ursus americanus and white-tailed deer Odocoileus virginianus are the largest mammals and rodents the most abundant; the Indiana bat Myotis sodalis occurs and is rated as vulnerable in the Red Data Book. Avifauna includes breeding populations of red-cockaded woodpecker Dendrocopos borealis, a rare and local species.

ZONING Under consideration but not yet established: about 76% would be wilderness, 23% tourist/administrative and 1% of historical importance.

DISTURBANCES OR DEFICIENCIES Feral pigs Sus scrofa have spread over two-thirds of park causing damage, destruction of native floras and competition with native fauna for food and habitat; heavy visitor use and some poaching.

TOURISM Facilities include information centres, campgrounds and trails

SCIENTIFIC RESEARCH Biology and control of Sus scrofa, and population and biology of Ursus americanus are among the wide range of topics being investigated.
SPECIAL SCIENTIFIC FACILITIES
Modest laboratory facilities, insect collection, herbarium collection and small reference library.

PRINCIPAL REFERENCE MATERIAL
SHANKS, R.E. 1954. Reference list of Native Plants of the Great Smoky Mountains. Botany Department, the University of Tennessee, 17 pp. mimeo.

STAFF
Management 6; administration 9, plus one temporary; visitor services 7, plus 25 temporary; resource management and visitor protection 32, plus 26 temporary; maintenance 58, plus 122 temporary; safety 2; fee collection 2, plus 25 temporary; total 126 permanent and 199 temporary.

BUDGET
US$ 3,208,000

LOCAL PARK ADMINISTRATION
Superintendent, Great Smoky Mountains National Park, Gatlinburg, Tennessee 37738, USA.
UNITED STATES OF AMERICA

NAME
Kings Canyon National Park
Sequoia National Park

TYPE NP
BIOTIC PROVINCE 1.3.3/1.11.2

LEGAL PROTECTION
Total, but sport-fishing permitted

DATE ESTABLISHED

GEOGRAPHICAL LOCATION
East central California, Sierra Nevada: centre of parks approximately: N 36°45'49"; W 118°32'20"

ALTITUDE
427-4418 m (Mount Whitney, highest point in the conterminous USA)

AREA
Kings Canyon: total 186,296 ha (186,115 ha Federal, 181 ha other) Sequoia National Park: total 156,536 ha (156,247 ha Federal, 316 ha other). The areas have been revised but do not affect the coding of these two parks.

LAND TENURE
See above: exclusive Federal jurisdiction over all lands within the park boundaries

PHYSICAL FEATURES
From west to east the parks extend from the foothills near the San Joaquin Valley to the crest of the Sierra Nevada and contain the highest and most scenic parts of that range. The Sierra Nevada is the largest fault block range in the United States and the parks include glacier carved canyons, granite peaks, high plateaux and ridges, as well as forests and meadows. Five life zones are represented from Upper Sonoran desert to alpine areas above the tree line.

VEGETATION
The flora includes 2175 species in 120 families, the most notable vegetation being the forests of giant sequoias Sequoiadendron giganteum including the largest living tree "General Sherman" 82.6 m in height and 8.38 m in diameter at 2 m above ground. The noted coniferous forests also include western yellow pine Pinus ponderosa, sugar pine P. lambertiana, foxtail pine P. balfouriana and lodgepole pine P. contorta.

NOTEWORTHY FAUNA
73 species of mammal and more than 124 bird species have been recorded. Most commonly seen animals include chipmunks Eutamias sp., yellow-bellied marmots Marmota flaviventris, California ground squirrels Citellus tenuis, black bear Ursus americanus and mule deer Odocoileus hemionus. Resident but rarely seen are pine martens Martes americana, fishers M. pennanti and wolverines Gulo g. luscus, these last being species of remote primitive areas. Also rarely seen are big-horn sheep Ovis canadensis, a threatened species of restricted range.

ZONING
Class I (recreation) 121 ha; Class II (general outdoor recreation) 8499 ha; Class III (natural environment) 43,100 ha; Class IV (outstanding natural) 110,178 ha; Class V (primitive) 180,933 ha; Class VI (historical) 49 ha.

DISTURBANCES OR DEFICIENCIES
Overuse of campgrounds and developed areas; some pollution of backcountry from heavy use

TOURISM
Private concessioner provides accommodation and services under long-term contract. Very heavy visitor use.
SCIENTIFIC RESEARCH  Basic and management studies by independent investigators under supervision of Research Biologist. Current research includes studies of carpenter ant and giant sequoia, black bear ecology, speleothem studies, water quality, structure of mixed coniferous forests, bighorn sheep, geological mapping, plant inventory, role of fire etc.

SPECIAL SCIENTIFIC FACILITIES  None (use of facilities adjacent to park)

PRINCIPAL REFERENCE MATERIAL


STAFF  97 permanent (superintendent, assistant superintendent, 4 assistants, 18 administrative, 31 visitor protection/resource management, 7 interpretation, 35 maintenance); an additional 250 employees for summer season, May to September.

BUDGET  US$ 2,652,500: operation of National Park Service; US$ 360,100 for planning, development and operation of recreational facilities, during 1975 fiscal year.

LOCAL PARK ADMINISTRATION  Superintendent, Kings Canyon and Sequoia National Parks, Three Rivers, California 93271, USA.
UNITED STATES OF AMERICA

NAME Canyonlands National Park

TYPE NP

BIOTIC PROVINCE 1.8.2

LEGAL PROTECTION Total except for livestock grazing

DATE ESTABLISHED 12 September 1964

GEOGRAPHICAL LOCATION South-east Utah, north central portion of Colorado plateau: N 37°57'-38°30'; W 109°40'-110°06'

ALTITUDE 1135-2133 metres

AREA 136,542 ha

LAND TENURE Federal Government owned

PHYSICAL FEATURES A high gently-sloping plateau (over 2000 m) extensively dissected by the Colorado and Green rivers which have carved canyons over 600 m deep and a multitude of tributary canyons of lesser depth. The northern sector, the so-called 'island in the sky', is a mesa 1830 m above sea level, surrounded by the 1340 m 'White Rim', overlooking the flat river valleys to the south-west and south-east. Erosion has shaped the sedimentary rocks into arches, needles, spires and standing rocks, especially in southern area. Temperatures range from -6.6°C in winter to 34°C in summer.

VEGETATION Mesas and plateau over 2000 m with pinon pine Pinus edulis and Utah juniper Juniperus osteosperma, but large areas dominated by grasses, forbs and brush. Intermediate plateau benches at 1600 m support blackbrush Coelogyn ramassina. At river level, 1150 m, there are willows Salix sp., cottonwoods Populus sp., and introduced Tamarix pentandra. Unusual associations of chasmophytes on isolated cliff faces where water is seeping out form 'hanging gardens' of orchids mainly Habenria and Epipactis spp., and ferns of the genera Adiantum and Cheilanthes.

NOTEWORTHY FAUNA Coyote Canis latrans, cougar Felis concolor, bobcat Felis rufa, mule deer Odocoileus hemionus and desert bighorn sheep Ovis canadensis nelsonii; the latter is a sub-species of what is classified in the Red Data Book as a vulnerable species, the limitation in this case being the competition by domestic livestock.

ZONING Planned to comprise zones 2A and 2B (archaeological and historical sites), 3A, 3B and 3C (protected natural areas) and small zones for administrative and tourist facilities, but it is not yet known to what extent the plan has been implemented.

DISTURBANCES OR DEFICIENCIES Grazing by domestic livestock; also inoperative but potentially active mineral exploration leases or permits.

TOURISM Public access is permitted to the entire area but vehicle use is restricted to specific roads and tracks, and camping and picnicking facilities are very limited. Boats are allowed to be used on the rivers.

SCIENTIFIC RESEARCH Current research (1975) includes study of Ovis canadensis nelsonii and the local race of North American cacomistle or ringtail Bassariscus astutus arizonensis; the flora, human impacts on rivers and archaeology are other subjects under investigation.

WDNP IUCN © 1975 9(1)F Code: UNI(3).2.16
SPECIAL SCIENTIFIC FACILITIES None

PRINCIPAL REFERENCE MATERIAL

STAFF Management and administration: 11 (10 with responsibilities elsewhere); protection and interpretation: 7 permanent and 10 seasonal; maintenance: 4 permanent and 2 seasonal, plus voluntary or student assistants during the summer vacation.

BUDGET US$ 330,000 approximately

LOCAL PARK ADMINISTRATION Superintendent, Canyonlands National Park, Moab, Utah 84532, USA.
United States of America

Name: Mount Rainier National Park

Type: NP

Biotic Province: 1.8.3

Legal Protection: Total

Date Established: 2 March 1899

Geographical Location: West slope of the Cascade Mountains, central western Washington: N 47°; W 122°

Altitude: 498-4395 metres

Area: 97,550 ha

Land Tenure: 99.37% Federal Government ownership: remainder consists of patented mining claims, the only private land in the park.

Physical Features: The mountain is a superlative example of the 'composite' type of volcano with alternating layers of lava flows and volcanic ash and cinder. The last eruption was 2000 years ago but the forces of volcanism are still evident. The peak supports the greatest single peak glacial system in the conterminous USA, with a dozen major glaciers and ice occupying 1/10th of the total park area. A wide range of temperature and wind velocity is experienced, rain or snowfall occurring on a majority of days giving abundant precipitation and a world record of 2858 cm snowfall during 1971/1972.

Vegetation: Almost 700 species of flowering plant occur representing 64 families. There are four life zones: the Humid Transitional is lowland coniferous forest (1.1.7) occupying 19% of the area with cathedral-like forests of Douglas fir Pseudotsuga menziesii, western red cedar Thuja plicata and western hemlock Tsuga heterophylla; The Canadian and Hudsonian life zones are montane/sub-alpine forests (1.1.9.3), with Pacific silver fir Abies amabilis, noble fir A. procera, yellow cypress Chamaecyparis nootkatensis and western white pine Pinus monticola in the Canadian zone and mountain hemlock Tsuga mertensiana and alpine fir Abies lasiocarpa in the Hudsonian zone. 6% is alpine tundra (5.3.2) with alpine mosses and lichens.

Noteworthy Fauna: 50 species of mammal and 130 bird species have been recorded. Mammals include the American pika Ochotona princeps and the hoary marmot Marmota caligata, both of the alpine areas, wolf Canis lupus (in the Red Data Book's vulnerable category), red fox Vulpes v. fulva, fisher Martes pennanti, wolverine Gulo g. luscus (the last two rated rare or endangered in the US), black bear Ursus americanus, cougar Felis concolor, introduced Rocky mountain elk or wapiti Cervus canadensis and possibly a few remaining Roosevelt elk Cervus (canadensis) roosevelti (an endemic form), black-tailed deer Odocoileus hemionus columbianus and mountain goat Oreamnos americanus. Birds include many migrants but resident species include blue grouse Dendragapus obscurus, ruffed grouse Bonasa umbellus, white-tailed ptarmigan Lagopus leucurus, Clark's nutcracker Nucifraga columbiana and dipper Cinclus mexicanus.

Zoning: 90% proposed as wilderness, 10% as managed natural area.

Disturbances or Deficiencies: A small inactive mining claim presents a remote threat to management objectives and its acquisition is a long-term goal.

WDNP: IUCN © 1975 9(1)F

Code: UNI(3).3.2
TOURISM

Approaching 2 million visitors a year: careful regulation to minimise impact

SCIENTIFIC RESEARCH

On impact of Rocky Mountain elk, ecology of the hoary marmot, ecology of sub-alpine meadows, seismic studies, glacier geology, snail distribution and the summit crater cave: most of these studies are continuing.

SPECIAL SCIENTIFIC FACILITIES

None, other than a small reference library

PRINCIPAL REFERENCE MATERIAL


STAFF

69 permanent employees and 176 seasonal employees

BUDGET

1975 fiscal year: US$ 1,795,100

LOCAL PARK ADMINISTRATION

Superintendent, Mount Rainier National Park, Longmire, Washington 98397, USA.
**NAME**  
Hawaii Volcanoes National Park

**TYPE**  
NP

**LEGAL PROTECTION**  
Total

**DATE ESTABLISHED**  
1 August 1916

**GEOGRAPHICAL LOCATION**  
In the south-east of the island of Hawaii: N 19°11'-19°33'; W 155°01'-155°39'

**ALTITUDE**  
Sea level to 4170 metres

**AREA**  
87,830 ha

**LAND TENURE**  
Federal Government owned

**PHYSICAL FEATURES**  
The park extends from the southern coast to the summit calderas of Kilauea and Mauna Loa volcanoes. These are among the world's most active volcanoes and exhibit constantly changing features. Since 1969 new flows have covered 78 sq. km of the park and added 81 ha of new land to the island. The volcanoes intercept the north-east trade winds and their windward slopes get an annual rainfall of 3810 mm; the leeward with only 381 mm annual rainfall grades into desert. Average temperatures vary from 22°C at sea level to 7°C at 3400 m and cooler still on the summit of Mauna Loa. The climate varies from tropical humid to desert and alpine. Extensive ruins of stone structures dating back to the time of Faao in AD 1275.

**VEGETATION**  
The windward Hawaiian rain-forest communities include ohia Metrosideros collina (the first tree to appear on new lava), lama Diospyros sp., tree fern Cibotium chamissonis, uluhe fern Gleichenia and mixed koa Acacia koa - a'e Sapindus stands. These grade on lea slopes, through upland shrublands, ohia-native shrub forest, dryland native shrubs closed perennial grasslands of native Deschampsia australis and introduced Holcus lanatus, to desert and alpine stone desert. The original flora is rich in endemics but there are a number of introduced species.

**NOTEWORTHY FAUNA**  
The Hawaiian hoary bat Lasiusus cinereus semotus is an endangered Red Data Book species as are the nene goose Branta sandvicensis, Hawaiian hawk or io Buteo solitarius, Hawaiian crow Corvus tropicalis and three honeycreepers, the akake Loxops cocccines, the akiapolaau Hemignathus wilsoni and the ou Psittacirostra salitae. Other birds include the cosmopolitan short-eared owl Asio flammeus and many endemics such as the Hawaiian thrush Phaeornis obscurus, elepaio Chasiempis sandwichensis, amakihi Loxops virens, creeper Loxops maculata, apapane Himatone sanguinea and iiwi Vestiaaria coccinea.

**ZONING**  
None

**DISTURBANCES OR DEFICIENCIES**  
Introduced species such as the black rat Rattus rattus, Norway rat R. norvegicus, mongoose Herpestes auropunctatus, pig Sus scrofa and goat Capra hircus have had serious biological consequences including destruction of native ecosystems and widespread extinction of endemic species. All these species are found in the park. Recently introduced exotic plants are invading native communities causing severe disruptions.

**TOURISM**  
1,300,000 visitors in 1974
SCIENTIFIC RESEARCH  The Hawaiian Volcano Observatory is located in the park and has a long and distinguished background of volcanic studies. Many of the International Biological Programme Island Ecosystem studies were based here and include investigation of the impact of introduced species and of the recovery capacity of native vegetation. The Fish and Wildlife Service is studying endangered birds.

SPECIAL SCIENTIFIC FACILITIES  US Geological Survey Hawaii Volcano Observatory; University of Hawaii/National Park Service Research Station; Fish and Wildlife Service Mauna Loa Field Station.

PRINCIPAL REFERENCE MATERIAL

STAFF  28 full-time employees; about 30 seasonal staff

BUDGET  US$ 800,000 annually

LOCAL PARK ADMINISTRATION  Superintendent, Hawaii Volcanoes National Park, Hawaii, USA.
UNITED STATES OF AMERICA

NAME Dinosaur National Monument

TYPE NP BIOTIC PROVINCE 1.8.2

LEGAL PROTECTION Total

DATE ESTABLISHED 4 October 1915 (fossil quarry site); enlarged 14 July 1938; boundaries revised 8 September 1960 (PL 36-729).

GEOGRAPHICAL LOCATION North-east Utah and north-west Colorado: N 40°25'-40°45'; W 108°30'-109°20'

ALTITUDE 1483-2745 metres

AREA 83,636 ha

LAND TENURE Government expropriated lands by law

PHYSICAL FEATURES Northern end of the Colorado plateau, a high semi-arid region bounded by mountain ranges and with large scale block faulting and massive folding of strata forming a varied landscape. The Green and Yampa rivers cut through the Monument 50 km to the north of park headquarters, providing a spectacular view of the canyon country over 600 m below. The rivers reveal a wide range of geologic formations before they join together to form a tributary to the Colorado river. Average precipitation 254 mm.

VEGETATION Semi-arid vegetation influenced by elevation, exposure and soil types. Higher elevations with ponderosa pine Pinus ponderosa, Douglas fir Pseudotsuga menziesii and quaking aspen Populus tremuloides. Pinyon pine Pinus edulis, Juniperus sp., and greasewood Sarcobatus sp., predominant at lower levels. Cottonwoods Populus sp., willow Salix sp., and box elder Acer negundo along streams and rivers.

NOTEWORTHY FAUNA Over 40 mammal species represented including rabbits Sylvilagus sp., prairie dogs Cynomys sp., ground squirrels Spermophilus sp., chipmunks Tamias sp., porcupine Erethizion sp., coyote Canis latrans, fox Vulpes sp., American badger Taxidea taxus, skunk Mephitis sp., mountain lion Felis concolor, bobcat Felis rufa, mule deer Odocoileus hemionus and bighorn sheep Ovis canadensis (the latter a vulnerable species). 120 species of birds recorded, including turkey vulture Cathartes aura, golden eagle Aquila chrysaetos, bald eagle Haliaeetus leucocephalus, sage grouse Centrocercus urophasianus. At least 7 species of lizard are found, the whiptail Onychodactylus sp., being the most common. Several species of snakes.

ZONING Due to be zoned according to National Park Service policy

SPECIAL PURPOSE OF RESERVE Preserving and interpreting an extraordinary deposit of dinosaur and other reptilian bones of Jurassic age exposed during quarrying.

DISTURBANCES OR DEFICIENCIES Grazing permitted on 75% of the area; also some private inholdings and areas of State ownership within the boundaries.

TOURISM Annual number of visitors about 407,000, of whom 3% come for running the rapids on the Green or Yampa rivers.
SCIENTIFIC RESEARCH  Limited to paleontological studies

SPECIAL SCIENTIFIC FACILITIES  Paleontological laboratory with viewing window for public

PRINCIPAL REFERENCE MATERIAL


STAFF  Total 22 (superintendent, 5 rangers/naturalists, 5 technicians, 3 administrative, 8 maintenance)

BUDGET  US$ 583,300 for fiscal year 1975

LOCAL PARK ADMINISTRATION  Superintendent, Dinosaur National Monument, P.O. Box 210, Dinosaur, Colorado, USA.
UNITED STATES OF AMERICA

NAME  White Sands National Monument

TYPE  NP

LEGAL PROTECTION  Total

DATE ESTABLISHED  18 January 1933

GEOGRAPHICAL LOCATION  South central New Mexico, Otero and Dona Ana counties; N 32°; W 106°

ALTITUDE  1181-3995 metres

AREA  58,614 ha

LANDBASED TENURE  56,099 ha Federal Government, 2515 ha non-Federal ownership

PHYSICAL FEATURES  Gypsum sand desert, the gypsum having accumulated as an evaporitic sediment on the floor of a landlocked drainage basin or bolson, the Tularosa basin. The surrounding mountains range from 1818-3626 m in height, the basin lies at 1181 m. Soils are alkaline with a high water table. The annual mean temperature is 17°C with extremes ranging from -20°C to 38°C. Rainfall averages 213 mm with June, July and August the wettest months.

VEGETATION  32.33% (18,947 ha) consists of the halophytic Allenrolfea occidentalis (Fosberg classification 3B12); 20.37% (11,943 ha) of Ephedra torreyana, Indian ricegrass Oryzopsis hymenoides and rubber rabbitbrush Chrysothamnus nauseosus (Fosberg 3B/C21); 20.11% (11,740 ha) of skunkbush sumac Rhus trilobata, hoary rosemarymint Poliomintha incana, rubber rabbitbrush, soaptree yucca Yucca elata and Rio Grande cottonwood Populus wislizeni (Fosberg 3A1/B21); 10.36% (6072 ha) of mesquite Prosopis juliflora (Fosberg 3B22); 8.3% (4858 ha) of four-wing saltbush Atriplex canescens (Fosberg 3B13); and 0.14% of bulrush Scirpus paludosus and French tamarix Tamarix gallica (Fosberg 3D1).

NOTEWORTHY FAUNA  The fauna includes 23 mammals, 173 birds, 25 reptiles and 5 amphibians. Common and representative mammals include Apache pocket mouse Perognathus apachi cypsi (a species of restricted habitat), desert pocket mouse P. penicillatus eremius, the kangaroo rat Dipodomys ordi, coyote Canis latrans and kit fox Vulpes velox neomexicana. Birds include a few golden eagle Aquila chrysaetos, scaled quail Callipepla squamata, roadrunner Geococcyx californianus, great horned owl Bubo virginianus, white-necked raven Corvus cryptoleucus, cactus wren Campylorhynchus brunneicapillus. Reptiles and amphibians include sonora gopher snake Pituophis melanoleucus affinis, several rattlesnakes Crotalus spp., Painted Desert glossy snake Arizona elegans philipi, lined whipsnake Mastigophis flagellum lineatus, bleached earless lizard Holbrookia maculata (limited to restricted dune areas), desert side-blotched lizard Uta stansburiana stejnegeri, Cowles prairie lizard Sceloporus undulatus cowlesi (also a dune species), New Mexican whiptail Cnemidophorus neomexicanus, yellow box turtle Terrapene ornata luteola and Couche's spadefoot toad Scaphiopus couchii.

ZONING  None

DISTURBANCES OR DEFICIENCIES  Military use of lands within the area: White Sands Missile Range adjacent to the area uses the west portion as a test missile target. Visitor access is occasionally restricted and recovery vehicles cause disturbance. The area is also in flight path of nearby air force base.

WDNP  IUCN © 1975  9(1)F  Code: UNI(3).3.13
TOURISM

Facilities include visitor centre, picnic areas.

SCIENTIFIC RESEARCH

Geological investigations of structure and sand depth and origins. Long-term study of physiological adaptations of plants and animals.

SPECIAL SCIENTIFIC FACILITIES

None

PRINCIPAL REFERENCE MATERIAL

Selected from 5 page bibliography:

BORELL, A.E. Birds of White Sands National Monument. (Only available in White Sands National Monument library.)


STAFF

11 permanent employees, varying numbers of temporary personnel (maximum not exceeding 15) giving normal workforce of 25 during season.

BUDGET

US$ 261,000 for 1975 fiscal year.

LOCAL PARK ADMINISTRATION

Superintendent, White Sands National Monument, P.O. Box 458, Alamogordo, New Mexico 88310, USA.
NAME: Coulee Dam National Recreation Area

TYPE: MR

LEGAL PROTECTION: National Park Service jurisdiction over development and activities, Bureau of Reclamation operate reservoir, Bureau of Indian Affairs administer special uses in the Indian zone.

DATE ESTABLISHED: 19 December 1946

GEOMETRICAL LOCATION: State of Washington, Columbia river from Coulee Dam to Canadian border: N 48°-49°; W 118°-119°

AREA: 45,000 ha

ALTITUDE: 349-1245 metres

LAND TENURE: Federal Government owned

PHYSICAL FEATURES: Franklin D. Roosevelt Lake, formed by the Grand Coulee Dam, stretches 93 km with a shoreline of 409 km and a surface area of 32,800 ha when full. The Columbia basin has been shaped by volcanism through a series of lava flows, glaciation (including a large glacial lake in the vicinity of the present lake) and water erosion then excavating the Grand Coulee and other channels. Although modified in character the northern 22 km of the river hemmed in by spectacular limestone cliffs does have something of its original semblance. Acid in south, cooler and wetter in north.

VEGETATION: Treeless grasslands in semi-arid southern region below the Spokane river, the deeper ravines bordered by Douglas fir Pseudotsuga menziesii and shrubs such as bitterbrush Pseudotsuga menziesii and sagebrush Artemisia sp. A relatively narrow strip of western yellow pine Pinus ponderosa grades southwards into steppe and northwards to Douglas fir. In the extreme north grand fir Abies grandis is found sparingly. Most plant communities have been altered by fire, logging and farming but still provide cover for watershed and wildlife, screening and shelter for recreation.

NOTEWORTHY FAUNA: Not particularly noteworthy but includes stable populations of jackrabbits Lepus spp., hoary marmot Marmota caligata, ground squirrels Citellus spp., coyote Canis latrans, badger Taxidea taxus, bobcat Lynx rufus and mule deer Odocoileus hemionus in the grasslands; birds include introduced California quail Lophortyx californica, ring-necked pheasant Phasianus colchicus and grey partridge Perdix perdix; mourning doves Zenaidura macrura and horned larks Eremophila alpestris are especially characteristic of the open grasslands. The pine woods are the habitat of squirrels Sciurus spp., and Tamiasciurus sp., porcupine Erethizon dorsatum, black bear Ursus americanus and white-tailed deer Odocoileus virginianus; also wild turkey Meleagris gallopavo. Marshes and streams support various rodents, including beaver Castor and muskrat Ondatra, as well as some 10 species of game fish.

ZONING: Multiple use area

DISTURBANCES OR DEFICIENCIES: The limited amount of shore included in the Area hampers realization of the recreational potential and the surrounding privately owned lands also influence the range of activities.

WDNP IUCN © 1975 9(1)F  Code: UNI(3).3.15
TOURISM  25 developed areas with camping and picnic facilities. Facilities are essentially water-oriented but include hunting as well as fishing.

SCIENTIFIC RESEARCH  Hydrological investigations by National Park Service

SPECIAL SCIENTIFIC FACILITIES  None

PRINCIPAL REFERENCE MATERIAL

STAFF  26 permanent, 62 seasonal employees

BUDGET  US$ 608,900

LOCAL PARK ADMINISTRATION  Superintendent, P.O. Box 37, Coulee Dam, Washington, 99116, USA.