

Chapter 2

PHYSICAL ENVIRONMENT

	<i>Page No.</i>
2.1	Physiography 20
2.2	Vegetation 22
2.2.1	Temperate Rain Forest 22
2.2.2	Mixed Forest 23
2.2.3	Subalpine Vegetation 23
2.2.4	Button-Grass Plains 24
2.2.5	Sclerophyll Forests 24
2.2.6	Coastal Heath Vegetation 25
2.3	Forest Management 25
2.4	National Parks 26
2.4.1	World Heritage Nomination 28
2.5	Climate 28
2.5.1	Winds 29
2.5.2	Temperature 29
2.5.3	Rainfall 30
2.5.4	Snow, Hail and Thunderstorms 31
2.5.5	Floods 31
2.5.6	Hobart's Climate 32
2.5.7	Monthly Weather Review, 1989 33
2.6	Environmental Management 34
2.6.1	Pollution Control 35
2.6.2	Environmental Planning 36
2.7	References 36

Chapter 2

PHYSICAL ENVIRONMENT

The State of Tasmania is a group of islands lying south of the south-east corner of the Australian mainland. Roughly shield-shaped with the greatest breadth in the north, the Tasmanian mainland extends from 40°38' to 43°39' south latitude and from 144°36' to 148°23' east longitude. The coastline is bounded by the Southern Ocean on the south and west and the Tasman Sea on the east, while the approximately 240 kilometres wide Bass Strait separates the island from the Australian mainland. Macquarie Island, a part of the State, is situated at 54°38' south latitude, 158°53' east longitude in the Southern Ocean.

The area of the whole State, including the lesser islands, is 68 331 square kilometres or about 0.9 per cent of the total area of Australia (7 686 900 square kilometres); it is just under one-third the size of Victoria, the smallest mainland State, and is less than half the size of England and Wales.

2.1 AREA OF ISLANDS

<i>Island</i>	<i>Area (square kilometres)</i>
Badger	10
Bruny	362
Cape Barren	445
Clarke	113
Flinders	1 374
Hunter	74
King	1 099
Macquarie	123
Maria	101
Prime Seal	10
Robbins	101
Schouten	34
Three Hummock	70
Vansittart	6
Total islands	3 922
Mainland Tasmania	64 409
Total Tasmania	68 331



Mainland Australia, extending north of the Tropic of Capricorn, and with much of its area in the zone of the sub-tropical anti-cyclones, is basically a warm, dry continent. Tasmania is in the temperate zone and practically the whole island is well watered with no marked seasonal concentration; there are no deserts or drought areas as found extensively on the adjacent mainland. Being south of latitude 40°, it is on the edge of the wind belt commonly known as

the 'Roaring Forties' and, with South America the nearest land mass to the west, Tasmania's weather is subject at times to strong winds and heavy rain about the south and west coastal areas. Its insular position provides protection against temperature extremes - the variation between summer and winter mean temperatures in coastal towns rarely exceeds 8° Celsius.

Apart from the Great Dividing Range in the east, continental Australia is predominantly a land of low plateaux and plains with little relief. In contrast, Tasmania could legitimately be called the island of mountains, since it has the largest proportion of high country to its total area, compared with the other States.

2.1 PHYSIOGRAPHY

Tasmania, a mere 296 kilometres from north to south and 315 kilometres from east to west, has a wide variety of mountains, plateaux and plains, of rivers, lakes, and tarns, of forest, moorland and grassland, of towns, farms and uninhabited (and virtually unexplored) country.

The temperate maritime climate partly explains Tasmania being called the most English of all States but other factors operate to heighten the comparison - the pattern of agricultural settlement with orchards, hedges and hopfields; the lake country; the early freestone architecture still common in the east and south-east and the roadsides and villages dotted with oaks, elms and poplars.

With six mountains exceeding 1500 metres, 28 above 1220 and a substantial part of the Central Plateau above 900 metres, Tasmania is truly an island of mountains. The tallest is Mt Ossa (1617 metres) located with a group of mountains, including Cradle Mountain, to the north-east of Queenstown and west of the highland lake country on the Central Plateau containing Lake St Clair, Australia's deepest natural freshwater lake.

Although the rivers are short, Tasmania is virtually criss-crossed by a network of rivers and lake systems. In the south, the Derwent flows from the Central Highlands past Hobart, providing one of the world's best harbours, to the sea at Storm Bay. The Huon River takes the waters of the south-west from the Gordon and Franklin Rivers at Lake Pedder. The State's longest river

2.2 MOUNTAINS, LAKES AND RIVERS

<i>Mountains</i>	<i>Height (metres)</i>
Mt Ossa	1 617
Legges Tor	1 573
Barn Bluff	1 559
Mt Pelion West	1 554
Cradle Mountain	1 545
Stacks Bluff	1 527
Mt Gould	1 491
Mt Jerusalem	1 491
Mt Olympus	1 447
Frenchmans Cap	1 443
Mt Ironstone	1 443

<i>Lakes</i>	<i>Area (square kilometres)</i>
Lake Gordon (a)	272
Lake Pedder (b)	241
Great Lake (c)	170
Arthurs Lake (c)	64
Lake Sorell (c)	52
Lake King William (a)	41
Lake Echo (c)	41
Lake Mackintosh (a)	29
Lake St Clair (c)	28
Lake Pieman (a)	22
Lake Rowallan (a)	9
Lake Rosebery (a)	7
Lake Barrington (a)	7
Lake Cethana (a)	4
Lake Murchison (a)	4

<i>Rivers</i>	<i>Length (kilometres)</i>
South Esk	201
Gordon	185
Derwent	182
Huon	170
Mersey	146
Franklin	118
Arthur	113
Pieman	100
North Esk	82

(a) Man-made.

(b) Man-made - inundated the smaller natural Lake Pedder.

(c) Natural lake enlarged by dam(s).

is the South Esk in the North flowing from the north-east to join the North Esk at Launceston to create the Tamar. Other rivers include the Mersey, Forth and Leven flowing to the North Coast and the Pieman and Arthur rivers on the West Coast.

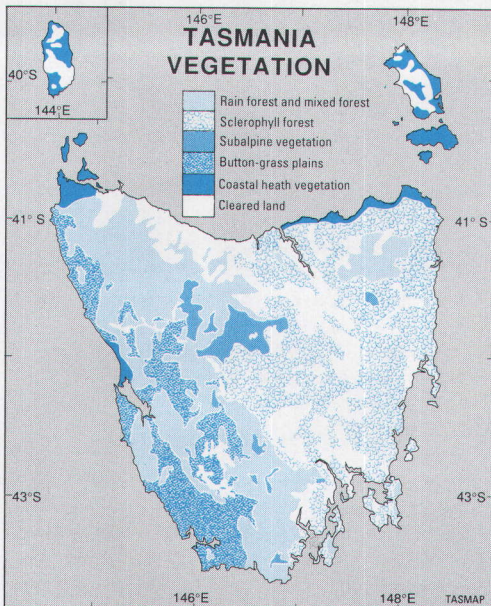


2.2 VEGETATION

(This section is based on an article contributed by Dr Winifred M. Curtis to the 1969 Tasmanian Year Book.)

Tasmania's rugged topography and diversity of soil and climate result in a wide range of habitats for plants. There are some 1200 species of native flowering plants of which about 200 are endemic, i.e. peculiar to the State. This flora, while closely related to that of the Australian mainland, has also a very strong affinity with the floras of other southern lands, namely New Zealand and southern South America.

Except on the mountain summits, the climate of Tasmania is favourable for the development of forest, both temperate rain forest in areas having an annual rainfall of about 1500 mm or more, and sclerophyll (eucalypt) forest in the drier parts. There are, however, considerable areas of sedge-moor and heath associated with particular types of soils; these are sometimes increased by the effects of repeated fires. Conditions for the growth of plants often change



abruptly, particularly in mountainous country dissected by gullies, and juxtaposition of forest, sedge-moor and subalpine communities produces a mosaic-like pattern.

2.2.1 Temperate Rain Forest

Myrtle and Sassafras

In areas of high rainfall and suitable soils, temperate rain forests are found from sea level to an altitude of about 1000 metres, and corridors extend into many of the deep sheltered gullies in eucalypt forests. The characteristic trees, myrtle (*Nothofagus cunninghamii*) and sassafras (*Atherosperma moschatum*), cast a deep shade and undergrowth is often reduced to a surface cover of liverworts, mosses and lichens with scattered areas of ferns. Corridor forests at low altitudes develop as fern gullies in which other species of trees appear. Often musk (*Olearia argophylla*), with sassafras, are the dominant trees forming a canopy above the tree ferns.

'Pines' and Blackwood

While myrtle and sassafras are characteristic and widespread throughout Tasmania's rain forests, other species are locally abundant. King Billy pine (*Athrotaxis selaginoides*) and pencil pine (*A. cupressoides*) are trees of 15 to 30 metres in height. They may be associated with myrtle or they may form pure stands on slopes of the central plateau in high-rainfall areas, e.g. at Cradle Valley. Huon pine (*Dacrydium franklinii*), a fine timber tree characteristic of the banks of rivers near the west coast and of lakes on the central plateau, is no longer plentiful. Blackwood (*Acacia melanoxylon*) reaches its greatest development in the swampy soils of the north-west.

Celery-top and Leatherwood

Where soils are acid and poor in mineral nutrients and the canopy of the rainforest becomes broken, other trees and also tall shrubs appear. Celery-top (*Phyllocladus aspleniifolius*) is widespread and leatherwood (*Eucryphia lucida*) locally abundant. The latter sometimes grows to a height of 30 metres although more usually 7-12 metres. In late summer, the flowers make a spectacular display; they are white, about 3.5 cm in diameter and resemble wild roses.

'Laurels', Waratahs and Heaths

The tall shrubs of these forests include a number of endemics, many characterised by showy flowers or by bright fleshy fruits. Native laurel

(*Anopterus glandulosus*) is a handsome shrub bearing large terminal racemes of white flowers. The waratah family (Proteaceae) and heath family (Epacridaceae) are well represented. From the latter family, two endemic species are of particular interest. Pandani or giant grass tree (*Richea pandanifolia*) has leaves one to two metres long, parallel-veined, hard, rigid and drooping, borne at the summit of a trunk which may be six to nine metres high. Climbing heath (*Prionotes cerinthoides*) is a climber not infrequent on the trunks of myrtle where it may reach a height of 12 metres above the ground. It forms pendant sprays of small evergreen leaves and crimson bell-like flowers.

Impenetrable Scrub

Locally in poor acid soils where the water table is at or very near the surface an almost impenetrable scrub develops, the density of which is notorious. About five species are mainly concerned. Woolly tea-tree (*Leptospermum lanigerum*) forms dense stands of trees having slender, very tough trunks up to 15 metres high. The sedges, appropriately called 'cutting grass', grow in clumps which are often more than two metres in height and breadth. *Bauera rubioides* (family Cunoniaceae) has innumerable thin, wiry, intertangled branches often spreading over other shrubs to a height of 3 metres or more. The most unusual growth form is horizontal scrub. This is a small evergreen tree making a closely packed understorey in the forest or forming pure stands in gullies. The trees sometimes grow erect with trunks up to 13 metres high but, typically, slender saplings arch towards the ground and many erect branches arise from the almost horizontal trunks. The branches in turn bend over, interlacing with each other and with branches from adjoining trees. In this way, dense platforms develop at varying heights above the ground.

2.2.2 Mixed Forest

Where rain forest gives way to sclerophyll forest, there is an ecotone of mixed forest, the extent and character of which are largely determined by the incidence of fires. Eucalypts are able to establish in open ground cleared by fire; at altitudes below about 750 metres swamp or stringy gum (*Eucalyptus regnans*), stringy bark (*E. obliqua*) and gum-topped stringy bark (*E. delegatensis*) tower above an understorey of trees and tall shrubs from the rain forest. In this understorey tree ferns are often abundant, their trunks clothed with epiphytes among which

filmy ferns (Hymenophyllaceae) are prominent and *Tmesipteris* locally frequent. At higher altitudes, eucalypts characteristic of montane and subalpine communities are found in the ecotone and myrtle may be reduced to a bushy scrub below Tasmanian snow-gum (*E. coccifera*), urn gum (*E. urnigera*), yellow gum (*E. subcrenulata*) or cider gum (*E. gunnii*).

2.2.3 Subalpine Vegetation

Subalpine Communities

The subalpine communities of the mountains form a complex pattern determined by the varied habitats. Endemic conifers often form quite extensive forests; here pencil pine is usually dominant. In some of the moister environments, stands of myrtle extend to the tree line. A second species of myrtle (tanglefoot), forms dense thickets on very exposed slopes. Tanglefoot is an endemic species and Tasmania's only native deciduous tree; its leaves brighten the slopes in autumn by changing colour from green to vivid golden-bronze or red before they fall.

Subalpine Moorland

The term subalpine moorland is used to include a number of communities such as shrubberies, the assemblages characteristic of screes and mountain-top detritus, herbfields, swamps and bogs. Some shrubberies comprise conifers reaching a height of two to two and a half metres, others consist of lower-growing plants, including the prostrate conifers *Podocarpus alpina* and *Microcachrys tetragona*, and with daisies, waratahs and heaths well represented. The plants of the heath community make a colourful display in summer and early autumn. The flowers of *Richea* (family Epacridaceae) are of particular interest; they are characterised by the corolla, the petals being joined to form a more or less conical cap which does not open when the stamens are mature but splits transversely near the base and falls in its entirety. *Richea scorparia*, which is abundant in the shrubberies, has flower buds ranging in colour from white to apricot, brick red, or deep crimson. The genus comprises some ten species of which only one occurs outside Tasmania, on mountains of the south-east of the Australian continent.

Micro-shrubbery

An interesting plant community, which may be termed a micro-shrubbery, develops on mountain-top detritus (worn rock material), on the margins of shallow pools and on gentle slopes

where snow often lies for up to six months of the year. Five species of cushion plant are concerned. These plants are perennial, ever-green and much-branched with the main branches prostrate but sending up short, erect shoots that grow to an even height. The erect shoots are very densely packed; they bear stiff, closely imbricated leaves and adventitious roots. As growth continues, the lower leaves die and the debris, together with roots and with silt washed into the interstices, help to consolidate the mass. A plant spreads to form a mound which may be one and a half metres or more in diameter, the surface flat or rounded and so firm as not to yield underfoot. The species involved are: *Abrotanella forsterioides* (Compositae family), which is able to grow at lower altitudes and in drier situations than the rest; *Pterygopappus lawrencii* (Compositae), distinguished by the sage-green colour of its leaves; *Dracophyllum minimum* (Epacridaceae); *Donatia novae-zelandiae* (Donatiaceae); *Phyllachne colensoi* (Stylidiaceae). This plant community closely resembles those found in comparable habitats in New Zealand and in the Magellanic moorland of South America. The species of *Donatia* and of *Phyllachne* are common to Tasmania and New Zealand.

As the cushion plants spread and adjoin, they form a mosaic which has a continuous level or undulating surface. These plants serve as seed beds for others; the white-flowered *Drosera arcturi* is often conspicuous and the endemic plantain, *Plantago gunnii*, is confined to this habitat. But a cushion plant does not continue to expand to an indefinite size; after a time it dies in the centre allowing the establishment of plants such as the fern *Gleichenia alpina*, *Calorophus minor* (syn. *Hypolaena lateriflora*, family Restionaceae), *Astelia alpina* (pine-apple grass, family Liliaceae) and also various shrubby species. One result of this method of growth is that the flow of water in the area is interrupted and conditions then favour the development of bog or swamp. In water-logged soils, pine-apple grass is locally frequent, often forming extensive mats which are firm underfoot. The leaves of this plant are closely tufted, lanceolate or ensiform and up to 30 cm long; they are very stiff and are held erect showing the lower surface which is silvery white and contrasts with the grey-green upper surface.

2.2.4 Button-Grass Plains

Extensive tracts of country in climatic conditions suitable for the development of temperate

rain forest or mixed forest carry sedge-moors which are given the descriptive name 'Button-grass plains'. The characteristic plant is button-grass (*Gymnoschoenus sphaerocephalus*) which grows in tussocks consisting of hard, narrow leaves, one to two metres long, and of slender spreading flower-stalks terminating in small spherical heads of flowers and fruits. This plant community is typical of wet infertile soils that are acid, podsolized and having a surface accumulation of peat. Reaching their greatest development on flat valley floors in areas of high rainfall, the tussocks extend from sea level and spread over hills until they give way to more drought-resistant or cold-tolerant plants of montane and subalpine regions. However, the boundaries of this community are not strictly limited by the nature of the soil and may be extended as a result of repeated fires. While button-grass is a characteristic and conspicuous plant, other monocotyledons, particularly representatives of the Restionaceae, are abundant and sometimes dominant. The yellow-flowered species of *Xyris* (family Xyridaceae) and mauve-flowered *Pater-sonia fragilis* (family Iridaceae) are widespread and, between the tussocks, small herbaceous plants are locally frequent. Where the soil becomes better drained, woody shrubs appear.

2.2.5 Sclerophyll Forests

Principal Growth

The sclerophyll forests dominated by *Eucalyptus* extend through a wide range of habitats from the margins of rain forests to exposed mountain plateaux and the relatively dry areas of the midlands. In the dry regions, the forest becomes almost a savannah woodland with scattered trees of cabbage gum (*Eucalyptus pauciflora*) and a ground cover of grasses or low shrubs. Between the extremes there are considerable areas of rather open forest. Some 26 species of *Eucalyptus* occur in the State of which about half are endemic. Many of these species are highly variable and the forests show a complex pattern in which variants of one species give way to those of another, in response to slight changes in conditions, e.g. different soil-type or different aspect. Near Hobart a pattern is well shown on the low but much-dissected foothills of Mt Wellington. Here the sunny north-facing slopes carry the glaucous species silver peppermint (*E. tasmanica*) or Risdon peppermint (*E. risdoni*) while the south-facing slopes carry the non-glaucous species such as stringy bark (*E. obliqua*) and white gum (*E. viminalis*). In the open forests, subdominant trees include

species of she-oaks, *Casuarina*, which often forms societies on dry slopes, the semi-parasitic native cherry (*Exocarpos cupressiformis*) and wattles such as black wattle (*Acacia mearnsii*). *Banksia marginata* and silver wattle (*Acacia dealbata*) are widespread. Many low-growing shrubs contribute to a colourful show of flowers in spring, representatives of the pea family, heaths, daisies and boronias being the most conspicuous.

Blue Gum

Blue gum (*Eucalyptus globulus*) which has been chosen as Tasmania's floral emblem is, of all Australian eucalypts, the species that has been most widely introduced overseas. The tree has been established throughout the Mediterranean region and in highlands of the tropics in many parts of Africa and India; it is widespread in California and in parts of Chile, Argentina and New Zealand. In many of these regions, the tree has become of considerable economic importance as timber, as a material for paper pulp production, and for fuel and oil. Blue gum is locally abundant in southern and eastern Tasmania; in well-drained soils and in sheltered valleys, it reaches a height of about 60 metres. The tree also occurs in restricted areas near the west and south coast, but, apart from local occurrences in southern Victoria, is native to Tasmania.

2.2.6 Coastal Heath Vegetation

On coasts, mainly in the north-west and north-east of the State, areas of infertile soils support only a heath vegetation of stunted trees and low shrubs. This community, like the sedge-moor, may extend beyond the infertile soils as a consequence of recurrent fires. Two species of grass tree (*Xanthorrhoea australis* and *X. minor*) are locally frequent. These are bizarre plants producing a large number of rigid, persistent, narrow-linear leaves, often half to one and a half metres long and tufted at the top of a stout stem. In *X. australis* the stem may form a trunk up to half a metre high. The flowering stems are erect, typically solitary, and, again in the larger species *X. australis*, from one to two metres high, having the upper half very densely crowded with small bracteate sessile flowers that form a narrow-cylindrical spike. The flowers are white but after they have withered, the dark brown fruiting spikes are long-persistent. The genus is confined to Australia and has been classified in several ways.

2.3 FOREST MANAGEMENT

Of the total forest area of 3 649 000 hectares, 38 per cent is in State Forest, 36 per cent is privately owned, 14 per cent is Crown Land and 11 per cent is in Crown reserves.

The need for permanent reservation of land for timber production was first given statutory recognition with the *Waste Lands Act* 1881. A program of acquisition of land suitable for dedication as State forest has seen the gazetted area reach 1 621 007 hectares at 31 May 1989.

State forests: Tenure by the Forestry Commission under the *Forestry Act*, 1920.

Forest reserves: Areas provided for recreational, scientific, environmental and aesthetic purposes established within State forests.

Crown land: Unallocated land with tenure by the Department of Lands, Parks and Heritage; wood production and sale controlled by the Forestry Commission.

Crown reserves: Principally National Parks and State Reserves administered under the *National Parks and Wildlife Act* 1970.

HEC: Land vested in the Hydro-Electric Commission.

2.3 TENURE OF FOREST AREA, TASMANIA, 1989 ('000 ha)

Tenure	High quality eucalypt	Low quality eucalypt	Rain forest	Plantations
State forest	377.7	845.1	174.8	42.7
Forest reserves	1.2	9.7	4.2	-
Crown land	23.7	202.5	269.8	-
Crown reserves	15.3	231.5	169.4	-
HEC	5.9	27.0	5.8	-
Private property	56.0	1 216.7	37.0	51.7
Total	479.8	2 532.5	661.0	94.4

Timbers

Hardwoods: The most valuable eucalypts are those which belong to the 'ash' group; stringybark (*Eucalyptus obliqua*), gum top stringybark or alpine ash (*Eucalyptus delegatensis*) and

swamp gum or mountain ash (*Eucalyptus regnans*). In the south and south-east Tasmanian blue gum (*Eucalyptus globulus*) occurs in high quality forests. In areas where the annual rainfall is below 760 mm the more important eucalypts are black peppermint (*Eucalyptus amygdalina*), swamp or black gum (*Eucalyptus ovata*), white gum (*Eucalyptus viminalis*), stringybark (*Eucalyptus obliqua*) and white peppermint (*Eucalyptus linearis*).

Softwoods: Although Tasmania's native forests produce some very valuable softwood timber, including King Billy pine, Huon pine and celery top pine, they are very slow growing and in short supply. For these and other reasons, attention has been given to building up another section of the total forest estate by growing plantations of exotic species.

Plantations

Fast-grown softwood plantations have been established in State forest initially to fill an expected sawlog scarcity. In addition, these softwood plantations yield a long-fibred pulp which is a requirement of paper production. Softwood plantations cover less than 2.4 per cent of State forest area and radiata pine (*Pinus radiata*) is the principal species planted. An increasing area of native hardwood plantations has been established in recent years.

In 1989 Tasmanian State forest plantations comprised 39 329 hectares of softwoods and 4263 hectares of hardwoods. Most softwood plantations are in the Fingal, Scottsdale, Devonport and Burnie districts, while hardwoods are distributed more widely.

THE FOREST ESTATE, 1988-89

Eucalypts more than 40 metres tall	359 200 ha
Eucalypts between 15 and 40 metres tall	832 400 ha
Rainforest	178 400 ha
Plantations:	
softwood	39 329 ha
hardwood	4 263 ha
Native Forests:	
area harvested	8 892 ha
regenerated	6 004 ha
Area held for regeneration in 1989-90	*2 888 ha

(* due to adverse weather conditions)

2.4 NATIONAL PARKS

(The following is based on an article in *Travelways*.)

Tasmania has more of its area than any other Australian State vested in national parks - more than 9000 of its total 68 000 square kilometres, are included in 14 national parks. More than any other part of Australia, it offers a wealth and variety of natural beauty.

Three of the national parks, Southwest, Franklin-Gordon Wild Rivers National Park and Cradle Mountain-Lake St Clair, plus new additional areas comprise the State's World Heritage Area.

Asbestos Range National Park on the north coast includes beaches, coastal hills, a small lagoon, small offshore islands and heathland. It offers many outdoor activities, including camping, swimming, boating, water skiing, fishing, bird watching and walking.

The 16 080 hectare Douglas-Apsley National Park, declared in December 1989, is Tasmania's best example of a dry sclerophyll forest. It also includes waterfalls and river and forest views. The park is near the resort of Bicheno and a one-way gravel road is open on weekends.

Freycinet National Park, on the Tasmanian East Coast, is a striking combination of red granite mountains, white sand and crystal clear water. The beaches, boating, fishing, swimming and bushwalking attract many visitors to the area, particularly at the height of summer. The park has a series of well defined walks, most of them within the capability of the average visitor.

Maria Island, 13 km off south-eastern Tasmania, was a penal colony early last century and relics from this period remain at Darlington the island's only settlement. Transport is provided by a ferry operating from the Eastcoaster Resort.

Mount William, in the extreme north-east of Tasmania, was declared a national park principally to protect the habitat of Tasmania's only endemic kangaroo, the gray forester, which can be viewed from a 'kangaroo drive'.

Rocky Cape National Park, the smallest of the Tasmanian national parks, stretches for about 12 kilometres along the Bass Strait shoreline. It incorporates rugged coastline, small sheltered beaches, heathlands and wooded hills.

Strzelecki National Park, in the south-western corner of Flinders Island, is dominated by the granite Strzelecki peaks, rising abruptly from the sea and providing excellent climbing views.

The Ben Lomond National Park, one of Tasmania's two principal ski-fields, is a large alpine plateau 50 kilometres south-east of Launceston, with the highest peak, Legges Tor, rising to 1573 metres.

Cradle Mountain-Lake St Clair National Park in the western Central Highlands, is Tasmania's, and one of Australia's, best known national parks, earning international renown for the beauty of its mountains and lakes and for the famed 85 kilometres 'Overland Track' from Cradle Valley to Lake St Clair. The park contains numerous highland tarns and lakes, streams and waterfalls and mountain peaks, including Tasmania's highest mountain, Mount Ossa (1617 metres). The overland walk is normally made in four, five or more daily stages, sheltering overnight in tents or at one of the 12 basic, unattended huts along the way.

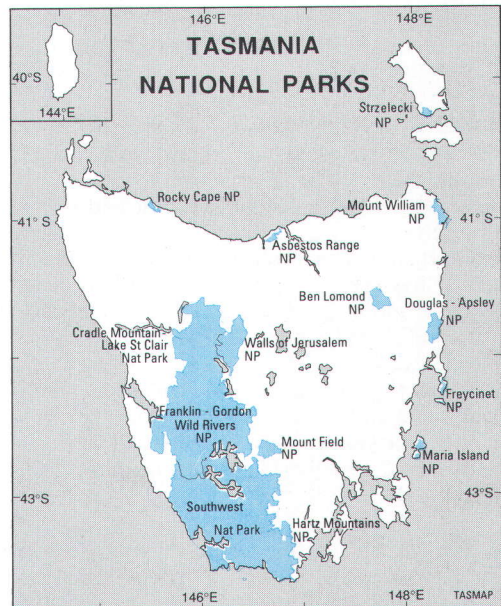
Hartz Mountains National Park, being 80 kilometres south of Hobart, is one of Tasmania's most popular national parks. The park is dominated by 1255 metre Hartz Peak, with a superb panoramic view out over the South-West wilderness and eastward to Bruny Island and the Tasman Peninsula. The park appeals to bushwalkers, with several well-defined trails. It is now included in the World Heritage Area.

Mount Field National Park, 70 kilometres west of Hobart, could be described as two parks within one - at the lower level is an almost English-style parkland area, merging into thick rainforest, with short nature walks, one for disabled people leading to the well-known Russell Falls. Contrasting with this is the steep drive up to the rugged and mountainous plateau, peaking in Mount Field West (1437 metres).

The Walls of Jerusalem National Park abuts the Cradle Mountain-Lake St Clair National Park and has recently been included in the World Heritage Area. It covers a plateau area, averaging 1200 metres, with mountain peaks, gorges, and a significant proportion of the 4000 lakes and tarns in the Central Highlands.

The Franklin-Gordon Wild Rivers National Park includes the Franklin River, the broad lower reaches of the Gordon River and Frenchman's Cap - a striking white quartzite peak, with a sheer cliff face of 300 metres. The Franklin has a reputation for providing some of the world's best white water rafting and in contrast, the broad, dark reaches of the lower Gordon, with their mirror reflections, may be seen from the comfort of cruise boats. The thick, temperate rainforest contains some of Tasmania's unique timber species including the renowned Huon pine.

The Southwest National Park is Tasmania's largest national park. It encompasses much of Tasmania's temperate wilderness, one of few such areas in the world, an area of rugged mountains, dense rain forest, button grass plains, swift flowing rivers and isolated coastline. High peaks predominate, including Mount Anne (1425 metres), Mt Eliza (1289 metres), Federation Peak (1224 metres) and Precipitous Bluff (1120 metres). It is a mecca for experienced bushwalkers and climbers from around the world. The two principal walking tracks are the South Coast track and the Port Davey track, meeting at Port Davey to provide a semi circular walk from Cackle Creek in the far south to Scotts Peak (Lake Pedder).



2.4.1 World Heritage Nomination

(The following section was prepared by the Department of Parks, Wildlife and Heritage.)

The Tasmanian Wilderness World Heritage Area comprises 1.37 million hectares of essentially wild, natural country in central and south-western Tasmania. It was jointly nominated for World Heritage listing by the Commonwealth and State governments in September 1989 and inscribed on the World Heritage list by the World Heritage Committee of UNESCO in December 1989.

Part of the World Heritage Area (the Cradle Mountain-Lake St Clair, Southwest and Franklin-Gordon Wild Rivers National Parks) was originally recognised by the World Heritage Committee in 1982. The 1989 listing enlarged the original area by approximately 600 000 hectares. It also includes the Lemonthyme area; the Walls of Jerusalem National Park and Central Plateau Conservation Area; the majority of the Central Plateau Protected Area west and north of Great Lake; Marakoopa Cave, Devils Gullet and Exit Cave state reserves; the three forest reserves of Meander, Liffey and Drys Bluff; the area north of Lake Gordon including the Denison and King William Ranges; the western strip of the southern forests stretching from Wayatinah to South Cape Bay including the upper reaches of the Weld, Huon and Picton Rivers; Hartz Mountains National Park; and in the west: the Broken Hills, south-east Macquarie Harbour, Sarah Island Historic Site, Birchs Inlet to Spero River, Governor River, Eldon Ranges and north to Sophia River.

The World Heritage Area now contains values not protected within the original area; notably areas of very tall eucalypt forest, extensive cave systems, a core breeding area for the endangered orange-bellied parrot and ice age Aboriginal cave art sites. The integrity of the original nomination has been greatly enhanced by the inclusion of important alpine and sub-alpine areas, karst and glacial features. These and other values were identified by the numerous reports to the Commission of Inquiry into the Lemonthyme and Southern Forests, established by the Commonwealth Government in 1988 to investigate and report on the World Heritage qualities of this area.

The Tasmanian Wilderness World Heritage Area is subject to a joint Commonwealth/State management arrangement. This consists of the

Ministerial Council, chaired by the Premier which approves expenditure and management plans and is supported by a Standing Committee of officials from both governments. The Council also receives advice from a Consultative Committee which has an independent chairperson and comprises 15 members nominated by both governments as representatives of different interests. A joint rolling program of recurrent and capital funding for World Heritage Area management has been agreed with Commonwealth funds guaranteed until 1994.

Day-to-day management of the World Heritage Area is carried out by the Tasmanian Department of Parks, Wildlife and Heritage. Field bases are located at Cradle Mountain, Lake St Clair, Strahan, Queenstown, Mt Field, Liawenee, Marakoopa and Hastings caves.

Preparation of a management plan for the entire World Heritage Area commenced in December 1989 with the launch of the most extensive program of public participation ever undertaken for reserve planning in Tasmania. Selected research programs are carried out to gain information for planning and management.

World Heritage Area management activities include providing visitors with information, interpretation and assistance, search and rescue, fire prevention and suppression, providing and maintaining a range of visitor facilities, walking track upgrading and maintenance, rehabilitation, environmental monitoring and exotic species control.

2.5 CLIMATE

(The following section was prepared by the Bureau of Meteorology.)

Since Tasmania lies between 40° and 43½° south of the Equator and is an island with no point more than 115 kilometres from the sea, its climate is classified as temperate maritime. On the coast the daily temperature range averages about 8° Celsius, rising to about 12° Celsius further inland, indicating a slight continental effect.

The combination of mountainous terrain in the western half of the State and prevailing westerly winds produces a marked west-east variation of climate, and especially of rainfall.

Summers are mild and characterised by greatly lengthened days. The sun reaches a maximum elevation of 70-73° in mid-summer, giving around 15 hours of daylight. In mid-winter, the sun's elevation does not exceed 20-23°, and the shortest day consists of about nine hours of daylight.

In winter, westerly winds reach their greatest strength and persistence, causing a distinct maximum in rainfall distribution in the west and north-west. In the east and south-east, rainfall is more evenly distributed throughout the year. In comparison with those areas of Europe and North America which are at similar latitudes, Tasmania enjoys a very temperate climate. This is due to the stabilizing effect of surrounding oceans whose temperatures change only 3-5° throughout the year. The higher proportion of ocean to land area confers a similar benefit on the Southern Hemisphere as a whole.

2.5.1 Winds

The prevailing winds over most of the Island are north-west to south-west, with greatest strength and persistence during late winter. Speed and direction vary with the eastward passage of high and low pressure systems. In the summer months, when westerlies are weak, afternoon sea-breezes become the predominant wind in coastal areas. Occasional periods of north-east to south-east winds occur. The highest average wind speeds are associated with extensive deep depressions over ocean areas south of Tasmania.

2.5.2 Temperature

Tasmania only occasionally experiences extremes of temperature. High temperatures recorded in the east and south-east of Tasmania

generally occur on the last day of a warm spell during which a dry air mass of mainland origin is advected over the State from a direction between north and north-west. Some cooling in the lower air layers over the waters of Bass Strait prevents the northern coast from reaching the higher temperatures that are experienced in the south under these conditions.

Launceston's Record Low

On 16 June 1989 Launceston had its lowest maximum June temperature on record, just 5°C as Tasmania froze in unusually low temperatures. Launceston's previous record June low was 6.3°C.

Hobart's maximum, also 5°C was just outside the record for its lowest maximum of 4.3°C. Both centres' maximums were 7°C below average for June. The lowest maximum temperature in Tasmania for the day was 1°C recorded both at Liapootah and Tarraleah. Liawenee recorded the lowest minimum temperature with -7°C. Despite the cold, no high-land areas reported snowfalls.

The highest temperature ever recorded in Tasmania was 40.8°C at Bushy Park in December 1945 and at Hobart in January 1976. The lowest temperature recorded was -13.0°C at Shannon, Butlers Gorge and Tarraleah in June 1983.

The recorded extremes of temperature for Hobart are 40.8°C in January 1976 and -2.8°C in June 1972 and July 1981. Readings above 38°C or below -1°C are rare, the mean maximum temperature in summer being 21°C and the mean minimum in winter, 4.8°C.

2.4 TEMPERATURES AT SELECTED STATIONS, TASMANIA, 1989 (°C)

Station	Summer (Dec-Feb)		Autumn (Mar-May)		Winter (June-Aug)		Spring (Sep-Nov)	
	Mean max.	Mean min.	Mean max.	Mean min.	Mean max.	Mean min.	Mean max.	Mean min.
Hobart	22.5	12.9	18.2	10.3	12.1	4.2	18.3	8.5
Launceston Airport	23.4	10.7	18.3	8.1	11.2	2.2	17.1	6.2
Devonport	21.4	12.3	18.6	9.8	12.8	3.5	16.7	7.7
St Helens	23.6	12.5	20.1	9.6	14.4	3.5	18.6	7.5
Queenstown	21.5	9.2	18.1	6.6	12.2	1.2	16.6	5.4

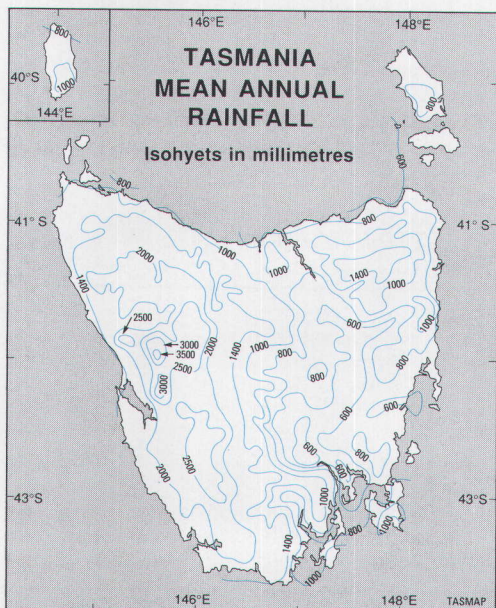
The average number of hours of sunshine a year ranges from about 2500 hours in the northern Midlands to less than 1750 hours on the West Coast and western highlands, this area having the least sunshine in Australia. Hobart averages 2100 hours per year and Launceston around 2400.

In January, daily averages of sunshine range from nine hours per day between the Midlands and Launceston to six hours per day on the West and South Coasts. In mid-winter, average daily sunshine is down to a maximum of three hours on the East Coast and to considerably less on the West Coast and highlands.

2.5.3 Rainfall

As Tasmania's position is on the northern edge of the 'Roaring Forties' (a westerly air-stream), its exposure to this stream and the mountainous nature of the terrain are the controlling influences on the amount, distribution and reliability of the State's rainfall.

In the west, average annual rainfall ranges from about 1500 mm on the coast to 3500 mm at Lake Margaret; in the north-east, from 500 mm on the coast to 1300 mm on the highlands; while rainfall in the north-west ranges from 1000 mm near the coast to 1600 mm in the higher inland areas.



Extreme three to five-day rainfalls occur most often on the West Coast in late June when the westerlies are increasing in strength and persistence and the sea temperature is well above the land temperature. In the north, short periods of extreme precipitation occur when wind flow is sustained for up to two days from the north-east, usually from late autumn to spring. The high moisture content of such streams from over the relatively warm waters of the Tasman Sea results in heavier, if less prolonged, rainfall than is produced by the westerly streams.

There is a strong gradation in rainfall from west to east, because of topography, with a distinct rain shadow east of the Central Plateau. Parts of the Midlands average less than 500 mm per year. Totals in the east and south-east are higher (over 800 mm on exposed slopes).

Rainfall is least reliable in the east, south-east, Midlands and Derwent Valley. Highest rainfall in these areas tends to occur in autumn and spring, under the influence of small cyclonic depressions off the East Coast.

2.5 ANNUAL RAINFALL, TASMANIA (mm)

Station	1987	1988	1989	Long-term average (a)
Bicheno	504	794	723	689
Burnie	673	1 043	1 215	994
Bushy Park	582	550	439	584
Butlers Gorge	1 598	1 697	1 117	1 686
Campbell Town	391	535	480	544
Devonport	738	1 105	1 033	892
Glenorchy	638	747	574	719
Hobart Airport	411	492	469	525
Hobart Bureau	492	642	492	628
Launceston Airport	480	588	615	695
Launceston	557	724	742	676
Maydena	1 134	1 168	778	1 218
Oatlands	403	461	492	562
Queenstown	2 653	2 383	2 012	2 527
Scottsdale	718	1 013	1 186	1 069
Southport	832	887	782	988
Smithton	910	1 254	1 111	1 103
Strahan	1 621	1 627	1 542	1 653
Strathgordon	2 665	2 572	1 717	2 525
St Helens	542	820	865	783
Swansea	372	560	564	612
Waddamana	775	876	603	797

(a) Number of years of record used to calculate the long-term average varies from station to station.

2.5.4 Snow, Hail and Thunderstorms

Snow and hail can be experienced over the highlands at any time of the year. Heaviest snowfalls occur, as a rule, in late winter and spring, and less frequently in June and July. Extensive snow below 150 metres occurs, on the average, less than once every two years, associated with an unusually vigorous outbreak of cold air from Antarctic regions. There is no permanent showline, but patches of snow often remain on the highest peaks until December.

Hail is most likely in spring, though possible in any month. Hail storms are a big risk to fruit crops in the Huon Valley and on the Tasman Peninsula, and sometimes cause extensive damage.

Thunderstorms are most common in the west and about the North Coast and are usually associated with the lifting of warm moist air by a cold front. Thunderstorms occur mainly in the summer months. Hobart and Launceston average five to seven storms per year, and the north and north-west, 10 to 15. The Central Plateau and north-eastern highlands report, on average, about five storms per year, while the Midlands, as gauged by Oatlands, has less than three.

2.5.5 Floods

In Tasmania, floods tend to be seasonal being more frequent in winter, when catchments are saturated, than in summer.

The major rivers in the Tamar River basin, the South Esk, Macquarie, Meander and North Esk Rivers, converge in the north of the State near Launceston, where the combined catchment area is nearly 9000 square kilometres. Many rivers in this system flow through flat country

and, consequently, floods can be widespread and disruptive. Besides many small rural townships, Launceston and Longford, the two major urban areas in the basin are affected by major floods such as those which occurred in 1929 and 1969.

The Derwent River, with a catchment area of 7750 square kilometres at New Norfolk, drains the central part of the State. Minor floods do not occur with the same regularity as in the South Esk due to the Hydro-Electric Commission's storages but these have little effect during major floods such as that which occurred in 1960 when New Norfolk was flooded.

The Huon River, which has catchment area of 2100 square kilometres at Judbury, rises very quickly during floods. Major floods, the most recent of which was in 1975, affect the main township in the catchment, Huonville.

Although heavily regulated by Hydro-Electric Commission power generation schemes, the Forth and Mersey rivers, with catchment areas of 1100 and 1600 square kilometres respectively, sometimes have major floods. The most recent major flood in 1970 affected urban areas in the catchments.

Many of the smaller rivers in the north and North-west of the State have their headwaters in the Western Tiers and are subject to flash flooding.

The short, fast-flowing rivers in the North-east and east of the State rise and fall rapidly but can be quite damaging.

Flooding of rivers in the west and south of the State go largely unnoticed as they pass through rugged, sparsely populated regions.

2.6 CAPITAL CITIES CLIMATIC DATA

	Hobart	Melbourne	Sydney	Brisbane	Darwin	Adelaide	Canberra	Perth
Temperature (°C) -								
Mean daily maximum	16.8	19.7	21.5	25.5	31.6	22.1	19.4	23.6
Mean daily minimum	8.3	10.0	13.6	15.7	23.8	12.0	6.3	13.5
Extreme maximum	40.8	45.6	45.3	43.2	40.5	47.6	42.2	44.7
Extreme minimum	-2.8	-2.8	2.1	2.3	10.4	0.0	-10.0	1.2
Mean daily hours of sunshine	5.8	5.7	6.7	7.5	8.5	6.9	7.2	7.9
Rainfall -								
Mean annual (mm)	628	656	1 212	1 149	1 814	552	625	869
Mean annual days of rain	160	147	139	123	111	121	107	119
Wind - Average (km/hr)	11.7	12.3	11.6	10.8	9.2	12.5	5.8	15.6

2.5.6 Hobart's Climate

Hobart is not the wettest Australian capital city; in fact it has the lowest mean annual rainfall of all capitals except Adelaide.

Temperatures: Mean maximum temperature exceeds 21°C in January and February. On average there are two or three days per year with maximum temperatures greater than 32°C. Minimum temperatures below -1°C are rare.

Rainfall: There is a strong gradient of rainfall to the immediate west of Hobart caused by the bulk of Mt Wellington. On the south-eastern slopes of the mountain the annual rainfall reaches 1400 mm (at The Springs and The Gap) while at Fern Tree the annual average is 1140 mm. The rainfall decreases to about 600 mm in the city area, the annual average being 628 mm at the Regional Office of the Bureau of Meteorology. Some eastern shore suburbs receive as little as 500 mm of rain per annum.

Monthly totals are fairly uniform. The wettest 12 months on record at the Bureau's Hobart Office yielded 1104 mm (to December 1916) and the driest, 320 mm (to November 1943).

Fog: Fogs occur in the city about six times per year, in the cooler months, but are more frequent over and near the Derwent River, down which they are often carried on a light north-

west wind. Fog frequency is far less than that for either Launceston or Melbourne.

Wind: The main wind direction is north-west, induced by the orientation of the Derwent Valley. Next in importance is the sea-breeze (from south or south-east) during summer months. The strongest wind gust experienced in Hobart was 150 km/hr recorded during a storm in September 1965.

Snow and Hail: Snow below 300 metres occurs, on the average, less than once per year. Falls lying in the centre of the city, almost at sea level, have occasionally been recorded. Snow generally lies on Mt Wellington during winter and early spring months, but it is rare between November and March. Hail occurs about four times a year mainly between September and November.

Frost: The average annual frequency of days of frost is 28, mostly from June to August. Cold air drainage is found in the hilly suburbs and frosts are common on the valley floors.

Sunshine and Cloud: No marked seasonal or diurnal variation of cloud amount occurs. However, there is a clear-cut seasonal variation in monthly average hours of sunshine with variations of 235 hours in January to 112 hours in June.

2.7 HOBART CLIMATIC DATA

Month	Temperature (°C)								Sunshine (Daily hours)		Rainfall (mm)	
	Maxima				Minima				Long-term average (a)	Mean 1989	Long-term average (a)	Total 1989
	Long-term (a)	Mean 1989	Extreme (a)	Extreme 1989	Long-term (a)	Mean 1989	Extreme (a)	Extreme 1989				
January	21.5	22.9	40.8	36.3	11.7	13.3	4.5	8.2	7.9	8.8	48	61
February	21.6	23.3	40.2	35.7	11.9	13.3	3.4	8.8	7.2	7.9	40	16
March	20.0	21.0	37.3	32.4	10.7	12.6	1.8	6.5	6.3	5.9	47	44
April	17.2	18.9	30.6	28.3	8.9	11.3	0.6	6.4	5.1	5.7	53	34
May	14.3	14.8	25.5	19.6	6.8	7.0	-1.6	1.3	4.2	4.5	50	21
June	11.8	11.1	20.6	15.5	5.1	3.3	-2.8	-0.3	3.9	3.8	56	47
July	11.5	11.8	21.0	17.6	4.4	4.5	-2.8	0.3	4.4	4.7	54	52
August	12.9	13.5	24.5	18.4	5.2	4.9	-1.8	1.2	5.0	5.4	52	34
September	15.0	16.1	31.0	24.5	6.3	7.0	-0.6	2.9	5.9	6.3	52	24
October	16.9	16.9	34.6	23.3	7.7	8.3	0.0	5.6	6.4	6.3	63	107
November	18.5	19.4	36.8	33.3	9.1	10.2	1.6	5.0	6.9	7.8	56	17
December	20.2	21.3	40.7	31.5	10.7	12.0	3.3	6.6	7.3	9.3	57	31
Annual	16.8	17.6	40.8	36.3	8.2	9.0	-2.8	-0.3	5.9	6.3	628	492

(a) Figures taken over all periods of records.

2.5.7 Monthly Weather Review, 1989

January

Above average rainfall was recorded in all districts except the East Coast and Bass Strait islands. Thunderstorm activity on the 9th disrupted power supplies in Northern districts, and produced minor flooding in the Hobart metropolitan area.

February

Most rainfall totals for February were only about 50 per cent of average with the Midlands and Flinders Island districts recording only 30 per cent of their averages.

March

Below normal rainfall continued during March, however most temperatures were above average.

April

The month of April was characterised by record high average temperatures throughout the State and above average rainfall in the Northern, Flinders Island, East Coast and Midlands districts. The average daily minimum temperature for Hobart (11.3°C) was the highest in 106 years of recordings. Several stations in the Northern parts of the State recorded record high April rainfall totals. Beaconsfield had its wettest April (261 mm) in 81 years of recordings.

May

Temperatures were near normal during May while rainfall was below average in the Central Plateau, Derwent Valley, Southeast and East Coast districts. Above average rainfall was recorded in the North-east.

June

Although daily maximum temperatures were generally close to average, minima tended to be between 1.0 and 3.0 degrees Celsius below the June average. Apart from the Bass Strait islands below average rainfall was recorded throughout, with the Midlands and Northern districts receiving only 5 per cent and 27 per cent of their averages, respectively.

July

Near average temperatures were recorded in most parts during the month, however the relative lack of westerly systems resulted in below

average rainfall being recorded over the Western and Central districts. Several depressions to the north of Tasmania brought average rainfall totals to the Northern, Eastern and South-eastern districts.

August

Rainfall during August was below average in all districts except Flinders Island. Strathgordon recorded its lowest August rainfall total (121 millimetres) in 20 years of records. Although daytime temperatures were close to average, minimum temperatures were generally below average, especially in the North-west, West Coast and Central Plateau areas. A number of stations in these regions established new low mean monthly minimum temperature records.

September

Essentially the Northern half of Tasmania recorded near average September rainfall totals while the Southern half recorded rain deficiencies. Day-time temperatures were slightly above average while night-time minima were closer to the monthly mean values.

October

October was a wet month throughout with all districts receiving above to well above average rainfall. Mean temperatures during the month were close to average.

November

The dominance of high pressure systems during the month resulted in below to well below average rainfall. Minimum temperatures were close to average while day-time maxima tended to be slightly above average. A number of stations in the Midlands, Central Plateau and South-east districts recorded record low November rainfall totals.

December

December rainfall was near average over most of the East Coast and the Northern half, while it was below average in the remainder of the State. Mean monthly temperatures ranged from near average to between one and two degrees Celsius above the mean values.

2.6 ENVIRONMENTAL MANAGEMENT

(The following is based on information supplied by the Tasmanian Department of the Environment.)

Tasmania's 'natural environment' extends above, below and beyond the State's landmass boundaries to the ozone layer 25 kilometres above; below, to the bottom of the deepest water tables; as far as noise carries as well as beyond the low-water mark as far as the coast of Victoria and the continental shelf. It also includes every plant and animal as well as the State's non-living resources. The State's works, its buildings and other structures, form its 'touched environment' and the way of life of its society forms its 'cultural environment'.

Changes, which started with the coming of the Aborigines and accelerated rapidly with European settlement, namely, large scale clearing of land for agriculture, extensive grazing, forestry, mining and settlements have extended human impact to almost every part of the State. Indeed our activities can have environmental impacts far beyond our borders. Once pollutants are discharged, they are not restricted by political boundaries.

The quality of the Tasmanian environment has profound effects upon the good health and well-being of all Tasmanians. Two substantial sectors of the Tasmanian economy, agriculture and tourism, rely on a high quality of natural environment. The future of Tasmania's society and its economy will be increasingly dependent upon the quality of its natural environment.

An important factor in determining the effect of our activities on the environment is the specific nature of the receiving environment. Tasmania is a mountainous island and is dominated by westerly winds. Despite these prevalent winds, inversion layers frequently form in the valley regions of the State, including the Derwent and Tamar valleys and influence dispersion of air pollutants.

In the mining areas of the west, average annual rainfall of 200 - 260 centimetres is common and mining districts in the North-east of the State also experience high rainfall. This has a signifi-

cant influence on water pollution problems arising from the mining operations in those areas.

Marine currents and sedimentary drift around the Tasmanian coast are strongly influenced by the big swell which almost continuously approaches the island from the south-west. Diffraction of this swell in Bass Strait, combined with the effect of prevalent north-westerly winds, produces a distinct on-shore movement along the north coast with consequent impairment of dispersion of any effluents discharged into this coastal region.

The State's population is becoming increasingly urbanised and this combined with rising per capita consumption and industry will inevitably raise living standards and this process will require greater control of community and industrial waste disposal.

Day of the Derwent

For the past 180 years, the Derwent River has been a dumping ground for Hobart's sewage, industrial waste and household effluent. A group of concerned residents calling themselves 'Friends of the Derwent' recognised that pollution was building up to the point where it posed a serious environmental, social, economic and ecological problem. A community based clean-up of the river was organised for 1 April 1989. About 10 000 people assisted with the clean-up campaign removing about 25 semi-trailer loads of garbage from the shores of the Derwent.



Derwent River clean-up.

Photo: Mercury

2.6.1 Pollution Control

Recent Legislation

The *Environment Protection (Sea Dumping) Act, 1987* gives effect to the provisions of the London Dumping Convention in relation to the waters of Tasmania by regulating, among other matters, the dumping into the sea, and the incineration at sea, of wastes as well as the dumping into the sea of certain other objects capable and likely to cause pollution. It makes provision for the granting of permits for the disposal of wastes at sea provided environmental requirements are satisfied.

The *Pollution of Waters by Oil and Noxious Substances Act, 1987* will give effect to the International Convention for the Prevention of Pollution from Ships, 1973-78 by providing for strict controls on the discharge from ships of oil and noxious substances carried in bulk. Where an oil spill occurs and a response plan is devised, the Minister for the Environment is able to make certain declarations which permit the State to incur clean-up costs. These costs would subsequently be recovered from the polluter or, if this is not possible, through the National Plan for combat of oil spills.

The *Chlorofluorocarbons and Other Ozone Depleting Substances Control Act, 1988* imposes strict controls on the use of the eight controlled substances identified in the Montreal Protocol on Substances that Deplete the Ozone Layer, namely CFC11, CFC12, CFC113, CFC114, CFC115, Halon 1211, Halon 1301 and Halon 2402. It was the first Act of its kind in Australia and one of the first in the world.

Ozone Monitoring

Bureau of Meteorology scientists presented several papers to an international conference on the ozone layer and health in Hobart in May 1989. The Bureau operates the national ozone monitoring network and recent data indicate a small decrease in stratospheric ozone over Australia during the past 10 years. The Bureau continues to play a key role in international monitoring arrangements and provides the basis for advice to government and general information to community interests.

In January 1989, the *Assessment Report on the Export Pulp Mill Project, Wesley Vale, -*

Environmental Impact Statement on the Wesley Vale Kraft Mill proposal was released. The guidelines for the control of the mill were as strict as any intended for similar operations in the world.

The report on the Derwent River sludge problem was completed. It mapped an estimated four million tonnes of sludge between Bridgewater and the Bowen Bridge and examined the options for dealing with the sludge.

APPM Wesley Vale was successfully prosecuted for breaches of the Environment Protection Act. The company pleaded guilty and was fined \$6200 with \$250 court costs, the highest ever fine for a single pollution incident in the State.

The Exeter tip site was closed following the detection of elevated levels of organochlorine and organophosphate compounds in sediments in and around the site and neighbouring farmland.

Five study plans for a Coastal and Estuarine baseline Monitoring Program, which aims to detail the current status and potential pollution problems in each study area, were released.

Pollution Incidents

During 1988-89, 881 telephone inquiries were received by the Department of the Environment, as well as a number of written complaints. Of these, 41 per cent were complaints investigated by the department and a further 19 per cent were complaints referred to municipalities and other agencies.

Of complaints investigated by the department, 39 per cent concerned 'heavy industry'. The highest number of complaints was 66 for the silicon smelter at Electrona and these concerned either direct venting and fume emissions from the roof of the plant and baghouse or the noise generated from the operation. The 28 complaints received about Pasmenco-EZ Risdon mostly concerned noise emitted from the plant at night, although there were some complaints about smoke emissions from the stacks and accompanying sulphur odours.

Complaints were also received concerning 'primary industry' (industries such as food processors, fish farms, poultry, mills and abattoirs), and 'light industry' (industries such as laundrettes, mixed businesses and small factories). Complaints about local councils were generally related to discharges or odours from sewage treatment plants or waste disposal sites.

Complaints about vehicles, which refer to all cars and trucks, generally concerned exhaust system noise and air pollution in about equal numbers.

2.8 COMPLAINTS INVESTIGATED BY THE DEPARTMENT OF THE ENVIRONMENT, TASMANIA, 1988-89

Category	Number	%
Heavy industry	140	39
Primary industry	61	17
Local councils	40	11
Light industry	40	11
Vehicles	30	8
Individuals (neighbours)	10	3
Others	40	11
Total	361	100

2.6.2 Environmental Planning

Environmental planning is the process of maintaining or improving the ambient environmental qualities required to ensure the long term suitability of an environment for the uses intended by the local community. The Department of the Environment has been developing an approach to objectively incorporate environmental assessment routinely into the planning process to increase the consistency of land-use planning and development control decisions and the subsequent management of emissions from premises. It advises planners of the potential environmental implications of planning decisions and appropriate methods to ensure that new developments do not cause pollution.

The *Handbook for Environmental Quality Assurance* is intended to overcome the problem inherent in single-point emission standards by using the principle of maintaining the quality of the ambient environment. It will assist industry to select appropriate sites, designs and environmental management techniques for their operations, so that they do not adversely affect surrounding land and water uses; detail criteria for water, air, noise and land capability classification, and environmental quality gradings; give advice on ambient monitoring, appropriate action on non-compliance with environmental quality criteria, sampling, analysis and pollution impact assessment.

Performance Improvement Program

All major industrial premises which do not currently comply with the provisions of the

Environment Protection Act, that is, they have ministerial exemptions, are required to develop detailed work programs aimed at eliminating the need for these exemptions within specific time frames.

Individual Premises Review

Major industrial and municipal operations are required to prepare an Environment Management Plan containing detailed information on process descriptions, plant emissions, pollution controls and self monitoring programs for each premises. If approved, the EMP becomes the major licence condition for the operation and the principle environmental controlling mechanism. At 30 June 1989, APPM Wesley Vale and Renison Ltd - Renison Bell had submitted Environment Management Plans.

Baseline Air Pollution Station

The Baseline Air Pollution station at Cape Grim in Tasmania provides the focus for Australia's participation in the World Meteorological Organisation's Background Air Pollution Monitoring Network (BAPMON). The station is funded and managed by the Bureau of Meteorology and its scientific program is supervised jointly by the Bureau and CSIRO. Its research in 1988-89 continued to focus on atmospheric constituents including the so called 'greenhouse' gases.

Industry Group Review Program

This program reviews specific industry groups statewide through site inspections, preparation of environmental status reports and where appropriate, the production of environmental management handbooks. The industry groups reviewed during 1988-89 were piggeries, fish processors and small abattoirs.

2.7 REFERENCES

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Forestry Commission of Tasmania, *Report for Year 1987-88*, Government Printer, Hobart.

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