

World Heritage Sites

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TASMANIAN WILDERNESS AUSTRALIA

These scenically dramatic parks and reserves in a once severely glaciated region, are part of one of the world's last great expanses of primeval temperate rainforest wilderness. They cover an area of nearly 1.4 million hectares and are rich in relict and endemic species. Remains found in caves attest to human occupation of the area for more than 30,000 years.

COUNTRY

Australia

NAME

Tasmanian Wilderness

MIXED NATURAL & CULTURAL WORLD HERITAGE SERIAL SITE

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

1989: Inscription extended under Cultural Criteria iii, iv and vi.

STATEMENT OF OUTSTANDING UNIVERSAL VALUE [pending]

INTERNATIONAL DESIGNATIONS

1977: Southwest National Park designated a Wetland of International Importance under the Ramsar Convention (605,000 ha).

1982 & 1989 - 2003: Southwest National Park designated a Biosphere Reserve under the UNESCO MAB Programme but was delisted in 2003.

IUCN MANAGEMENT CATEGORIES

The site comprises 4 National Parks, 3 Forest Reserves, 3 State Reserves, 2 Protected Archaeological Sites, 2 Historic Sites, 4 Conservation Areas, 1 Game Reserve, 3 Commonwealth freehold & private lands.

Southwest National Park	II National Park
Franklin-Gordon Wild Rivers Nation	II National Park
Cradle Mountain-Lake St Claire National Park	II National Park
Walls of Jerusalem National Park	II National Park
Hartz Mountains National Park	II National Park
Meander Forest Reserve	II Forest Reserve
Liffey Forest Reserve	II Forest Reserve
Drys Bluff Forest Reserve	II Forest Reserve
Devils Gullet State Reserve	III State Reserve
Marakoopa Cave State Reserve	III State Reserve
Liffey Falls State Reserve (part)	III State Reserve
Exit Cave State Reserve	III State Reserve
Macquarie Harbour Historic Site	III Natural Monument
Sarah Island Historic Site	III Natural Monument
Maxwell River Protected Archaeological Site	III Natural Monument
Wargata Mina Protected Archaeological Site	III Natural Monument
Central Plateau Conservation Area	IV Habitat / Species Management Area
Adamsfield Conservation Area	IV Habitat / Species Management Area

Southwest Conservation Area (in HEC)	IV Habitat / Species Management Area
Marble Hill Conservation Area	IV Habitat / Species Management Area
Farm Cove Game Reserve	IV Habitat / Species Management Area
Maatsuyker Island (Commonwealth freehold)	IV Habitat / Species Management Area
St Clare Lagoon (vested in HEC)	IV Habitat / Species Management Area
Private and Commonwealth freehold	IV Habitat / Species Management Area

BIOGEOGRAPHICAL PROVINCE

Tasmanian (6.02.02)

GEOGRAPHICAL LOCATION

Comprises a contiguous network of reserve lands extending over much of west-central and southwest Tasmania. Several islands off the south coast are included: Ile du Golfe, Maatsuyker I., De Witt I., Flat Witch I. and Pedra Branca I.: 41° 35' to 43° 40'S by 145°25' to 146°55'E.

DATES AND HISTORY OF ESTABLISHMENT

Northern Reserves

- 1922: Cradle Mountain established a Scenic Reserve by the 1915 Scenery Preservation Act (originally 63,943 ha);
- 1927: Received Sanctuary status under the Animal & Birds Protection Act of 1919;
- 1936: Extended to include Lake St Clair and Oakleigh Creek Conservation Area (60,705 ha);
- 1971: Cradle Mountain-Lake St Claire National Park proclaimed under the 1970 National Parks & Wildlife Act, except for Oakleigh Creek (124,848 ha); many later extensions and boundary adjustments;
- 1981: Walls of Jerusalem National Park established;
- 1982: Central Plateau Conservation Area and Drys Bluff Forest Reserve created;
- 1991: Liffey Forest Reserve and Meander Forest Reserve created.

Central Reserves

- 1939: Gordon River, Lyell Highway State Reserves created;
- 1941: Frenchmans Cap National Park created;
- 1954: Sarah Island Historic Site designated;
- 1981: Franklin-Lower Gordon Wild Rivers National Park proclaimed, absorbing the above reserves;
- 1990: Major extensions to the National Park (to 440,000ha): areas added were the King William Range, Upper Gordon River, Denison Range, Prince of Wales Range, Lower Gordon River, Sorell River, the southern end of Macquarie Harbour, Farm Cove and the Kelly Basin area.

Southern Reserves

- 1939: Hartz Mountains National Park and Marakoopa Cave State Reserve created;
- 1951: Port Davey State Reserve created;
- 1955: Lake Pedder National Park established;
- 1968: Southwest National Park established, absorbing and extending the above two reserves;
- 1976: Southwest National Park re-proclaimed under the National Parks and Wildlife Act, 1970 and extended to 372,300 ha;
- 1977: Southwest National Park recognised as a National Biosphere Reserve;
- 1979: Exit Cave State Reserve created;
- 1980-1 & 1990: Southwest Conservation Area established; Further extensions incorporated: area north of Nye Bay, South Cape Bay area, Mt Bobs and the Boomerang, Adamsons Peak, Mt Picton, Gallagher Plateau and Mt Weld: the Upper Weld River and Mt Bowes.

Full details on the progress of reservation, except in the case of state forests and Sarah Island Historic Reserve, are given in the World Heritage nomination (Government of Australia, Nomination document, 1988).

LAND TENURE

All the land is Crown property administered by the Ministry for Tourism, Parks and Heritage, through the Parks and Wildlife Service (PWS) which is responsible for over 99% of the total area, also by Forestry Tasmania (for forest reserves) and the Hydro-Electric Commission (HEC) except for some 320 ha of privately-owned land in the Vale of Rasselas.

AREAS

The total area of the Tasmanian Wilderness World Heritage Area (WHA) is ~1,383,640 ha (20% of the area of Tasmania) and includes the following:

Southwest National Park	605,000 ha
*Franklin-Gordon Wild Rivers Nat'l Park	440,120 ha
Cradle Mountain-Lake St Claire Nat'l Park	161,000 ha
Walls of Jerusalem National Park	51,800 ha
Hartz Mountains National Park	7,140 ha
Devils Gullet State Reserve	806 ha
Marakoopa Cave State Reserve	790 ha
Liffey Falls State Reserve (part)	20 ha
Macquarie Harbour Historic Site	15,300 ha
Maxwell River Protected Archaeological Site	560 ha
Wargata Mina Protected Archaeological Site	155 ha
Central Plateau Conservation Area	89,200 ha
Adamsfield Conservation Area	5,400 ha
Southwest Conservation Area (in HEC)	616 ha
Marble Hill Conservation Area	77 ha
Farm Cove Game Reserve	1,720 ha
Meander Forest Reserve	1,660 ha
Liffey Forest Reserve	1,055 ha
Drys Bluff Forest Reserve	680 ha
Maatsuyker Island (C'wealth freehold)	180 ha
St Clare Lagoon (vested in HEC)	29 ha
Private and Commonwealth freehold	320 ha

*Lake Gordon, a Hydro-Electric Commission storage lake, is excluded from the World Heritage site.

ALTITUDE

Sea level to 1,617m (Mount Ossa, the highest peak in Tasmania, in Cradle Mountain National Park)

PHYSICAL FEATURES

In contrast with mainland Australia, Tasmania is rugged and forested; it is also scenically spectacular. The Tasmanian Wilderness World Heritage Area (WHA) is geologically and geomorphologically complex and the product of at least three major glaciations. The western half of the island is underlain by fold structures, the eastern half by fault structures, both of which are represented in the World Heritage Area. The fold structure region in the southwest is extremely craggy and densely vegetated, with north-south oriented mountain ranges and valleys. The rocks vary in age from Precambrian to Devonian and were subjected to two major orogenies, the Frenchman and Tabberaberan. Precambrian formations are widespread and consist of quartzite, schist, phyllite, conglomerate, dolomite, siltstone and sandstone. The more resistant sequences such as quartzite and quartz schist form most of the prominent ranges; the less resistant schists, dolomite and phyllite underlie many of the valleys and plains.

Faulting in the east and north produced the distinct scarp-bounded plateaux and residual hills that contrast dramatically with the fold structure province to the south. This region includes the Cradle

Mountain-Lake St Clair National Park, Walls of Jerusalem National Park, parts of Lemonthyme and Southern forests and the Mount Anne and Mount Ronald Cross areas. It includes a plateau of sedimentary roof-rocks in the Walls of Jerusalem Park and Central Plateau area with a myriad of small lakes, and Lake St Clair which is the deepest lake in Australia. The rocks are Permian-Triassic sediments capped by Jurassic dolerite, and generally occur above about 600m, except in the east. Basement rocks, probably of Precambrian, Cambrian, Ordovician and Silurian age, are generally overlain by upper and lower horizontal sediments of the Parmeener Supergroup. The Permian lower unit consists of glacio-marine sequences including tillite, sandstone, siltstone, mudstone and limestone horizons. The upper Triassic unit contains banks of sandstone, mudstone, siltstone and coal, probably laid down during a humid, cool climate in swamps, lakes and river channels. These rocks contain rare plant and amphibian fossils. A dramatic period of igneous activity followed the deposition of these sediments in the Jurassic, with the injection of massive amounts of dolerite into the sediments. Owing to its resistant nature the dolerite still covers a vast tract of the World Heritage Area.

Changing climates have also influenced the landscape, most recently during a late Cainozoic and two major Pleistocene glaciations. Ice caps and cirque and valley glaciers generally covered most of the high mountains and plateaux. Cirques occur on most mountains, and glacio-fluvial deposits are found in the Picton, Middle Huon and Upper Weld valleys. Glacial erosion has created spectacular horns, arêtes, cirques, rock basins containing tarns and U-shaped valleys. These are common at Frenchmans Cap and in the Frankland, Prince of Wales, Arthur and Ironbound Ranges. Karst landforms have formed through the solution of carbonate rocks in the widely distributed dolomite and Ordovician limestone. These include cave systems, natural arches, clints and grikes, dolines, karren surfaces, pinnacles and blind valleys. Extensive underground passages occur, notably at Precipitous Bluff, Mount Anne, Upper Weld River, and along the Franklin and Gordon Rivers. Exit Cave near Ida Bay on the south coast is the longest measured cave system in Australia (23 km), and Anne-akananda, in the Upper Weld-Mt Anne karst system, is the deepest cave at 373m. There is a large meteorite impact crater of Pleistocene age in the Andrew River valley of significance on the world scale (Government of Australia, Nomination document, 1988).

Below about 600m, depositional features are typical, including moraines and other outwash deposits. Periglacial activities, including much slope instability, caused gelifluctate, landslip and talus deposits. The river drainage system has a pronounced trellis pattern, with only the larger rivers, notably the Franklin and Gordon rivers, having cut directly through the mountain ranges, producing spectacular gorges. The lakes of the Denison Range are of great interest because of their physical and chemical characteristics. An analysis of the chemical properties, light regime and the Tasmanian endemic algal flora shows that the lakes are indicators of the east-west divide. Lake George and later Lake Pedder in the meadows of the Gordon River valley were created by the Hydro-Electric Commission in the early 1970s. The coastline experienced a number of sea-level changes during the glaciations. It is now a classic example of a drowned landscape, seen in the discordant coastline in the south, and the rias at Port Davey and Bathurst Harbour. The geological variety underlies a corresponding diversity of soil and vegetation types, including extensive peatlands (Nomination document, 1988).

CLIMATE

Tasmania has a temperate maritime climate, wet, windy, cloudy and cool. The south-west in the westerly airstream of the Roaring Forties is the wettest region in Australia. Rainfall over the Gordon-Franklin basin ranges from about 1,800mm in the headwaters of the Franklin to over 3,400mm near Serpentine Dam. The east is far drier (Bosworth, 1977). Average annual temperatures range between the low teens in winter and the low twenties in summer.

VEGETATION

This site contains most of the last great temperate wilderness in Australia and its largest cool temperate rainforest. It is also recognised as an international centre for plant diversity with a wealth of habitats which support many unusual plant taxa and communities. There are four main vegetation types in the protected areas: closed temperate rain forest (273,477 ha or 20% of the WHA) open eucalypt forest and woodland (401,109 ha, 29%), buttongrass moorland and heath (439,515 ha, 31%) and alpine and sub-alpine communities 188,599 ha, 14%). There are also 77,426 ha (5%) of lakes and rocks. The remainder comprise coastland, wetlands and grasslands. These occur in a unique mosaic of Antarctic and Australian elements which has as much in common with the cool temperate regions of South America and New Zealand. The Antarctic element consists of species descended from Gondwanan flora. Populations of relict coniferous genera, now known only from Tasmania, such as *Athrotaxis*, *Diselma* and *Microcachrys* species, are found in the alpine moorland and the rain forest.

Australian plants which have evolved more recently dominate the area's sclerophyll communities: the genus *Eucalyptus* is a prime example. For other species now extinct on the mainland, Tasmania is a refuge: *Eucalyptus morrisbyi* (EN) survives in four small stands on the edge of the site. Three-fifths (266) of Tasmania's endemic higher plant taxa are present, about half of which are dependent on the WHA for most of their distribution, as are many threatened higher plants. Tasmania may be correspondingly important for the conservation of lower plant species, but knowledge of these is as yet fragmentary. Preliminary studies of lichens and bryophytes have already revealed the presence of new endemic taxa (Nomination document, 1988). Of the identified vegetation communities in Tasmania, the sites contain at least 42 of the 43 alpine communities, 33 of the 39 temperate rain forest communities, 40 of the 65 wet sclerophyll communities, 22 of the 31 buttongrass moorland communities, 13 of the 42 grassland and grassy woodland communities, each of the eight *Sphagnum* peatland communities and 21 of the 33 coastal communities (Kirkpatrick *et al.*, 1995). Discoveries continue: a fern-like plant *Isoetes* sp. was discovered only recently. At present, vascular plus non-vascular plants under threat include 31 species in danger and 31 vulnerable; 133 are rare (PWS, 2004).

Alpine vegetation grows on the higher peaks and plateaux above the tree line, which varies from about 800m near the coast to 1,200m inland. It is almost totally dominated by shrubs, compared with the tussock grass and herb-dominant vegetation typical of the Australian mainland alps. Where the drainage is slow there are fascinating plant communities dominated by cushion plants and dwarf pines: *Donatia*, *Dracophyllum* and *Abrotanella* spp., and scoparia *Richea scoparia*. Taller heaths, coniferous shrubberies and Tasmania's one native deciduous tree, the deciduous beech *Nothofagus gunnii* grow on well-drained sites, including boulder fields. Some 60% of the alpine flora is endemic to Tasmania (Nomination document, 1988).

Temperate rainforest covers less than 30% of the area below the treeline but supports 33 of the 39 temperate rainforest communities of Tasmania. The old-growth sclerophyllous forest contains the greatest biodiversity. It is characterised by the dominance of Antarctic tree species, a generally low diversity of higher plants and a rich cryptogammic flora. It differs from tropical and subtropical rain forests in the low number of dominant tree species, the smallness of their leaves, the absence of lianas, the relative lack of epiphytes apart from moss and lichen and the total absence of typical rain forest morphological adaptations, such as drip-tip leaves, stem-flowering and buttressing. These characteristics have much in common with the temperate rain forests of New Zealand and South America, but remain distinctive. Most of the rain forest contains species, which evolved on the ancient continent of Gondwana: myrtle beech *Nothofagus cunninghamii*, which is usually dominant, leatherwood *Eucryphia lucida*, native plum *Cenarrhenes nitida* and sassafras *Atherosperma moschatum*. Co-dominants are Huon pine *Lagarostrobos franklinii*, one of the longest-lived species in Australia and second longest living species in the world (living to 3,000 years), in riverine habitats, King Billy pine *Athrotaxis selaginoides* (VU), celery-top pine *Phyllocladus aspleniifolius*, pencil pine *Athrotaxis cupressoides* (VU), and prostrate *Anodopetalum biglandulosum* on poor sites and at high altitudes (Nomination document, 1988). A rare endangered plant is a clonal clump of Kings' holly *Lomatia tasmanica* (nationally CR), said to be 43,600 years old - the oldest known sterile vascular plant clone on Earth (PWS, 2004).

Some of the eucalyptus are among the highest of deciduous trees. Emergent above large areas of the rainforest, either of two eucalypts occur: messmate stringybark *Eucalyptus obliqua* on the better soils in the east and Smithton peppermint *Eucalyptus nitida* on the poorer soils mainly in the west. In addition to these mixed forests of eucalypts with rain forest understorey, eucalypts dominate other communities such as sub-alpine woodlands, dry sclerophyll forests and woodlands in which the understorey is multiple-aged and contains small-leaved prickly shrubs; also wet sclerophyll forests in which the understorey is uniform-aged and contains broad-leaved shrubs and ferns, and some scrub and moorland communities. Of particular conservation importance are the magnificent examples of pristine tall forest, with eucalyptus such as swamp gum *Eucalyptus regnans*, the world's tallest flowering plant. This forms a 60-100m high canopy over a 10-20m high closed wet sclerophyll understorey of native musk *Olearia argophylla*, Victorian hazel *Pomaderris apetala*, silver wattle *Acacia dealbata* and blackwood *Acacia melanoxylon*. Rain forest species such as myrtle beech, sassafras and tree ferns replace the wet sclerophyll understorey where fire frequency is low (Nomination document, 1988).

Nearly a third of the WHA is comprised of moorland vegetation, dominated by buttongrass sedge *Gymnoschoenus sphaerocephalus* on very acid peaty nutrient-poor soils and typically surrounded by scrub and heath communities with ti-trees *Leptospermum* spp. and paperbarks *Melaleuca* spp.

predominating. Some 150 threatened vascular plant species are found. The vegetation has developed in response to fire partly due to Aboriginal practices over the last 30,000 years and more recently, to logging contractors and prospectors. Grassland is limited to small patches, some of which result from the firing of rain forest, the rest probably being edaphic or climatic in origin. Specialist communities occur in more restricted habitats. There is a wide range of flowing and still water ecosystems. Owing to their unusual hydrological properties, Lake Sydney and Lake Timk have developed interesting marginal herbaceous communities, and the Snowy Range contains dynamic string bog systems characterised by bolster plants. Lakes with permanently stratified layers of water and coastal lagoons with their unusual micro-organisms, are also of ecological importance. The southwest coast has a wide range of plant communities peculiar to salt marsh, coastal cliffs, coastal sand dunes and sea bird breeding colonies, also areas fire-cleared by fishermen. These offer specialised niches for rare and restricted endemic plants. Limestone and dolomite substrates, whether on lowland plains, riverine cliffs or at high altitude, are also important habitats for restricted endemics (Nomination document, 1988).

FAUNA

The fauna is of world importance because, protected by isolation, it includes an unusually high proportion of endemic species and ancient relict groups. In invertebrate groups for instance endemism ranges from 20% to 100%. The varied topography, geology, soils and vegetation together with the harsh and variable climatic conditions have combined to create a wide array of habitats and a correspondingly diversely adapted fauna: the scrubland, heath and moorland animals have many unusual adaptations. The insularity of Tasmania and of the southwest wilderness has protected them from the impacts of the exotic species that have seriously affected the mainland fauna. Two main faunal groups co-exist there: one that includes the marsupials and burrowing freshwater crayfish that are relicts of the Gondwanan fauna; the second, including rodents and bats, that invaded Australia from Asia millions of years after the break-up of Gondwanaland. The invertebrate fauna, including cave-adapted species, is outstanding: many are ancient relict species such as the velvet worms *Euperipatoides* and *Ooperipatellus* spp., which have changed little in the last half billion years. They are considered a missing link between the annelids (worms) and the arthropods (crustaceans and insects) (Nomination document, 1988).

Of Tasmania's 32 mammal species, 27 are present in the area. The Tasmanian wolf *Thylacinus cynocephalus* (EX) was last seen in 1936. Four of these mammals are endemic to Tasmania including the somewhat dog-like Tasmanian devil *Sarcophilus harrisii* (EN: 20-50,000 mature individuals) the world's largest extant carnivorous marsupial, the cat-like eastern quoll *Dasyurus viverrinus*, Tasmanian pademelon or rufus wallaby *Thylogale billardierii* and the rodent-like Tasmanian betong *Bettongia gaimondi*. The duck-billed platypus *Ornithorhynchus anatinus* and short-beaked echidna *Tachyglossus aculeatus* also occur. 13 of the 150 bird species recorded are endemic, including the iconic orange-bellied parrot *Neophema chrysogaster* (CR: 200 individuals), one of Australia's rarest and most threatened birds, found in the far southwest (Brown *et al.*, 1985). There are 11 reptile species, of which four are endemic and of six frog species two are endemic. The moss froglet *Crinia nimbus* is a recently discovered species. The Tasmanian tree frog *Litoria burrowsi* is mainly restricted to the area. There are 15 species of freshwater fish including four endemic species. Two native fish, Lake Pedder galaxias *Galaxias pedderensis* (CR) and small pedder galaxias *G. parvus* are largely restricted to the area. In 2003, 28 vertebrate and 3 invertebrate species were listed as nationally endangered (PWS, 2004).

The alpine regions have a specialised fauna of great zoogeographic interest, with high endemism and local phenotypic variation. Three endemic species of lizards of the genus *Leiopisma* occur on mountain tops with unusual adaptations to the locale. Many of its insects are adapted to pollinate the alpine vegetation. Diurnal moths of the primitive sub-family Archiearinae occur on some peaks. Alpine grasshoppers are common and include four monotypic endemic genera. The rare endemic dragonfly *Archipetalia auriculata* which breeds in alpine streams is the most archaic member of an ancient family, the Neopetaliidae, and has strong Gondwanan affinities. The 250-million year old mountain shrimp *Anaspides tasmaniae* is one of the most ancient of crustaceans.

Old-growth sclerophyllous forests contain the greatest diversity of living plants and animals in Tasmania. The rain forest invertebrate fauna includes many groups of Gondwanan descent. Talitrid amphipods, which have undergone great adaptive radiation in Tasmanian forests, are represented by 15 species, making the area one of the world's richest centres of diversity for talitrids. Among mammals, only the endemic long-tailed mouse *Pseudomys higginsi* occurs principally in the rain forest though the eastern spotted-tail quoll *Dasyurus maculatus* and Tasmanian pademelon are found there. The lack of a distinct rain forest mammal fauna has parallels with the *Nothofagus*-dominated rain

forests of New Zealand and Southern America. No birds, reptiles or amphibians are confined to this habitat type. Closed forests are inhabited by three species of arboreal mammals, common ring-tail possum *Pseudocheirus peregrinus*, common brush-tail possum *Trichosurus vulpecula* and eastern pygmy-possum *Cercartetus nanus*; also many birds such as the endemic green rosella *Platycercus caledonicus* and swift parrot *Lathamus discolor* (EN). Some of the rainforest communities have an open verdant, cathedral-like quality: silent, cool, dark and damp places where both the trunks of trees and the forest floor are covered with a luxuriant carpet of mosses and lichens. Open eucalypt forest supports a greater diversity of mammals and birds than rain forest, scrub, heath, moorland or alpine areas, among them forty-spotted pardalote *Pardalotus quadragintus* (EN) and eastern barred bandicoot *Perameles gunnii*.

Within aquatic habitats, the freshwater crustaceans are of global significance, as are many amphipods, isopods, crayfish and shrimps which are relictual Gondwanan fauna. Three lakes on the Lower Gordon River are of international repute for being permanently stratified (meromictic) yet relatively shallow and inhabited by diverse and unusual aquatic micro-organisms. Streams, rivers, coastal lagoons and estuaries support many species of native fish such as the Swan, barred and clarence galaxias *Galaxias fontanus* (CR), *G. fuscus* (CR) and *G. johnstoni* (CR), western paragalaxias *G. occidentalis*, Australian grayling *Prototroctes maraena* (VU) and a highly endemic aquatic invertebrate fauna. However, introduced species, such as brown trout *Salmo trutta* and eastern brook trout *Salvelinus fontinalis* have contributed to the decline of several native species of fish. Major rivers, such as the Old and Davey rivers in the south-west and New River in the Southern Forests, are of importance for scientific reference because of their pristine state. Many of the 175 Tasmanian invertebrates listed as rare or threatened are protected within the WHA. These include such species as freshwater snails, caddis flies, stoneflies and dragonflies.

In buttongrass moorland the critically endangered orange-bellied parrot, the ground parrot *Pezoporus wallicus*, and the rare broad-toothed mouse *Mastacomys fuscus* are found. The rare Ptunarra brown butterfly *Oreixenica ptunarra* is found on the central grasslands. Freshwater crayfish, such as the endemic *Parastacoides tasmanicus*, live in burrows under the buttongrass tussocks despite the highly acidic environment; their burrows are in turn colonised by a range of extraordinary endemic invertebrates such as the Tasmanian anaspid crustacean *Allanaspides helonomus* (VU) and Hickman's pygmy mountain shrimp *A. hickmani* (VU). Both of these species have very restricted distributions near the inundated Lake Pedder. The monotypic and endemic Tasmanian spot-wing dragonfly *Synthemiopsis gomphomacromioides* breeds in the mud surrounding buttongrass tussocks. Caves are inhabited by many endemic invertebrates including crickets, spiders, beetles and aquatic crustaceans. Displays of Tasmanian glow-worm *Arachnocampa tasmaniensis* can be seen at several places, particularly at Exit and Entrance Caves (Nomination document, 1988).

In coastal areas and on offshore islands, vast numbers of short-tailed shearwater *Puffinus tenuirostris* return to breed each year. Also present are wedge-tailed eagle *Aquila audax* (~100 individuals), white goshawk *Accipiter novaehollandia* (<110), shy albatross *Thalassarche cauta*, little tern *Sterna albifrons* and soft-plumaged petrel *Pterodroma mollis* (50). Port Davey is the site of an unusual marine community including new species of skate and sea slugs. One endemic reptile, the Pedra Branca skink *Niveoscincus palfreymani* (VU: 290 individuals) lives only on the small offshore rocky island of Pedra Branca (Thwaites, 1995; PWS, 2004). Offshore the fin-walking spotted handfish *Brachionichthys hirsutus* (CR), southern right whale *Eubalaena australis* and the New Zealand fur seal *Arctocephalus forsteri* are found.

CONSERVATION VALUE

The WHA contains most of the last great temperate wilderness in Australia, most of it in a natural or near natural condition. It has the most extensive glaciated landscapes in Australia, and a great diversity of habitats: islands, jagged coastlines, major estuaries, alpine plateaus and mountain peaks, turbulent rivers, sheltered lakes, rain forest and moorland. These support a flora and fauna that include many primitive groups of Gondwanan origin, related to similar fragments in South America, Africa and India. Endemism is high and there is a large number of threatened species though protection has led to an increase in several populations. The property also contains Pleistocene archaeological sites, Holocene aboriginal sites and historic evidence of the past 180 years of European activity including colonisation by transported convicts. The Park lies within a Conservation International-designated Conservation Hotspot, in WWF marine and freshwater Global 200 Eco-regions, in a WWF/IUCN Centre of Plant Diversity, and in one of the world's Endemic Bird Areas. It contains a Ramsar Wetland and part was a UNESCO Biosphere Reserve between 1982 and 2003.

CULTURAL HERITAGE

Tasmania was cut off from mainland Australia by the flooding of Bass Strait at least 8,000 years ago, isolating the aboriginal inhabitants. The Tasmanian Aborigines were, until the advent of the European explorer Abel Tasman, the longest isolated human group in world history, surviving hundreds of generations without outside influence. Current archaeological evidence indicates a significant Ice Age (Pleistocene) hunter-gatherer society inland in the southwest, which existed from at least 30,000 years ago until the end of the Ice Age some 11,500 years ago, when the vegetation changed with warmer conditions from open grassland-woodland to rain forest. Several inland valleys are rich in Aboriginal sites. The discovery of Ice Age art in the Kitikina cave in the Franklin River valley helped to secure protection of the area from damming. Some 30 caves have been located: Judds Cavern (Wargata Mina), with over 3.5 km of explored passages, is one of the largest river caves in Australia, and almost certainly the most southerly painted site in the world. Coastal occupation by Aborigines dates from at least 3,000 years ago until the Europeans arrived in the 19th century, but may date from around 6,000 years ago when the sea stabilised at its present level (Nomination document, 1988).

At the time of the first European arrivals, the area was occupied by two main kinship groups - the Big River group in the central highlands and the Port Davey group who inhabited mainly the southwest and southern coastal regions. Each group is estimated to have had 300 to 400 people. Much of the aboriginal population was evacuated in the 1830s by the missionary zealot G. A. Robinson. European incursion into the area started in the early 1800s, mainly for Huon pine logging and whaling. Whaling ceased before the turn of the century but felling pine trees continued up to recent times in some places (Nomination document, 1988). The remains of the first penal settlement in Tasmania, at Macquarie Harbour between 1821-33, are a notable example of the colonisation of remote parts of the world by the transportation of convicts. Sarah Island Penitentiary Historic Site in Macquarie Harbour was chosen for a convict settlement in 1822 because of its remoteness and the availability of Huon pine for shipbuilding on site. The WHA contains the remains of many sites related to exploration, Huon pine logging, mining, sheep-herding, hydro-electric development and recreation (PWS, *in litt.*, 1996).

LOCAL HUMAN POPULATION

The only permanent residents now within the WHA are ranger staff, primarily at Lake St Clair and Cradle Valley though the Lyell Highway to the west coast crosses the WHA at the north end of the Franklin-Gordon Rivers Park. The waters of several valleys are used for hydro-electric power generation. Mineral exploitation is still permitted in the Adamsfield Conservation Area beside Lake Gordon. Some telecommunications facilities exist within the area. Beekeeping for the production of leatherwood honey occurs along the Lyell Highway, the Mt. McCall and Kelly Basin Tracks and beside the Gordon River and Scotts Peak Roads. Port Davey is used for shelter by professional fishermen (PWS, *in litt.*, 1996).

VISITORS AND VISITOR FACILITIES

At least half a million tourists a year visit the WHA and visitor numbers between 1992 and 1999 increased from $\pm 400,000$ to $\pm 550,000$ (PWS, 2004). Visiting is markedly seasonal, peaking in January and low during winter and spring. Most tourists are day visitors and follow a similar circuit route around Tasmania, visiting Cradle Mountain, Strahan and Lake St Clair. The most popular single site in the area is Cradle Mountain which received 200,700 visits in 1999 to 2000, a substantial increase over the approximate 80,000 annual visits of the late 1980s. In 1997 the Gordon River received at least 105,000 visitors per annum and in 1999-2000 the Lake St Clair visitor service zone received about 104,000. Other popular access routes include the Lyell Highway, and the Strathgordon and Scotts Peak roads into the centre of the Area. There are now four Visitor Centres, at Lake St Clair, Cradle Mountain, Strachan and Mt. Field, a museum in Cradle Mountain Park, and visitor services at Cynthia Bay. The site provides a range of recreational and wilderness activities, including bushwalking, fishing, boating and canoeing, riding, licensed hunting (of wallabys), camping, caving, mountaineering, climbing, rafting, and cross-country skiing. Long-established trails such as the Overland Track and South Coast Track provide high quality wilderness walks (PWS, *in litt.*, 1996). The Area is well publicised and the tourism and tourist developments are well monitored. Commercialised tourism, in cooperation with the Parks Service, is on the increase. A tourist lodge on Pumphouse Point on Lake St Clair may be developed.

SCIENTIFIC RESEARCH AND FACILITIES

Archaeological surveys have been conducted: coastal areas were investigated in the early 1970s and more recently the south coast and Port Davey areas have been surveyed. Since 1981, preliminary

surveys of a number of inland river valleys have been carried out including one of the caves of the Gordon-Franklin river system (Middleton, 1979). Mineralogical studies of the impact crater near Mount Darwin are conducted by the University of Tasmania, as are limnological studies of meromictic and other lakes (Nomination document, 1988). Surveys of the vegetation over the whole Area and its susceptibility to fire and to disease are ongoing, coordinated by the Parks Service. The Port Davey-Bathurst Harbour ecosystem has been investigated leading to a proposal that it should become a Marine Reserve. Studies of aboriginal customary knowledge and the recording, protection and interpretation of Aboriginal cultural sites has been funded. Funding is also available for the study and protection of species of World Heritage value such as Tasmanian devil and of threats to the area's ecology such as the root-rot fungus (PWS, 2004).

MANAGEMENT

The Tasmanian Parks and Wildlife Service is largely responsible for administering the area, with assistance from the World Heritage Area Consultative Committee and a Ministerial Council. There is close consultation between the Service and Forestry Tasmania who manage the forest reserves within the WHA and the extensive areas of state forest adjoining the boundary (PWS, *in litt.*, 1996). Legal provision for conserving the property is provided under both federal legislation, namely the World Heritage Properties Conservation Act of 1983 and the Conservation Amendment Act of 1988, and under state legislation, notably the National Parks and Wildlife Act 1970, Aboriginal Relics Act 1975, Crown Land Act 1976 and the Forest Protection Act of 1985. Before 1982 the Cradle Mountain-Lake St Claire, Franklin-Lower Gordon Wild Rivers and Southwest National Parks were known as the Western Tasmanian Wilderness National Parks.

The major past human intrusion into the region was the construction by the state Hydro-Electric Commission (HEC) of the Middle Gordon Hydro-electric Power Scheme in the early 1970s to form two large impoundments by damming a section of the Gordon River, which was excluded from the property, and flooding the Lake Pedder valley and its pink quartzite beach. The resulting Lake Pedder is 242 sq.km in area and the connected Lake Gordon covers 272 sq.km. These and three other dams were created between 1970 and 1994 to industrialise the Tasmanian economy by providing cheap power. As part of this development, a road was built into the heart of the Southwest Conservation Area and a small town, Strathgordon, built just outside Southwest National Park. A bitter six-year political battle between conservationists and developers in the Provincial government culminated in 1982-3. Plans to flood the lower reaches of the Gordon and Franklin rivers were approved by the Tasmanian Government in 1982 (HEC, 1982) but met with strong opposition both nationally and internationally, reinforced by inscription of the property on the World Heritage List in 1982 and the area's designation of the Southwest National Park as a UNESCO Biosphere Reserve.

The Commonwealth Government intervened, following the recommendation of the World Heritage Committee that the integrity of the property be protected, and passed the World Heritage Properties Act in 1983. The validity of this Act and actions taken under it to stop the dam were challenged by the Tasmanian Government, but dismissed by the High Court of Australia in 1983 (Wilcox, 1983; DAHE, 1985). The campaign created a very active conservationist political pressure group. As there is now a surplus of hydroelectric power this group aims to lower the level of Lake Gordon, enabling the flat valley under Lake Pedder to be drained and restored. But a proposal in 1995 to do this failed to gain political or public support (PWS, *in litt.*, 1996)

Protests in 1986 against logging at Farmhouse Creek and in the Lemonthyme Forest prompted the Commonwealth Government in 1987 to establish a Commission of Inquiry into the Lemonthyme and Southern Forests to resolve the matter. The findings of the Commission were split and public unrest continued. In 1989, the Commonwealth Government nominated 1.38 million hectares, including the existing area nominated in 1982 and adjoining forests, for inclusion on the World Heritage List as the Tasmanian Wilderness World Heritage Area. Most of the extensions were incorporated into the state reserve system (PWS, *in litt.*, 1996). Concern that not all areas of World Heritage quality are included within the present boundaries prompted a report in 1990 on the appropriate boundaries for the World Heritage Area; incorporation of the Tarkine area in the northwest of the island was suggested. In 1989 the inscription was extended to the Area's cultural heritage, Aboriginal as well as western.

The current Ten-Year Tasmanian Wilderness World Heritage Area Management Plan was adopted in 1999 and the first *State of the Tasmanian Wilderness World Heritage Area Report* was released in September 2004. This was an exhaustive account of the work done in all fields in the area during the previous decade with emphasis on evaluating the effectiveness of its management (PWS, 2004; Jones,

2005). There is increasing emphasis on management for ecological integrity. In 2008 the second Five-Yearly Review of the Tasmanian Regional Forest Agreement confirmed recommendations for the sustainable management and monitoring for ecological integrity of the forests and World Heritage site vegetation. The management of Aboriginal and other cultural sites and the need for Aboriginal stakeholder involvement was also acknowledged. An additional 23,872 ha in 21 adjoining reserves of tall eucalyptus forests, mainly in the north and east, and the Southwest Conservation Area south of Melaleuca to Cox Bight are to be incorporated into the property after mines on the latter site are closed. These are already covered by the Area Management Plan of 1999 and the State Forestry Practices Code which mandates rehabilitation of logging roads no longer needed. The further addition of 806,000 ha, some already managed under the site's masterplan, is urged by local NGOs (UNESCO, 2010).

MANAGEMENT CONSTRAINTS

Hydro-electric development has taken place at Scotts Peak, Mount Arrowsmith and Lakes St Clair, McKenzie and Augusta, the levels of which have been artificially raised. The Lake Mackintosh impoundment forms a minor intrusion into Cradle Mountain-Lake St Clair National Park. The Basslink project to link the Gordon River Hydroelectric Scheme with the mainland grid may damage the aquatic ecology. Erosion of the banks of the Gordon River is extensive and has been exacerbated by river traffic. At present the upper three quarters of the river is closed to commercial use. The lower section is used extensively by cruise boats. Monitoring shows that erosion rates have decreased but there is still a discernible difference between rates of erosion in trafficked and non-trafficked parts of the river. Speed limits for cruise boats appear to have helped but a sustainable regime has not yet been achieved (PWS, *in litt.*, 1996). Small-scale mining has taken place in the past and rights exist to operate a small osmiridium mine at Adamsfield until 2011. Limestone extraction from a quarry near Exit Cave has stopped and rehabilitation is completed. Track erosion and the spreading of plant diseases by 4WD and bicycle traffic is also increasing with increased tourism. Trampling damage by trekkers is common but is constantly monitored and made good.

There is little agreement among the State Party and foresters over conflicts between logging and conservation. Some forest in peripheral areas as in Lemonhyme, south of Farmhouse Creek and other localities has been disturbed by previous logging and road-building activities but logging continues outside the WHA in the East Picton forests, around Wylds Craig, in the upper Mersey valley, west of Walls of Jerusalem National Park, in the lower Weld and Styx valleys, and in part of the Great Western Tiers (Tasmanian Wilderness Society, 1995a and b). 80 logging coupes within 5 km of the site boundaries are scheduled for exploitation before 2012. These and the associated logging roads will expose the site to the edge effects of invasive winds and sunlight, soil dessication, vegetation die-back, and the risk of fire (UNESCO, 2010). Fire continues to be the greatest threat to susceptible slow-growing species and much of the more remote country, especially as the climate warms. This has led to the banning of campfires in certain areas. A report on land degradation in the Central Plateau has been released and states that 10,890 ha of this area have been affected by sheet erosion. Fires and overgrazing by stock and rabbits have created the current barrens. Parts of this area are some of the most severely eroded alpine and sub-alpine ecosystems in Australia (PWS, *in litt.*, 1996).

Species of World Heritage value are beginning to suffer. In the 1990s a fungal root-rot, *Phytophthora cinnamomi* affected numerous alpine species in the Pine Lake area in the northeast of the area, killing many species, including ancient native pines. It was confined to one catchment and measures were taken to delay its spread to others. Infected areas were mapped, aerial spraying with phosphonate was tried, a road through the area was sealed to restrict the infection and a major education campaign held. The area was quarantined and signed as a no-entry area, although some people still enter and it may have to be sealed off. A plant pathologist is employed to isolate the disease and to look at methods that can be used to slow its spread (PWS, *in litt.*, 1996). Since 1996 the population of the widespread Tasmanian devil, has been devastated by Devil facial tumour disease, which is spreading west. Sightings since 2006 have declined by 70% and a program to save the animal has been started. Amphibian chytrid fungus is spreading among frogs and an aquatic fungus *Mucor amphiborum* is affecting the platypus. Foxes and feral goats, cats and rabbits with invasive weeds such as sea spurge *Euphorbia paralis* and marram grass *Ammophila arenarum* have also caused problems for the wilderness (Aus Govt., 2010).

STAFF

In 2004, 112 office and field employees of the PWS were involved in WHA planning and management. This included 66 people in field centres, 18 in the Land Management Division and 28 in the Resources,

Wildlife and Heritage Division, both in the head office (PWS, 2004). Temporary staff are drawn on when needed.

BUDGET

The 1998 joint Commonwealth - State funding agreement provided for a total of \$8.9 million per annum, five eighths from the Commonwealth, the balance from the state (PWS, *in litt.*, 1996). For the 2002-3 period the Commonwealth provided ±A\$4.3 million, to be negotiable annually, and the State, ±A\$4.75 million, totalling ±\$9.05 (US\$4.85m) (PWS, 2004). In 2009 the Commonwealth government provided an A\$8.5 million operational fund, A\$1.8 million for a Jobs Fund, A\$1.3 million for track maintenance and, with the State, A\$23.5 million over a 5 year period to save the Tasmanian devil. A\$387,500 was also set aside to fund the recording, protection and interpretation of Aboriginal cultural sites (Aus Govt., 2010).

LOCAL ADDRESSES

Tasmanian Parks and Wildlife Service, GPO Box 1751, Hobart 7001, Australia.

Forestry Tasmania, GPO Box 207B, Hobart 7001.

Hydro-Electric Commission, GPO Box 355D, Hobart 7001.

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