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1991

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WESTERN AUSTRALIAN  
YEAR BOOK

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WESTERN AUSTRALIAN YEAR BOOK

1991

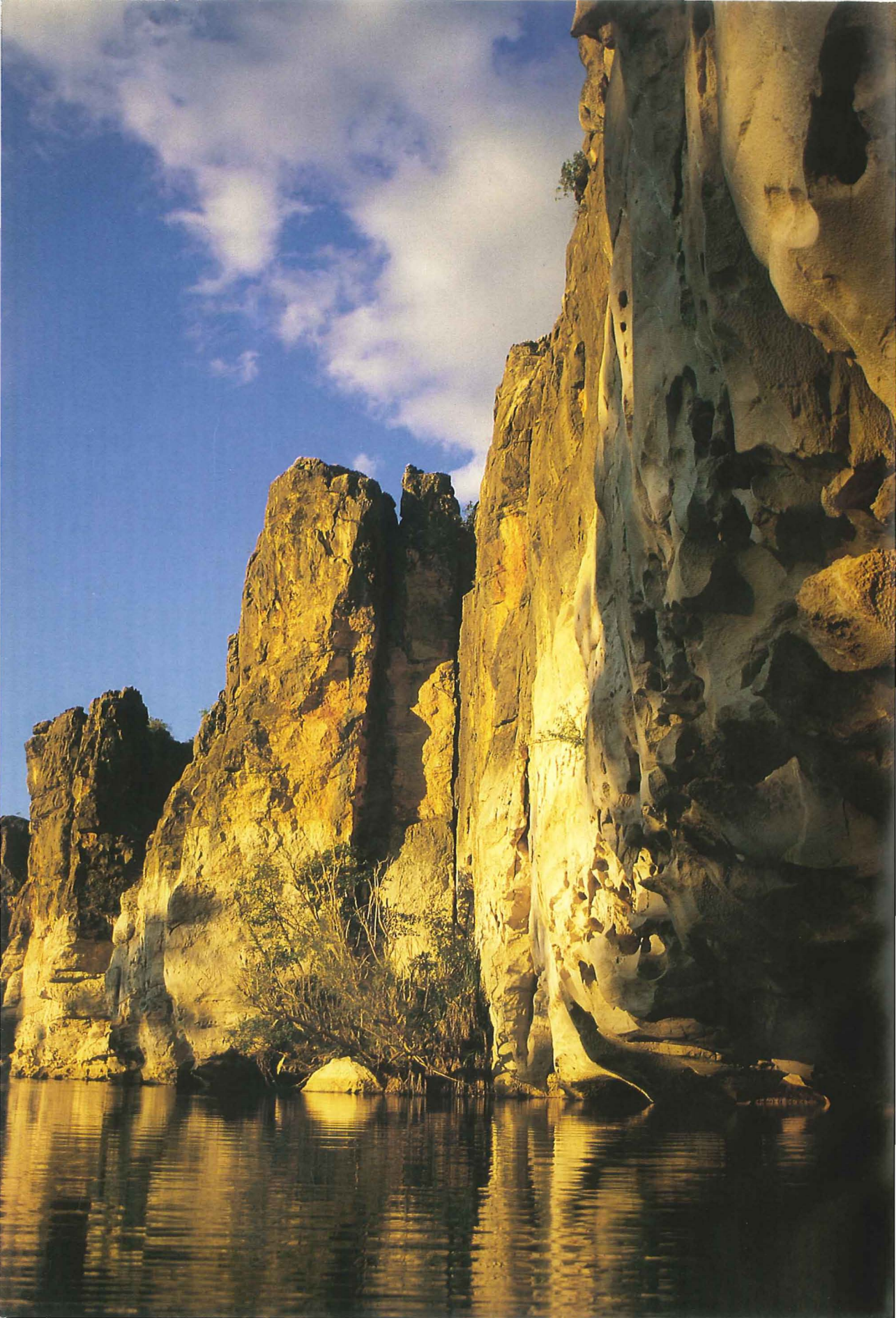
Cover: The native honey possum (*tarsipes rostratus*) and a species of hakea (*hakea laurina*). The diminutive honey possum is crucial to the pollination and survival of a number of species of native flora.

*Design:* Shaan Coutinho

Frontispiece: Geikie Gorge on the Fitzroy River, Kimberley region. The walls of the gorge are constructed of fossil layers and limestone dating back 350 million years to the Devonian period.

*Photograph:* Cliff Winfield, Photo Index





# **WESTERN AUSTRALIAN YEAR BOOK**

**No. 28— 1991**

**B. N. PINK**

DEPUTY COMMONWEALTH STATISTICIAN  
AND GOVERNMENT STATISTICIAN

AUSTRALIAN BUREAU OF STATISTICS  
WESTERN AUSTRALIAN OFFICE

Australian Bureau of Statistics  
Catalogue number 1300.5

© Commonwealth of Australia 1991

ISSN 0083-8772

Pre-press work by CDC Graphics Pty Ltd, Perth  
Printed and bound by Advance Press, Perth

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## GENERAL INFORMATION

### Symbols

The following symbols mean:

ABS	Australian Bureau of Statistics
n.a.	not available
n.y.a.	not yet available
—	nil or rounded to zero
..	not applicable
n.p.	not available for separate publication (but included in totals where applicable)
p	preliminary—figure or series subject to revision
r	figures or series revised since previous issue
n.e.c.	not elsewhere classified
n.e.i.	not elsewhere included
n.e.s.	not elsewhere specified
—	break in continuity of series (where drawn between two consecutive figures or columns)
*	subject to sampling variability too high for most practical uses

### Other forms of usage

*Rounding.* Where figures have been rounded, discrepancies may occur between sums of the component items and totals.

### Services available from the ABS

The ABS provides a comprehensive set of printed publications and other standard products on magnetic tape, microfiche, floppy disc, CD-ROM and electronically on DISCOVERY and AUSSTATS. ABS products and services are detailed in the *Catalogue of Publications and Products, Australia* (1101.0), which is available from any ABS Office.

For economic reasons the ABS does not publish all of its available statistics. A wide range of unpublished statistics can be made available on request.

The Western Australian Office of the ABS provides an Information Consultancy Service which offers a professional level of service to meet more complex and detailed information needs.

A Statistical Consultancy Service is also available to assist clients with their statistical projects. Our experienced and professional consultants can provide advice and assistance on project planning, design of surveys, questionnaire design and data analysis.

Information Services and Statistical Services are located at Level 1, Hyatt Centre, 30 Terrace Road, East Perth WA 6004. Office hours are 9.00 a.m. to 4.30 p.m., Mondays to Fridays. Telephone (09) 323 5140 (Information Services) or (09) 323 5252 (Statistical Services) or facsimile (09) 221 2374.

## PREFACE

The *Western Australian Year Book* is a general reference work on Western Australia and includes authoritative information on almost every aspect of life in the State. Together with chapters on the social, demographic and economic structure of the State, the Year Book includes information on history, geography, climate, vegetation and fauna, and government. Each chapter contains the latest information available at the time of manuscript preparation.

Significant effort goes into the production of the Year Book. I am indebted to outside organisations who have written articles, updated existing information or supplied photographs and maps. I would also express my appreciation to officers in subject matter areas of the Bureau and the staff of CDC Graphics and Advance Press for their valuable contributions. The coordination of this effort and editing of the Year Book has been the task of the Bureau's Publishing Section. Joint editors Ann Soutar and Bruce Luxton, with excellent support from Larry Dunning, have compiled this 1991 edition.

The 1991 cover was designed by Shaan Coutinho, a third year graphic design student at the Perth College of Tertiary and Further Education (TAFE). Shaan's winning design was chosen from eleven entries submitted in response to a design brief issued to Perth TAFE students. To Jeremy Williams, lecturer in art and design at TAFE, I offer my appreciation for his help in coordinating and guiding this initiative.

Constraints of time and space mean that the Year Book can only be illustrative of the wide range of data available from the ABS in over 1,500 publications, or on microfiche, magnetic tape, floppy disk, CD-ROM, or electronically through DISCOVERY or AUSSTATS.

To help clients access the extensive range of ABS data, this Office maintains an Information Consultancy Service to provide expert advice as well as information that is up-to-date, in the required format and tailored to clients needs. Publications and other statistical products can be purchased from the ABS Bookshop or clients can be placed on a publications subscription service to receive ABS publications on a regular basis. The Office library holds all ABS publications and other statistical material and is open to the public for reference purposes. The publications of the Western Australian Office are listed in the Appendix.

The wide range of statistics presented in this book would not be possible without the continued cooperation of individuals, businesses, government agencies and other organisations who provide the basic information from which ABS statistics are produced. Their assistance is gratefully acknowledged.

August 1991

B.N. PINK  
Deputy Commonwealth Statistician  
and Government Statistician



## Chapter 1

# HISTORY OF WESTERN AUSTRALIA

*Contributed by Laura Hodan, B.A. (Hons)*

**The history of the people of Western Australia began some 40,000 years ago when the ancestors of the present Aborigines are believed to have come to the western coast of Australia from South East Asia. What this history actually is has been open to much speculation, resulting in the promulgation of several theories. Archaeology, with the discovery of relics of Aboriginal cultures, has helped to replace or modify these theories with factual evidence.**

There is a general consensus among anthropologists that these 'first West Australians' had a complex culture involving a religion and ritual closely related to the environment which supported them, and a simple system of management of the land and its resources — people adjusting their social and reproductive behaviour to the changing potentialities of the landscape.

These nomadic people had managed to live their lives in a delicate balance with an extremely harsh environment for thousands of years.

The history of the European people of Western Australia began much later.

European sailing ships, mainly of Dutch origin, had touched on the north-west shores of Western Australia in the 17th century. Dirk Hartog, skipper of the *Eendracht*, landed in the Shark Bay area, leaving behind him a pewter dish inscribed with details of his visit and bearing the date 1616. Other ships, blown off their course for the East Indies by the strong westerly winds, became wrecked off the treacherous north-west coast, among them the *Batavia* in 1629 and *Vergulde Draeck* in 1656.

Abel Tasman's visit in 1644 was no accident: he had been commissioned by the Dutch East India Company to explore the north and north-west

coasts of this new land about which there were constant reports. He called this land 'New Holland'.

In 1621 a British ship, the *Trail*, was wrecked near the Montebello Islands and was probably the first British ship to reach Western Australia; but it was not until William Dampier's visit in the *Cygnets* that the attention of the British Government was drawn to 'New Holland'. Dampier was one of a group of buccaneers who, having cause to repair their vessel, beached her in King Sound. On returning to England he wrote of his experiences and impressions of 'New Holland' in a book *New Voyages Around the World*. On the strength of this the British Government then commissioned Dampier to make a further voyage of exploration. This he did, again visiting the north-west coast in 1699.

These European navigators, all with thoughts of trade and profit in their minds, could see nothing, either in the country or its inhabitants to warrant further expenditure on continued exploration.

For the next 100 years very little interest was taken in the western coastline. However, the formal British occupation of Australia at Sydney Cove in January 1788 and the ensuing colonisation of New South Wales stimulated activity in exploring the remainder of the coastline of this new country. Such activity was not

confined to the British. French navigators were also exploring and charting the 'New Holland' coastline and many names today — Baudin, Freycinet, Hamelin — bear witness to their presence.

### 1826 TO 1850 — EARLY SETTLEMENT IN WESTERN AUSTRALIA

It was this interest of the French that stirred the British into action. In a move designed primarily to forestall the French who they feared planned to annex the territory for themselves, Major Edmund Lockyer was sent in command of a small military garrison from Sydney to what is now Albany. The purpose of this move was not, as yet, to formally claim the area of Western Australia for Britain but rather to merely 'keep trespassers out'. However, when Lockyer and his party anchored in King George Sound on 25 December 1826 they did, in fact, establish the first British settlement in what is now Western Australia.

In 1827 Captain Stirling was despatched from Sydney in HMS *Success* to explore the area around the Swan River. He wrote very favourably in his report regarding its suitability for settlement. Nevertheless the British Government at first firmly rejected the idea of a settlement. Stirling had cause to return to London in 1828 and whilst there was able to arouse the interest of a syndicate of capitalists who were prepared to invest large sums of money in the new Colony. In addition to this Stirling made frequent visits to the Colonial Office with convincing evidence that there was considerable public support for a colony as well as rumours that the French still had thoughts of 'New Holland' for themselves.

British Government reluctance was finally overcome. Captain Fremantle in HMS *Challenger* was despatched forthwith and, landing at the mouth of the Swan River hoisted the British flag on the south head and formally took possession of the territory in the name of His Majesty King George IV on 2 May 1829.

The Colonial Office officially announced that a colony was to be established with Captain Stirling as Lieutenant-Governor.

The newly appointed Lieutenant-Governor Captain James Stirling, his family and about seventy settlers arrived off Garden Island in the *Parmelia* on 1 June 1829. HMS *Sulphur* bearing a detachment of troops, arrived some days later.

A Proclamation establishing the Colony was read on 18 June 1829. The site at the mouth of the Swan River was named Fremantle and proclaimed to be the port of the Colony. After some difficulty a site for the capital was selected some twenty kilometres upstream. The official ceremony to mark the foundation of Perth took place on 12 August 1829.

The terms relating to land grants offered by the Colonial Office to prospective settlers were remarkably favourable and aroused a great deal of initial interest and excitement in England. By the end of 1830 almost 2,000 settlers had come to Western Australia.

This land grant system took no account of any prior rights of the Aboriginal population. On the whole it appears that neither the Government of the Colony nor the colonists themselves took account of any rights of the Aboriginal people, even their right to live.

In his much publicised report Dampier describes the natives of Western Australia as primitive in the extreme, with only rudimentary knowledge of stone or wood technology and making no apparent use of the land. These words were to prejudice the minds of the English and Australian alike right into the twentieth century.

The European settlers were so blinded by the belief in the superiority of their own culture that they brought their whole life-style with them — society, religion and technology. Little wonder then that they were unable to see the existence among the Aborigines of any cultural achievement. In fact, so great were the differences between these people and themselves that it was seriously debated whether they were human or not.

Not only did these people have a culture but it was shown to be hopelessly at variance with that of the Europeans — in the practice of religion, in attitudes towards material possessions, the relative importance of the work ethic and the relationship between the people and the land. Neither group could have possibly understood the very basis for living of the other. This did not cause problems in the settlement of King George Sound where, over quite some time, the Aborigines had already had contact with transient Europeans. The garrison at King George Sound was small, each party remained independent of the other with no occasion for exploitation of the Aborigines. There was never any fierce competition for scarce resources.

A similar situation did not exist in the Swan River Colony. Initially each side was cautious, trying to avoid open conflict but, when the settlers began cultivating the soil, planting crops and driving the Aborigines off the land they considered their land it is understandable that this soon led to direct confrontation. The stories of bloodshed and revenge — the attacks on the settlers and the terrible retribution meted out to the Aborigines are not among the great achievements of the Colony.

After the treacherous killing of Yagan, a notable Aboriginal leader, in 1833 and the Battle of Pinjarra in 1834 the resistance of the coastal Aborigines was broken. It lasted much longer and was more bitter in the northern pastoral area. In the process of breaking the resistance hundreds of Aborigines were killed; hundreds more died in the epidemics of white man's disease to which these people had no resistance — whooping cough, influenza, measles, smallpox etc. They still further decimated their own numbers by tribal killings. By the turn of the century there were no longer many full blood Aborigines left — merely the last vestige of a race that seemed doomed to extinction.

Trouble with the Aborigines was only one of the many problems that beset the new Swan River Colony almost causing its abandonment in the early years. Although by the end of 1830 some 2,000 settlers had arrived in the Colony the population twenty years later was only around 5,200. This compares with a population in South Australia at the same date of nearly 53,000 — and the colony in South Australia was not founded until 1836.

The preparations for the settling of the new Swan River Colony had been calamitously inadequate. The surveyors were unable to keep pace with the new arrivals and the land was granted and occupied in a most haphazard fashion. Both the new land owners and the labourers they brought with them were quite unused to the physical exertion required to bring virgin land into cultivation. They didn't understand this land; they hadn't known what implements to bring with them. This was all compounded by the fact that the soil along the coast and around Perth was of poor quality and that the better land further south was covered with dense, difficult to clear hardwood forest.

Many disillusioned settlers left the Colony but in spite of all the obstacles some progress had been made by the time the first convicts arrived in 1850.

The Colony was exporting wool, timber, sandalwood, livestock, and products from a whaling industry in Cockburn Sound. In 1840 the *Shepherd* departed for London with a cargo consisting wholly of colonial produce. There were flour mills and sawmills; seagoing ships were being built at Fremantle. Exploration and settlement were being extended south to Bunbury, over the Darling Range to York and Beverly and further north into the Kimberley region. A road from Albany to Perth had been surveyed. Postal services existed between Perth and various towns and there were newspapers and a published Government Gazette. In 1841 legislation was passed providing for compulsory registration of births, deaths and marriages and the establishment of a central registry office in Perth. A General Board of Education was established in 1847 and Perth Boys' School and Perth Girls' School opened in the same year. There were social and economic institutions such as banks, a civil court and churches.

The first official census was conducted in October 1848 with: population 4,622 (males 2,818, females 1,804); livestock numbered 141,123 sheep, 10,919 cattle, 2,287 pigs and 2,095 horses; the area under crop was more than 7,000 acres, including 3,317 acres of wheat.

Various small mining discoveries had also been made — coal in the Murray district and at Irwin River; lead in the Northampton district near Murchison River resulted in the establishment of the Geraldine Lead Mine.

In spite of these advances, Western Australia was, at this time, one of the most isolated and insignificant corners of the British Empire. Although colonies had been established in South Australia and Victoria in the 1830s the settlers in the Swan River Colony were still separated from other European settlements by many hundreds of kilometres of desert.

The local market was too small to generate economic activity on its own account and the Colony was unable to attract either capital or labour in the face of the more advanced and successful, competing colonies in eastern Australia.

### 1850 TO 1890 — CONVICTISM; ITS IMPACT ON THE COLONY

Many leading colonists felt that this state of stagnation would disappear with the help of an increased labour supply and the provision of

much-needed public works. The answer, they felt, lay in allowing convicts into the Colony. Originally proud of being a non-convict colony, the land-owners were grateful enough when the British Government agreed to the transportation of convicts to Western Australia. The first convicts, seventy-five in number, arrived in 1850; and between 1850 and 1868 when transportation virtually ceased some 10,000 convicts had been brought into the Colony.

The influx of convicts affected Western Australia in several important ways. It was convict labour which built the Colony's first public works — roads, bridges, jetties, wharves and buildings. Agriculture was boosted by the provision of cheap labour but perhaps more so by the increase in the size of the local market. Shipping became more regular thus, in effect, increasing the size of the export market. Convictism provided a much needed injection of capital as the British Government had to spend money on feeding, clothing, housing and guarding the convicts. It also brought its own social problems; all the convicts were males and this created an even greater imbalance between the sexes. There was an increased number of crimes of violence and a deepening of the colonial inferiority complex, but, on the whole Western Australia was not plagued by the severity of the problems which convictism had brought to the other colonies of Australia.

Considerable development and quite rapid progress were made in Western Australia in the 1850s and 1860s. Although this slowed with the cessation of transportation of convicts in 1868 the following fifteen to twenty years were years of exploration and opening up of new areas in the Kimberley and inland, the starting of new industries and the consolidation of existing ones — sandalwood, hardwoods, a now flourishing pastoral industry and the rapid rise of a valuable export-earning pearling industry off the north west coast.

It was also a period during which social and political advances were made.

Representative government was inaugurated in 1870 with the new Legislative Council comprising twelve elected members and six nominees.

A Medical Board for the registration of medical practitioners was established. The municipalities of Perth, Fremantle, Guildford, Albany, Bunbury, Busselton, Geraldton and York were proclaimed and Road Boards established.

In 1877 the Overland Telegraph line between Perth and Eucla was completed. This establishment of communication with Adelaide and Darwin and thus London went a long way in reducing the isolation of the Colony from the outside world.

### **1890 TO 1900 — TEN YEARS OF RESPONSIBLE GOVERNMENT; GOLD RUSHES**

Responsible government was granted to Western Australia in 1890 and a constitution proclaimed on 21 October of that year. The elections for members of the newly-constituted Legislative Assembly took place in November and December; the Governor nominated the first members of the newly-constituted Legislative Council and Parliament was officially opened on 30 December 1890 with John Forrest commissioned to form the first Ministry.

Forrest, a locally-born explorer-surveyor was an ambitious developer with a very good standing in the Colony. His determined policy was to develop the Colony's land and mineral resources, but before this could be done the Colony needed railways, roads, bridges, harbour facilities and other public works. To achieve this aim he planned to use funds raised by loan to the limit of the Colony's credit, a policy enthusiastically received by the new Parliament and the colonists alike.

From 1888 to 1891 there was a series of small gold rushes in the Colony leading to a significant rise in annual revenue. Also in 1891 the Colony's first Engineer-in-Chief was appointed — C.Y. O'Connor, a highly skilled engineer and a man of vision.

It was against this backdrop of responsible government, expanding annual revenue, an astute, prestigious and ambitious Premier ably served by the first Engineer-in-Chief that the rich discoveries of gold at Coolgardie in 1892 by Bayley and Ford, and at Kalgoorlie in 1893 by Hannan and O'Shea were to have such a dramatic impact.

The lure of gold brought men streaming in their thousands to Western Australia; there was a massive inflow of capital — anything relating to gold or situated in the mining areas was able to attract almost unlimited capital from London and the eastern colonies.

This huge increase in capital, production of wealth and the great surge in the population providing the much needed increase in the size of the local market meant that the gold discoveries at Coolgardie and Kalgoorlie gave tremendous impetus to the Colony.

Railways were built, harbour works were undertaken, with the dredged and newly reconstructed harbour at Fremantle opened to shipping in 1897 and Bunbury Harbour works started in the same year. In 1898 work commenced on the project for which C.Y. O'Connor is probably best remembered: a pipeline to the Goldfields by which water was pumped through a number of stations from a reservoir at Mundaring in the Darling Range. This 557-kilometre pipeline was completed in 1903 thus proving the success of a scheme which many had prophesied could only fail. By this time Forrest had left the State for Federal politics and O'Connor, dogged by vicious criticism of the scheme, took his own life in 1902 before the pipeline was completed.

Anticipating the time when the gold mania would be over and the most easily won gold largely worked out, Forrest's government took measures to enhance the development of the agricultural and pastoral sectors of the Colony to provide a more permanent and solid base for the economy.

The Homestead Acts of 1893 and 1894 were passed, encouraging new settlers to take up small parcels of land; an Agricultural Bank was formed, a Department of Agriculture succeeded the former Bureau and the first butter factory was established at Busselton. These factors, with the continued extension of railways into the agricultural areas plus the placing of tariffs on imported livestock and foodstuffs into Western Australia and the vastly expanded local market enabled the agricultural industries to prosper in spite of some bad seasons.

The gold rushes had brought men to Western Australia more liberal than the conservative local land owners. These men had ideas on trade unionism from the eastern colonies and as they became dissatisfied with the Colonial Government's mining regulations they agitated for greater political rights. By 1901 all adult men and women had been granted the right to vote at Legislative Assembly elections, there were reductions in the previously imposed food tariffs protecting the farmers and graziers, as well as other parliamentary reforms.

Although the colonial land owners still controlled the parliament it became obvious that the influx of men and new ideas from outside had irreversibly changed the character of the Colony. Now it was much more in line with the rest of Australia. It was not therefore surprising that a referendum on the issue of federation with the rest of the colonies resulted in a majority of about 70 per cent favouring federation.

Many of the more conservative, or perhaps far-sighted, old colonists remained unreconciled to the idea of being joined to areas much more economically advanced and of losing the power of self-government they had so newly received.

### 1901 TO 1929 — FEDERATION; WORLD WAR 1; CENTENARY

Federation took effect from 1 January 1901 but there have been times since when many Western Australians felt the State should have stayed out of the Commonwealth of Australia.

Politically, with the departure of John Forrest for the federal arena and the arrival among the gold seekers of some very experienced trade unionists from the east there came a period of unstable Ministries. This led finally to the formation of the political party system. A Trades and Labour Congress held in 1899 decided on the formation of a Political Party which captured six seats in the Legislative Assembly at the 1901 elections. The Labour Party rapidly became a strong parliamentary force virtually compelling the other factions to join together to form a Liberal Party.

The mantle of federation did not seem to fit comfortably on the shoulders of Western Australians. The State was still very isolated from the rest of the Commonwealth in distance and perhaps in thinking. Its manufacturing industries were very severely discouraged by the now free trade existing between and States; and it never seemed to be able to get enough funds to carry out important projects.

In 1910 the Commonwealth agreed to make special grants to Western Australia for the next ten years. In 1925 the Commonwealth established a Royal Commission to enquire into the financial disabilities of Western Australia under federation, and, in 1933 the Commonwealth grants Commission was set up to recommend action required to bring about a more equitable distribution of Commonwealth finance among the States. Western Australia's disabilities were

recognised — it was given the status of 'claimant' State and received special grants right into the 1960s.

Western Australia was very much in favour of the Commonwealth Government decision to support Britain in the 1914—18 War providing more volunteers for overseas military service in proportion to population than any other State. Perhaps this was because Western Australia had a higher proportion of British migrants and single men — perhaps this was also the reason why Western Australia returned the highest 'Yes' vote in the referendum on conscription in 1916.

Following the Australia-wide political turmoil after the split in the Labour Party over the conscription vote the unions became more militant under the policies of the Federal Labour Government. At the time of the national waterfront strike in 1917 Prime Minister Hughes called for volunteers to work on the wharves. These volunteer National Workers, as they were called, were granted considerable favours for their actions. This naturally angered the union lumpers, culminating on the Fremantle wharves in 1919 in the 'Battle of the Barricades' which involved violent confrontation between about 3,000 lumpers (and their supporters) and police, resulting finally in the shooting of one unionist.

Nevertheless, although the 1914—18 War caused manpower shortages in some industries and disruption to overseas shipping, for the people who remained in the State the tempo of life was not much changed.

The period from Federation to 1929 saw many changes within the State. It was a time of continued, if often modest progress.

Wheat growing was being consciously fostered as the staple industry. Access to finance was readily available through the Agricultural Bank, railways were being extended into the wheatbelt areas. There was large scale assisted migration from United Kingdom in association with further settlement of the wheatbelt in the 1920s; and superphosphate fertiliser, the answer to the infertility of the wheatbelt soils, was being manufactured within the State from 1910. Apart from setbacks due to droughts the wheat industry continued to expand with production reaching 36.4 million bushels in 1927 and 39.1 million bushels in 1929, both being the highest in the Commonwealth for those years.

Transport and communication were improving, the transcontinental railway between Kalgoorlie and Port Augusta in South Australia being opened in 1917. A road construction scheme with financial assistance from the Commonwealth commenced; there was a State Shipping Service; the first air mail service in Australia began in 1921 between Geraldton and Derby and the first regular air service between Perth and Adelaide started in 1929. The first radio station, 6WF commenced broadcasting in 1924.

Further education facilities were being provided: a School of Mines at Kalgoorlie in 1904; first students enrolled in the University of Western Australia, established in 1913 on a temporary site; Muresk Agricultural College opened in 1926.

Influential womens' organisations active in this period helped to bring about social legislation particularly in the areas of public health and child welfare. A Children's Hospital was opened in Perth in 1909 and the King Edward Memorial Hospital for Women in 1916, due much to the agitation of Edith Cowan who, in 1921 was to become Australia's first woman member of parliament.

And so by 1929, the State's centenary year, with over 50 per cent of the population living in the Perth metropolitan area and Western Australia a relatively comfortable place to live in, it was with a considerable degree of satisfaction that the State was able to look back on its first 100 years of progress.

### 1929 to 1945 — WORLD DEPRESSION; WORLD WAR II

Western Australia, so very dependent on income from exports of wheat and wool was heavily hit when the world wide depression was heralded by sharply falling wheat and wool prices. As the depression deepened farmers were forced off their land; the Government cut back its public works; all commercial activity slowed dramatically. Thousands were unemployed — some 30 per cent of trade union membership. Those employed had to accept wage cuts. Men lived in government camps while employed part-time on relief projects or searched for work in the 'back blocks'; thousands of families were dependent on the dole or charitable hand outs.

Western Australians, some ill-nourished, dismayed and helpless at this turn of events allowed their anger and discontent to find outlet in a renewed move for secession in 1933.

What did they stand to gain from being part of the Commonwealth? Secondary industry could never develop unless protected from competition in the other States; protective tariffs were imposed by the Commonwealth to protect manufacturing in the eastern States from overseas competition. In this State, so dependent on primary industries, it only served to increase farm costs to a disastrous level; and the Commonwealth Government had always starved Western Australia of funds.

No wonder then that at a referendum in 1933 over two-thirds voted to leave the Federation. However, a delegation despatched to London to seek secession from the British Parliament found its petition rejected by this Parliament on the grounds of constitutional impossibility.

It was clear that the Commonwealth Government, which had by this time far reaching financial and economic powers, held responsibility for dealing with the depression. However, it seemed unable to bring in any course of action to combat the problem. In 1933 all States adopted the 'Premiers' Plan', at least a unified course of action. Whether the improved conditions reached by 1935 had much to do with the Plan or were the result of Australia 'importing' recovery from overseas is a moot point.

For those in regular employment even the 1930s brought a modest increase in real living standards by way of greater use of telephones, refrigerators, motor cars and the general improvement in transport and communication and other services. It was however, the war of 1939-45 which brought regular employment for all, followed by hitherto unknown prosperity in the post-war period.

In the early years of the war, life in Western Australia more or less continued at its usual pace. There was a drought in 1940, cyclone and floods in 1941 and 1942, the Canning and Samson Brook Dams were completed and work was started on Eyre Highway, linking Norseman and Port August (South Australia). Liquid fuel had been rationed and industrial activity had increased, particularly in manufactures for war purposes — engineering, clothing and food processing.

The full reality of war was brought home to Western Australians in 1942 with attacks by Japanese aircraft on Broome, Wyndham and Port Hedland and the real threat of an invasion of Australia. Discussion by the military of a 'Brisbane Line', which would have abandoned the West to invasion, only served to reinforce Western

Australia's sense of isolation from the rest of the nation.

A munitions factory was established at Welshpool; registration of all civilian persons aged 16 years and over was imposed. Clothing, tea and sugar were rationed in 1942, butter in 1943 and meat in 1944. A Commonwealth daylight saving scheme was introduced with Western Australia exempted in 1943. These war related measures, the introduction of the Uniform Tax Scheme making the Commonwealth the sole taxing authority in the income tax field and the extension of federal social services did, nevertheless, all help to bind Western Australia more closely into the Commonwealth.

### 1946 TO 1960 – A STATE GROWING UP

War ended in 1945 and with the demobilisation of the fighting forces came problems of rehabilitation and an acute housing shortage. Agreements were made between the Commonwealth and the States on land settlement and housing.

A new industrial centre was established in 1946 at the former munitions factory at Welshpool and plans announced for manufacture of agricultural tractors. In 1947 the first of the assisted migrants arrived from Britain and the first of the 'displaced persons' under agreement with the International Refugee Organisation.

There was general stimulation in the mining industry with world shortages and high prices of most minerals.

The shipment to New South Wales of the first load of iron ore mined at Cockatoo Island was made in 1951.

The fishing industry expanded and the first crayfish tails were exported. An integrated wood distillation and charcoal iron industry commenced production at Wundowie. The Stirling Dam was officially opened and the Commonwealth granted \$4.3m to Western Australia towards the cost of the Comprehensive Water Supply Scheme.

Boosted by a high level of immigration all facets of the economy were expanding as fast as other scarce resources would allow. War time controls were being progressively removed with rationing of meat, clothing, petrol, tea and butter abolished by 1950.



In this post-war period the strong demand for primary products was a major contributing factor to the prosperity. Wool prices reached their, until then, highest ever level. Wheat production increased to 50 million bushels in 1950–51, the highest since 1930–31 due to both an increase in area sown and in average yield. The gross value of this harvest was \$33m, five times higher than in 1945–46.

The highest population increase since 1896, the peak gold rush period, occurred in 1950 with migration at 19,295 and natural increase 9,170.

The increased manpower for civilian production, the progressive removal of war time controls and the substantial recirculation of purchasing power previously withheld (deferred pay, allowances etc.) which released the pent-up demand contributed to the economic recovery in Western Australia after the strains imposed by transition from war to peace.

The inherent cause of economic prosperity or otherwise in Western Australia had always been the state of the primary sector and this time was no exception. The booming conditions of the early 1950s, caused largely by high export returns for wheat and wool, ended with falls in these export prices and a consequent sharp decline in farm incomes in 1954–55.

This fundamental weakness in the economic structure of the State had long been recognised and attempts had been made after the war to seek some diversification. As a result, in 1952 negotiations were completed for the establishment at Kwinana of oil refining, steel rolling and cement manufacturing projects with provisions of port facilities in Cockburn Sound and rail links with the metropolitan system. The oil refinery and steel rolling mill began operating in 1955 and 1956 respectively. By the late 1960s, improved rail and sea transport facilities and the State Government's favourable terms had attracted many more industrial concerns to the Cockburn Sound area. Western Australia had gone a long way towards overcoming the industrial backwardness that had inhibited it for so long.

There was also considerable interest in developing the northern part of the State in the post war period. Air transportation of beef carcasses from Glenroy Station to Wyndham for shipment overseas began in 1949. In 1963, after expenditure of millions of dollars by State and Commonwealth Governments under Western Australian Grant (Beef, Cattle, Roads) Acts the first consignment of

frozen beef carcasses were sent by road from Glenroy Station to the coast, thus replacing the air-freight system which had operated for almost fifteen years. Under another Commonwealth Act, finance was made available to Western Australia for the development of the State north of 20°S latitude. A large proportion of these moneys was to be spent in connection with damming the Ord River and associated irrigation works.

### 1960 TO 1991 — THE MINERAL BOOM; A STATE COMES OF AGE

Oil was found at Exmouth Gulf in 1953 but proved uncommercial and it was not until the late 1960s that oil and natural gas in commercial quantities were discovered, firstly at Barrow Island in 1966.

Repeatedly the Commonwealth had rejected applications by the Western Australian Government for a licence to export iron ore; finally, in 1960 the embargo on iron ore exports was lifted. This stimulated exploration which resulted in the location of massive deposits of iron ore in the Pilbara. With large British, American and Japanese firms ready to invest in the north to mine the ore, development was rapid.

The mineral boom involved not only iron ore but also the mining of bauxite in the Darling Scarp, nickel at Kambalda and production of ilmenite from mineral beach sands. By 1965 Western Australia had become a major world supplier of mineral exports.

The State Governments of these years have been given credit for much of this achievement. They had fought hard for the establishment of the first industries at Kwinana. The Commonwealth had been persuaded to provide large sums of money for development of the north, the standard rail link with the eastern States and expanding roles in areas such as housing, hospitals etc. They had been able to attract to the State the vast quantities of private capital needed to finance the development of its mineral resources.

Perth itself was changing — its skyline was becoming higher, the Narrows Bridge was completed in 1959 and the beginnings of a freeway system to provide for an ever increasing volume of heavy traffic. In the years of the mineral boom of the 1960s Western Australia became 'affluent' and was able to throw off its status of 'claimant' State and even defied Canberra on many issues — not however, going as far as secession.

Some of the heat had gone out of the mineral boom by the early 1970s but, by then foreign capital inflow into the State had been enormous — not only to develop the mineral resources but also to invest in new farming lands and city real estate. The Perth skyline continued to change, becoming higher and higher, its suburbs sprawling further north and south serviced by extending freeways.

Development of the State's resources continues; diamonds are mined in the Kimberleys; there have been ups and downs in the gold mining industry; proposals for more mineral sands mining and plans for further industrial development. The shift has been away from the more traditional agricultural industries toward the mining sector. Along with this has been a rapid growth in the areas providing the services required by this now highly sophisticated society.

At June 1990 the estimated population of Perth was 1,193,130, more than double what it was in 1965; but what a vastly different population! With a very high proportion of migrant-born inhabitants it is a culturally diversified and highly cosmopolitan population in the 1990s.

As the trade of Australia and, in particular Western Australia, becomes more and more closely tied to Pacific countries Perth's situation midway between Singapore and Sydney becomes highly strategic. Perth has a new international airport with over forty international flights per week. There is a highly developed communication system — the world is as close as the nearest telephone or telex machine. The State of Western Australia can no longer be considered as isolated in any sense of the word.

For the first 130 years of its existence, originally as the struggling Swan River Colony, later as an underprivileged State of the Commonwealth, Western Australia had sought to overcome three major economic disabilities. Its extreme isolation from the other States and the rest of the world, its small population and hence a small local market in which to sell its production, and, partly linked to this its heavy reliance on overseas markets particularly for wool and wheat. In the last few decades these forces have proved to be no longer paramount. Western Australia has 'come of age' economically — but not without cost.

### 1991 TO... — WHERE TO NOW?

This process of continued growth and development has created serious problems — the problems of pollution of the sea, the land, the rivers and the atmosphere by factories as well as the ubiquitous motor vehicle; and the general degradation of the land by what can now be seen as agricultural malpractices — over clearing, overstocking and the use of massive amounts of artificial fertilisers to name a few. The obvious extent and the rate of increase of this degradation and pollution is attracting the attention of Governments and public alike.

The practices carried out with impunity in colonial days with no obvious deleterious effect on the environment at the time can be destructive when carried out over a long period on an ever increasing scale.

The original inhabitants of Western Australia lived for thousands of years in a state of delicate balance with an extremely harsh environment. Perhaps the decade of the 1990s will see the present inhabitants of Western Australia begin a process of re-learning and re-creating whereby it will be possible to reach and maintain a delicate balance between continued economic progress and a healthy physical and social environment.

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## Chapter 2

### PHYSICAL FEATURES AND GEOLOGY

#### The Geomorphological Framework of Western Australia

*Contributed by K-H. Wyrwoll M.Sc., PH.D., Department of Geography, University of Western Australia*

Western Australia covers some one-third of the Australian landmass. Its overall geomorphological development is closely tied to the long-term geological evolution of this part of the Australian continent. This becomes most apparent when the continental-scale geomorphology of the State is considered, and questions asked such as: 'How did the coastal outline of Western Australia develop?'. The major continental-scale geomorphological divisions of the State largely correspond to the major tectonic diversions. But the control of geology on geomorphology is equally evident in more regional-scale considerations, and this is the result of long periods of relatively uninterrupted sub-aerial weathering. A selection of relevant references are given at the end of this Chapter.

In addition to the tectonic and lithological controls, the geomorphology of Western Australia, has been strongly influenced by its climatic history, and especially the global and regional climatic changes of the Cenozoic. The climates of the Cenozoic have left a strong imprint on the landscape, as witnessed by widespread eolian, fluvial and marine depositional sequences and landforms. These sequences include the extensive areas of desert dunes, such as in the Great Sandy Desert, widespread river deposition and floodplain formation, such as along the Gascoyne and Fitzroy rivers, and Quaternary coastal deposits which dominate the geomorphology of the Swan Coastal Plain and the Shark Bay region.

#### MORPHOTECTONIC DEVELOPMENT AND GEOMORPHOLOGICAL REGIONS

The general correspondence between the continental-scale geomorphology and geology, and their link to the development of Western Australia as a landmass is expressed in the major morphotectonic divisions of the State (Diagram

2.1 and Table 2.1). The regional-scale geomorphology is most conveniently considered in terms of 'landform regions' (Diagrams 2.2 and Table 2.2), which frequently show some correspondence to regional-scale geological divisions.

A major geomorphological difference between Western Australia and other continental masses is the lack of Phanerozoic orogeny, and particularly Late Phanerozoic orogeny. In fact, large parts of Western Australia have been relatively stable for over 1,000 million years (1 Ga). However, little remains of the original landsurfaces, and the regions have been so reduced in their relief as to lose much of the erosional potential.

The antiquity of the landsurface of Western Australia is exemplified by the Yilgarn Block, which with the Pilbara and Kimberley Blocks, formed the geological framework of Western Australia, and controlled much of the long-term and broad-scale geomorphological evolution of the State.

DIAGRAM 2.1

Modified National Oceanic and Atmospheric Administration (NOAA) satellite image showing the general morphotectonic-geological divisions of Western Australia. The numbers refer to Table 2.2 where the subdivisions are named (modified from Geological Survey of Western Australia, Memoir 2). NOAA image courtesy of Remote Sensing Application Centre, Department of Land Administration.

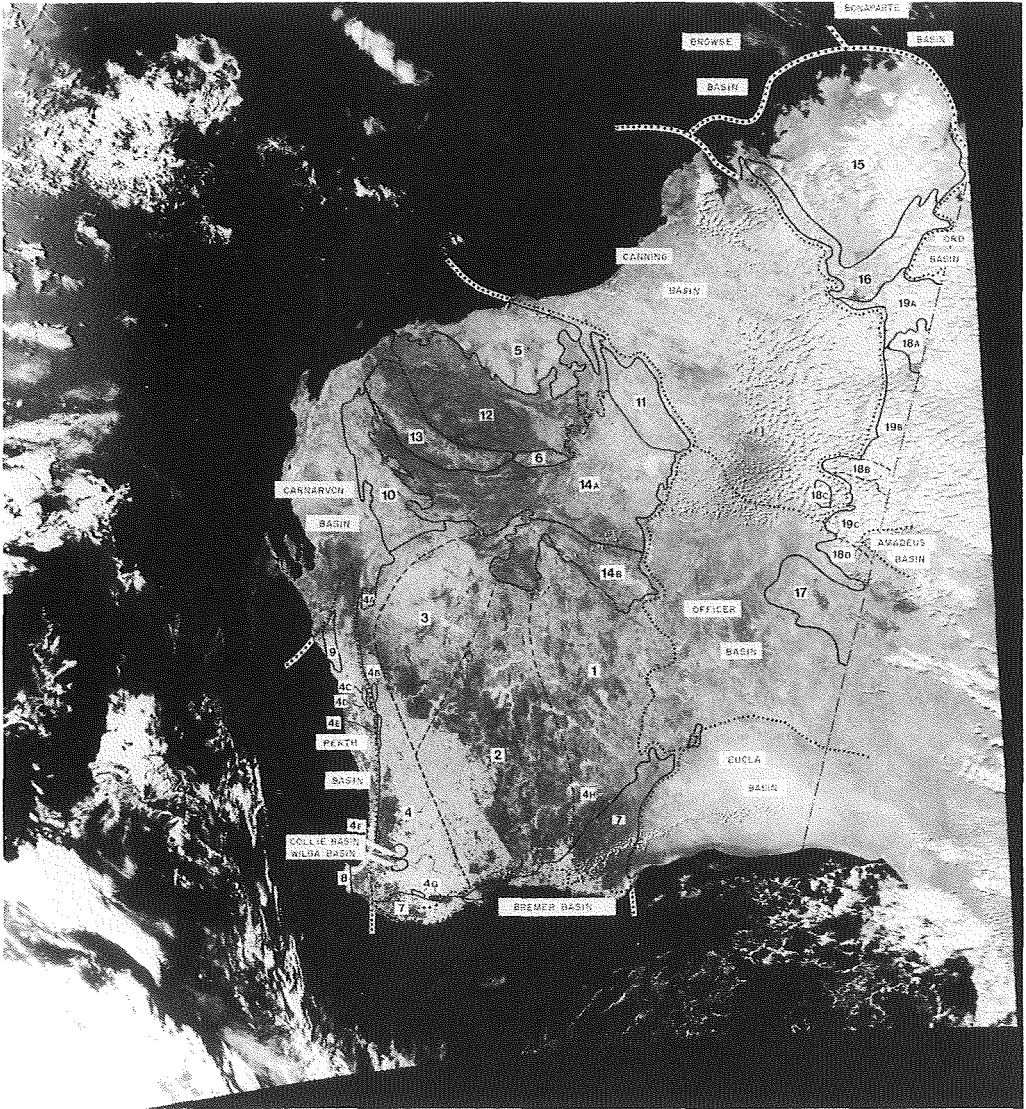


TABLE 2.1 – MORPHOTECTONIC DIVISIONS OF WESTERN AUSTRALIA  
(To be used in conjunction with diagram 2.1)

<i>Area</i>	<i>Division</i>	<i>Subdivision</i>	<i>Diagram reference</i>	
Western Shield	Yilgarn Block	Eastern Goldfields Province	1	
		Southern Cross Province	2	
		Murchison Province	3	
		Western Gneiss Terrain	4	
		Proterozoic rocks on or adjoining the Yilgarn Block	4 A-H	
		Pilbara Block	Not subdivided	5
	Archaean inliers between the Yilgarn and Pilbara Blocks	Not subdivided	6	
	Main areas of Proterozoic metamorphic and igneous rocks		Albany-Fraser Province	7
			Leeuwin Block	8
			Northampton Block	9
			Gascoyne Province	10
			Paterson Province	11
	Main areas of Proterozoic sedimentary rocks		Hamersley Basin	12
			Ashburton Trough	13
Bangemall Basin			14A	
Nabberu Basin			14B	
Remaining Precambrian areas	Kimberley region	Kimberley Basin	15	
		Halls Creek Province	16	
	Musgrave Block	Not subdivided	17	
	Areas between region and the Kimberley Musgrave Block	Areas of Proterozoic metamorphic and igneous rocks	Proterozoic basins	18 A-D
			Proterozoic basins	19 A-C
	Phanerozoic areas	Sedimentary basins indicated on Diagram 2.1		

TABLE 2.2 - THE MAJOR GEOMORPHOLOGICAL DIVISIONS OF WESTERN AUSTRALIA

<i>Reference</i>	<i>Division and Description</i>	<i>Reference</i>	<i>Division and Description</i>
1	Israelite Plain— Narrow coastal plain with extensive dunes	17	Great Victoria Desert Dune Field— Northwest Dunes and Hills - west-east longitudinal dunes broken by low tablelands and ridges
2	Esperance Hills— Low granite hills and plains extending as headlands and inlets	18	Great Victoria Desert Dune Field— Main Dunefield - west-east longitudinal dunes
3	Stirling and Mt. Barren Hills— Hills and low ranges of granite and metamorphic rocks with intervening plains and moderately incised southerly valleys	19	Musgrave Ranges— Granitic ranges and rounded high hills
4	Roe Plain— Coastal plain with extensive dunes	20	Warburton Ranges— Ranges and hills of basic volcanic rocks and granite
5	Albany Headlands and Inlets— Granitic headlands and inlets with lagoons	21	Gibson Desert Plains— Sandy or stony lateritic plains
6	Donnybrook Lowland— Lowland on down-faulted weak sedimentary rocks	22	Yilgarn Plateau— Sandplains and laterite breakaways; granitic and alluvial plains; ridges of metamorphic rocks and granitic hills and rises; calcretes, large salt lakes and dunes along valleys
7	Leeuwin Peninsula— Narrow granitic horst ridge with extensive cover of calcareous dune sands	23	Woodramung Hills— Low rounded ridges of folded metamorphics
8	Collie-Kalgan Slopes— Gently sloping dissected edge of plateau on granite and gneiss with laterite cappings	24	Dandaragan Tablelands— Dissected plateaus and hills of sedimentary rocks, with minor laterite cappings and dry valleys; extensive sand cover in lower parts
9	Swan Plain— Dune ridges, mainly of limestone, and inner alluvial plain	25	Greenough Hills— Dissected plateaus and hills of sandstone and shale, with extensive sand cover in lower parts
10	Darling Range— High plateau rim with steep western fall; remnant laterite cappings and deeply incised valleys of oceanward drainage	26	Yaringa Sandplain— Sandplain with minor dunes
11	Northam Plateau— Flat-floored valleys of moderately incised oceanward drainage; older laterite remnants with breakaways on divides in east; shallow younger laterites on valley sides in west	27	Shark Bay Peninsulas— Peninsulas and islands formed by indurated limestone dunes
12	Narrogin-Ongerup Plateau— Sandplains and laterite cappings with breakaways on divides; stripped granitic plains on valley sides; small salt lakes and bordering dunes along shallow valley floors	28	Murchison Plateau— Mainly granitic plains with out-going drainage, broken by ridges of metamorphic rocks
13	Coonana-Ragged Plateau— Sandplain and stripped gneissic plains with low hills of granite and metamorphic rocks; calcretes and scattered small salt lakes along shallow valleys	29	Glengarry Hills— Sandstone plateau sloping north to low hills of basic volcanic rocks
14	Bunda Plateau— Covered karst plain of flat-lying limestone with closed depressions and caves; continuous cliff margin on south coast	30	Carnegie Hills— Sandstone tablelands, stony limestone plains, salt lakes and adjacent dunes
15	Carlisle Plain— Sandstone plain with shallow closed depressions	31	Carnarvon Dunefield— South-north longitudinal dunes
16	Leemans Sand Plain— Sand plain with small salt lakes	32	Carnarvon Plain— Alluvial plain
		33	Kennedy Range— Dissected sandstone plateau with partial lateritic cappings, covered by longitudinal dunes
		34	North West Cape Ridges— Ranges and peninsula formed by folded sedimentary rocks and limestone dunes

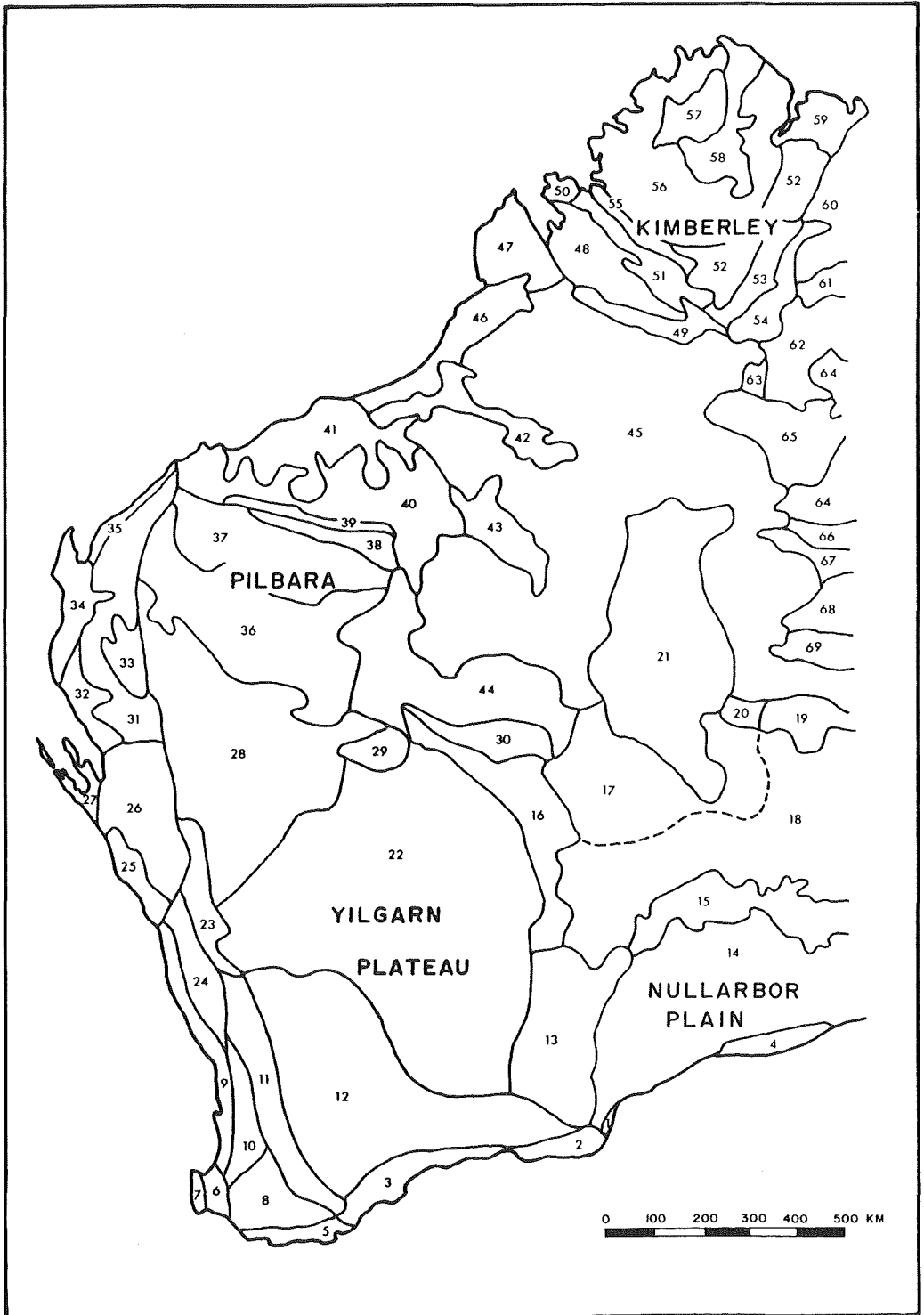
TABLE 2.2 - THE MAJOR GEOMORPHOLOGICAL DIVISIONS OF WESTERN AUSTRALIA

<i>Reference</i>	<i>Division and Description</i>	<i>Reference</i>	<i>Division and Description</i>
35	Onslow Plain— Alluvial, deltaic and littoral plains; minor islands	52	Leopold-Durack Ranges— Prominent ranges of dipping quartzites rimming the main plateau
36	Augustus Ranges— Parallel ranges and dissected plateaus with intervening sandy lowlands	53	Springvale Foothills— Granite hills and minor undulating plains
37	Hammersley Plateaus— Dissected bold plateaus and ranges in flat lying or moderately folded sedimentary rocks	54	Halls Creek Ridges— Ranges and rounded hills on granite and metamorphic rocks
38	Fortescue Valley— Mainly alluvial lowland	55	Richenda Foothills— Rounded hills and ridges and lowlands on a belt of granite and folded metamorphic rocks with minor basalt
39	Chichester Range— Narrow range of dipping quartzite and sandstone	56	Kimberley Plateau— Sandstone plateaus with tabular high summits; ria coast and islands to north-west
40	Nullagine Hills— Dissected flat-topped hills of granites and metamorphic rocks with partial lateritic cappings; narrow estuarine plain and islands	57	Couchman Uplands— Undulating to hilly lower plateaus, mainly on basalt
41	De Grey Lowlands— Floodplains and deltaic plains; granitic and limestone lowlands; scattered ranges of metamorphic rocks in north	58	Drysdale Lowlands— Undulating to hilly lowlands, mainly on basalt
42	Anketell Hills— Low mesas, buttes and stony rises of lateritized sandstone and shale among east-west longitudinal dunes and sandy plains	59	Bonaparte-Diemen Lowlands— Dissected lateritic lowlands and minor islands; part alluvial, part estuarine coastal plains
43	Rudall Tablelands— Dissected low sandstone tablelands	60	Ord-Victoria Plateaus— Dissected plateaus, mainly basaltic but partly of sandstone and with local lateritic cappings
44	Stanley Hills and Dunes— Isolated sandstone ridges among west-east longitudinal dunes and sandplain	61	Birrundudu Plain— Low basaltic plain with clay soils; indeterminate drainage with large claypans
45	Great Sandy Desert Dunefield— East-west longitudinal dunes and minor salt lakes	62	Tanami Sandplain and Ranges— Sandplain with scattered low ranges and tablelands and occasional granitic hills
46	Eighty Mile Plain— Coastal dunes and estuarine plain	63	Sturt Creek Floodout— Floodout with distributary channels and claypans
47	Dampier Tablelands— Low sandstone tablelands, partially lateritized and with extensive sandplain cover	64	Wiso Sandplain— Sandplain with minor longitudinal dunes in South; floodplains and floodouts on margins; stony rises in North
48	Fitzroy Plains— Floodplains and broad estuarine plains	65	Stansmore Dunefield and Ranges— East-west longitudinal dunes locally broken by narrow sandstone ranges
49	Fitzroy Ranges— Scattered sandstone tablelands and ranges; extensive sandplain and east-west longitudinal dunes	66	Redvers $\epsilon$ Dunefield— East-west longitudinal dunes
50	Yampi Peninsula— Parallel ridges of quartzite and sandstone and narrow valleys of basalt; extending as a ria coast and islands	67	Macdonald Sandplain— Mainly sandplain with dune-fringed salt lakes
51	Napier Limestone Ranges— Limestone tableland and intricately dissected bevelled ridges; rocky karst surfaces with box valleys	68	Amadeus Lowland— Dunefields and sandplains with scattered sandstone ranges; salt lakes and calcrete plains along lowland axis
		69	Rawlinson-Petermann Ranges— Dissected sandstone ranges with prominent escarpmen



DIAGRAM 2.2

The major geomorphological divisions of Western Australia. The numbers correspond to those given in Table 2.2 (after Jennings, J.N. and Mabbutt, J.A., 1986: in Jeans, D.N., (ed), Australia—A Geography (Volume One) The Natural Environment).



The geomorphology of the Yilgarn Block is essentially one of an erosional plain, in which lithological differences and major tectonic lineaments are accentuated in their erosional expression. Not surprisingly, the resistant banded iron formations often form prominent ridges. Similarly, large granite domes are prominent features in the western areas of the Yilgarn Block. Even the larger dykes (e.g. the Jimberlana Dyke, of the Norseman region) have a clear topographic expression. Other regional-scale lithological differences are also well marked topographically, for example, the paired metamorphic belts of the Perth-Northam area, which are related to the Northam Plateau.

The western margin of the Yilgarn Block is demarcated by the Darling Fault, which has existed since the Late Proterozoic or Early Palaeozoic. It probably originated as a transcurrent fault, but later functioned as a normal fault with a maximum throw of about 15,000 m. In the Donnybrook area, the Donnybrook Sandstone and Maxicar Beds abut against the Darling Scarp and extend into valleys incised into the scarp. These sediments are of Neocomian age, and are believed to have been deposited at about the time of the last major movement along the Darling Scarp. As a morphotectonic structure, bounding a continental margin, the Darling Scarp (Diagram 2.3) forms one of the 'Great Escarpments' of the world.

Unlike the Yilgarn Block, the Kimberley Block is largely covered by the later Proterozoic sediments and volcanic rocks which form the Kimberley Basin, and consequently little is known of its geology. It is known however, that the block has remained stable since circa 2.1 Ga. The geomorphology of the Kimberleys is dominated by a series of plateaus on which major structural lineaments have strongly controlled drainage net evolution. Surficial depositional elements are generally suppressed, but important Cenozoic alluvial sequences are found, some of which contain diamonds.

The Pilbara Block consists of large granitoid batholiths, some 3-3.5 Ga old, associated with older greenstone belts.

The southern part of the Pilbara Block is overlain by the Fortescue Group of the Hamersley Basin which is dated at 2.7 Ga, suggesting that major stabilisation had by then taken place. The geomorphology of the block is characterised by

erosional plains, in which the lithological controls of the solid geology are clearly expressed. The corestone plains and granite domes reflect the large batholiths.

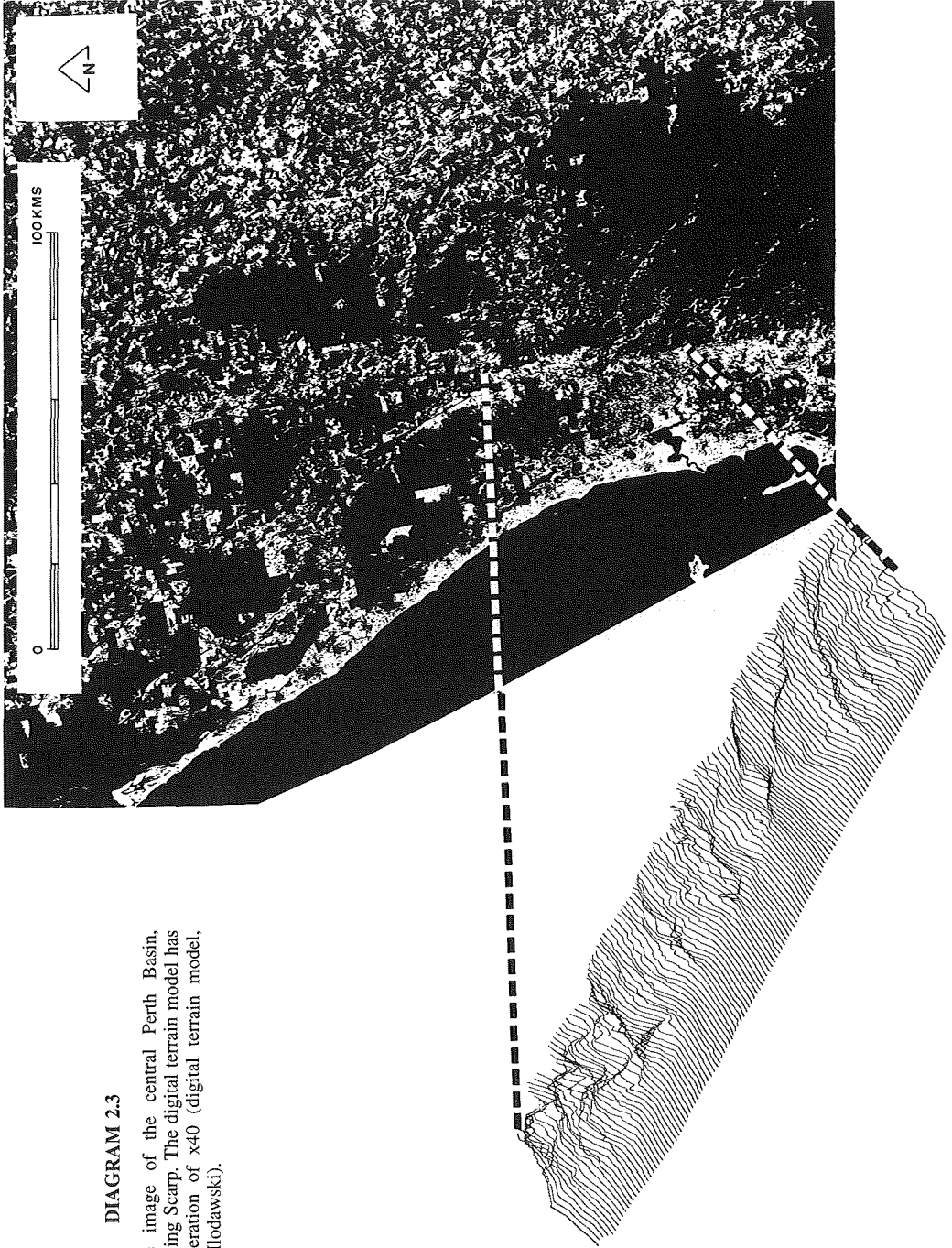
The Proterozoic saw the development of a number of block-marginal mobile belts and the formation of sedimentary basins which led to the deposition of an intracratonic platform cover. The Hamersley Basin is the oldest sedimentary basin and the deposition of the basin infill straddles the Archaean/Proterozoic boundary (2.5 Ga). The Hamersley Basin itself was probably cratonized by circa 2.0 Ga.

The geomorphological continuity of the Hamersley Basin is interrupted by the Fortescue Valley (a possible graben), in which alluvial deposition has taken place. Large alluvial fans debouch out of the bounding escarpments into the valley. To the north of the Fortescue River, the Chichester Range is the geomorphological expression of the Fortescue Group. To the south, the Hamersley Group forms a strongly defined, dissected plateau, on which structural and lithological controls have developed a distinctive terrain (Diagram 2.4).

The Gascoyne Province and Ashburton Trough are the two elements of a complex orogenic zone or mobile belt—the Capricorn Orogen—joining the Pilbara Craton to the Yilgarn Block. In the northern part, the orogen consists of folded sediments of the Ashburton Trough. The major structural elements are indicated by the ridge arrangement of the erosional geomorphology.

In both the Naberu and Bangemall sedimentary basins, the geomorphology is closely controlled by the geology. Sand dune development is widespread. The major playa systems of Lakes Gregory, Naberu, Teague, Carnegie and Wells are important depocenters in the region; and especially Lake Carnegie, where large amounts of clastic sediments are at present being supplied to the playa. Some of these clastics result from the extensive stripping of the Permian sediments of the area which reveals older landsurfaces.

The Albany-Fraser Province is a mobile belt which delimits the southern part of the Yilgarn Block. It has been dated at 1.2- 2.1 Ga. Along the western margin of the Yilgarn Block the basement is generally concealed by a thick sequence of Phanerozoic sediments, and is only exposed in the Naturaliste and Northampton blocks.



**DIAGRAM 2.3**

Landsat satellite image of the central Perth Basin, showing the Darling Scarp. The digital terrain model has a vertical exaggeration of x40 (digital terrain model, courtesy of G. Mlodawski).

DIAGRAM 2.4

Landsat satellite image showing the contrast in the geomorphological expression of the Pilbara Block (the northern part of the scene) and the Hamersley Basin (the southern part of the scene).



The Kimberley Block and bounding Halls Creek and King Leopold mobile zones of northwestern Australia are part of the wider North Australian Craton. These mobile belts have a very pronounced geomorphological expression (Diagram 2.5).

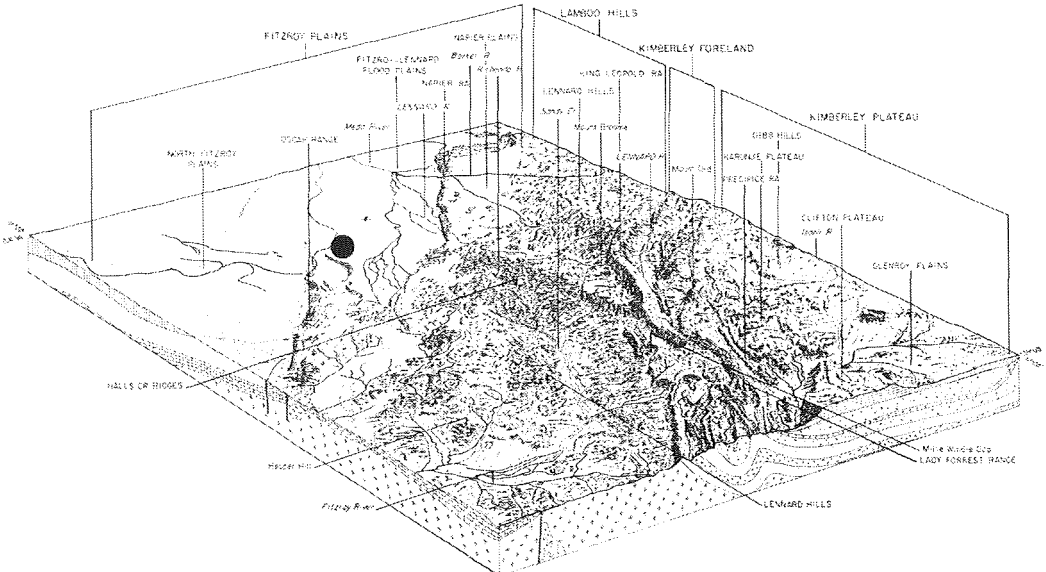
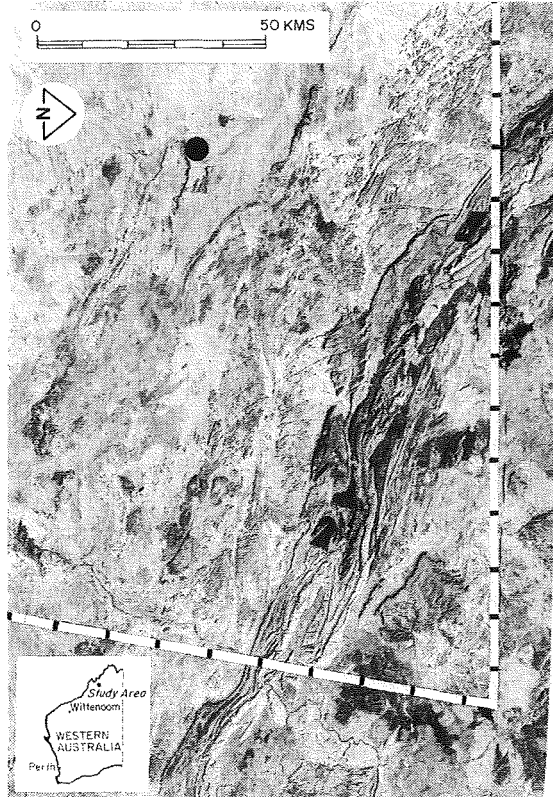
By the end of the Precambrian the morphotectonic framework, which was to control much of the future continental-scale geomorphological evolution of Western Australia, was essentially in place. In this framework the Yilgarn and Pilbara blocks and the associated mobile belts and sedimentary basins, are now combined and constitute the Western Australian Shield. The Shield was to remain the dominant morphotectonic element of the geology of Western Australia, and from at least the end of the Precambrian, large parts of this region were to remain as relatively stable landsurfaces.

Our present understanding of the Early Palaeozoic morphotectonic development of Western Australia is incomplete. However, it is clear that at that time Australia was then part of the Gondwana supercontinent, and that during the Early Cambrian, Gondwana generally experienced continental drift and seafloor spreading. In the region which was to become the northwest margin of Australia, plates diverged, releasing extensive tholeiitic flood basalts. From the Cambrian on there was a southward migration of marine deposition with time, which may reflect the progressive southward opening of a divergent margin, with the development of failed arms off it.

During the Middle and Late Devonian, marine conditions prevailed over much of the Canning, Carnarvon, Bonaparte Gulf and Ord basins and extensive coral reef complexes formed. In the northern Canning Basin the present Napier and

**DIAGRAM 2.5**

Landsat satellite image of the Lennard River area. The northwest-southeast trending ridges are Proterozoic sedimentary and associated igneous formations, which constitute part of the King Leopold Mobile Zone, which is part of the Halls Creek Province. The Devonian reef complexes which form the Napier and Oscar ranges, are also shown. The area enclosed by the broken line approximates to the area in the block diagram (from Derrick, G.M. and Playford, P.E. 1973: Lennard River, Western Australia. Geological Survey of Western Australia:250 000 Geological Series Explanatory Notes). The 'dots' fix corresponding locations.



Oscar ranges developed as fringing, barrier and atoll reef complexes during the Late Devonian. Today these form limestone ranges, which still reflect much of their original geomorphological expression and clearly show the original reef facies. Karst forms are well developed in some of the more massive limestones.

During the Early Permian, regions which were to contain the northern and western margins of Western Australia, subsided and extensive deposition occurred in the sedimentary basins. Widespread glaciation throughout much of Western Australia during the Early Permian is well documented. Glacial sediments are widely found in a stratigraphic context in the sedimentary basins, from Collie in the south to the Bonaparte Gulf in the north. But outliers of glacial deposits are also known on the Precambrian Shield, which indicate that the Early Permian ice sheet covered much of present-day Western Australia. An ice-cap covering an area of as much as 2.5 million square kilometres is possible but this is not to suggest that it was continuous. For the geomorphological development of Western Australia, Permian widespread glaciation was important. It provided a fresh start for surface denudation processes—just as the Cenozoic ice age has removed much of the weathered mantle that had previously covered the Canadian Shield. Similarly, isostatic adjustments had important geomorphological repercussions. It is not, however, at all certain that any large glacial erosional forms remain in the present landscape of Western Australia.

The marine sediment sequences of the Permian were deposited in broad basins, but at the end of the Permian the depositional basins began to assume a more linear form. This change in style of the environment of deposition was associated with faulting and the development of rift valleys, so that deposition was now along axes which were to parallel the present continental margin.

Along the present western margin, the Triassic saw the development of graben structures, which controlled deposition—grabens were active particularly in the Late Triassic.

During the Jurassic, graben development was less active than in the Triassic. During the Middle Jurassic Gondwana began to break-up, with a mid-ocean spreading ridge entering the north-west coast of Australia. The Perth Basin underwent renewed graben development in the Late Jurassic, and this was the fore-runner of a later episode of rifting.

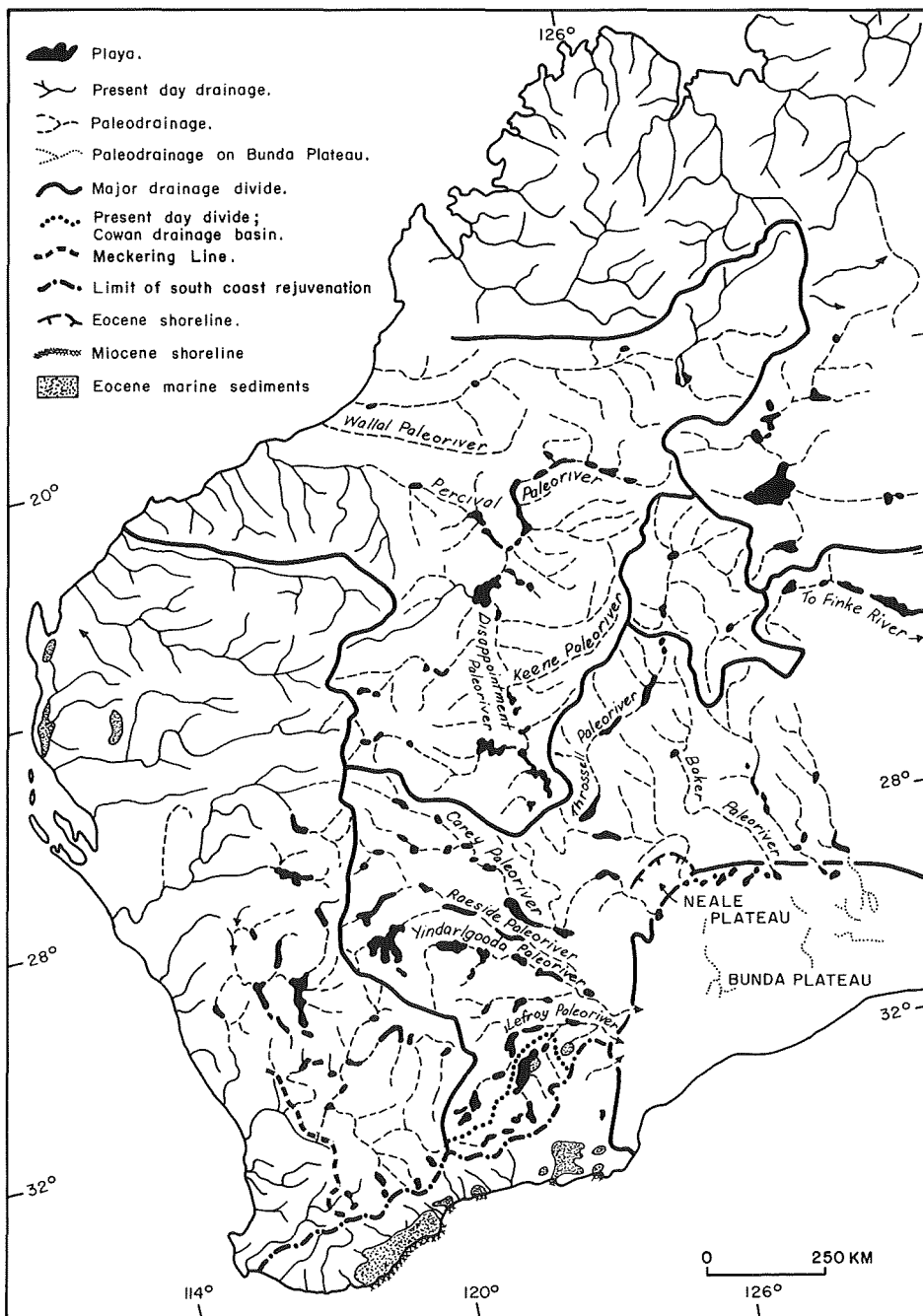
During the Cretaceous the coastal margins of Western Australia began to take on much of their present form. The strong Late Jurassic graben faulting had significantly diminished by the beginning of the Neocomian. In the Early Cretaceous, tensional tectonics between Australia and Antarctica led to the formation of a large downward which was to become the Eucla Basin. Along the western margin, the area between the Naturaliste Plateau and the Exmouth Plateau was probably still linked to Greater India. But during the mid-Neocomian, a mid-ocean ridge developed between Australia and Greater India, accompanied by widespread uplift. At the same time India moved away from Australia and the separation has continued to the present day. From the time of the breakup (127 million years (Ma)) until the Early Tertiary (53 Ma), Australia and India were separated by mid-ocean ridge spreading systems.

During the Late Cretaceous the southern margin of Australia was controlled by a series of graben structures parallel to the coast. However, these were less pronounced along the southern margins of Western Australia, and here Late Cretaceous sedimentation was largely restricted to the Eucla Basin.

The spatial relationship of deposits of Cretaceous age to the present geomorphology indicates that major elements in the landscape may be older than 100 Ma. From the distribution of Late Cretaceous sediments it is clear that some of the present valleys, which cut through the scarps of the Darling and Dunsborough faults, were already in existence at that time. There is similar evidence that the lower Murchison River valley may have existed in the Cretaceous. Evidence of the upstream extension of Triassic sediments along the Greenough River valley, suggests that some of the drainage in the southern Carnarvon Basin/northern Perth Basin may have existed in the Triassic. Large playa systems with complex depositional and marginal deflation features are widespread in Western Australia. They are frequently related to a network of palaeochannels which were probably active during the Late Cretaceous. From the combined evidence it is clear that major elements of geomorphology of Western Australia are much older than generally accepted for other parts of the world. In fact, it seems that some elements of the geomorphology of the present landsurface may have survived the break-up of the Gondwana supercontinent.

DIAGRAM 2.6

Major palaeochannels and Tertiary marine sediments and shorelines. The Meckering Line separates the poorly defined streams of the inland region from the more incised coastward draining rivers. The limit of rejuvenation along the south coast is related to the Ravensthorpe Ramp (from van de Graaff, W.J.E., Crowe, R.W.A., Bunting, J.A. and Jackson, M.J., 1977: Zeitschrift fr Geomorphologie, 21).





**CENOZOIC: THE DEVELOPMENT OF THE PRESENT LANDSURFACE**

The morphotectonic framework of Western Australia was in place by the beginning of the Tertiary, but nevertheless, marine transgressions during the Paleocene, Eocene and Miocene significantly modified large areas of the western and southern margins of Western Australia (Diagram 2.6).

The Eocene saw marine transgressions extending into the western and southern coasts of Western Australia. In the Middle Eocene, shallow seas penetrated into the Eucla Basin, and during the Late Eocene extended to north of Norseman. The Bremer Basin, with its characteristic siltstone, lignite and spongolite, is a product of the Late Eocene transgression. These sediments were deposited over an irregular landsurface of Precambrian rocks, like that now found in the Esperance area. Marine platforms, which formed during the height of the Late Eocene marine transgression, are still evident along some Precambrian uplands, which rise above the Tertiary sediments.

The Miocene saw extensive carbonate deposition in both the Eucla and Carnarvon basins. Today, Miocene limestones dominate the surface geology of the Eucla Basin, and provide the setting for one of the classic karst regions of the world.

Although the morphotectonic framework of Western Australia was established by the Early Tertiary, the details of the geomorphology of the landsurface were still quite different from those of today. This is evidenced by the existence of an extensive palaeochannel network which is thought to have been still active at that time (Diagram 2.6); and climate generally was quite different from that of today. The occurrence of the mangrove palm, *Nipa*, in the Eocene Kings Park Formation suggests that sea surface temperatures may have been warm as 20° – 25° C, significantly warmer than today. Pollen, in Late Eocene sediments, show that over southern Western Australia the vegetation resembled tropical to subtropical rainforest. Similar conditions prevailed over southern Western Australia throughout much of the Oligocene. Early Miocene precipitation was probably high, but more arid conditions set in during the Middle Miocene. By the Late Miocene the arid climates that now prevail over much of Western Australia, had been established, and Australia had essentially reached its present geographical position.

The climates of the Early and Middle Tertiary were conducive to deep weathering; and this is likely to have taken place during the Eocene (?), but certainly the Oligocene and Early-Middle Miocene. Deep weathering resulted in a weathered regolith and extensive laterite formation. The landsurface of much of Western Australia, bears a

**DIAGRAM 2.7**

Uplifted reef-complexes along the western margin of the Cape Range (after van de Graaff, W.J.E., Denman, P.D. and Hocking, R.M., 1976: Geological Survey of Western Australia Annual Report for 1975).

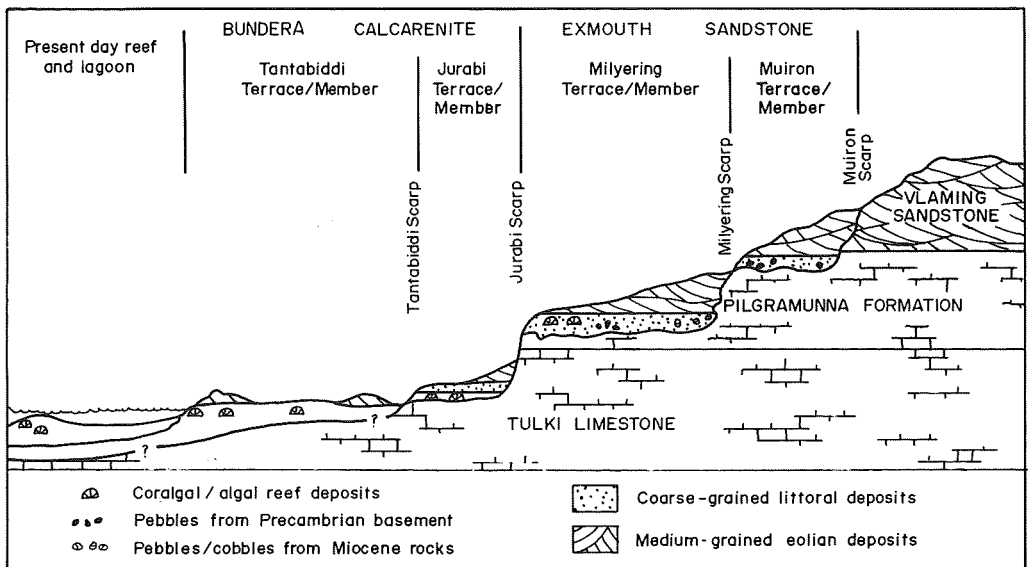
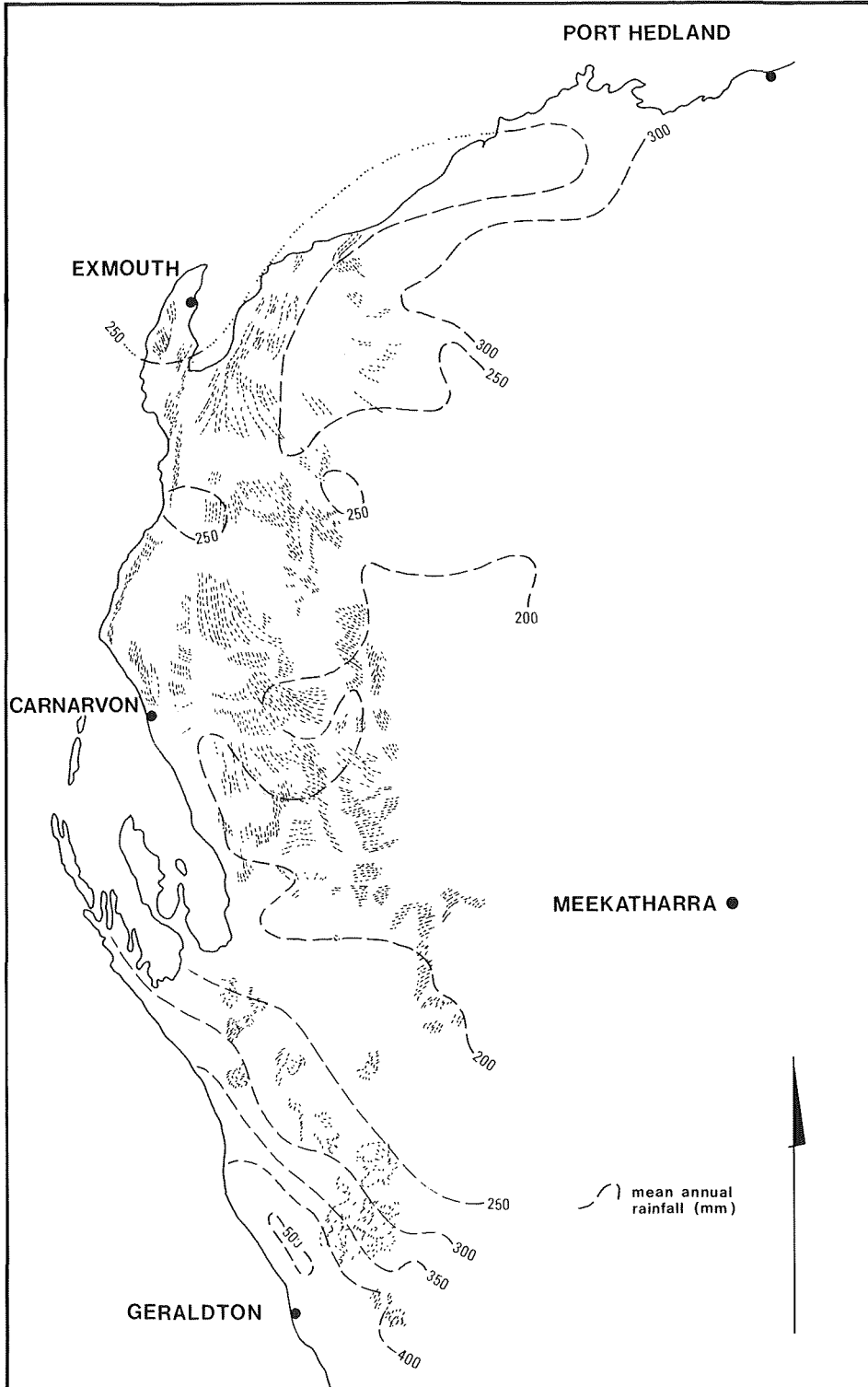


DIAGRAM 2.8

The present occurrence of Late Pleistocene (?) desert dunes in the central coastal areas of Western Australia.



strong imprint of the deep weathering event of the Tertiary, and its control on subsequent geomorphological development is well manifested in etchplain development.

It was traditionally thought that, in terms of tectonics, Western Australia had been essentially stable during much of the Cenozoic. But with the recognition of the South West Seismic Zone, the Jarradale Axis and Ravensthorpe Ramp (Diagram 2.6) and other features, this view has been modified. The most striking geomorphological expression of Cenozoic tectonic activity is in the Exmouth Gulf—Cape Range area. Here, three ranges—the Cape Range, Rough Range and Giralalia Range—correspond to anticlinal axes initiated during post- Middle Miocene times by reverse movement on underlying normal faults. The Cape Range is the dominant of the three, reaching a height of some 300 m. The range has been deeply dissected during uplift, which has continued to the present. This is witnessed by warped and uplifted Quaternary reef complexes which now form a staircase along the western flank of the range (Diagram 2.7). On the Yilgarn Block, fault scarps a metre or so high and tens of kilometres long have formed within historic times. Such fault scarps are rapidly eroded and are only incomplete indicators of past seismic activity.

The Late Cenozoic left a significant geomorphological imprint on the landscape as a result of the climatic changes which occurred during this time. The importance of deep weathering to our understanding of the geomorphology is fundamental, but equally striking is the geomorphological expression of the arid climates which first set in during the Late Tertiary. Repeated extensions of the arid zone occurred during the Pleistocene, and resulted in the development of desert dune sequences, which are now stabilised and are found well outside their climatic range (Diagram 2.8). Although no convincing dates are available for these events, it is generally thought that arid zone advances were coincident with global glacial maxima, and that the last massive extension of the arid zone took place at about 18,000 years before present (Ka BP).

Quaternary changes in climate caused variations in the hydrology and sediment supply characteristics of streams. These changes controlled alluvial deposition and resulted in formation of alluvial fills and terrace complexes along the major rivers of Western Australia. The Gascoyne, Fitzroy and at a smaller scale the Swan River, all possess well-developed terrace forms flanking their present courses (Diagram 2.9). In the Geraldton area,

**DIAGRAM 2.9**

The terraces and associated deposits of the Swan River immediately downstream of the Darling Scarp. The digital terrain model is a view from the north-east (vertical exaggeration approximately x5).

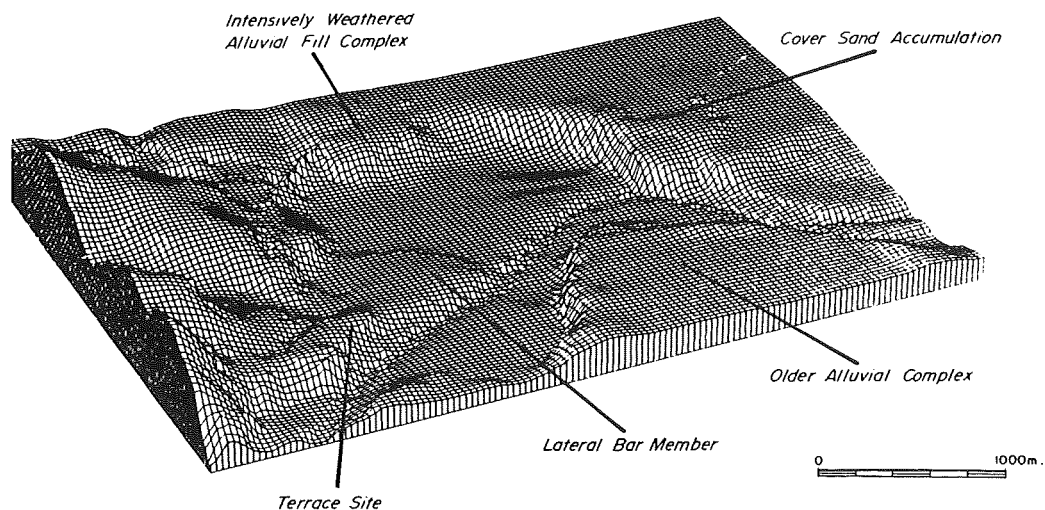


TABLE 2.3 – GEOLOGICAL TIME SCALE

<i>Era</i>	<i>Period</i>	<i>Epoch</i>	<i>Duration (years)</i>	<i>Years before present</i>	
Cenozoic	Quaternary	Holocene (Recent)	10,000	10,000	
		Pleistocene	1.5–1.8 million	1.5–1.8 m	
	Neogene	Pliocene	3–5 million	5–7 m	
		Miocene	19 million	26 m	
	Tertiary	Oligocene	11–12 million		
		Palaeogene	Eocene	16 million	
	Paleocene		10 million	64–65 m	
	Mesozoic	Cretaceous	Late	Maastrichtian Campanian Santonian Coniacian	35 million
				Turonian Cenomanian	
		Early	Albian Aptian Barremian Neocomian	36 million	136 m
Jurassic			54–59 million	190–195 m	
Triassic		33 million	225 m		
Permian		55 million	280 m		
Palaeozoic	Carboniferous	65 million	345 m		
	Devonian	50 million	395 m		
	Silurian	35–45 million	430–440 m		
	Ordovician	60–70 million	500 m		
	Cambrian	70 million	570 m		
	Precambrian Eras	Adelaidean	230–530 million	800–1,100 m	
		Undifferentiated	250–550 million		
Proterozoic	Carpentarian	450 million	1,800 m		
	Early	700 million	2,500 m		
	Archaean	2,100 million	4,600 m		

extensive alluvial deposition, linked to changes in sediment yield processes, took place during the early part of the Late Quaternary. It is now known, from radiocarbon dates, that significant parts of the Swan and Helena river terraces fill were deposited since circa 40 Ka BP. In the Carnarvon Basin, the large wedge of sediments associated with the avulsion of the lower Gascoyne River was deposited over the last 120 Ka.

During the Late Cenozoic, global ice volume changes significantly altered sea level. Thus, during the last interglacial-glacial-interglacial cycle, from about 130 Ka to present, sea level along the Western Australian coast ranged from +8m at 120 Ka to -150 m at 18 Ka BP, and reached its present level (or slightly above) by 6.5 Ka BP. These changes in sea level have influenced geomorphological evolution along many coastal areas in Western Australia.

During the Late Tertiary or Early Pleistocene, shoreline complexes now at heights of 115-90 m (Eneabba and Ridge Hill Shelf) and 20-80 m (Yoganup Formation) were deposited in the Perth Basin. They are the initial sequences of a series of coastal barriers which formed in the Perth Basin throughout the Quaternary. At present there is evidence for possibly three major Pleistocene barrier complexes.

In the course of the Late Cenozoic there was a significant change in the nature of coastal sediments in the Perth Basin. The older barrier sequences are essentially siliciclastic deposits, whereas the younger Pleistocene barriers are carbonate rich. The Tamala Limestone sequences which dominate much of the coastal plain of the Perth Basin, and which in the Carnarvon Basin have led to the development of the distinctive Shark Bay region, are a Middle to Late Quaternary phenomenon.

Significant geomorphological modifications have taken place over many parts of Western Australia in the last 150 years, linked to European land use practises: consequently rates of sediment yield may well be an order of magnitude higher than earlier in the Late Cenozoic. Widespread erosion is evident in many catchments and high rates of sediment supply are changing the hydraulic and sediment regimes of streams. Wind erosion is equally widespread, and in the most severely affected catchments, such as the Gascoyne, the loss of the vegetation cover has resulted in the local mobilisation of former desert dunes, giving rise to fears of desertification.

## GLOSSARY

*Basalt*: An aphanitic crystalline rock of volcanic origin, composed largely of plagioclase feldspar and dark minerals such as pyroxene and olivine - the extrusive equivalent of gabbro.

*Batholith*: A large intrusive mass of igneous rock, typically granite, outcropping over at least 100 square kilometres and extending to an unknown depth. Batholiths are particularly characteristic of orogenic belts in subduction zones.

*Craton*: The large, relatively immobile (stable) portion of continents, consisting of shields and platforms, which has remained unaffected by orogenic activity for commonly several periods of time.

*Dyke*: A tabular intrusion of igneous rock, normally of intermediate grain size, that cuts discordantly through the surrounding rock.

*Graben*: A block of the Earth's crust, generally with a length much greater than its width, that has dropped relative to the blocks on either side.

*Granite*: A coarse grained acid igneous rock, consisting mainly of quartz, alkali feldspar and mica, with various accessory minerals. It occurs in intrusive bodies from crystallised magma, or the 'granitisation' (metasomatic transformation) of pre-existing rocks.

*Karst*: A topography formed over limestone, dolomite or gypsum and characterised by sinkholes, caves and underground drainage.

*Laterite*: Weathered material composed principally of the oxides of iron, aluminium, titanium, and manganese; laterite ranges from soft, earthy, porous soil to hard, dense rock.

*Lignite*: Coal of relatively recent origin, intermediate between peat and bituminous coal; often contains patterns from the wood from which it formed. Also known as brown coal.

*Mantle*: The section of the Earth's interior between the crust and the outer core, bounded at the top by the Mohorovicic discontinuity and at the base by the Gutenberg discontinuity.

*Metamorphic rock*: A rock formed from pre-existing solid rocks by mineralogical,

structural and chemical changes, through the action of heat or pressure or both.

*Mobile belt*: A long, relatively narrow region where crustal mobility by magmatism, metamorphism and tectonic activity has led to widespread deformation.

*Orogeny*: An episode of tectonic activity (folding, faulting, thrusting) and mountain-building usually related to a destructive plate margin.

*Playa*: A low, essentially flat, part of a basin or other undrained area in an arid region.

*Regolith*: The layer or blanket of unconsolidated rocky debris of any thickness that overlies bedrock and forms the surface of the land.

*Sedimentary basin*: An area of continued subsidence of the crust that accumulates sediment over a prolonged period.

*Shield*: A major structural unit of the Earth's crust, consisting predominantly of Precambrian metamorphic and igneous rocks which have remained unaffected by later orogenics.

*Spongolite*: A rock or sediment composed chiefly of the remains of sponges.

*Tectonics*: A branch of geology dealing with the broad architecture of the outer part of the Earth, that is, the regional assembling of structural or deformational features, a study of their mutual relations, origin and historical evolution.

*Transcurrent fault*: A strike-slip fault characterised by a steeply inclined surface.

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## Chapter 3

# CLIMATE AND METEOROLOGY

*(Contributed by the Western Australian Regional Office of the Bureau of Meteorology)*

**Western Australia is the largest State in the Commonwealth, extending from latitude 13°30' S to 35°08' S, and from longitude 113°09' E to 129° E. It stretches about 2,400 kilometres in a north-south direction and about 1,600 kilometres west-east. A little more than one-third of the State lies within the tropics, while the remainder extends southward to the temperate zone.**

Because of its large size and its latitudinal position, Western Australia has entirely different climates in its northern and southern parts, while in the central regions there is a gradual change from the tropical climate of the north to the typical Mediterranean climate of the south.

Most of the State is a plateau between 300 and 600 metres above mean sea-level and there are no outstanding mountain ranges. Where the edge of the plateau forms the Darling Range along the southern part of the west coast, it exerts a marked influence on the rainfall, causing a rapid increase from the coastal plain to the higher land. Elsewhere the effect of topography is less marked and its main influence is seen in the general decrease of rainfall with increasing distance from the coast.

### PRESSURE SYSTEMS

Weather during the year is controlled largely by the movement of the anticyclonic belt (high pressure systems with anti-clockwise winds) which lies in an east-west direction across the continent for about six months of the year.

In winter this system moves northward, bringing clear skies with fine sunny days and easterly winds to the tropics. With this northward movement, westerly winds on the southern side of the anticyclones extend over the southern part of

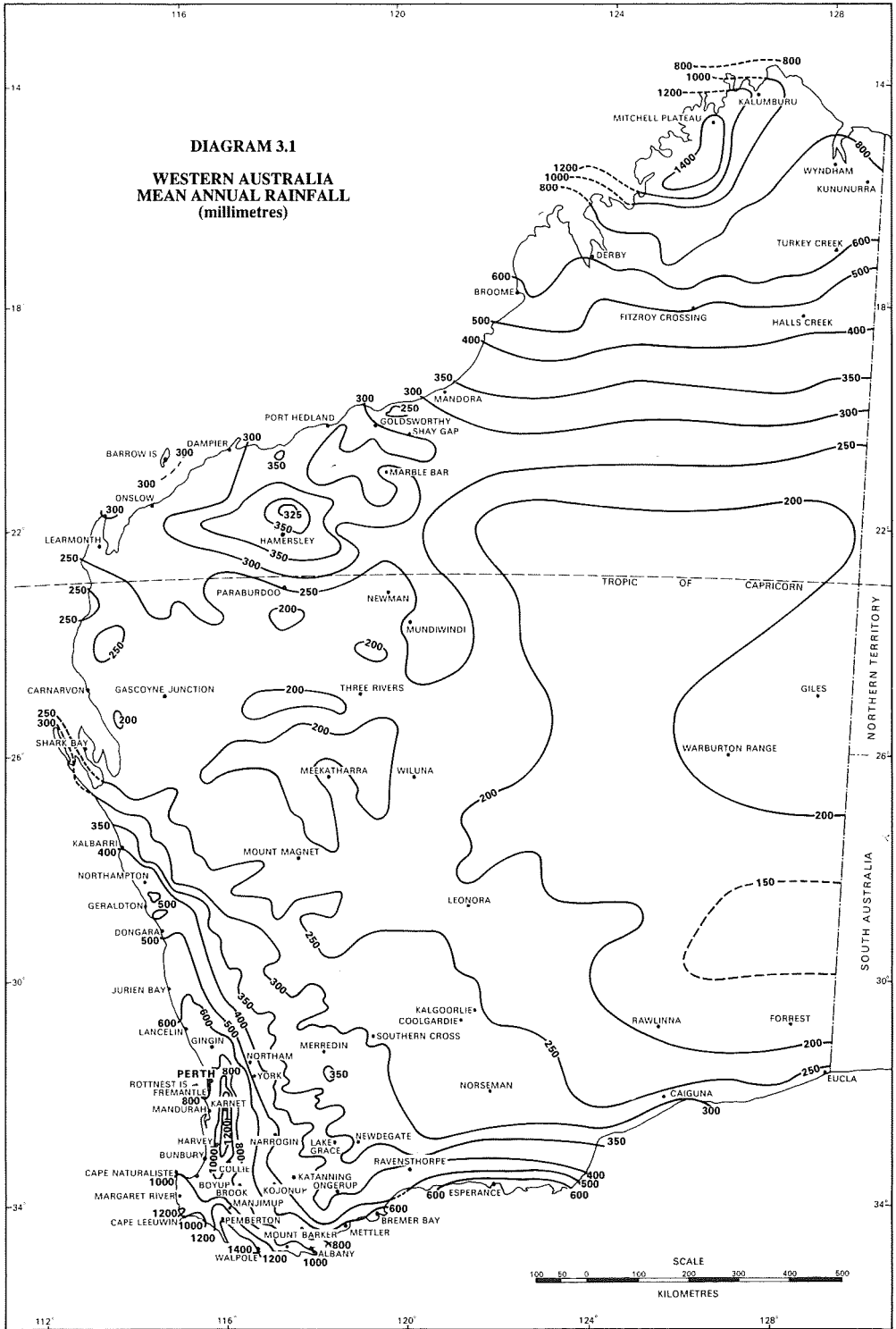
the State, bringing with them cool cloudy weather and rain. In mid-winter the northern fringe of the 'Roaring forties' extends to Western Australia and there are frequent westerly gales in the south coastal belt.

These westerly winds are maintained by a series of depressions (low pressure systems with clockwise winds), which move eastward well south of the Western Australian coast, and others which originate in the Indian Ocean and move south-eastward past Cape Leeuwin. The extent to which westerlies affect the State depends largely on the intensity and the position of these depressions.

Towards the end of winter the anticyclonic belt moves southward, and the westerlies are confined more to the lower south-west and the south coastal districts. By summer the anticyclonic belt has moved so far south that its axis is off the south coast and easterly winds prevail over most of the State.

During this summer period the midday sun is at a high elevation in the tropics and the continual heating leads to the development of a monsoonal depression over this region. Wind circulation round this system causes easterlies on its southern or inland side, but in the coastal districts north-east from Onslow, and in parts of the Kimberley, westerlies prevail. Winds in both the north and the





south of the State are then in the opposite direction to those prevailing during the winter.

Nearing summer's end the anticyclonic belt moves northward again. The monsoonal depression over the tropics dissipates and westerlies again gradually extend northward to the southern part of the State.

During the northern 'Wet' season (from about December to March), occasional cyclones, known locally as 'willy willys', bring strong winds and rain to the tropics. They originate generally in the Timor Sea or off the north-west coast and often move first in a south-westerly direction parallel to the coast and later in a south-easterly direction.

They frequently move inland between Broome and Onslow but occasionally travel further westward before curving to the south-east and moving inland over the west coast. Others fade out at sea without ever crossing the coast. Those that move inland usually start to dissipate soon after crossing the coast, but occasionally they move right across the State, passing into the Southern Ocean and moving off towards Tasmania.

These storms are often extremely violent and have on occasions almost completely wrecked towns on the north-west coast, while a cyclone which struck a pearling fleet off the Eighty Mile Beach in 1887 caused the loss of twenty-two vessels and 140 lives.

However, despite the damage which they cause, the storms are of great benefit to the pastoral regions because of the heavy and widespread rain which generally accompanies them. The heaviest fall ever recorded in one day in Western Australia, 747 millimetres, was received at Whim Creek from a cyclone in 1898.

## RAINFALL

The moist rain-bearing winds in this State are in general from a westerly direction. The easterlies, having come from the dry inland parts of Australia, usually bring fine weather and clear skies.

Because of this the highest rainfall occurs in the winter months in the south of the State, and in the summer months in the north. In between these areas there is a gradual change from one rainfall regime to the other.

Proceeding northward from the winter rainfall area of the south-west of the State, the wet period occurs earlier during the year. Across a belt Carnarvon-Menzies-Eucla, there is a more rapid change, and this belt divides the winter rainfall area from that which receives most of its rain in the first six months of the year. Further north, the change is more gradual but continuous and in the Kimberley most of the year's rainfall is received in the summer months which, in the southern parts of the State, are the driest of the year.

TABLE 3.1 - RAINFALL AT REPRESENTATIVE CLIMATOLOGICAL STATIONS  
(Stations are arranged from north to south in three groups: Coastal, Wheat Belt and Other Inland)

Reporting station and characteristic		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
COASTAL														
Wyndham	(New site) (a)—													
Rainfall (mm)—	Average	161	193	153	23	10	2	7	—	8	18	57	109	740
	Highest	329	369	428	119	98	23	84	—	78	75	174	226	1,101
	Lowest	47	43	—	—	—	—	—	—	—	—	2	15	63
	Highest one day	89	77	140	74	48	23	49	—	78	38	84	87	140
Wet days—	Average number	15	14	11	3	1	—	—	—	1	3	6	9	63
Broome—														
Rainfall (mm)—	Average	175	162	92	25	30	19	5	2	2	2	9	41	564
	Highest	825	427	439	226	176	208	72	23	24	28	50	279	1,228
	Lowest	5	8	—	—	—	—	—	—	—	—	—	—	139
	Highest one day	351	151	204	107	119	127	55	12	13	15	37	210	351
Wet days—	Average number	11	11	7	3	3	2	1	1	1	1	1	5	47
Port Hedland M.O. (b)—														
Rainfall (mm)—	Average	58	94	46	23	28	18	10	4	1	1	4	17	304
	Highest	454	360	251	352	170	125	81	35	9	8	67	219	627
	Lowest	—	—	—	—	—	—	—	—	—	—	—	—	45
	Highest one day	387	329	152	111	156	53	46	25	3	7	59	169	387
Wet days—	Average number	5	7	4	2	3	3	2	1	1	1	1	2	32

**TABLE 3.1 – RAINFALL AT REPRESENTATIVE CLIMATOLOGICAL STATIONS — *continued***  
**(Stations are arranged from north to south in three groups: Coastal, Wheat Belt and Other Inland)**

<i>Reporting station and characteristic</i>	<i>Jan.</i>	<i>Feb.</i>	<i>Mar.</i>	<i>Apr.</i>	<i>May</i>	<i>June</i>	<i>July</i>	<i>Aug.</i>	<i>Sept.</i>	<i>Oct.</i>	<i>Nov.</i>	<i>Dec.</i>	<i>Year</i>
COASTAL (continued)													
Onslow—													
Rainfall (mm)— Average	27	46	49	19	45	43	18	10	1	1	2	4	266
Highest	261	539	415	279	259	227	222	107	25	27	56	61	998
Lowest	—	—	—	—	—	—	—	—	—	—	—	—	15
Highest one day	192	356	283	157	124	111	76	62	17	21	30	38	356
Wet days— Average number	2	3	3	2	3	4	2	2	—	—	—	—	21
Carnarvon M.O. (b)—													
Rainfall (mm)— Average	13	21	15	12	39	49	44	18	6	7	5	1	230
Highest	157	149	93	89	195	161	180	51	22	53	81	4	557
Lowest	—	—	—	—	—	1	—	1	—	—	—	—	75
Highest one day	66	78	77	76	95	96	82	35	17	25	81	4	96
Wet days— Average number	2	3	2	3	5	7	7	5	3	3	1	1	42
Geraldton—													
Rainfall (mm)— Average	6	14	15	26	71	112	95	67	30	20	10	5	471
Highest	64	131	89	100	282	286	243	131	81	109	47	59	843
Lowest	—	—	—	—	1	—	25	24	11	—	—	—	220
Highest one day	36	69	88	48	62	109	72	59	39	71	24	51	109
Wet days— Average number	2	2	3	6	10	14	15	13	9	7	4	2	87
Perth (Bureau of Meteorology)—													
Rainfall (mm)— Average	9	12	19	46	123	182	173	135	80	55	21	14	869
Highest	115	166	145	149	308	476	425	318	199	200	73	81	1,339
Lowest	—	—	—	—	14	55	62	12	9	1	—	—	509
Highest one day	55	87	77	67	76	99	76	74	52	55	39	47	99
Wet days— Average number	3	3	4	8	14	17	18	17	14	11	6	4	119
Bunbury—													
Rainfall (mm)— Average	11	12	22	46	128	183	171	124	80	54	26	14	871
Highest	157	103	91	175	288	412	417	302	201	195	84	80	1,365
Lowest	—	—	—	—	10	36	49	21	—	5	—	—	484
Highest one day	115	86	66	61	79	82	95	62	58	39	38	27	115
Wet days— Average number	2	2	4	7	14	18	20	17	14	11	6	4	119
Albany M.O. (b)—													
Rainfall (mm)— Average	23	23	28	65	96	99	124	106	82	79	48	25	798
Highest	141	62	85	127	260	224	204	174	133	172	117	97	966
Lowest	3	4	6	21	47	45	55	52	43	37	6	5	628
Highest one day	80	36	52	52	40	38	43	44	44	53	29	42	80
Wet days— Average number	8	8	11	14	18	19	21	21	18	15	13	10	176
Esperance—													
Rainfall (mm)— Average	14	27	25	48	77	80	98	88	55	50	39	17	618
Highest	35	80	82	155	186	162	193	145	119	117	87	85	868
Lowest	2	—	1	6	18	33	23	39	16	16	21	1	468
Highest one day	25	70	31	34	51	61	45	31	28	77	42	24	77
Wet days— Average number	5	6	6	10	12	14	15	15	13	11	8	6	121
Eucla—													
Rainfall (mm)— Average	14	19	21	25	31	29	24	26	21	19	17	14	260
Highest	95	182	127	205	104	155	83	82	85	74	114	116	433
Lowest	—	—	—	—	—	2	—	2	—	1	—	—	112
Highest one day	54	115	51	41	75	36	26	38	40	33	42	65	115
Wet days— Average number	3	4	6	7	10	10	10	9	8	6	5	4	82
WHEAT BELT													
Carnamah—													
Rainfall (mm)— Average	11	15	21	23	51	82	70	54	28	18	11	9	393
Highest	103	103	180	121	170	231	188	192	83	73	91	57	783
Lowest	—	—	—	—	2	13	11	12	1	—	—	—	204
Highest one day	97	78	153	89	74	61	43	79	33	40	71	50	153
Wet days— Average number	2	2	3	5	9	13	14	11	8	5	3	2	77

TABLE 3.1 - RAINFALL AT REPRESENTATIVE CLIMATOLOGICAL STATIONS — *continued*  
 (Stations are arranged from north to south in three groups: Coastal, Wheat Belt and Other Inland)

Reporting station and characteristic	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
WHEAT BELT (continued)													
Wongan Hills—													
Rainfall (mm)— Average	11	16	20	23	53	75	70	52	28	19	11	9	389
Highest	114	111	166	81	188	220	174	131	97	66	60	59	675
Lowest	—	—	—	—	1	17	8	8	2	—	—	—	161
Highest one day	69	80	81	62	64	70	41	34	37	36	39	57	81
Wet days— Average number	2	2	3	5	8	12	13	12	8	6	3	2	76
Kellerberrin—													
Rainfall (mm)— Average	10	15	22	22	43	58	53	41	26	19	12	13	334
Highest	100	127	152	110	119	163	123	100	76	77	86	67	661
Lowest	—	—	—	—	—	15	11	3	2	1	—	—	172
Highest one day	52	108	103	58	41	53	38	40	24	37	45	57	108
Wet days— Average number	2	2	3	5	8	12	13	11	8	6	3	2	75
Southern Cross—													
Rainfall (mm)— Average	14	20	21	21	34	41	38	30	19	16	15	12	281
Highest	113	137	169	128	119	183	107	88	106	79	75	72	577
Lowest	—	—	—	—	—	5	6	1	—	—	—	—	118
Highest one day	63	84	61	44	55	43	36	40	25	55	51	40	84
Wet days— Average number	3	3	3	5	8	10	11	9	6	5	3	2	68
Northam—													
Rainfall (mm)— Average	8	13	19	24	57	84	85	62	36	25	12	9	434
Highest	118	190	189	88	148	233	221	170	129	100	70	66	711
Lowest	—	—	—	—	1	10	20	3	3	—	—	—	194
Highest one day	102	116	126	75	65	67	54	33	31	58	32	50	126
Wet days— Average number	2	2	3	5	10	15	16	14	10	7	4	2	90
Wandering—													
Rainfall (mm)— Average	10	15	20	35	79	118	115	94	61	43	19	14	623
Highest	156	244	122	121	195	368	324	270	192	130	65	106	1,051
Lowest	—	—	—	—	11	25	34	14	8	1	—	—	297
Highest one day	115	138	104	51	61	85	69	53	40	43	48	64	138
Wet days— Average number	3	3	4	7	13	17	17	16	13	11	6	4	114
Narrogin—													
Rainfall (mm)— Average	10	17	21	30	65	92	89	69	47	34	18	13	505
Highest	155	237	128	121	167	300	243	185	121	128	79	95	741
Lowest	—	—	—	—	10	25	25	16	7	2	—	—	269
Highest one day	150	115	114	63	68	71	81	42	36	49	38	58	115
Wet days— Average number	2	3	4	6	11	15	15	14	11	9	5	3	98
Katanning—													
Rainfall (mm)— Average	13	17	22	31	61	79	76	63	46	37	21	16	482
Highest	217	225	134	162	148	214	174	173	123	115	98	74	782
Lowest	—	—	—	1	7	21	22	13	4	5	—	—	273
Highest one day	116	126	70	106	59	70	38	44	37	50	55	55	126
Wet days— Average number	3	4	5	7	13	17	18	16	13	10	6	4	116
OTHER INLAND													
Halls Creek M.O. (b)—													
Rainfall (mm)— Average	149	124	71	22	14	5	7	3	5	16	32	69	517
Highest	501	484	381	162	105	87	71	49	85	92	175	208	922
Lowest	13	3	2	—	—	—	—	—	—	—	1	4	250
Highest one day	202	124	100	88	62	36	48	42	37	61	97	120	202
Wet days— Average number	13	12	8	3	2	1	1	1	1	3	6	10	61
Marble Bar—													
Rainfall (mm)— Average	76	79	56	21	23	23	12	6	1	4	10	36	347
Highest	310	337	389	241	187	165	134	46	24	116	71	243	798
Lowest	—	—	—	—	—	—	—	—	—	—	—	—	12
Highest one day	152	121	305	125	91	105	63	32	24	84	61	150	305
Wet days— Average number	7	7	5	2	2	2	2	1	—	1	2	4	35

**TABLE 3.1 – RAINFALL AT REPRESENTATIVE CLIMATOLOGICAL STATIONS — *continued***  
**(Stations are arranged from north to south in three groups: Coastal, Wheat Belt and Other Inland)**

<i>Reporting station and characteristic</i>	<i>Jan.</i>	<i>Feb.</i>	<i>Mar.</i>	<i>Apr.</i>	<i>May</i>	<i>June</i>	<i>July</i>	<i>Aug.</i>	<i>Sept.</i>	<i>Oct.</i>	<i>Nov.</i>	<i>Dec.</i>	<i>Year</i>
OTHER INLAND (continued)													
Meekatharra M.O. (b)—													
Rainfall (mm)— Average	26	31	23	13	25	35	22	11	6	6	13	9	220
Highest	129	142	166	66	96	187	166	56	41	62	113	32	441
Lowest	—	—	—	—	—	1	—	—	—	—	—	—	66
Highest one day	103	57	58	37	37	114	62	23	17	25	82	24	103
Wet days— Average number	4	4	4	4	5	6	6	4	2	2	2	3	46
Laverton—													
Rainfall (mm)— Average	22	25	30	22	25	25	16	14	9	7	15	15	221
Highest	142	144	122	205	124	126	66	85	67	50	152	135	452
Lowest	—	—	—	—	—	—	—	—	—	—	—	—	66
Highest one day	75	87	67	54	52	40	33	41	44	49	91	71	91
Wet days— Average number	3	3	4	3	5	5	4	4	2	2	3	3	41
Kalgoorlie M.O. (b)—													
Rainfall (mm)— Average	22	28	20	19	27	32	26	20	15	16	18	14	257
Highest	186	308	143	99	110	186	83	70	98	84	115	60	488
Lowest	—	—	—	—	—	2	2	2	1	—	—	—	108
Highest one day	154	178	70	50	45	57	28	40	44	77	77	27	178
Wet days— Average number	3	4	4	5	7	8	9	7	5	4	4	3	63
Rawlinna—													
Rainfall (mm)— Average	13	17	20	17	18	19	14	16	13	13	13	15	188
Highest	210	123	85	114	81	131	59	155	85	64	81	117	497
Lowest	—	—	—	—	—	—	—	—	—	—	—	—	77
Highest one day	100	73	48	58	31	38	25	66	72	31	65	49	100
Wet days— Average number	2	3	3	3	5	5	5	5	4	3	3	3	44
Collie—													
Rainfall (mm)— Average	16	15	24	50	129	187	182	142	100	68	32	16	961
Highest	243	178	105	183	270	474	440	414	249	213	106	81	1,467
Lowest	—	—	—	0	15	56	52	31	15	2	1	—	598
Highest one day	74	106	84	63	62	91	69	73	58	49	48	32	106
Wet days— Average number	3	3	5	9	17	20	22	20	17	14	8	5	143
Manjimup—													
Rainfall (mm)— Average	20	20	31	64	137	177	179	149	108	79	47	24	1,035
Highest	92	117	138	194	269	332	320	323	257	165	122	78	1,761
Lowest	—	—	1	8	26	80	43	49	24	9	3	—	650
Highest one day	79	44	89	77	79	83	50	54	59	53	49	32	89
Wet days— Average number	5	6	7	11	17	20	22	20	17	14	10	7	156
Pemberton—													
Rainfall (mm)— Average	21	20	38	81	155	199	219	165	118	92	62	35	1,205
Highest	82	86	128	213	337	365	391	388	214	189	160	92	1,712
Lowest	1	1	5	6	36	116	130	50	45	13	6	3	802
Highest one day	60	30	77	81	77	59	91	61	45	44	45	42	91
Wet days— Average number	6	6	8	12	18	20	22	21	18	16	12	9	168
Mount Barker—													
Rainfall (mm)— Average	23	24	36	56	86	98	107	92	81	72	43	29	746
Highest	182	179	129	234	243	209	261	173	157	160	155	87	1,095
Lowest	1	1	4	4	16	43	22	33	18	16	3	1	431
Highest one day	105	72	56	139	71	68	72	48	45	54	64	44	139
Wet days— Average number	7	7	10	13	17	19	21	20	18	16	11	9	168

(a) Commencing with Year Book No. 21 — 1983 figures relate to reporting station on a new site. (b) Meteorological Office.

TABLE 3.2 – ANNUAL RAINFALL AT REPRESENTATIVE STATIONS  
(millimetres)

Station	1985	1986	1987	1988	1989	Long term 1990 average (a)	
Albany M.O. (b)	820	740	667	956	961	908	811
Broome M.O. (b)	395	339	528	482	309	195	563
Bunbury (c)	665	529	843	666	571	871	
Carnamah	231	388	274	388	300	477	390
Carnarvon M.O. (b)	202	210	103	108	160	204	227
Collie	753	638	620	(c)	759	837	960
Esperance M.O. (b)	561	651	572	552	773	568	626
Eucla	240	312	204	361	248	368	259
Geraldton M.O. (b)	392	558	460	466	427	429	472
Giles M.O. (b)	84	200	260	234	421	156	260
Halls Creek M.O. (b)	283	457	699	508	205	497	511
Kalgoorlie M.O. (b)	210	280	306	272	180	300	256
Katanning	409	397	330	517	462	440	484
Kellerberrin	261	337	272	333	269	347	330
Leonora	223	233	261	244	130	254	223
Manjimup	913	791	715	(c)	(c)	—	1,032
Marble Bar	238	266	330	620	373	194	345
Meekatharra M.O. (b)	170	303	289	186	328	209	221
Mount Barker	601	618	535	830	710	659	745
Narrogin	435	387	453	534	443	556	505
Newman	270	177	302	326	213	197	310
Northam	322	445	391	404	347	467	433
Onslow	67	432	180	180	200	224	263
Pemberton	1,040	997	869	1,388	1,186	1,260	1,204
Perth (Bureau of Meteorology)	691	930	768	912	738	786	868
Port Hedland M.O. (b)	102	167	153	533	568	97	314
Southern Cross	346	331	274	382	278	329	283
Wandering	489	507	472	598	516	594	622
Wongan Hills	356	401	377	477	335	452	388
Wyndham	462	683	872	663	461	610	730

(a) Number of years of record used to calculate the long-term average varies from station to station. (b) Meteorological Office. (c) Records incomplete.

## TEMPERATURE

The hottest months in Western Australia are November in the Kimberley, December a little further south and January near the Tropic of Capricorn. In the tropics temperatures generally rise from July, the coldest month, to November. In some places further rises occur, but in others the onset of the 'Wet' prevents this further rise and there is a slight fall. As the rains cease at these latter places temperatures start to rise again and there is another minor peak in March or April. After this there is a general fall until July.

South of the tropics the hottest month is January, except in coastal districts where February is hotter. The coldest month is again July.

The most consistently hot place in the State is Wyndham, where the mean maximum throughout the year is 35.5°C and the mean minimum for the coldest month is 16.9°C. Although at Marble Bar the yearly mean maximum of 35.3°C is very similar to that of Wyndham, its mean minimum

temperatures are consistently lower, falling to 11.6°C in the coldest month. The mean maximum at Marble Bar is the highest in Australia, exceeding 37.8°C in the five months from November to March inclusive. There are often long spells of hot weather in this region and during one period, from 31 October 1923 to 7 April 1924, the maximum temperature at Marble Bar reached or exceeded 37.8°C on 160 consecutive days.

Further south temperatures are lower, but even in the southern parts of the State there are occasional heat waves, the highest temperature on record being 50.7°C recorded at Eucla on the south coast.

Near the coast the sea breeze generally brings relief from high temperatures. It blows nearly every afternoon in the hot months, and is known in Perth as the 'Fremantle Doctor'. Away from the influence of the sea, extremes are greater, day temperatures being higher and night temperatures lower than in the coastal districts. During the winter, temperatures have fallen below -1.1°C in







TABLE 3.3 – TEMPERATURE AT REPRESENTATIVE CLIMATOLOGICAL STATIONS — *continued*  
 (Stations are arranged from north to south in three groups: Coastal, Wheat Belt and Other Inland)

Reporting station and characteristic	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
WHEAT BELT (continued)													
Wongan Hills—													
Mean max. °C	34.4	33.9	30.6	25.9	21.1	17.9	16.9	17.6	20.4	24.8	28.7	32.4	25.2
Mean min. °C	17.9	18.2	16.2	13.1	9.6	7.6	6.5	6.5	7.5	10.1	12.9	15.7	11.4
Highest max. °C	47.4	44.5	43.5	39.2	34.7	26.0	25.4	27.2	35.2	39.4	41.8	44.2	47.4
Lowest min. °C	8.8	9.6	5.6	2.8	-0.6	0.5	-0.9	-0.5	0.2	0.6	4.3	5.3	-0.9
No. of days 30.0°C and over	25	22	17	6	—	—	—	—	—	4	11	21	108
No. of days 40.0°C and over	4	3	1	—	—	—	—	—	—	—	—	2	10
No. of days 2.2°C or lower	—	—	—	—	—	1	2	3	1	—	—	—	7
Kellerberrin—													
Mean max. °C	34.1	33.3	30.2	25.2	20.7	17.5	16.3	17.3	20.2	24.7	28.6	32.1	25.0
Mean min. °C	17.5	17.6	15.6	12.2	8.8	7.3	6.1	5.8	6.7	9.3	12.7	15.6	11.3
Highest max. °C	46.5	46.7	44.4	39.2	35.6	26.9	24.9	28.3	36.5	39.4	43.1	45.0	46.7
Lowest min. °C	7.2	6.1	4.0	1.1	-2.2	-2.2	-2.0	-1.3	-1.0	0.3	1.7	5.4	-3.3
No. of days 30.0°C and over	24	20	15	5	—	—	—	—	1	5	11	19	102
No. of days 40.0°C and over	4	2	—	—	—	—	—	—	—	—	—	1	7
No. of days 2.2°C or lower	—	—	—	—	1	2	4	5	2	—	—	—	13
Southern Cross—													
Mean max. °C	34.6	33.7	30.7	25.7	20.5	17.1	16.3	18.0	21.9	25.4	29.7	33.2	25.7
Mean min. °C	17.1	17.1	15.0	11.3	7.4	5.7	4.3	4.7	6.4	9.1	12.7	15.5	10.4
Highest max. °C	46.1	47.2	44.4	39.6	33.3	27.5	26.7	30.6	34.8	39.3	43.4	45.9	47.2
Lowest min. °C	5.6	5.6	3.4	-1.1	-3.3	-4.3	-5.0	-3.9	-3.3	-1.1	1.1	3.4	-5.0
No. of days 30.0°C and over	26	21	17	6	—	—	—	—	1	6	13	22	112
No. of days 40.0°C and over	4	2	1	—	—	—	—	—	—	—	—	1	8
No. of days 2.2°C or lower	—	—	—	—	2	5	7	8	3	1	—	—	26
Northam—													
Mean max. °C	34.0	33.6	30.6	25.9	20.8	17.7	16.7	17.8	20.4	23.7	28.3	32.1	25.1
Mean min. °C	17.1	17.1	15.4	12.0	8.5	6.4	5.4	5.7	7.0	9.0	12.5	15.4	10.9
Highest max. °C	46.2	46.7	43.9	39.5	35.1	27.2	25.0	28.0	34.6	39.4	44.1	45.6	46.7
Lowest min. °C	7.3	7.5	5.5	-0.6	-2.7	-3.9	-2.1	-1.1	-1.0	-0.4	2.1	5.6	-3.9
No. of days 30.0°C and over	25	21	17	5	—	—	—	—	—	4	10	21	107
No. of days 40.0°C and over	4	3	—	—	—	—	—	—	—	—	—	2	10
No. of days 2.2°C or lower	—	—	—	—	1	3	4	4	2	—	—	—	14
Wandering—													
Mean max. °C	31.7	31.0	28.2	23.5	18.9	16.0	15.1	16.0	18.1	21.3	25.8	29.5	22.8
Mean min. °C	13.7	13.7	12.0	8.9	6.3	5.0	4.1	4.0	4.8	6.2	9.1	11.9	8.2
Highest max. °C	45.6	44.6	41.9	37.2	33.2	25.0	23.8	26.1	30.9	36.9	39.8	42.8	45.6
Lowest min. °C	3.3	2.8	-0.6	-2.2	-5.6	-5.7	-4.4	-3.9	-3.5	-2.6	-1.7	1.0	-5.7
No. of days 30.0°C and over	20	17	11	2	—	—	—	—	—	2	7	16	76
No. of days 40.0°C and over	2	1	—	—	—	—	—	—	—	—	—	1	3
No. of days 2.2°C or lower	—	—	—	1	6	7	9	10	9	5	1	—	48
Narrogin—													
Mean max. °C	30.8	30.0	27.2	22.4	18.2	15.3	14.6	15.1	17.3	21.2	24.9	28.9	22.0
Mean min. °C	14.7	14.9	13.6	10.9	8.1	7.0	5.8	5.6	6.2	8.1	10.7	12.9	9.5
Highest max. °C	43.7	42.8	40.9	36.1	32.2	26.2	22.2	24.9	36.4	37.8	42.1	43.2	43.7
Lowest min. °C	4.3	3.9	3.3	—	-1.4	-2.7	-2.7	-2.7	-3.0	-1.7	—	1.8	-3.0
No. of days 30.0°C and over	16	13	8	1	—	—	—	—	—	1	5	12	57
No. of days 40.0°C and over	1	1	—	—	—	—	—	—	—	—	—	—	2
No. of days 2.2°C or lower	—	—	—	—	1	2	3	4	3	1	—	—	14
Katanning—													
Mean max. °C	30.3	29.4	26.7	22.6	18.3	15.4	14.4	15.4	17.7	20.6	25.0	28.4	22.1
Mean min. °C	13.6	13.7	12.5	10.2	7.9	6.5	5.4	5.5	6.4	7.6	10.0	12.1	9.2
Highest max. °C	43.8	44.6	41.7	36.1	32.3	24.1	22.2	23.8	30.6	37.8	41.1	43.3	44.6
Lowest min. °C	5.0	3.3	1.7	0.6	-1.1	-2.1	-3.9	-2.2	-1.2	-0.6	1.7	2.7	-3.9
No. of days 30.0°C and over	16	13	9	1	—	—	—	—	—	1	5	12	58
No. of days 40.0°C and over	1	1	—	—	—	—	—	—	—	—	—	—	2
No. of days 2.2°C or lower	—	—	—	—	1	3	4	4	3	1	—	—	13

TABLE 3.3 - TEMPERATURE AT REPRESENTATIVE CLIMATOLOGICAL STATIONS — *continued*  
 (Stations are arranged from north to south in three groups: Coastal, Wheat Belt and Other Inland)

Reporting station and characteristic	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
OTHER INLAND													
Halls Creek—													
Mean max. °C	36.8	35.8	35.6	33.8	29.8	27.3	27.0	29.9	33.6	36.9	38.4	38.2	33.8
Mean min. °C	24.1	23.6	22.6	20.2	16.6	13.5	12.2	14.7	18.5	22.6	24.3	24.7	19.9
Highest max. °C	44.3	43.8	42.2	39.9	37.2	35.0	34.0	37.8	40.2	43.8	45.0	44.9	44.9
Lowest min. °C	15.6	12.2	11.0	7.2	2.4	0.2	-1.1	0.4	3.0	8.9	11.7	12.1	-1.1
No. of days 30.0°C and over	29	27	29	27	17	7	6	17	27	30	30	30	279
No. of days 40.0°C and over	6	3	1	—	—	—	—	—	—	3	9	9	31
No. of days 2.2°C or lower	—	—	—	—	—	—	—	—	—	—	—	—	—
Marble Bar—													
Mean max. °C	41.0	40.0	39.1	36.0	30.6	27.0	26.7	29.5	33.8	37.4	40.5	41.6	35.3
Mean min. °C	26.1	25.6	24.7	21.2	16.4	12.9	11.6	13.2	16.6	20.1	23.6	25.4	19.8
Highest max. °C	49.2	48.3	46.7	45.0	39.5	35.6	35.0	37.2	42.6	45.6	47.2	48.3	49.2
Lowest min. °C	18.9	13.9	15.3	11.1	5.6	1.1	2.2	3.9	5.6	10.0	14.4	17.2	1.1
No. of days 30.0°C and over	30	27	31	28	19	5	5	13	26	30	30	30	273
No. of days 40.0°C and over	19	14	13	3	—	—	—	—	—	8	17	23	94
No. of days 2.2°C or lower	—	—	—	—	—	—	—	—	—	—	—	—	—
Meekatharra—													
Mean max. °C	38.1	36.6	34.6	29.1	23.3	19.4	18.6	21.0	25.3	29.1	33.1	36.3	28.6
Mean min. °C	24.2	23.7	21.5	16.9	11.7	8.7	7.3	8.3	11.5	14.8	18.5	22.0	15.8
Highest max. °C	44.8	45.2	43.7	38.8	36.0	28.3	28.8	32.6	37.7	40.2	42.3	45.0	45.0
Lowest min. °C	12.2	12.3	10.3	5.8	1.7	-3.1	-0.2	—	3.5	5.2	5.2	11.1	-3.1
No. of days 30.0°C and over	29	26	27	14	2	—	—	—	4	14	23	29	169
No. of days 40.0°C and over	11	6	2	—	—	—	—	—	—	—	1	5	25
No. of days 2.2°C or lower	—	—	—	—	—	—	1	—	—	—	—	—	1
Laverton—													
Mean max. °C	35.8	34.8	31.9	27.2	22.1	18.5	17.8	20.0	24.5	28.0	32.1	34.9	27.4
Mean min. °C	20.5	20.0	18.0	13.9	9.5	6.6	5.2	6.4	9.5	12.8	16.6	19.3	13.5
Highest max. °C	46.1	46.1	44.4	40.0	35.0	30.2	30.1	33.9	36.8	40.6	43.9	45.6	46.1
Lowest min. °C	7.2	7.5	6.1	2.8	-0.9	-2.8	-4.2	-2.8	-1.1	2.2	4.4	10.0	-4.2
No. of days 30.0°C and over	28	22	20	11	2	—	—	—	3	13	20	25	147
No. of days 40.0°C and over	8	4	2	—	—	—	—	—	—	—	2	3	18
No. of days 2.2°C or lower	—	—	—	—	1	2	6	4	—	—	—	—	12
Kalgoorlie—													
Mean max. °C	33.6	31.9	29.6	25.1	20.4	17.5	16.5	18.3	22.0	25.5	28.9	32.1	25.3
Mean min. °C	18.2	17.7	15.9	12.4	8.3	6.2	4.8	5.4	7.8	10.8	13.9	16.6	11.5
Highest max. °C	46.5	46.1	44.5	39.2	33.3	27.6	28.1	30.6	36.8	40.7	41.7	45.0	46.5
Lowest min. °C	8.4	8.6	5.3	1.7	-1.8	-3.0	-3.4	-2.4	-0.6	-1.0	3.4	5.5	-3.4
No. of days 30.0°C and over	24	18	14	5	—	—	—	—	2	6	12	21	100
No. of days 40.0°C and over	3	2	1	—	—	—	—	—	—	—	—	2	8
No. of days 2.2°C or lower	—	—	—	—	1	4	8	6	1	—	—	—	20
Rawlinna—													
Mean max. °C	32.9	31.9	29.6	25.5	21.7	18.6	17.9	19.8	23.4	26.3	29.6	31.7	25.7
Mean min. °C	15.6	15.5	14.3	11.5	8.1	5.9	4.6	5.3	7.6	9.8	12.4	14.4	10.3
Highest max. °C	47.9	46.4	44.7	40.0	35.0	31.3	29.7	33.9	39.3	41.7	45.6	45.7	47.9
Lowest min. °C	5.6	5.0	6.1	1.7	—	-2.7	-2.3	-3.2	-0.6	0.7	0.8	5.1	-3.2
No. of days 30.0°C and over	22	17	14	8	1	—	—	1	3	9	14	19	106
No. of days 40.0°C and over	5	3	2	—	—	—	—	—	—	—	1	3	13
No. of days 2.2°C or lower	—	—	—	—	1	3	7	4	1	—	—	—	16
Collie—													
Mean max. °C	30.5	30.1	27.3	23.2	18.9	16.3	15.5	16.3	18.1	20.7	24.8	28.3	22.7
Mean min. °C	13.2	13.1	11.5	8.7	6.3	5.0	4.2	4.5	5.8	7.4	9.7	11.7	9.1
Highest max. °C	44.4	43.4	40.8	36.7	30.4	24.4	22.8	26.1	30.3	36.3	38.8	41.7	44.4
Lowest min. °C	3.2	1.8	0.2	-1.3	-2.2	-4.0	-3.9	-3.2	-2.2	-0.6	0.3	1.7	-4.0
No. of days 30.0°C and over	18	15	9	2	—	—	—	—	—	1	5	12	63
No. of days 40.0°C and over	1	—	—	—	—	—	—	—	—	—	—	—	2
No. of days 2.2°C or lower	—	—	—	1	3	6	8	9	5	2	—	—	34

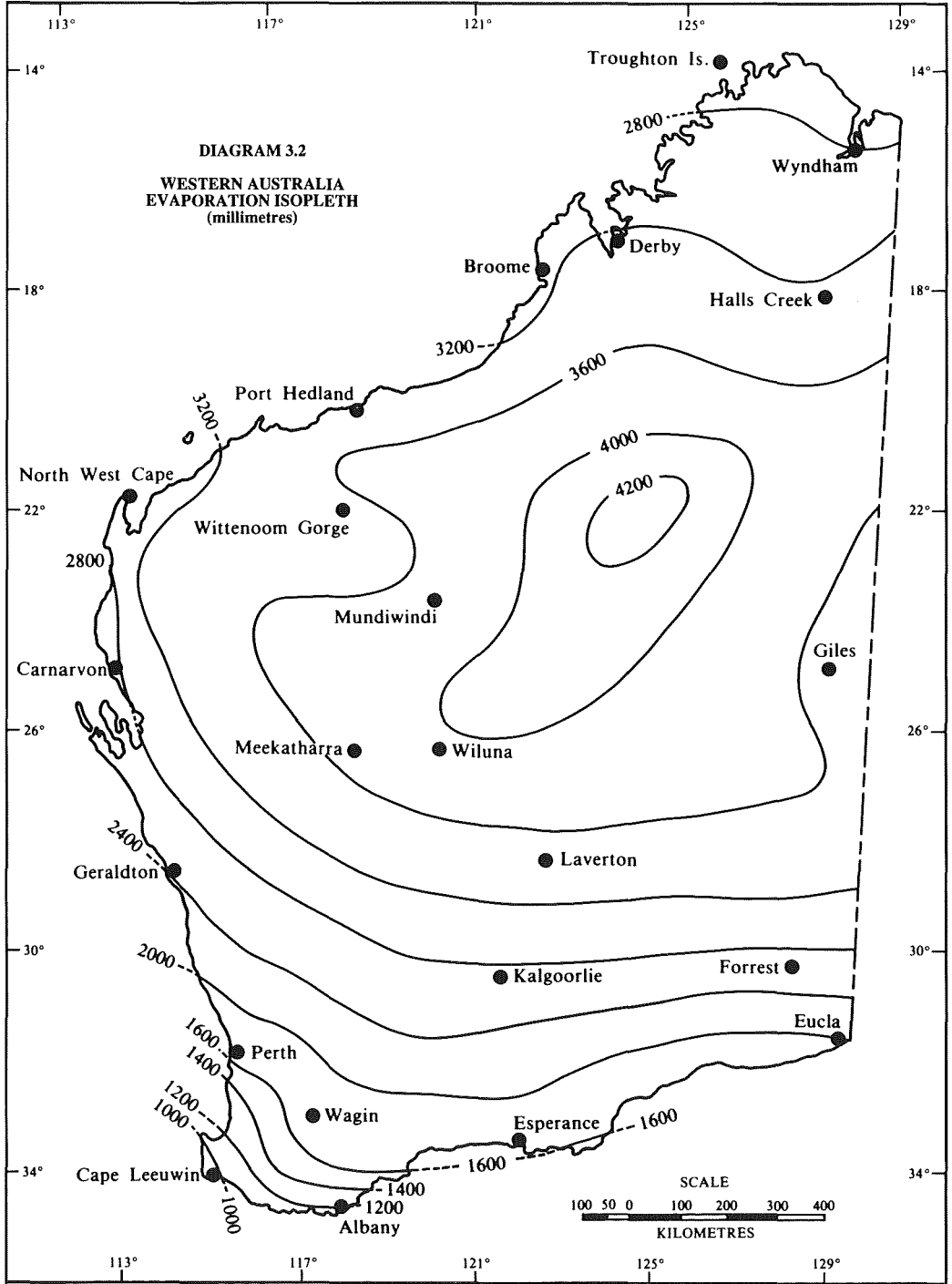


TABLE 3.3 - TEMPERATURE AT REPRESENTATIVE CLIMATOLOGICAL STATIONS — *continued*  
(Stations are arranged from north to south in three groups: Coastal, Wheat Belt and Other Inland)

Reporting station and characteristic	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
OTHER INLAND (continued)													
Manjimup—													
Mean max. °C	27.0	26.9	24.5	20.7	17.2	15.1	14.2	14.8	16.4	18.6	21.6	24.6	19.9
Mean min. °C	13.0	13.2	12.3	10.4	8.6	7.3	6.3	6.3	7.0	8.2	10.0	11.5	9.2
Highest max. °C	42.7	41.2	38.9	33.6	29.2	22.9	21.7	24.7	28.1	33.3	37.4	38.8	42.7
Lowest min. °C	5.6	4.4	3.3	1.6	-0.6	0.2	-2.8	-1.1	-0.6	0.6	1.7	4.4	-2.8
No. of days 30.0°C and over	10	9	5	1	—	—	—	—	—	—	2	6	33
No. of days 40.0°C and over	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of days 2.2°C or lower	—	—	—	—	—	1	1	1	—	—	—	—	2
Pemberton—													
Mean max. °C	26.0	26.1	24.1	20.6	17.6	15.6	14.7	15.1	16.5	18.6	21.1	23.6	20.0
Mean min. °C	13.0	13.5	12.5	10.7	9.1	8.1	7.1	6.8	7.3	8.4	10.1	11.8	9.7
Highest max. °C	43.2	40.1	38.9	33.9	28.3	23.2	22.0	25.6	28.3	30.6	37.0	38.5	43.2
Lowest min. °C	4.4	4.4	3.9	2.7	—	-0.4	-1.4	-1.1	-0.3	0.6	2.1	3.9	-1.4
No. of days 30.0°C and over	8	7	4	1	—	—	—	—	—	1	1	4	29
No. of days 40.0°C and over	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of days 2.2°C or lower	—	—	—	—	—	1	—	1	1	—	—	—	3
Mount Baker—													
Mean max. °C	26.2	25.9	24.0	21.0	17.6	15.2	14.2	15.0	16.8	18.7	21.8	24.3	20.1
Mean min. °C	12.6	12.8	12.1	10.4	8.4	6.9	5.8	5.9	6.8	7.9	9.7	11.3	9.2
Highest max. °C	43.9	43.2	40.6	37.2	32.2	23.3	22.2	24.4	28.9	35.6	39.3	40.0	43.9
Lowest min. °C	4.4	5.3	4.8	2.8	1.0	—	-0.6	0.5	—	1.7	3.5	5.0	-1.3
No. of days 30.0°C and over	9	8	6	1	—	—	—	—	—	1	2	6	32
No. of days 40.0°C and over	1	—	—	—	—	—	—	—	—	—	—	—	1
No. of days 2.2°C or lower	—	—	—	—	—	—	1	1	1	—	—	—	2

## THUNDERSTORMS

Thunderstorms are frequent in the Kimberley during the 'Wet' season but are practically unknown in the 'Dry'.

In most of the State south from the tropics thunderstorms are most frequent in the summer months but in the south-west they are more uniformly distributed and in many places in coastal districts they are most frequent in winter.

The winter storms are often accompanied by hail which, however, is usually not heavy enough to cause damage. Hail accompanying summer storms can be much heavier, and occasionally damages ripening crops in the wheat belt. Both winter and summer thunderstorms may be accompanied by severe squalls, but these are infrequent.

## EVAPORATION

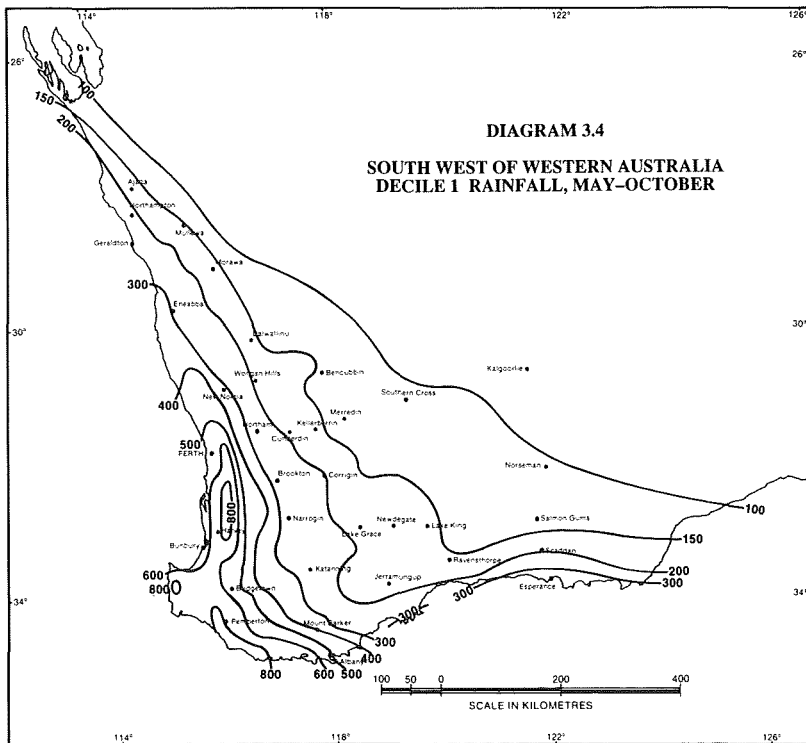
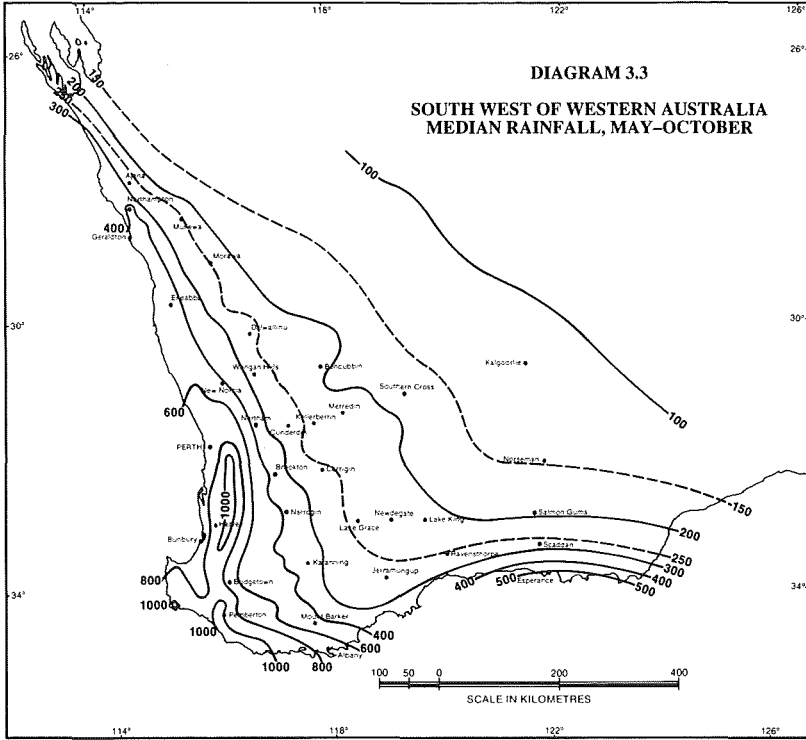
Except for the lower south-west, evaporation from a free water surface exceeds the annual rainfall, and in a large proportion of the State it is more than ten times greater than the rainfall.

It is least in the winter months, amounting in July to less than fifty millimetres in the far south-west, and to about 225 millimetres in the northern tropics. In January, when evaporation is highest, it totals about 200 millimetres on the far south coast and reaches 500 millimetres in the East Gascoyne and North-Eastern Meteorological Districts. Further north, evaporation is reduced by the moister air over the tropics at this time of the year.

Diagram 3.2 shows the average annual annual evaporation using the Class A pan evaporimeter with bird guard.

## GROWING SEASON RAINFALL

Crop production in the agricultural districts of the south-west of the State is dependent on the winter rains. The bulk of the useful rainfall for this purpose occurs in the six-month period between May and October. Diagram 3.3 shows the median (50 percentile) value of the rainfall in this period and the decile 1 (10 percentile) rainfall, (i.e. the rainfall total which on average is not exceeded in one year in ten) is shown in Diagram 3.4.



## SNOW

Snow has been known to fall as far north as Wongan Hills, but it is only in the southern districts that it occasionally lies on the ground. It is seen on top of the Stirling Ranges for a short time nearly every winter, but elsewhere is very infrequent and of negligible importance.

## METROPOLITAN CLIMATE

Perth has more sunshine and a greater number of clear days during the year than any other State capital city. It also has the wettest winter, the driest summer, and is the windiest of the capital cities. The highest temperature on record for Perth is 46.2°C (23 February 1991) and the lowest 1.2°C (7 July 1916).

TABLE 3.4 - CLIMATOLOGICAL DATA - PERTH BUREAU OF METEOROLOGY

Month	Wind				Temperature				Relative humidity (Saturation = 100%)		Cloud (proportion of sky covered)— Mean of readings at 9 a.m. 3 p.m. and 9 p.m.		Evaporation Mean daily amount
	Prevailing direction		Speed		Highest in sun	Lowest terrestrial	Mean	At 3 p.m.	Sunshine Mean daily amount	30 (a)	30 (a)		
	9 a.m.	3 p.m.	Average	High-est									
Number of observations	30 (a)	30 (a)	63	63	81	30 (a)	30 (a)	30 (a)	13 (b)				
			km/h	km/h	°C	date	°C	date	%	%	hours	%	mm
Jan.	E SSW	17.5	89	80.7	22/1914	4.2	20/1925	53	43	10.6	29	9.3	
Feb.	ENE SSW	17.2	113	78.7	4/1934	4.3	1/1913	52	43	10.0	31	8.9	
Mar.	E SSW	16.2	113	75.0	19/1918	2.6	(c)	57	46	8.9	35	7.1	
Apr.	ENE SSW	13.7	130	69.4	8/1916	-0.7	26/1960	60	48	7.3	42	4.4	
May	NE WSW	13.5	119	63.3	4/1925	-3.9	31/1964	68	58	6.0	54	3.0	
June	N NW	13.5	128	57.5	9/1914	-3.4	27/1946	72	63	4.9	59	2.3	
July	NNE W	14.2	137	56.2	13/1915	-3.8	30/1920	73	63	5.4	56	2.4	
Aug.	N WNW	15.1	156	62.8	29/1921	-3.0	18/1966	71	60	6.3	56	2.8	
Sept.	ENE SSW	15.1	113	67.5	29/1916	-2.7	(d)	64	57	7.2	4.9	4.0	
Oct.	SE SW	16.1	104	71.8	19/1954	-1.2	16/1931	64	54	8.4	48	5.7	
Nov.	E SW	17.2	102	75.0	30/1925	-1.1	1/1968	57	47	9.8	39	7.1	
Dec.	E SSW	17.7	102	76.0	11/1927	3.3	29/1957	54	46	10.6	32	8.7	
Year—													
Average	E SSW	15.6	..	..	..	..	..	62	52	8.0	44	..	
Extremes	..	..	156	80.7	22/1/14	-3.9	31/5/64	..	..	..	..	..	

(a) Standard 30 year's normal (1911-1940). (b) Class A Pan 1967-1979. Correction of + 7% applied for bird screen. (c) Recorded on 8 March 1903 and 16 March 1967. (d) Recorded on 8 September 1952 and 6 September 1956.

## Chapter 4

# FLORA AND FAUNA

## The Vegetation of Western Australia <sup>1</sup>

Contributed by T.E.H. Aplin and P.G. Wilson

(Western Australian Herbarium, Department of Conservation and Land Management)

The flora of Western Australia consists of about 8,000 species of flowering plants (angiosperms), 15 cycads and conifers (gymnosperms) and 50 ferns. The families of flowering plants that characterise the flora are also widespread throughout Australia, e.g. Myrtaceae, Proteaceae and Leguminosae. The Stylidiaceae, Goodeniaceae and Epacridaceae, which are poorly represented outside Australia, are well developed in Western Australia. Large groups of plants that are almost wholly endemic in this State are the *Chloanthaceae*, *Prostantheroideae* (Lamiaceae), *Personieae* and *Banksieae* (Proteaceae) and *Epacrideae* (Epacridaceae). At the generic level there are forty-seven monotypic genera, most of which are endemic in the South-West Province, while at the species level 2,472, or 68 per cent of species in the South-West are endemic, although it has been suggested that the degree of endemism may approach 75-80 per cent.

Climatically, Western Australia shows a marked variation from a predominantly summer rainfall pattern in the north to a characteristically Mediterranean-type winter rainfall pattern in the south. Between these two rainfall systems is a large region whose climate is characterised by the extreme variability of the rainfall both annually and seasonally.<sup>2</sup> The vegetation of Western

Australia is determined by these varying climatic patterns, although local changes in geology, soils, topography and drainage may affect the structure and/or the floristic composition of plant communities. The delineation of the present day vegetation also reflects the past tectonic and climatic history of the Australian continent.

It is generally accepted that in the Palaeozoic era the Australian continent was united with the continents of Africa, Antarctica, India and South America in a once common land-mass known as Gondwana. During this period these continents had a common flora as exemplified by the *Glossopteris* elements. In the late Neocomian period (Early Cretaceous), rifting between India (with Africa and South America) and Australia (with Antarctica) was initiated. In Eocene times (Early to Mid Tertiary), sea-floor spreading between Australia and Antarctica commenced and for the first time the southern coasts were warmed by the entering Indian Ocean. The early Tertiary flora of the South-West Province contained several sub-tropical rainforest and mangrove genera in abundance. The Australian continental block was isolated at about the time the pan-Australian flora began to develop, and the northward drift of the continent which brought the Australian block into contact with the Asian block in the middle

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1 See Appendix for reference to additional information in earlier issues of the Year Book

2 See Chapter 3, Climate and Meteorology

Miocene period (Late Tertiary) allowed the entry of a different flora, the 'Indo-Malayan' flora.

The degree of endemism and diversification in the south-western flora, which had its origin in pre-Miocene times, was brought about largely by the isolation caused by the late Eocene and Miocene seas which inundated the Nullarbor Shelf. Another factor that contributed to the diversification of the flora was the lateritisation that occurred in the Tertiary period, with the subsequent dissection of the lateritic landscape causing fragmentation of a once continuous flora.

**FORMATIONS AND ALLIANCES**

The classification of vegetation involves the groupings of similar structural units and the grouping or classification of the floristic components present in all strata of plant communities that form part of the vegetation.

**BOTANICAL PROVINCES AND DISTRICTS**

The vegetation of Western Australia has been sub-divided into three Botanical Provinces. The areas that these provinces occupy are determined largely by climatic pattern. Within each province are smaller regions, known as Botanical Districts, in which the structure and floristics of the vegetation are determined partly by climate and partly by geology and soils. The boundaries of these provinces and districts are shown in Diagram 4.1.

**TABLE 4.1 - PLANT COMMUNITIES - MAJOR STRUCTURAL FORMATION**

<i>Life-form and height of tallest stratum</i>	<i>Projective foliage cover of tallest stratum, as per cent</i>	<i>Description</i>
Trees over 30 m	70-100 30-70 10-30 under 10	High closed forest High open forest High woodland High open woodland
Trees 10-30 m	70-100 30-70 10-30 under 10	Closed forest Open forest Woodland Open woodland
Trees under 10 m	70-100 30-70 10-30 under 10	Low closed forest Low open forest Low woodland Low open woodland

**TABLE 4.1 - PLANT COMMUNITIES - MAJOR STRUCTURAL FORMATION - continued**

<i>Life-form and height of tallest stratum</i>	<i>Projective foliage cover of tallest stratum, as per cent</i>	<i>Description</i>
Shrubs over 2 m	70-100 30-70 10-30 under 10	Closed scrub Open scrub High shrubland High open shrubland
Shrubs 1-2 m	70-100 30-70 10-30 under 10	Closed heath Open heath Shrubland Open shrubland
Shrubs under 1 m	70-100 30-70 10-30 under 10	Low closed heath Low open heath Low shrubland Low open shrubland
Herbs	70-100  30-70  10-30	Closed hermland, closed tussock grassland, closed sedgeland, etc. Hermland, tussock grassland, sedgeland, etc. Open hermland, open tussock grassland, open sedgeland, etc
Hummock grasses	10-30 under 10	Hummock grassland Open hummock grassland

**The Northern Province**

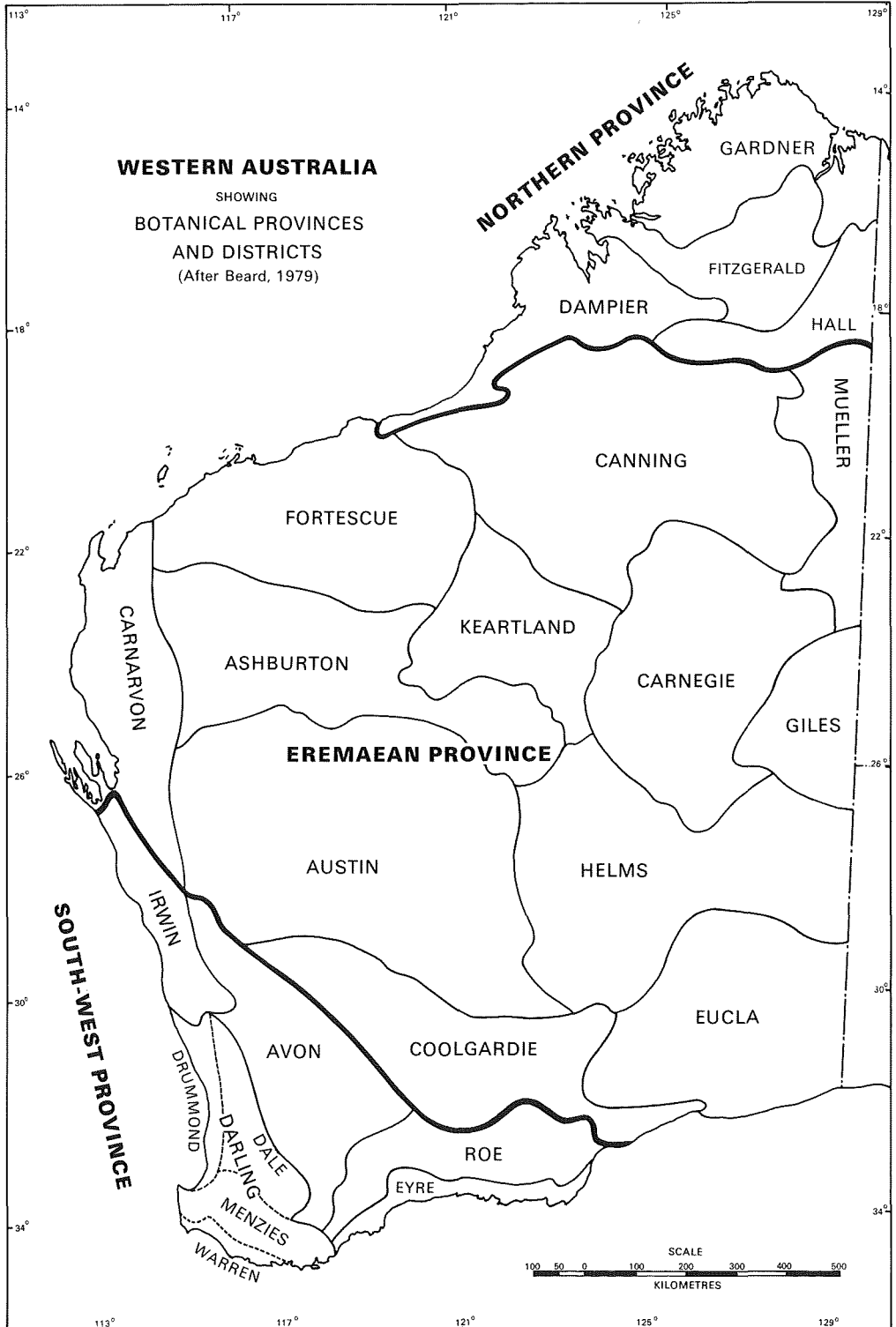
The Northern Province, or Tropical Zone, is characterised by a dry monsoonal climate. The rainfall received in the summer months ranges from less than 500 mm to over 1,250 mm per annum. The annual mean maximum temperature is over 30°C. The evaporation rate ranges from 2,000-2,500 mm per annum.

The vegetation formation consists of grassy *Eucalyptus* open forests and woodlands. The major components are 'Australian' elements, with 'Indo-Malayan' elements as minor components. The latter are usually found in special habitats such as streamlines or scarps. Some important 'Indo-Malayan' genera are *Ficus* (Moraceae), *Barringtonia* (Lecythidaceae) and *Terminalia* (Combretaceae).

**The Gardner Botanical District.** The Gardner botanical district, commonly referred to as the Kimberley Plateau, consists of a series of sandstone, shale, quartzite and volcanic rocks. The topography varies from alluvial flats through rolling to hill landscape to very rugged dissected



DIAGRAM 4.1



plateau. Saline mud flats are present along estuaries.

On the volcanic rocks and shales, on gently undulating to hilly topography, the woodland and open woodland formations consist mainly of *E. tectifera*-*E. grandifolia* alliance. *E. tectifera* sub-alliance is restricted to the volcanic soils while *E. grandifolia* sub-alliance is developed on the shales and sandstones. *E. latifolia* and *E. papuana* alliances characterise the flats and levee soils.

On the sandstone and quartzite rocks, ranges and hogbacks, the woodland, open woodland and low open woodland formations are mainly made up of *E. tetradonta*-*E. miniata* alliance. In this alliance, *E. tetradonta* sub-alliance is found mainly in the northern high-rainfall region while *E. phoenicea*-*E. ferruginea* (Scarlet Gum-Rusty Bloodwood) sub-alliance is its southern lower-rainfall counterpart.

Other alliances and associations found in the Gardner botanical district are *Terminalia* spp.-*Dichanthium* spp. woodland and grassland communities, on soils of heavy texture; *E. brevifolia*, *E. argillacea* and *Melaleuca viridiflora* associations on podsolics, over shales and sandstones; fringing communities of *E. camaldulensis* and *Terminalia* spp.-*Ficus* spp.-*Melaleuca* spp.; and mangrove communities on the estuarine mud flats. Closed mixed forests of 'Indo-Malayan' elements such as *Calophyllum*, *Ficus*, *Carallia*, *Barringtonia*, *Nauclea*, *Randia* and *Myristica* and *Melaleuca leucadendra* (Cadjaput) fringe gullies, while semi-deciduous vine thickets with lianes such as *Aristolochia*, *Capparis*, *Cansjera*, *Adenia* and *Canavalia* occur in small pockets.

**The Hall Botanical District.** In the Hall botanical district, the low open woodlands of *E. pruinosa* association are the low-rainfall counterparts of *E. tectifera* woodlands and occur on soils derived from basic rocks. *E. brevifolia* association is generally seen on skeletal soils on acid rocks, and also on many other soils. Low open woodlands of *Terminalia* spp. alliance occur on cracking clay soils formed on volcanics and limestone. Tussock grasslands with *Astrebla*, *Dichanthium*, *Chrysopogon* and *Panicum* occur on high-level plains of Tertiary alluvia. The rugged hilly country of the Halls Creek ridges carries *E. brevifolia* and *E. pruinosa* low open woodland associations over

*Triodia intermedia*. The gently undulating plains with calcareous soils carry arid short grass communities of *Enneapogon* (Bottle Washers), *Aristida* and *Sporobolus*.

**The Fitzgerald Botanical District.** The Fitzgerald botanical district consists essentially of mountain ranges, plateaus and steep-sided valleys. The ranges and plateaus are made up of quartzite and shale-sandstone with lateritic remnants, lightly covered with a thin soil mantle. The vegetation comprises mainly low open woodland of *E. brevifolia*, *E. dichromophloia* and *E. phoenicea*-*E. ferruginea* communities, with a patchy shrub layer and *Plectrachne pungens* as the main ground component.

**The Dampier Botanical District.** The Dampier botanical district is a region in which a great thickness of gently folded sedimentary rock, of Palaeozoic and Mesozoic age, overlies a Precambrian basement of crystalline rock. The basement outcrops along the north and east of the basin.

The upland regions consist of low hills and stony plains with granite domes, gneiss, hills, schist ridges and gently sloping sandy plateaus. The vegetation formations consist of low open woodland formations of Eucalyptus species with a hummock grassland ground layer. The main alliance of *E. brevifolia* is represented by a number of associations. One noteworthy association is *Grevillea pyramidalis*. The hummock grassland layer consists of the genera *Triodia* and *Plectrachne* in almost pure stands of species. A short grass ground storey with *Enneapogon* and *Aristida* may be seen on the interfluvial and hillfoot slopes to the south-east. The drainage floors usually carry low open woodland formations of *E. dichromophloia* and *E. tectifera* alliances. The grass layer includes the genera *Chrysopogon*, *Sehima*, *Sorghum* and *Dichanthium*.

The Dampier botanical district contains extensive areas of sandy plains which lack surface drainage. The dominant layer in the vegetation is composed of *Acacia*, the more important species being *A. tumida*, *A. eriopoda*, *A. pachycarpa*, *A. holosericea* and *A. monticola*. *E. dichromophloia* and *E. zygophylla* make up the tallest stratum of the low woodland formation containing these *Acacia* species. Other tree genera include *Gyrocarpus*, *Atalaya*, *Hakea*, *Grevillea*, *Lysiphyllum*, *Persoonia* and *Erythrophleum*, with

the occasional *Adansonia*. In the high rainfall area, a woodland formation of *E. miniata* alliance is present. This alliance also has a strong layer of *Acacia* shrubs. In this district *E. tetradonta* is not associated with *E. miniata* as it is in the Gardner botanical district.

### The Eremaean Province

The Eremaean Province, which lies between the predominantly summer and predominantly winter rainfall patterns of the north and the south-west, respectively, is intermediate in character. The rainfall, which over most of the province is less than 400 mm per annum, is received either from extensions of summer rainfall southward or from northern extensions of the southern winter systems. The vegetation of the province varies from woodland, high shrubland, low shrubland to hummock grassland. Eleven botanical districts have been broadly recognised, seven of them in the desert area.

**The Fortescue Botanical District.** The Fortescue botanical district, usually placed in the Northern Province, consists of the Pilbara block. The vegetation of the narrow coastal strip carries grasslands of *Eragrostis* and *Eriachne* and low open shrublands of *Acacia translucens*-*A. inaequilatera* alliance. *Acacia pyrifolia* high open shrubland alliance is present on granite and basalt soils. High shrubland and low woodland *A. aneura* alliance is found along the major valleys and southern flanks of the Hamersley Range. On the Proterozoic rocks of the Hamersley Range the characteristic vegetation is a low open woodland formation, with *E. leucophloia* alliance. Hummock grassland ground layer found on stony soils consists mainly of *Triodia wiseana* and *T. basedowii*. Low woodland formations of *E. dichromophloia*-*E. setosa*, with *Triodia basedowii* as ground cover, occur on the sand plains.

**The Ashburton and Austin Botanical Districts.** The Ashburton and the Austin botanical districts are separated by rainfall patterns. The former, with its rainfall more likely to occur in summer, and the latter, with its rainfall more likely to occur in winter, both carry extensive low woodland and high shrubland formations of *A. aneura* alliance but, whereas the northern alliance is associated more with grass genera such as *Aristida*, *Eragrostis*, *Eriachne*, *Panicum*, *Brachiaria*, *Triodia* and *Setaria*, the southern alliance is associated more with genera such as *Danthonia*, *Eremophila*, *Maireana*, *Helipterum*, *Cephalopterum*, *Velleia*, *Swainsona* and other herbaceous annuals. *A. aneura* alliance consists of

a number of sub-alliances and associations. *Maireana pyramidata* is associated with *A. aneura* on saline alluvial plains. Other woody genera that are prominent in the *A. aneura* alliance are *Hakea*, *Grevillea*, *Atriplex*, *Frankenia*, *Plagianthus*, *Alectryon* and *Brachychiton*.

**The Carnarvon Botanical District.** The Carnarvon botanical district, a sedimentary basin in which the exposed surface rocks range from Permian to Recent in age, is mostly low-lying. The vegetation on the northern plains consists of *Acacia xiphophylla* high open shrubland with *Triodia basedowii* as ground cover. On the sand plains the vegetation is predominantly *Acacia pyrifolia* open shrubland, with scattered *Owenia reticulata*, and with *Triodia pungens* and *Plectrachne schinzii* as ground cover. On Cape Range *E. dichromophloia* low open woodland, with *Triodia pungens* and *T. wiseana*, is to be seen.

*Acacia* species such as *A. coriacea*, *A. ramulosa*, *A. sclerosperma*, *A. xiphophylla*, *A. tetragonophylla*, *A. grasbyi* and *A. ligulata* form high open shrubland or low open woodland communities with shrub species of other genera over a wide area of this botanical district. On alluvial flats the low shrub understorey layer consists of species of *Maireana* and *Atriplex*. *Halosarcia* low open shrubland occupies the wetter sites. On Kennedy Range a mixed open shrubland with *Triodia basedowii* and *T. pungens* as ground cover is present.

The Canning, Mueller, Kearland, Carnegie, Giles and Helms botanical districts make up the desert region of Western Australia.

**The Canning and Mueller Botanical Districts.** The Canning and Mueller districts contain extensive areas of high shrubland with several species of *Acacia* dominating. On the sandy plains the dominant species is *A. pachycarpa* with *Triodia pungens* as ground cover. Scattered trees of *Eucalyptus* sp. (Desert Bloodwood) are present on the dunes. *Owenia reticulata* (Desert Walnut) is the principal low tree species in the north-western sector. *E. pachyphylla* and *E. odontocarpa* are prominent in the north-eastern sector, while woodlands of *Allocasuarina decaisneana* are also of local importance there, in the interdunes.

**The Keartland Botanical District.** The Keartland district has a noticeable abundance of *Thryptomene maisonneuvei* and other Myrtaceae in the high shrubland formation. The Desert

Bloodwood is present on the dunes, together with *Plectrachne schinzii*. *A. aneura* is of local importance, on small hills and mesas, with *Triodia pungens*. Hills of igneous rocks are covered with *Plectrachne melvillei*.

**The Carnegie Botanical District.** The Carnegie district carries extensive areas of *A. aneura*, with *Danthonia* and seasonal ephemerals. On the rises of the lateritic plains hummock grasslands of *Triodia basedowii* and high shrublands with *E. kingsmillii* merge in with the *A. aneura* which tend to thin out. Desert Bloodwood, *Allocasuarina decaisneana*, and *E. coolabah* become more local in distribution, while *Plectrachne schinzii* is increasingly replaced by *Thryptomene maisonneuvei* southwards.

**The Giles Botanical District.** The Giles district consists of ranges with sandhill country between them, somewhat similar to the Carnegie district. *Allocasuarina decaisneana* groves are very common in sandhill country between the ranges. *Triodia basedowii* and *Plectrachne schinzii* provide ground cover. On the ranges the high shrubland is made up predominantly of *Acacia* spp. including *A. aneura*, with *Eremophila*, *Hakea*, *Grevillea* and *Eucalyptus* as co-dominants in some areas. *Callitris columellaris* is locally dominant. *Triodia basedowii* and *Plectrachne melvillei* form the hummock grassland ground layer.

**The Helms Botanical District.** The Helms district contains extensive areas of *A. aneura* alliance. A high shrubland formation characterised by *E. youngiana* alliance is also well developed. Associated with the shrubland community are other tall shrubs such as *Hakea*, *Acacia*, *Melaleuca*, *Grevillea* and other *Eucalyptus* species. Patches of open woodland of *E. gongylocarpa* are restricted apparently to areas where the sand is deeper. The hummock grass associated with *E. youngiana* and *E. gongylocarpa* is *Triodia basedowii*.

**The Eucla Botanical District.** The Eucla botanical district, commonly referred to as the Nullarbor Plain, is dominated by a low shrubland formation of *Maireana sedifolia*. *Atriplex*, *Stipa* and seasonal ephemerals are well represented. Towards the margin a low open woodland of *Acacia sowdenii* alliance, with a shrubland understorey of *Maireana* and *Atriplex*, becomes more and more evident. To the north this is replaced by a low woodland made up of *Acacia aneura*, *Casuarina cristata* and *Myoporum platycarpum*. Along the coastal strip low

woodlands of *E. socialis*, *E. gracilis* and *A. sowdenii* alliances are to be seen on the ridges and flats, respectively. *E. transcontinentalis*-*E. flocktoniae* woodland alliance, found in the extreme south-western portion, forms a continuum with a similar formation in the Coolgardie botanical district.

**The Coolgardie Botanical District.** The Coolgardie botanical district marks the transition from the South-West Province to the Eremaean Province, from the Eucalyptus zone to the Acacia zone. In this district a high degree of variability occurs within Eucalyptus and Acacia. It is thought that this variability may have been due to climatic oscillations known to have occurred since the Pleistocene period, thus making many of the 'species' of recent origin. The vegetation is a mosaic of woodland and shrubland formations. Woodland formations include *E. salmonophloia*, *E. transcontinentalis*-*E. flocktoniae*, *E. torquata*-*E. lesouefii*, *E. dundasii*-*E. longicornis*, *E. brockwayi* and *Acacia aneura* alliances. Shrubland formations include *Grevillea eriostachya*-*G. didymobotrya*-*G. excelsior*, *Eucalyptus foecunda*, *E. eremophila* and other mallee or shrub eucalypts, *Acacia* spp.-*Casuarina* spp.-*Melaleuca* spp. and *Acacia aneura* alliances.

### The South-West Province

The South-West Province, which receives its rainfall in winter and has a warm to cool temperate climate, has a high degree of endemism in its flora. The degree of endemism is most powerfully expressed in the cusps of its triangular-crescentic area particularly in the high shrubland and heath formations found to the north of the Hill River and to the east of the Fitzgerald River. The shrubland and heath formations in the South-West Province, apart from certain communities dominated by *Eucalyptus* and *Acacia*, are known as Kwongan. Large areas of this province have been altered greatly by man and contain a high proportion of the naturalised alien species recorded in the State.

**The Darling Botanical District.** The Darling botanical district consists of four subdistricts. The Warren subdistrict, which occupies the extreme south-western corner of Western Australia, has an annual rainfall in excess of 1,200 mm. The main vegetation formations are the high open forest, on granite soils represented by *E. diversicolor* alliance; open forest on lateritic soils represented by *E. marginata*-*E. calophylla* alliance; low forest and scrub of *Agonis flexuosa* on extensive coastal dunes; also on sand dunes, heaths, with *Jacksonia*

*horrida*-*Acacia decipiens*; and sedgeland of *Evandra aristata*-*Anarthria* spp. in waterlogged areas.

The *Menzies* subdistrict marks the transition from the *Warren* subdistrict to the *Dale* subdistrict.

In the *Drummond* subdistrict the narrow strip of Recent or Pleistocene sand dunes carry scrub or low forests of *Agonis flexuosa* alliance at the southern edge, with *Acacia rostellifera*. *A. cyclops*-*A. cochlearis* alliance and sand dune complex over most of its length. Inland and parallel to the coastal dune system is a narrow belt of coastal limestone hills, the natural habitat of *E. gomphocephala* woodland alliance. The greater part of the Perth basin is mantled with aeolian sands. The northern sector carries a low forest formation of *Banksia menziesii*-*B. attenuata*-*Allocasuarina fraseriana*-*E. todtiana* alliance, with a heath understorey, and smaller areas of *B. prionotes* alliance; the southern part is dominated by a *E. marginata*-*E. calophylla* open forest or woodland alliance, with a heath understorey, and smaller areas of *Banksia* low forest. Poorly drained swampy areas carry *Casuarina obesa* low forest alliance. Swamp and fen formations are made up of complex communities of sedgeland. Watercourses in the district are fringed by a *E. rudis*-*Melaleuca* spp. alliance.

The *Dale* subdistrict occupies the laterite capped plateau dissected by young streams to form steep-sided valleys. An open forest formation of *E. marginata*-*E. calophylla* alliance characterises the lateritic erosional and deep depositional surfaces, with *E. wandoo* alliance restricted to the heavier pediment soils.

**The Irwin Botanical District.** The Irwin botanical district, for the most part, overlies sedimentary rocks from Silurian to Quaternary age, with smaller areas of Precambrian metamorphics. At the northern extremity, the Irwin district consists of red and yellow sands underlain by Mesozoic sediments. High shrubland formations are made up of mixed high shrubland with a heath understorey, with mainly Proteaceous and Myrtaceous elements, *Acacia* spp.-*Allocasuarina acutivalvis* and *Melaleuca* spp. and *Hakea* spp. scrub alliances. Low woodlands of *Banksia menziesii*-*B. attenuata*, *B. ashbyi*-*B. sceptrum*, *B. prionotes* and *Actino-strobus arenarius* occur on deep sands. Heath and low heath formations of Proteaceae, Myrtaceae, and Leguminosae occur in areas where the sand is shallow or where a lateritic crust is present.

The vegetation of the coastal dune system is an extension of the Darling district. The limestone hills in the Irwin district carry low woodlands of *E. erythrocorys*. Poorly drained areas and small lakes carry or are fringed by *Casuarina obesa* and *E. rudis*-*Melaleuca* spp. alliances.

The central to southern portions of the Irwin district are characterised by the so-called 'sand plains'. These carry low woodlands of *Banksia menziesii*-*B. attenuata*-*E. todtiana* and *B. prionotes* alliances particularly on the deeper sands. *E. lane-polei* (Salmonbark Wandoo) and *E. accedens* (Powderbark Wandoo) are of local significance, on heavy clay soils. In areas of deep dissection, the valleys carry woodlands of *E. wandoo* and *E. calophylla* alliances. Heath and low heath formations cover most of the elevated regions. Proteaceae, Myrtaceae and Leguminosae are dominant components, while on laterite hills *Xanthorrhoea reflexa* and *Dryandra* spp. become very conspicuous. High shrubland communities with *Grevillea eriostachya*-*G. didymobotrya*-*G. eriostachya*, *Lambertia multiflora* (Native Honeysuckle) and *Actinostrobus arenarius* alliances are also significant in the sandplain region.

**The Avon Botanical District.** The Avon botanical district, which covers most of the so-called wheat belt, is now for the most part cleared of native vegetation for farming.

On the eastern edge of the Darling district, on the low hilly to hilly terrain, with hard acidic yellow mottled soils, the pediments of early erosional cycles, the woodland formation consists of *E. wandoo* alliance. *E. marginata*-*E. calophylla* alliance occurs on soils which tend more to ironstone gravels with a sandy matrix. *E. wandoo* alliance is associated with *E. accedens*, and with *E. astringens* which commonly occur on lateritic breakaways. In the southern portion *E. gardneri* (Blue Mallet) and *E. falcata* (Silver Mallet) are more commonly seen on the breakaways, while *E. cornuta* woodland alliance replaces the *E. wandoo* woodland alliance. *E. wandoo* woodland has a very open low shrub layer.

On the hard neutral red soils of the river valley systems, which represent further erosional cycles, the woodland formation is represented by the *E. loxophleba* alliance, with *Acacia acuminata* as its main associate. *A. acuminata* tends to merge with the *E. wandoo* alliance, particularly as the soils become sandy or gritty. In the southern portion *E. occidentalis* alliance replaces the *E. loxophleba*

alliance. *E. occidentalis* woodlands occur also on the clay soils of swamps or seasonal shallow lakes.

Extensive areas of *E. salmonophloia* woodland alliance are found in the hard alkaline yellow soils further to the east, on valley plains and terraces. *E. salmonophloia* woodland has an open mixed low shrub understorey with *Maireana* and *Atriplex* dominating in more saline soils. Other trees associated with this alliance are *E. salubris* (Gimlet), *E. longicornis* (Red Morrel) and *E. melanoxylo*n (Black Morrel).

Salt lakes, remnants of once extensive river systems, carry *Casuarina obesa* and *Melaleuca* spp. low woodland alliances on the fringes with low shrubland formations of *Halosarcia* spp. alliance in the old watercourse. *E. sargentii* (Salt River Gum) and *E. kondininensis* (Kondinin Blackbutt) grow on saline soils.

**The Eyre Botanical District.** The Eyre botanical district lies at the edge of the Archaean Shield where it abuts into the Proterozoic metamorphics of the Albany-Esperance block. The latter consists largely of sediments of middle and late Eocene age, at one time mantled by a lateritic crust, which is represented in the present landscape by narrow ironstone gravel ridges and erosional scarps along the northern edge.

The Stirling and Mount Barren Ranges which rise abruptly out of an otherwise predominantly undulating landscape are composed of hard Proterozoic metasedimentary rocks. The ranges carry Kwongan of closed heath and scrub formations of mixed Myrtaceae, Proteaceae, Leguminosae and Epacridaceae alliance. Woodlands of *E. marginata*-*E. calophylla*, *E. wandoo* and *E. cornuta* occur on the lower slopes and valleys of the Stirling Range.

Over a large area of the Eyre district, the vegetation is made up of Kwongan of high shrubland formations with shrub or mallee eucalypts dominating. *E. tetragona*, *E. redunca*-*E. uncinata*, *E. gardneri*-*E. nutans* and *E. eremophila*-*E. oleosa* alliances form a mosaic over the area, the former on the undulating upper slopes and rises nearer the coast. Patches of mixed heath and low heath of Proteaceae, Myrtaceae and Leguminosae are present. The heath vegetation merges into and forms the understorey of the high shrubland communities. To the east *E. tetragona* alliance gives way to *E. tetragona*, while on the

sandy soils *Banksia speciosa*-*lambertia inermis* and *Nuytsia floribunda* become dominant.

Woodland formations of *E. occidentalis*, *E. loxophleba* and *E. salmonophloia* alliances occur along drainage lines and loamy slopes and flats. Low forests of *E. platypus*-*E. gardneri*-*E. falcata* alliance occur locally on scarp slopes.

The littoral fringe of the coastal plain is made up of a chain of granite bosses with drift sand between them. *Acacia rostellifera*-*A. cyclops*-*A. cochlearis* and *Agonis flexuosa* scrub alliances are present with the sand dune and granite lithic complexes. *Banksia baxteri* and *B. attenuata*, as well as *Lambertia inermis* (Chittick), are dominant on the drift sand, inland, with *E. marginata* and *E. cornuta*, the former found to the west, the latter restricted to interdunal flats.

**The Roe Botanical District.** The Roe botanical district contains a number of plant communities found in the adjacent Eyre, Avon and Coolgardie districts. On residual sandplains there are extensive areas of mixed heath.

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## The Fauna of Western Australia

(Contributed by the Western Australian Museum)

### EXTINCT FAUNAS<sup>3</sup>

Earth's oldest recorded organic remains occur in Western Australia. Stromatolites discovered near Marble Bar are about 3,500 million years old. They are dome-shaped structures in which sediment has been trapped by single-celled Cyanobacteria. Stromatolites have been found throughout sediments of Precambrian age; living survivors also occur in Western Australia, the best known being in Shark Bay.

Invertebrate marine life in the Cambrian (570-500 million years ago) is revealed in rocks in the Ord River district, crowded with trilobites (*Redlichia*, *Xystridura*), brachiopods (*Wimanella*, *Billingsella*) and *Biconulites*.

The Ordovician (500-400 million years) saw a substantial thickness of marine deposition in the West Kimberley, with abundant fossil nautiloids (e.g. *Kyminoceras*) and other molluscs, graptolites, trilobites and brachiopods (*Spanodonta*).

The Silurian (440-395 million years) seems to have passed with little sedimentation in Western Australia. In the lower Murchison district however, sandy deltaic deposit formed around the mouth of an extensive river system. This sandstone, now incised by the gorge of the Murchison River, has preserved tracks of a range of marine animals including those of large, scorpion-like predators known as eurypterids.

Seas of the Devonian (408-360 million years ago) abounded in early forms of fish. Limestones of this age in the West Kimberley have yielded exquisitely preserved fossils, including more than 34 species of primitive armoured fishes (placoderms), sea-living lungfish (dipnoans), rhipidistians and actinopterygians. Many of these show such fine anatomical details preserved that they have formed the basis for extensive revision of the classification and phylogeny of early vertebrates. Extensive shallow-water Devonian limestone reefs around the south-western part of the central Kimberley Block contain abundant marine faunas, including stromatoporoids (*Amphipora*, *Actinostroma*), corals, (*Hexagonaria*,

*Thamnopora*), brachiopods (*Stringocephalus*, *Ladjia*, *Schuchertella*), nautiloids (*Beloceras*), goniatites (*Manticoceras*, *Platyclymeria*), other molluscs, bryozoans and trilobites. The oldest known vascular plants from Western Australia occur only rarely in Devonian sediments of the East Kimberley (the lycopod *Leptophloeum*) and of the Carnarvon area (a lepidodendroid).

The Carboniferous (345-280 million years) saw deposition confined to parts of the East and West Kimberley and Carnarvon areas. The marine formations contain rich invertebrate faunas, including corals (*Syringopora*), brachiopods (*Camarotoechia*, *Cleiothyridina*, *Unispirifer*), trilobites, molluscs and bryozoans, and fishes.

Permian deposits (280-225 million years) cover extensive areas in Western Australia. Principal occurrences are in the West Kimberley, Carnarvon and Irwin River districts. Marine sediments contain diverse invertebrate faunas, including crinoids (*Calceolispongia*, *Jimbacrinus*), brachiopods (*Neospirifera*, *Linoproductus*, *Aulosteges*, *Strophalosia*), goniatites (*Juresanites*), bivalves (*Deltopecten*, *Schizodus*), gastropods (*Ptychomphalina*, *Bellerophon*), corals (*Pleurophyllum*, *Euriphyllum*) and the rare trilobite *Ditomopyge*. A shark, *Helicoprion*, is known from the Carnarvon district. Permian coal measures occur in the Collie and Irwin districts and contain a flora which includes *Glossopteris*, *Gangamopteris* and *Noeggerathiopsis*.

Rocks of the Triassic (225-194 million years) are exposed only in a few small areas of the State. A marine deposit in the Erskine Range, West Kimberley, contains large amphibians (*Deltasaurus*, *Blinasaurus*), fish including a dipnoan (*Ceratodus*) and invertebrates (*Lingula*). A similar deposit in the Geraldton district has yielded remains of *Deltasaurus*, ammonites (*Ophiceras*) and other invertebrates, including molluscs and brachiopods. Terrestrial deposits in the West Kimberley contain remains of the 'Seed Fern' *Dicroidium*, the bennettitalean *Otozomites* and other plants.



Jurassic (194-135 million years) marine sediments in the Geraldton area contain a rich, well-preserved mollusc fauna, notably bivalves (*Trigonia*, *Cucullaea*, *Oxytoma*, *Astarte*), and ammonites (*Fontannesia*, *Otoites*, *Pseudotoites*), a large nautiloid, brachiopods and rare echinoids. Slightly younger marine faunas in the West Kimberley contain the bivalves *Inoceramus*, *Buchia* and *Malayomaorica*, the ammonite *Kossmatia* and belemnites.

Australian Jurassic land vegetation included elements with extensive global distributions. Plants of this period recorded from the West Kimberley, include the Bennettites *Taeniopteris*, *Otozamites* and *Ptilophyllum*, the conifers *Brachyphyllum* and *Elatocladus* and *Ginkgoites*, related to the living Ginkgo.

Widespread deepwater radiolarites of the Cretaceous Period (135-65 million years) in the Carnarvon hinterland contain the large ammonites *Tropaeum*, *Australiceras* and numerous belemnites. Chalk occurs sporadically from near Exmouth Gulf southwards to near Perth and contains rich faunas of bivalves (*Inoceramus*, oysters etc.), brachiopods (*Inopinatarcula*, *Magadina*), crinoids (*Marsupites*, *Uintacrinus*) and occasional pachydiscoid ammonites. Greensands in the Gingin-Dandaragan district have yielded ichthyosaur, plesiosaur and mosasaur remains, as well as shark teeth. A Late Cretaceous deposit near Exmouth Gulf is notable for its prolific ammonite fauna which lived close to the time of extinction of this group of cephalopod molluscs. Western Australia's only known dinosaur, a theropod, *Megalosauropus broomensis*, is known only from footprints preserved in Lower Cretaceous sandstone at Broome. Land vegetation (including *Cladophlebis*, *Otozamites*) associated with this and other Lower Cretaceous deposits show affinities with archaic Jurassic forms.

The onset of the Tertiary (65-1.6 million years) brought major changes to marine faunas, with the decline and disappearance of a number of long-standing Cretaceous groups and their gradual replacement by more modern forms. Marine limestones and greensands of Paleocene (65-54 million years) age form an extensive surface outcrop in the Exmouth district and are notable for well-preserved faunas of echinoids (*Giraliaster*, *Schizaster*), brachiopods (*Tegulorhynchia*) and bryozoans; the nautiloids *Anuroidea*, *Deltoidonautilus* and *Teichertia* are also represented.

Eocene (55-40 million years) marine deposits in the Carnarvon hinterland contain well-preserved

faunas, notably corals and molluscs including the nautiloid *Aturia*. Plant remains include familiar modern genera, such as *Banksia*, *Casuarina* and forms related to *Araucaria*. *Banksia* cones from this area provide the earliest unequivocal record for the genus in Australia. Eocene deposits along the south coast contain a great diversity of fossil remains, both marine and non-marine. Marine groups present include many species of sponges, echinoids and molluscs, including the nautiloids *Aturia*, *Cimomia* and *Teichertia*. Rich assemblages of fossil leaves, wood, pollen, spores and occasional fruiting bodies are known from Eocene and other early Tertiary deposits in southern Western Australia. Most of this diverse flora remains to be identified; however, the presence of tree ferns and other ferns such as *Gleichenia*, the conifers *Araucaria*, *Agathis* and *Dacrydium*, palms such as *Livistona*, the Antarctic Beech, *Nothofagus*, mangroves including rhizophoraceans and genera of humid-tropical affinity, such as *Ficus*, *Terminalia*, *Bombax* and *Anacolosa* indicate vegetation consistent with a humid temperate rainforest environment.

In the Miocene Epoch (23-5 million years), extensive deposits of marine limestone were laid down in the Carnarvon and Nullarbor districts. These contain rich fossil assemblages, notably molluscs and echinoids. Affinities of the northern fauna lie strongly with the tropical Indo-Pacific; those of the Nullarbor area lie mainly with south-eastern Australia. Towards the end of the period, a marked intensification of global cooling was observed, accompanied by a substantial fall in sea level and in Australia, a shift toward continental aridity.

Sea levels appear to have remained lower than at present around Western Australia during most of Pliocene time (5.0-1.6 million years). Faunal remains from this period are known from deposits on the Roe Plains of the southern Nullarbor and from the subsurface near Perth. The coastline near Perth lay close to the foot of the Darling scarp, the Swan Coastal Plain being, for a time, wholly submerged.

During Quaternary time (the last 1.6 million years) many caves formed and have preserved the fossil remains of a vertebrate fauna of much greater diversity than that recorded today. Included are species of kangaroo (*Macropus*) larger than any living kangaroo, as well as other large macropods including *Sthenurus* and *Protemnodon*; the large diprotodontid *Zygomaturus*; the 'marsupial lion', *Thylacoleo*; a koala, *Phascolarctos*, a wombat *Vombatus*; a large echidna, *Zaglossus*; a giant

flightless bird of the family Dromornithidae and a large boid snake, *Wonambi*. When these elements became extinct is unknown, but it appears to have been more than 40,000 years ago. The Thylacine (*Thylacinus*) and Tasmanian Devil (*Sarcophilus*) became totally extinct within Western Australia more recently, the Thylacine disappearing about 3,500 years ago. The Dingo appeared first in relatively recent times no more than 4,000 years ago, co-existing only for a brief period with its marsupial counterpart, the Thylacine.

## CONTEMPORARY FAUNAS

### Origins and Distributions <sup>4</sup>

**Terrestrial.** The origins of the Australian fauna can be explained by the breakup of the southern hemisphere supercontinent, Gondwana, in the Cretaceous and the northward drift of Australia during the Tertiary to close the 4,000 kilometre gap with South-East Asia. Consequently the contemporary fauna comprises an ancient Gondwanic element with affinities with faunas of the other southern continents, and a more recent post-Gondwanic northern continental element. Representatives of the latter have reached Australia at different times by flying or rafting across water barriers of varying width. Among the earliest to arrive were successful rafters, such as lizards and rodents and good flyers such as certain birds and bats. Others (including humans) less able to cross the barriers arrived later by 'island-hopping' via the unstable arc of islands linking South-East Asia at times when sea levels were lower and water barriers narrower. There are thought to have been two main routes of invasion to Australia as a whole: from the Malaysian Archipelago (or Philippines) via Celebes to New Guinea and Cape York Peninsula, and via the Sunda Arc to the Kimberley and Arnhemland.

The present distribution of the modern Western Australian fauna reflects not only past geological and climatic events, particularly those of the Quaternary, but also short term climatic oscillations. The broad distribution patterns of most living terrestrial animals can generally be related to today's major climatic zones which give rise to three major faunal divisions: a northern tropical fauna adapted to conditions of reliable monsoonal summer rain and dry winters characteristic of the Kimberley; a temperate fauna adapted to Mediterranean-type conditions with

reliable winter rainfall and dry summers characteristic of the south-west and, between them, a fauna adapted to arid conditions with irregular and variable rainfall that prevail over the remainder of the State. These broad faunal divisions do not necessarily reflect origins and both Gondwanic and post-Gondwanic elements may be present in each. However, particularly in some of the more mobile groups, such as birds and bats, the Kimberley has stronger South-East Asian representation than the others. Additionally, a number of interesting Gondwanic relics are now confined to the south-west, e.g. certain genera of legless lizards (*Pygopodidae*), an onychophoran (*Occiperipatoides*) and the Salamander Fish (*Lepidogalaxias*).

Elevation has little influence on broad faunal distributions as Western Australia is generally of low relief, averaging only about 400 m above sea level with a maximum of 1,200 m.

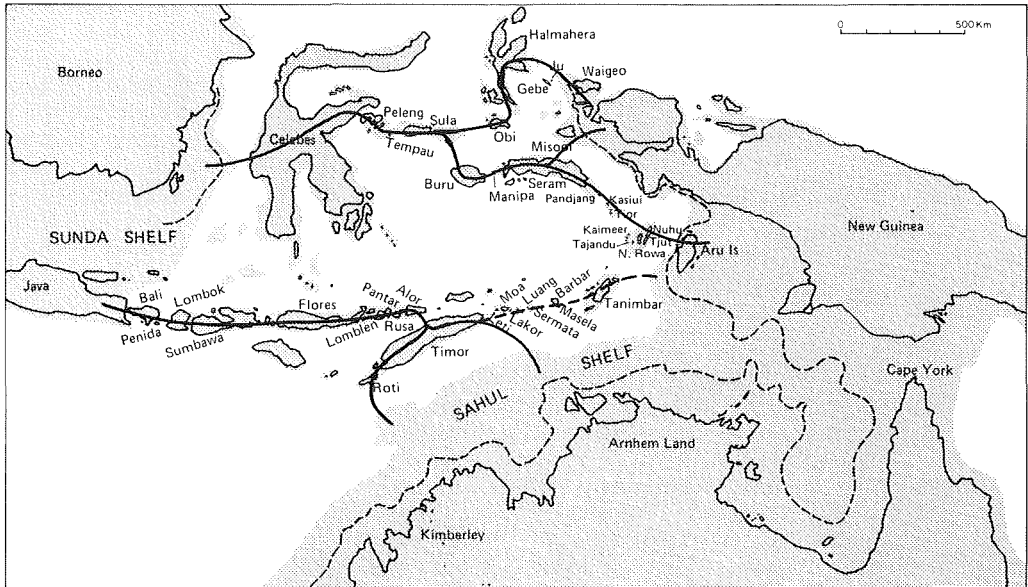
The distribution of some terrestrial species, particularly medium-sized marsupials, has been substantially modified by recent direct and indirect influence of European man (e.g. land clearing and introduction of alien animals), usually resulting in marked contraction of former distributional ranges, but a few distributions, such as that of the Crested Pigeon, have expanded. Near-shore islands, cut off by rising sea levels, such as Barrow, Bernier, the Houtman Abrolhos and the Archipelago of the Recherche, are important refuges for a number of terrestrial animals that have recently disappeared from the mainland or have contracting distributions. On some islands, forms have evolved that are distinct from their mainland counterparts.

**Inland Waters.** The inland waters of Western Australia may be divided into rivers and inland drainage systems. The flow regimes of the rivers reflect the climatic zones of the State. Rivers of the northern zone flow during the summer wet season. During the winter dry season flow is dependant on groundwater and may cease altogether, leaving only pools.

The fauna is rich and diverse, examples being the freshwater crocodile *Crocodylus johnstoni*, large freshwater prawns or Cherrabun (*Macrobrachium*) and archer fishes (*Taxotidae*). Rivers of the arid zone from the De Grey to the Murchison are subject to periodic flooding usually associated

DIAGRAM 4.2

## FAUNAL MIGRATION ROUTES TO AUSTRALIA



Exposed land areas at the lowest sea-level of approximately minus 120 m (stippled) and at the average sea level over the last 120,000 years of minus 50 m (dotted line). Postulated faunal migration routes are shown as solid lines (redrawn from Birdsell, 1977).

with cyclones, but become reduced to isolated pools during drought. The faunal assemblages of the larger rivers are impoverished in comparison with the rich assemblages of the Kimberley and some species represent outliers of these. Flow of most permanent rivers and streams of the south-western winter rainfall zone slows down substantially in summer and some are reduced to chains of pools. Increased salinity caused by agricultural clearing and building of dams is rapidly altering much of the riverine ecosystem in this zone. The fauna of the south-western rivers and streams is of particular interest for its Gondwanic element, examples of which are native minnows (*Galaxiidae*), freshwater crayfish (*Parastacidae*) and a freshwater mussel (*Westralunio*).

The inland drainage systems can be divided into fresh-water 'gnamma-holes' usually in granite outcrops, claypans (including man-made dams), swamps, soaks and lakes; and saline lakes. Gnamma-holes, claypans and soaks of the arid zone are characterised by an ephemeral fauna, mainly of brachiopod crustacea. Many birds and mammals dependent of free water must move away if they dry up. Man-made dams have

increased the availability of water and the abundance and distributions of certain animals in this zone have changed. Permanent lakes, swamps and soaks along the south-western coast are important refuges for water birds. The saline lakes of the inland and south-west support an interesting and highly adapted ephemeral fauna. Conspicuous when water is present are brine shrimps (*Artemia* and *Parartemia*), which at times build up to high population densities and attract large numbers of water birds, many of which breed there.

**Coastal Waters.** The coastal marine fauna of the north coast is distinct from that of the south coast although a few species do occur around the entire coastline. The northern fauna is representative of the widespread tropical Indo-West-Pacific fauna. It is the product of the continuous tropical conditions experienced on the north coast since the beginning of the Tertiary due to Australia's northward drift. The southern fauna is representative of a temperate element largely restricted to the Australian south coast. The south coast has experienced less stable environmental conditions than the north since the break-up of Gondwana, including circulation changes (development of the west wind drift) and marked temperature fluctuations owing to

glaciations and changes in position of the sub-tropical convergence. Consequently, the origins of the present fauna are complex, sometimes involving renewed contact between sister species which had evolved on the west and east coasts. Some species of the northern and southern faunas overlap on the west coast, with the distribution of tropical species being extended well south by the southward flow of the Leeuwin current in winter. This overlap region of the west coast is characterised by a number of endemic species. Of these, two commercially important examples are the Western Rock Lobster *Panulirus cygnus* and the Western Jewfish *Glaucosoma hebraicum*.

### Mammals<sup>5</sup>

The modern Australian mammal fauna comprises approximately equal numbers of marsupials (pouched mammals), and eutherians (true placental mammals), and two species of monotremes (egg-laying mammals).

Western Australia, with about one-third of the area of the continent, has 55 per cent of all Australian species of mammals. This fauna comprises 166 native and 19 introduced (including the Dingo) species, including representatives of all modern families except those of the Platypus, Tasmanian Tiger, Koala and rhinolophid bats. Excluding exotics and the single monotreme, the Echidna, the terrestrial assemblage comprises 53 per cent marsupials, 21 per cent rodents and 26 per cent bats. This is a close reflection of the proportion of these broad groups on the continent as a whole.

Because of the extensive coastline encompassing both tropical and temperate areas, Western Australian waters have representatives of most of the Australian aquatic mammals, including four seal, seventeen whale and fifteen killer whale and dolphin species, as well as a particularly large population of Dugong (*Dugong dugon*) at Shark Bay.

Nineteenth century American and other whalers took Sperm Whales *Physeter macrocephalus*, Southern Right Whales *Eubalaena australis* and Humpback Whales *Megaptera novaengliae*; local bay whalers also took the latter two species, while in the 20th century Humpbacks and Sperm Whales were hunted from shore stations. Humpbacks were so seriously overfished that the industry ceased in

1963 but there has been some recovery in numbers recently. Southern Right Whales are also being seen more frequently. Sperm whaling ceased in 1978. All cetaceans now receive special protection under the *Commonwealth Whale Protection Act 1980*.

The State's mammal fauna can be grouped into broad divisions related to climatic zones mentioned on page 54. The south-western zone is particularly rich in native terrestrial mammals, with sixty-three species recorded since European settlement. Endemics comprise the Dibbler, *Parantechinus apicalis*; White-tailed Dunnart, *Sminthopsis granulipes*; Western Ringtail Possum, *Pseudocheirus occidentalis*; Honey Possum, *Tarsipes rostratus*; Broad-faced Potoroo, *Potorous platyops*; Banded Hare-wallaby, *Lagostrophus fasciatus*; Quokka, *Setonix brachyurus*; Western Brush Wallaby, *Macropus irma*; the marsupial mice, *Sminthopsis gilberti* and *S. griseoventer*; *Sminthopsis* spp; Ashy Grey Mouse, *Pseudomys albocinereus*; and the Western Mouse, *Pseudomys occidentalis*.

The south-western zone is noticeably richer in macropodids than the other broad regions. However, many south-western species in the kangaroo family are now extinct there and persist only on the continental islands off the coast. Those no longer in the south-western zone are: Long-nosed Potoroo, *Potorous tridactylus*; Broad-faced Potoroo, *P. platyops* (extinct); Burrowing Bettong, *Bettongia lesueur*; Banded Hare-wallaby, *Lagostrophus fasciatus*; Rufous Hare-wallaby, *Lagorchestes hirsutus* and Crescent Nailtail Wallaby, *Onychogalea lunata* (extinct). Compared to the northern zone, the south-western zone is poor in bat species.

The northern zone of reliable summer rainfall has a relatively rich mammal assemblage of sixty-five species, particularly of the small vespertilionid and hipposiderid bats. This assemblage is more distinctive than those of the other regions, containing groups not found elsewhere in the State (hipposiderid bats; Blossom-bat, *Macroglossus*; mosaic-tailed rats, *Melomys*; tree rats, *Mesembriomys*; Rabbit-eared Rat, *Conilurus*; Scaly-tailed Possum, *Wyulda* and the little Rock-wallaby, *Peradorcas*) but excluding other genera that are widely represented elsewhere (Stick-nest rats, *Leporillus*; hopping mice, *Notomys*; Kultarr, *Antechinomys*; ningauis,

*Ningau* and long-nosed bandicoots, *Perameles*). Endemic to the Kimberley are: *Antechinus* sp. 'ningbing'; Scaly-tailed Possum, *Wyulda squamicaudata*; Warabi, *Petrogale burbidgei* and Yellow-lipped Eptesicus, *Eptesicus douglasorum*.

The south-western part of the Kimberley, incorporating Dampier Land, has a mammal fauna that is supplemented to some extent by an intrusion of arid and semi-arid zone mammals from the Great Sandy Desert. The subhumid North Kimberley has a group of species not found elsewhere in the region, including the Little Rock-wallaby, *Peradorcas concinna*; Warabi, *Petrogale burbidgei*; Northern Brown Bandicoot, *Isoodon macrourus*; Common Planigale, *Planigale maculata*; Black-footed Tree Rat, *Mesembriomys gouldi*; Pygmy Long-eared Bat, *Nyctophilus walkeri* and Lesser Wart-nosed Horseshoe Bat, *Hipposideros stenotis*. However, the species richness of this area declines with rainfall gradients and major geomorphological changes across the region. The east Kimberley has a relatively depauperate mammal assemblage with few drier-country species. This reflects the combined influence of the drier climate and its geomorphological similarities to the north Kimberley.

The arid zone includes the deserts, Pilbara, North West Cape, Murchison and Gascoyne areas. Over much of the region rain generally falls in summer, although the southern deserts and western part of the other areas receive most of their effective rain in winter. Mosaics of desert dune, sandplains and alluvial plain environments are found throughout the region.

The deserts, contrary to popular belief, are not markedly poor in species of mammals. Fifty-two species of native mammals are recorded from there. Although none is confined to the desert areas, a number are restricted to desert substrates (Hairy-footed Dunnart, *Sminthopsis hirtipes*; Lesser Hairy-footed Dunnart, *S. youngsoni*; Long-tailed Dunnart, *S. longicaudata*; Spinifex Hopping Mouse, *Notomys alexis*; Desert Bandicoot, *Perameles eremiana* and Desert Mouse, *Pseudomys desertor*). Dasyurids, particularly the species *Sminthopsis* and native rodents of the genus *Pseudomys*, are well represented (both genera by six species). However, the other rodent genera are poorly represented there.

Slightly fewer than half of the species found in the deserts have restricted arid or semi-arid distributions; many are widely distributed species including a few tropical intruders (Northern Brush-tailed Possum, *Trichosurus arnhemensis*; Northern Nailtail Wallaby, *Onychogalea unguifera* and Northern Mastiff-bat, *Chaerophon jobensis*) and those from the temperate south-western zone referred to earlier. The relative proportions of arid and wetter tropical elements in the desert mammal fauna show gradational changes as the deserts approach the south-western zone.

The mammal assemblage of the Pilbara, North West Cape, Gascoyne and parts of the Murchison areas shows greatest affinity with that of the deserts; as in the deserts, there are relatively fewer species (forty-nine) than either the northern or the south-western zones. Like the deserts these areas have relatively few macropodid and rodent species while dasyurids are well represented. Bats are well represented and the number of species (nineteen) in these areas is second only to the Kimberley—although as in the deserts there are relatively few vespertilionids. The Pilbara, because of its geomorphological similarities with the Kimberley, retains some elements of the Kimberley mammal fauna (Northern Quoll, *Dasyurus hallucatus*; Common Rock Rat, *Zyromys argurus*; Orange Horeshoe Bat, *Rhinonicteris aurantius*); it also has the endemic species: *Pilbara Ningau*, *Ningau timealeyi* and Chapman's Pseudomys, *Pseudomys chapmani*. The Little Red Antechinus, *Dasykaluta rosamondae*, once thought to be restricted to the Pilbara is now also known from the adjacent deserts.

As in eastern Australia, the group that has suffered most since European settlement comprises the medium-sized species i.e. the Desert Bandicoot, *Perameles eremiana*; Pig-footed Bandicoot, *Chaeropus ecaudatus*; Long-nosed Potoroo, *Potorous tridactylus*; Broad-faced Potoroo, *P. platyops*; Crescent Nailtail Wallaby, *Onychogalea lunata* and stick-nest rats, *Leporillus* spp. Several of the Western Australian species that are now extinct are however small rodents, namely *Notomys longicaudatus* and *N. macrotis*. The only group of mammals that has not apparently declined is the bats. In fact bats seem to have been favoured in some areas, such as the Pilbara and Murchison, by mining activity which has created new habitats in mine shafts.

## Birds <sup>6</sup>

For its size Western Australia has a small avifauna. Three hundred and eighty species breed here and another 130 visit the State.

As in most groups of animals and plants, the distribution of birds in Western Australia can be related to the principal climatic zones: the northern summer-rain zone, the central arid zone and the south-western winter-rain zone.

The northern zone, a region of open woodlands with grassy understorey, is the stronghold in Western Australia of such granivorous birds as the finches and pigeons. The larger streams are lined with relatively lush forests; living in them are many species of birds, especially honeyeaters, not found further south but which extend eastwards through the Northern Territory to Queensland. In north-west Kimberley, where mean annual rainfall exceeds 1,000 millimeters, semideciduous vine forests and thickets develop on basaltic soils and other favourable sites. Confined to them are the Scrub Fowl, Red-crowned and Torres Strait Pigeons, Rufous Owl and Rainbow Pitta.

The arid zone, a region of low and unreliable rainfall, occupies the greater part of the State. North of the Tropic of Capricorn little rain is received outside summer and early autumn. Here the vegetation is predominantly a hummock grassland of spinifex (*Triodia*) that supports very few species of birds. The woodlands of river gum and cajuput fringing the north-western rivers are somewhat richer in birds, including a few Kimberley species such as the Peaceful Dove, Pheasant Coucal, Blue-winged Kookaburra, Black-tailed Tree-creeper and Black-chinned Honeyeater.

With mean annual rainfall ranging from 250 millimetres at the mulga-eucalypt line to 1,500 millimetres in the karri forests of the deep south-west the winter-rainfall zone is much more diverse than the others. In the drier parts of the zone many of the birds inhabiting the mallee and eucalypt woodlands, e.g. the Mulga Parrot, Mallee Fowl, Southern Whiteface, Chestnut-tailed Thornbill and White-browed Babbler, also inhabit the adjacent mulga scrubs of the arid zone. Others,

like the Southern Scrub-robin, Gilbert Whistler and White-eared Honeyeater, do not transgress the mulga-eucalypt line; nor do they penetrate the eucalypt forests of the wetter parts of the zone.

Whereas the distributions of the mallee and woodland birds are continuous with or only narrowly separated from those of eastern Australia, the birds of the wetter forests and heaths of the south-west are widely separated. In isolation some of them have evolved into distinct subspecies, e.g. the Little Wattlebird and White-cheeked Honeyeater, or even full species, e.g. Baudin's Cockatoo, Noisy Scrub-bird, White-breasted Robin, Elegant Fairy-wren, Western Spinebill and Red-eared Firetail. One south-western forest bird, the Red-capped Parrot, has no close relative in south-eastern Australia.

## Reptiles <sup>7</sup>

Four families of turtles, five families of lizards, seven families of snakes and one family of crocodiles are represented in Australia. Only one of them, the Chelydidae, was certainly here before the fragmentation of Gondwana. The gecko subfamily Diplodactylinae could be another example; it occurs in Australia, the Loyalty Islands, New Caledonia and New Zealand. The families Pygopodidae and Carettochelyidae are confined to Australia and New Guinea; in the absence of fossils their place of origin is unknown, as is that of marine families Cheloniidae and Dermochelyidae. All remaining families, plus the gecko subfamily Gekkoninae, probably arrived here from South-East Asia after Australia drifted northwards from Antarctica.

In Western Australia there are 8 genera and 13 species of turtles; 42 genera and 313 species of lizards; 30 genera and 102 species of snakes; and 1 genus and 2 species of crocodiles.

The northern summer-rain zone has more in common with the far north of the Northern Territory and north Queensland than with the rest of Western Australia. It is the only part of the State inhabited by colubrid snakes, wart snakes and crocodiles, and it is much richer than other regions in monitors, blind snakes and mud snakes. In the gecko family the dominant genera are

6 Contributed by G.M. Storr.

7 Contributed by G.M. Storr.

*Gehyra* and *Oedura*; among dragon lizards, *Diporiphora* and *Gemmatophora*; among skinks, *Carlia*, *Ctenotus* and *Eulamprus*; and among elapid snakes, *Demansia* and *Denisonia*.

The fauna of the arid zone is strongly demarcated from that of the northern zone but forms a continuum with that of the south-western zone. In other words the mulga-eucalypt line is irrelevant in reptile distribution. Reptiles are generally much less sensitive to changes in the vegetation than to changes in the soil. Among arid-zone geckos the dominant genera are *Diplodactylus*, *Gehyra* and *Nephrurus*; among the dragons, *Ctenophorus* and *Tympanocryptis*; among skinks, *Ctenotus* and *Lerista*; and among elapid snakes, *Vermicella*. The seas of the Pilbara share with the Kimberley the bulk of the State's sea snakes and marine turtles.

The arid zone is not so impoverished in reptiles as in birds and frogs. It owes this to the fact that lizards are essentially lovers of warm dry climates, and in particular to the great radiation of two genera of skinks (*Ctenotus* and *Lerista*) and a genus of geckos (*Diplodactylus*).

The south-western winter-rain zone is the most diverse part of the State. From the warm dry north to the cool humid south there is a gradual decline in the number of geckos, dragon lizards, monitors and blind snakes. The number of skinks and elapid snakes does not decline, but the composition of these families changes rapidly. For example, the dominant skink genera in the north are *Ctenotus* and *Lerista*; in the south, *Egernia*, *Morethia* and *Hemiergis*. Compared with other regions, the south-western zone is notable for its wealth of legless lizards; indeed no other part of Australia is as rich in these lizards as the coastal plains between Shark Bay and the Swan River.

Unlike the birds, the reptiles of the south-western zone have little in common with those of south-eastern Australia. The south-western zone is well represented by such northern and arid genera as *Diplodactylus*, *Ctenophorus*, *Tympanocryptis*, *Ctenotus*, *Lerista*, *Menetia*, *Morethia* and *Vermicella*. Genera shared with south-eastern Australia include *Phyllodactylus*, *Aprasia*, *Hemiergis*, *Leiopolisma* and *Notechis*. Except in the far south these genera constitute only a minor

part of the fauna, and one of them (*Leiopolisma*) contains only two species, compared with twelve in south-eastern Australia and Tasmania.

### Amphibians<sup>8</sup>

Frogs alone occur in Australia, and they are represented over most of the continent by only two families, the 'tree frogs'; (Hylidae) and 'ground frogs' (Leptodactylidae). Since its contact with the northern island arc, two other families have entered Australia, namely the Ranidae (a single species in North Queensland) and the Microhylidae (eight species in North Queensland, one of which reaches the far north of the Northern Territory).

The frogs of Western Australia comprise two families: the Hylidae (2 genera, 25 species) and Leptodactylidae (12 genera, 51 species). In the far north (the region of good summer rains) hylid frogs slightly predominate. In the south-west (the region of good winter rains) leptodactylid frogs are overwhelmingly predominant. The intervening arid zone is understandably inhabited by many fewer species, but here too leptodactylids greatly predominate, owing to their ability to burrow and so avoid desiccation during droughts.

### Fishes<sup>9</sup>

The fish fauna of Western Australia comprises approximately 1,600 species, of which the tropical northern component is by far the largest with about 65 per cent of the total. The remaining species are divided between the southern temperate marine and freshwater environments which contain about 400 and 60 species respectively. Only about 6 per cent (95) of the marine species are endemic to Western Australia, whereas nearly 50 per cent of the freshwater fishes fall into this category. It has been conservatively estimated that another 200-300 species remain to be collected off this State, mainly from deep water.

Western Australia's temperate fish fauna consists of two major components, a cool temperate fauna inhabiting the south coast and lower west coast, and a warm temperate or subtropical fauna along the west coast. The first component is generally

8 Contributed by G.M. Storr.

9 Contributed by G.R. Allen and J.B. Hutchins.

made up of species that are shared with other areas of southern Australia, whereas the warm temperate component contains many species endemic to Western Australia. Among the coastal reef fishes for instance, over 55 species are confined to the seas of the State, most of which have the major portion of their distributions along the west coast. The temperate fauna extends up the west coast to the region of Kalbarri, thereafter the number of cool-water species decrease sharply northwards until Coral Bay where this element disappears.

The tropical fishes tend to be widespread, occurring throughout the vast Indo-West Pacific region. The northern tropical fauna is by far the largest comprising approximately 1,200 species. The majority are inhabitants of coral reefs, or their immediate vicinity, for example in adjacent sand flats or weed beds. The larger predators are the best known because of their edible qualities and the sport they provide for anglers. The most common fishes in this category include the gropers, coral cods, and coral trout (all members of the family Serranidae), the jacks or trevallies (Carangidae), tropical snappers or sea perches (Lutjanidae, unrelated to the popular southern snapper of the family Sparidae), sweetlips (Haemulidae), emperors (Lethrinidae) and barracuda (Sphyraenidae).

Coastal estuaries and sandflats represent another major tropical habitat for at least 100 species, including the juveniles of some species which later migrate to reefs. Mulletts (Mugilidae), threadfins (Polynemidae), ponyfishes (Leiognathidae), silver biddies (Gerridae) and herrings (Clupeidae) are common.

The freshwater fish fauna of Australia is small by world standards, consisting of about 150 species. However, this total can be approximately doubled if species which are basically marine or estuarine, but frequently enter freshwater, are added. The main reason for Australia's impoverishment is the extremely arid climate. Nearly all its freshwater fishes were derived in relatively recent times from sea-dwelling ancestors.

The Western Australian fauna can be conveniently divided into south-western (temperate) and northern (tropical) components with little intermixing of the two except in a few streams between the Murchison and Greenough Rivers.

The south-western freshwater fishes are mainly confined to the coastal belt between Esperance and Perth. Ten species are known from this region. Half of these belong to the family Galaxiidae, commonly known as native minnows. The group is represented by two genera: *Galaxias* and *Galaxiella*. The Salamanderfish, *Lepidogalaxias salamandroides* was formerly believed to belong to this group, but recent studies indicate that it is in a separate family (Lepidogalaxiidae). This small (five centimetre) fish is of special interest to biologists, some of whom believe that it is a pre-Gondwanic relic showing affinities with northern hemisphere esocoid fishes. It inhabits streams and waterholes in the Pemberton area and aestivates in damp soil during drought.

The northern fauna is more diverse and comprises twelve species in the Pilbara region and about 45 species in the Kimberley Division. About half are endemic to the State. The most speciose families are the grunters (Teraponidae), catfishes (Ariidae and Plotosidae), rainbowfishes (Melanotaeniidae), hardyheads (Atherinidae), glassfishes (Ambassidae) and gudgeons (Eleotridae).

#### Echinoderms<sup>10</sup>

All five groups of echinoderms: feather stars (Crinoidea) star fish (Asteroidea), brittle stars (Ophiuroidea), sea urchins (Echinoidea) and sea cucumbers (Holothuriodea), are well represented. The majority are either tropical species or endemic species with tropical affinities.

Certain edible holothurians known as *bêche-de-mer* or *trepang* occur on the shores and reefs of the north-west. Little is known of the fishing potential for trepang, but the resource has been traditionally fished by boats from Indonesia. The only other echinoderm of potential economic importance is the Crown-of-thorns starfish, *Acanthaster planci* which has caused extensive damage to coral reefs in the Indo-West Pacific.

#### Molluscs<sup>11</sup>

The marine molluscs number over 2,000 species. The shallow water marine molluscs may be divided into a northern tropical Indo-West Pacific fauna, a temperate southern Australian fauna and a region of overlap, characterised by the presence of west coast endemic species. The North West

10 Contributed by L.M. Marsh.

11 Contributed by F.E. Wells.



Cape area is the major geographical limit for tropical molluscs, with nearly one-third of species having their southern limit in that area. Two subsidiary areas of southern limits occur on the west coast at Shark Bay and the Houtman Abrolhos. The Houtman Abrolhos is the southernmost area that can be considered to have a basically tropical fauna; 72 per cent of the molluscs are tropical forms. South of the Abrolhos the tropical species rapidly drop out; only about 3 per cent of the tropical species occur as far south as Cape Leeuwin. Most of the temperate molluscs occur along the entire south coast of Western Australia to Cape Leeuwin. About 20 per cent have their northern limit in the Cape Leeuwin-Cape Naturaliste region; only 3 per cent extend to the north coast, beyond North West Cape. Endemics comprise about 10 per cent of the west coast fauna. While some occur on the north or south coasts most endemics have at least part of their range on the west coast. Although the number of endemic species is only a small fraction of the total molluscan fauna, some species occur in large numbers and are thus ecologically important in coastal habitats.

Commercial fisheries exist for abalone, scallops, squid and pearl oysters.

The freshwater mollusc fauna is impoverished, but best developed in the Kimberley. Salt lake snails, *Coxiella*, reach their greatest diversity and abundance in the south-west. Some freshwater snails are vectors for parasites.

The land snail fauna is adapted to a wide variety of climatic conditions, ranging from moist situations to the most arid. In the Kimberley the family Camaenidae is particularly diverse. *Bothriembryon* is diverse in the south and south-west.

### Corals<sup>12</sup>

Approximately 318 species of corals in 70 genera have been recorded for the State. Coral growth is best developed off the tropical north with patch and platform reefs on the inner Sahul and North-West Shelves and a series of atolls along the shelf edge—Ashmore, Seringapatam and Scott Reefs and the Rowley Shoals. Along the mainland coast of the Kimberley and Pilbara and adjacent islands are fringing reefs. Best developed is the

Ningaloo Reef which extends 220 kilometres southward from North West Cape. The most southerly true coral reefs in the Indian Ocean occur at the Houtman Abrolhos off Geraldton. South of the Abrolhos the coral fauna diminishes sharply but extensive colonies of *Pocillopora damicornis* and *Montipora* grow at Rottneest Island from where 25 species have been recorded. Seven genera reach Geographe Bay and four extend to the Recherche Archipelago. The southward extension of corals along the west coast to the south coast is facilitated by the Leeuwin current which transports larvae and maintains slightly elevated water temperatures in winter.

### Crustaceans<sup>13</sup>

The most important commercial crustacean species is the Western Rock Lobster, *Panulirus cygnus*, a west coast endemic. On the south coast, the Southern Rock Lobster, *Jasus novaehollandiae*, supports a small fishery. On the continental slope off the North west shelf five species of deep water lobsters, *Metanephrops*, are trawled, together with several species of deep water prawns.

The Swan River Prawn or School Prawn, *Metapenaeus dalli*, is netted by amateur and professional fishermen in west coast estuaries. In northern gulfs and bays larger prawns are taken by commercial trawlers. Fishing centres are at Shark Bay, Exmouth Gulf and Nickol Bay. The main species are the Western King Prawn, *Penaeus latisulcatus*, Brown Tiger Prawn, *P. esculentus* and Banana Prawn, *P. merguensis*. Two species of shovel-nosed lobsters sometimes taken in trawls are the Moreton Bay Bug, *Thenus orientalis*, and the Balmain Bug, *Ibacus peronii*.

The Blue Swimming Crab, *Portunus pelagicus*, is plentiful in summer in the estuary of the Swan River and at Mandurah. The large edible crab, *Hypothalassia armata*, occurs in deep water between Rottneest Island and Geraldton and Australia's largest crab, *Pseudocarcinus gigas*, is occasionally caught in deep water along the south-west and south coasts. Possibly two species of large edible mud crab (*Scylla*) occur in the mangroves of the north.

Crustaceans of the inland waters fall into the ecological climate-dependent groupings mentioned on page 55. The Cherrabun (*Macrobrachium*), a

12 Contributed by L.M. Marsh.

13 Contributed by P.F. Berry, D.S. Jones and G.J. Morgan.

large freshwater prawn, occurs in permanent pools of the Kimberley.

Ephemeral inland waters are often inhabited by shield shrimps (*Triops*, *Lepidurus*), fairy or brine shrimps *Artemia*, *Parartemia* and *Branchinella* and water fleas Cladocera. These produce resistant eggs which survive in dry sediment for years, hatch after occasional rains, grow rapidly to maturity and breed before the water dries up.

Permanent inland waters support copepods (especially *Boeckella*), water fleas (Cladocera) and shelled fairy shrimps (Conchostraca).

Several species of freshwater crayfish occur in the south-west. The Marron, *Cherax tenuimanus*, lives in permanent streams with deepwater pools; the Jilgie, *C. quinquecarinatus* in shallow permanent water, while the Koonac, *C. preissii* burrows in swamps. Three other crayfish species of *Engaewa* live in isolated seepages and swamps. The 'White Yabbie', *C. destructor* has been introduced from south-eastern Australia into many wheatbelt dams for local consumption. The shrimp *Palaemonetes australis* is abundant in fresh water and estuaries.

## ARACHNIDS AND MYRIAPODS<sup>14</sup>

### Arachnids

Six major groups of arachnids are known to occur in Australia: Spiders, scorpions, mites (and ticks), pseudoscorpions, harvestmen and schizomids.

Spiders are the most conspicuous group, with many different species occurring in or around houses. Orbweaving spiders (Araneidae) often spin large, sticky webs at night for prey capture, while others such as wolf spiders (Lycosidae) and huntsman spiders (Heteropodidae) are vagrant hunters, and usually do not construct aerial webs. Trapdoor spiders are common in Western Australia, but females are rarely seen due to their habit of seldom moving from their silk-lined burrow. However, upon maturity males leave their burrows to search for potential female mates. They then may wander into houses or fall into swimming pools. Local trapdoor spiders are often confused with the dangerous Sydney Funnel-web Spider (*Atrax robustus*), but true funnel-web spiders have never been reported from Western Australia.

The only Western Australian spider that is capable of inflicting a dangerous bite is the Red-back Spider (*Latrodectus hasselti*). This widespread species is very common around dwellings and other buildings, and although not aggressive, should be treated with caution. An antivenene is available.

Scorpions occur in many different habitats in Western Australia, but the largest dig deep spiral burrows to avoid desiccation. Mites and ticks (Acarina) are ubiquitous. Of the former, several are known to sporadically feed on humans, but the association is normally short-lived. Ticks feed on the blood of a wide variety of vertebrates such as kangaroos, bandicoots, domestic stock, goannas and birds. Pseudoscorpions are rarely seen, due to their small size and cryptic habits; they resemble scorpions, but lack the characteristic scorpion tail and sting. Harvestmen are also seldom seen, and may be easily mistaken for spiders. However, they lack a medial constriction of the body which is present in all spiders.

### Myriapods

Three main myriapod groups occur in Western Australia (centipedes, millipedes and symphylans) and all possess large numbers of legs (hence the name 'myriapod').

Most centipedes are fairly small and innocuous. However, several species are quite large, sometimes with colourful bands across the body, and capable of inflicting a painful bite. Millipedes are slow moving, rounded animals, often black in colour. The introduced Portuguese Millipede (*Ommatilius moreletti*) has been reported from several localities in Perth and other towns in the south-west. This species is a pest in South Australia where it occasionally reaches plague proportions, infesting houses and gardens. Symphylans are extremely small and agile, and rarely seen in Western Australia.

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## Insects

This section deals with the six-legged arthropods (or hexapods) which are known loosely as 'insects' and which comprise four classes: Collembola (springtails), Protura, Diplura and Insecta (the true insects).

The hexapods occupy virtually all terrestrial and freshwater environments and are the most diverse group of organisms on Earth. Only in the marine environment have they not been particularly successful.

The four classes are subdivided into 32 easily recognisable orders (e.g. Coleoptera — the beetles; Diptera — the flies; Orthoptera — grasshoppers and crickets). Most orders are cosmopolitan and only three very small, rather obscure ones (Grylloblattodea, Zoraptera and Raphidioptera) are absent from Australia. None is exclusive to this continent.

The proportion of species representing each order usually varies little from one continent or major region to another. So, in Western Australia as elsewhere, the largest orders by far (in descending order) are the Coleoptera, Lepidoptera (butterflies and moths), Hymenoptera (sawflies, wasps, bees and ants) and Diptera.

The orders are subdivided into families of which over 570 are represented in Australia and most of these occur also in Western Australia.

Recent estimates put the number of Australian insect species at over 100,000 and about half that number could reasonably be expected to occur in Western Australia. Doubtless a great many species remain to be discovered and described.

Comprehensive censuses of the insect faunas of individual Australian states have never been attempted so that broad scale comparisons between states are difficult to make. The study of insect systematics has not been well supported in Western Australia and documentation of the State's insect fauna has been left largely to workers in eastern Australia and overseas. Consequently, the fauna is comparatively poorly studied.

A detailed synopsis of the insects of Western Australia is beyond the scope of this article and readers requiring a comprehensive coverage of the State's insects are referred to the CSIRO textbook *The Insects of Australia* (2nd edition).

The three main climatic regions of Western Australia (northern, arid and south-western) differ considerably in their insect faunas. The northern region has an insect assemblage fairly characteristic of the monsoonal (Torresian) belt of northern Australia (although it lacks many rainforest elements); the arid zone fauna is much the same as that throughout the Eremaean Province of central Australia; and the south-western fauna has much in common with that of south-eastern Australia (Bassian fauna). Nevertheless, there is much overlap between the regions and some insect species inhabit all three. Many other species occupy restricted habitats within these regions. The Hamersley Plateau, for example, is a centre of endemism within the arid zone.

Endemism in Western Australia is quite rare at the family level, moderately common at genus level and very common at species level. The family Carthaeidae represented by a single fine species, the dryandra moth (*Carthaea saturnioides*), is restricted to south-western Australia as are the bizarre spoon-winged lacewings (*Chasmoptera* spp.: Neuroptera).

Specialised habitat requirements restrict the distributions of many species. Insects may require particular kinds of soils, water bodies, plants or animals to complete their life cycles. For example, a large and diverse assemblage of insects lives in association with the prickly spinifex (*Triodia*) grasslands which dominate large areas of the arid zone and some native bees are known to specialize in certain flower species confined to the Swan Coastal Plain.

Probably because of the absence of extensive tracts of rainforest, certain groups of insects are much less well represented in Western Australia than in some eastern states. Western Australia has, for example, only 33 of 202 species of cicadas and 103 of 382 species of butterflies described from Australia. The aquatic orders Odonata (dragonflies), Ephemeroptera (mayflies), Plecoptera (stoneflies), Megaloptera (alderflies) and probably also the Trichoptera (caddisflies) are also poorly represented, particularly in southern Western Australia. However, some other groups such as the paracolletine and stenotritid bees which abound in semiarid or arid habitats are much more diversified in Western Australia than elsewhere.

While the majority of the State's insects are indigenous, numbers of exotic species have also been introduced inadvertently. Most of the insects which infest city buildings, warehouses, grain stores and households are cosmopolitan pests introduced via goods and containers. Notable amongst the household pests are silverfish (Thysanura), the American Cockroach (*Periplaneta americana*), the booklouse (*Liposcelis* sp.), the clothes moths (*Tinea* and *Tineola* spp.), the carpet beetle (*Anthrenus verbascii*) and the biscuit beetle (*Stegobium paniceum*). The Indian house cricket (*Gryllodes sigillatus*), while a common nuisance because of its persistent nocturnal singing, is not known to cause damage.

Not all pest insects are introduced. Many native species are also economically important (e.g. certain grasshoppers which periodically behave as 'locusts' and various destructive termites). For a review of the economic insects of Western Australia see the 1990 and earlier editions of the *Western Australian Year Book*.

Undoubtedly the most popular and best studied insects on any continent are the butterflies but only 48 species inhabit the south-western region and only eight species are endemic to the State as a whole.

Given the paucity of the butterflies, many local collectors have turned to the jewel beetles, colourful members of the family Buprestidae. Australia has about 1,000 buprestid species and perhaps 400 of those occur in Western Australia. Many species are quite large, up to 7 cm in length, and adorned with various iridescent colours. Others do not rate as 'jewels', being very small and drab. This family now has legal protection in Western Australia so that specimens cannot be taken without a permit from the Department of Conservation and Land Management (the ant *Nothomyrmecia macrops* is the only other insect given such protection).

No insects in the State need be feared, except perhaps where allergic reactions are likely. Stings from the domesticated honeybee, *Apis mellifera*, are responsible for the greatest number of insect-related casualties. This is the only insect which leaves its sting in a victim.

Other stinging insects in Western Australia include the papernest wasps (*Polistes* spp.), the bulldog or

sergeant ants (*Myrmecia* spp.) and occasionally the introduced European Wasp (*Vespa germanica*), all of which may attack with little provocation.

Bites (delivered by the mouthparts) usually arise from insects' need for blood meals. Common culprits in Western Australia are the march flies (Tabanidae), mosquitoes (Culicidae), biting midges or 'sand flies' (Ceratopogonidae), stable flies (Muscidae), fleas (Siphonaptera), lice (Phthiraptera) and (rarely nowadays) bed bugs (Cimicidae). Some other insects may bite in self defence (e.g. assassin bugs, Reduviidae, and tree crickets, Gryllacrididae).

Some moth caterpillars have hairs or bristles which may cause stinging or irritation upon coming into contact with the skin or the eyes. Cup-moth (limacodid) larvae have eversible tufts of stinging bristles which are erected whenever the larvae are disturbed.

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## Chapter 5

### GOVERNMENT

#### System of Government

Western Australia is one of the six federated sovereign States which, together with the Northern Territory and the Australian Capital Territory, constitute the Commonwealth of Australia. Thus, in addition to having its own Parliament and executive government, it is represented in the federal legislature. As well as government at the Federal and State levels, there is a third system, that of local government, which functions through City Councils, Town Councils and Shire Councils.

#### OUTLINE OF CONSTITUTIONAL DEVELOPMENT

A Legislative Council was established in Western Australia shortly after its foundation as a Crown Colony and sat for the first time in February 1832. The Council was non-elective and consisted of the Governor and four senior officials. In 1839 membership was increased to nine when the Governor nominated four unofficial members. Additional appointments were made from time to time until the dissolution of the nominee Legislative Council in 1870 with the inauguration of representative government as provided for in the Australian Colonies Government Act of 1850. This Act, which enabled the establishment of representative governments in other Australian Colonies, withheld the privilege from Western Australia until such time as the Colony should be able to defray all costs of government from its own revenues, and it was not until 1870 that it was felt that Western Australia was able to satisfy this condition. The new Legislative Council, elections for which took place in October of that year, consisted of twelve elected members, three nominees and three officials. The number of members of the Council was increased in 1874 to 21, of whom 14 were elected, in 1882 to 24, of whom 16 were elected and in 1886 to 26, comprising 17 elected members, 5 nominees and 4 officials.

Following the passage by the Legislative Council of a Constitution Act in 1889 and subsequent representations made in London by delegates sent from the Colony, responsible government was granted to Western Australia by an Imperial Act assented to on 15 August 1890. Provision was made for the establishment of a Parliament of two Houses, to be known as the Legislative Council and the Legislative Assembly, to replace the old Council. Proclamation of responsible government was made in Perth on 21 October 1890 and election of the thirty members of the Legislative Assembly took place in November and December. The fifteen members of the Legislative Council were nominated by the Governor, as provided for in the Constitution Act, and the Parliament was officially opened on 30 December 1890. The Constitution Act of 1889, while prescribing a Council which was originally nominative, contained a provision that, after the expiration of six years or on the population of the Colony reaching 60,000, the Council should become fully elective. The required population was attained in 1893 and an amendment to the Act in that year enabled the election of twenty-one members to the Legislative Council, and at the same time increased the Legislative Assembly to thirty-three members. By an amendment of 1899, membership of the Legislative Council was raised to thirty and of the Legislative Assembly to fifty. Provision was made for the Legislative Assembly to be increased

to fifty-one members by the *Constitution Acts Amendment Act (No. 2) 1965*. The increase in numbers, however, did not become effective until the State general election in 1968.

On 1 January 1901, Western Australia and five other Australian Colonies were federated under the name of the 'Commonwealth of Australia', authority for the union having been given by the Commonwealth of Australia Constitution Act which was passed by the British Parliament in 1900. By a provision of the Constitution Act the constituent parts of the Commonwealth previously designated 'Colonies' became known as 'States'. Under the Constitution, powers are divided between the Parliaments of the Commonwealth and of the States by conferring power in respect of specific subjects on the Commonwealth either exclusively or jointly with the States, leaving the remaining powers to the States.

Procedure in both Federal and State Parliaments is based on British practice. The legislatures consist of the Sovereign, represented by the Governor-General of Australia or the Governor of the State, and the elected members. In the field of executive government the British 'Cabinet' system has also been adopted. The members of the Cabinets must hold seats in the legislature as elected members. The Cabinet is responsible to the Parliament and continues in office only while holding the confidence of the Parliament. All Cabinet Ministers are members of the Executive Council, the supreme group of advisers to the crown, and the Cabinet thus provides the executive government of the Commonwealth or the State. The executive Council is presided over by the Governor-General of Australia or the Governor of the State and at its meetings, which are formal and official in character, the decisions of the Cabinet are given legal form, appointments are made, resignations accepted, proclamations issued and regulations approved.

## VICE-REGAL REPRESENTATION

### The Governor-General of Australia

Under the Commonwealth Constitution, ultimate executive power is vested in the Crown and is exercised by the Governor-General as the direct representative of the Sovereign. Appointment to the office is made by the Crown after consultation with the Prime Minister of the Commonwealth. The present Governor-General is His Excellency the Honourable Bill Hayden, AC who was sworn in on 16 February 1989. During the absence from

Australia of the Governor-General it is usual for the senior among the State Governors to be appointed Administrator.

### The Governor of Western Australia

The Governor of Western Australia is the personal representative of the Sovereign in the State and exercises the powers of the Crown in State matters. He is the titular head of the Government and performs the official and ceremonial functions attaching to the Crown. In the event of the Governor's absence from Western Australia the Lieutenant-Governor of the State is appointed Administrator. If there is no Lieutenant-Governor it is customary for the Chief Justice of Western Australia to be appointed Administrator. The present Governor of Western Australia, Sir Francis Burt, KCMG, was appointed on 27 February 1990. He had been Acting Governor since June 1989 and had served as Lieutenant-Governor since 1977. Chief Justice David Malcolm was sworn in as Lieutenant-Governor on the same date, 27 February 1990.

The last Governor of Western Australia as a Colony was Lieutenant-Colonel Sir Gerard Smith, KCMG, whose term of office expired on 29 June 1900 and the first Governor of the State was Captain Sir Arthur Lawley, KCMG, who was sworn in on 1 May 1901.

**The Late Governor, of Western Australia, Professor Gordon Reid, AC.** Professor Gordon Reid was sworn in as the 25th Governor of Western Australia on 2 July 1984 and his term of office was extended for a second time in December 1988. His resignation of commission was accepted on 22 September 1989 following a disclosure of illness. Professor Reid died on 26th October 1989.

Professor Reid began his public service career in 1946 following a period with the RAAF (1942-1946) where he served with Bomber Command. On joining the public service Professor Reid was appointed to the staff of the House of Representatives; he rose to become Sergeant-at-Arms and Clerk of Committee whilst completing his degree in commerce. After studying for a doctorate through London University, Professor Reid went on to become a reader in politics at Adelaide University in 1965. In 1966 he was appointed to the newly created Chair in Politics at the University of Western Australia and was re-appointed to that position in 1974 following a brief sojourn as professor of

political science at the Australian National University; four years later he became Deputy Vice Chancellor.

In 1983 the Commonwealth Parliament commissioned Professor Reid to write a 200,000 word history of the Australian Parliament. Designed to coincide with the Bicentennial this work went to press in 1988 and was titled *Australia's Commonwealth Parliament 1901-1986*. For this work and for services to learning and the Crown Professor Reid was admitted as a Companion in the Order of Australia in the 1986 Queen's birthday honours list. Two years earlier the Senate of the University of Western Australia had also honoured him by making him an emeritus professor.

### THE FEDERAL PARLIAMENT

The legislative power of the Commonwealth is vested in a Federal Parliament which consists of Her Majesty the Queen (represented by the Governor-General), a Senate and a House of Representatives. Subject to the Constitution, the Federal Parliament is empowered to make laws concerning, among other things, defence, external affairs, customs and excise, trade and commerce with other countries and among the States, taxation, borrowing of money on public credit, currency and coinage, banking, insurance, navigation, fisheries, quarantine, posts and telegraphs, census and statistics, immigration, naturalisation and aliens, copyrights and trademarks, bankruptcy, marriage, divorce and matrimonial causes, social services, and conciliation and arbitration for the prevention and settlement of industrial disputes extending beyond the limits of any one State. The Constitution provides that, when a law of a State is inconsistent with the law of the Commonwealth, the Commonwealth law shall prevail and the State law shall, to the extent of the inconsistency, be invalid.

The qualifications necessary for membership of the Federal Parliament and for voting at federal elections are described in *Year Book Australia*. Under the provisions of the *Commonwealth Electoral Act 1973*, which was proclaimed operative from 21 March 1973, the age qualification for enrolment, voting and candidature

for federal parliamentary elections was lowered from twenty-one years to eighteen years.

The payment of allowances to Senators and Members of the House of Representatives is provided for in the Constitution and a superannuation scheme is established under the provisions of the *Parliamentary Retiring Allowance Act 1984*.

### The Senate

The Senate consisted originally of thirty-six members, six Senators being returned from each State. The Parliament is authorised by the Constitution to increase or decrease the number of members. The growth of the population since Federation having been such as to warrant a considerable enlargement of the Parliament, a Representation Act was passed in 1948 to provide for increased membership by raising from six to ten the number of Senators from each State. A further Representation Act was passed in 1983 increasing the number of Senators for each State from ten to twelve. The counting of votes in elections for the Senate is one of proportional representation. A summary of the procedure is given in the *Western Australian Year Book* No. 24—1986 and earlier issues..

Members are elected on the basis of adult suffrage by the people of the State which they represent. As provided by the *Commonwealth Electoral Act 1918*, enrolment as an elector is compulsory for all qualified persons except those who are Aboriginal natives of Australia. Aborigines, although entitled to enrol, are not required to do so. Voting is compulsory for all enrolled persons in terms of an amendment of 1924 which operated for the first time at elections held on 14 November 1925. The term of office of a Senator is normally six years and commences on the first day of July following his election. One-half of the members retire at the end of every third year and are eligible for re-election.

Elections for the Senate were last held on 24 March 1990. Table 5.1 shows the Western Australian membership of the Senate at April 1991.



**TABLE 5.1 – WESTERN AUSTRALIAN MEMBERS OF THE SENATE**

<i>Member</i>	<i>Political party</i>	<i>Year of retirement</i>
M.E. Beahan	A.L.P.	1996
I.G. Campbell	Lib.	1993
Hon. P.F.S. Cook	A.L.P.	1993
W. Crane	Lib.	1996
N.A. Crichton-Browne	Lib.	1996
Hon. P.D. Durack, QC	Lib.	1993
P.J. Giles	A.L.P.	1993
S.C. Knowles	Lib.	1993
J.P. McKiernan	A.L.P.	1996
J.H. Panizza	Lib.	1996
J. Vallentine	Ind.	1996
Hon. P.A. Walsh	A.L.P.	1993

A.L.P. = Australian Labor Party. Lib. = Liberal Party. A.D. = Australian Democrats. Ind. = Independent.

### The House of Representatives

State membership of the House of Representatives is on a population basis with the proviso that each State shall have at least five members. The Constitution provides further that the number of members of the House of Representatives shall be, as nearly as practicable, double the number of Senators. With the enlargement of the Senate from thirty-six to sixty members, the membership of the House of Representatives was increased, from the date of the 1949 elections, from seventy-four to 121, not including a member for the Australian Capital Territory, which achieved representation for the first time at this election, and a member for the Northern Territory, which had been represented since 1922.

Subsequent redistributions have increased the number of members of the House of Representatives in line with population growth. At the last election in March 1990, the following numbers of members of the House were elected: New South Wales 51; Victoria 38; Queensland 24; Western Australia 14; South Australia 13; Tasmania 5; plus the Australian Capital Territory 2 and the Northern Territory 1, making a total of 148 seats. Diagram 5.1 shows House of Representatives electorates in Western Australia.

Members of the House of Representatives are elected for the duration of the Parliament—which is limited to three years—by the people of the electorate whom they represent. As provided by the *Commonwealth Electoral Act 1918*, enrolment for electors is the same as for the Senate. Voting is on the preferential system.

Elections for the House of Representatives were last held on 24 March 1990. Table 5.2 shows the Western Australian membership of the House of Representatives at April 1991.

**TABLE 5.2 – WESTERN AUSTRALIAN MEMBERS OF THE HOUSE OF REPRESENTATIVES**

<i>Member</i>	<i>Political party</i>	<i>Electorate</i>
W.F. Fatin	A.L.P.	Brand
G. Gear	A.L.P.	Canning
C.A. Jakobsen	A.L.P.	Cowan
A.C. Rocher	Lib.	Curtin
G.D. Prosser	Lib.	Forrest
Hon. J.S. Dawkins	A.L.P.	Fremantle
G. Campbell	A.L.P.	Kalgoorlie
P. Filing	Lib.	Moore
C.W. Tuckey	Lib.	O'Connor
F. Chaney	Lib.	Pearce
Dr R.I. Charlesworth, AM	A.L.P.	Perth
R.F. Edwards	A.L.P.	Stirling
Hon. K.C. Beazley	A.L.P.	Swan
P.D. Shack	Lib.	Tangney

A.L.P. = Australian Labor Party. Lib. = Liberal Party of Australia.

### THE STATE PARLIAMENT

The Crown, represented by the Governor, and the Parliament, comprising a Legislative Council and a Legislative Assembly, constitute the legislature of Western Australia.

Executive government is based, as in the case of the Commonwealth and other States, on the system which evolved in Great Britain in the eighteenth century and which is generally known as the 'cabinet' system. The cabinet consists of Ministers of the Crown chosen for the Ministry from members of Parliament belonging to the political party, or coalition of parties, which is in the majority in the Legislative Assembly. The Constitution requires that at least one of the Ministers be selected from members of the Legislative Council. In Western Australia, as in the other Australian States, the office of principal Minister is designated 'Premier'.

Since 1890, when responsible government was granted to Western Australia, there have been twenty-nine separate Ministries. No organised political party existed in the Colony until the formation of a Labour party in the 1890s. A Labour Ministry assumed office in 1904.

The Constitution Act of 1889 provided for a Ministry of five members. This number was

increased by subsequent amendments to the Act to seventeen and is currently sixteen Ministers.

The right to vote at parliamentary elections was extended to women by the *Constitution Acts Amendment Act 1899* and membership of either House was provided for by the Parliament (Qualification of Women) Act 1920. The first woman member of any Australian Parliament was Mrs Edith Dircksey Cowan, OBE, who was elected to the Legislative Assembly in March 1921 as member for West Perth. Mrs A.F.G. (later Dame Florence) Cardell-Oliver, MLA for Subiaco became the first woman Cabinet Minister in Australia when she joined the McLarty Ministry in 1947.

Payment of members was introduced in 1900 by a Payment of Members Act and a superannuation fund operates under the *Parliamentary Superannuation Act 1970*.

Under the provisions of the *Acts Amendment (Electoral Reform) Act 1987*, which came into operation on 30 October 1987, three Electoral Distribution Commissioners were appointed to divide the State into fifty-seven electoral districts—thirty-four comprising the Metropolitan Area (as described in the *Metropolitan Region Town Planning Scheme Act 1959*, as at 1 January 1987) and twenty-three the remainder of the State. These districts return one member each to the Legislative Assembly.

The State is also divided into six regions—three Metropolitan regions consisting of the Metropolitan electoral districts, a South-West region, an Agricultural region and a Mining and Pastoral region consisting of the electoral districts comprising the remainder of the State. The North Metropolitan Region and the South-West Region each return seven members to the Legislative Council, and the other electoral regions return five Council members.

TABLE 5.3 - MINISTRIES FROM 1890

Name of Premier	Political party	Date of assumption			Duration		
		Year	Day	Month	Years	Months	Days
Forrest		1890	29	December	10	1	17
Throssell		1901	15	February	—	3	12
Leake			27	May	—	5	25
Morgans	(a)		21	November	—	1	2
Leake			23	December	—	6	8
James		1902	1	July	2	1	9
Daglish	Labour	1904	10	August	1	—	15
Rason	Liberal	1905	25	August	—	8	12
Moore	Liberal	1906	7	May	4	4	9
Wilson	Liberal	1910	16	September	1	—	21
Scaddan	Labour	1911	7	October	4	9	20
Wilson	Liberal	1916	27	July	—	11	1
Lefroy	Liberal	1917	28	June	1	9	20
Colebatch	Liberal	1919	17	April	—	1	—
Mitchell	Nat. and C.P. (coalition)		17	May	4	10	30
Collier	Labour	1924	16	April	6	—	8
Mitchell	Nat. and C.P. (coalition)	1930	24	April	3	—	—
Collier	Labour	1933	24	April	3	3	27
Wilcock	Labour	1936	20	August	8	11	11
Wise	Labour	1945	31	July	1	8	1
McLarty	L.C.L. and C.P. (coalition)	1947	1	April	5	10	22
Hawke	Labour	1953	23	February	6	1	10
Brand	L.C.L. and C.P. (coalition)	1959	2	April	11	11	1
Tonkin	A.L.P.	1971	3	March	3	1	5
Court	Lib. and C.P. (coalition)	1974	8	April	7	9	17
O'Connor	Lib. and C.P. (coalition)	1982	25	January	1	1	—
Burke	A.L.P.	1983	25	February	5	—	—
Dowding	A.L.P.	1988	25	February	1	11	12
Lawrence	A.L.P.	1990	12	February			Still in office (b)

A.L.P. = Australian Labor Party. C.P. = Country Party(c). L.C.L. = Liberal and Country League(d). Lib = Liberal. Nat. = Nationalist.

(a) No specific party designation. (b) At 30 April 1991. (c) The name of the Party was changed to the National Country Party of Australia (W.A.) Inc. on 5 May 1975. (d) The name of the Party was changed to The Liberal Party of Australia (Western Australian Division) Incorporated on 15 July 1968.

TABLE 5.4 – THE MINISTRY AT 27 FEBRUARY 1991

<i>Minister</i>		<i>Title of office</i>
C.M. Lawrence, B Psych, PhD,	MLA	Premier; Treasurer; Minister for the Family; Women's Interests.
I.F. Taylor, B Econ (Hons), JP	MLA	Deputy Premier; Minister for State Development; Goldfields.
J.M. Berinson, QC	MLC	Attorney General, Minister for Corrective Services; Leader of the Government in the Legislative Council.
E.K. Hallahan, BSW, JP	MLC	Minister for Education; Employment and Training; The Arts; Deputy Leader of the Government in the Legislative Council.
R.J. Pearce, BA, Dip Ed, JP	MLA	Minister for Environment; Leader of the House in the Legislative Assembly.
K.J. Wilson	MLA	Minister for Health.
P.A. Beggs, JP	MLA	Minister for Transport; Racing and Gaming; Tourism.
E.F. Bridge, JP	MLA	Minister for Agriculture; Water Resources; North-West.
G.L. Hill, JP	MLA	Minister for Mines; Fisheries; Mid-West; Minister assisting the Minister for State Development.
G.J. Edwards	MLC	Minister for Police; Emergency Services; Sport and Recreation.
Y.D. Henderson, BA, Dip Ed, JP	MLA	Minister for Productivity and Labour Relation; Consumer Affairs.
D.L. Smith, LLB, JP	MLA	Minister for Lands; Planning; Justice; Local Government; South-West.
G.J. Gallop, B Econ, MA, M Phil, D Phil	MLA	Minister for Fuel and Energy; Microeconomic Reform; Parliamentary and Electoral Reform; Minister assisting the Treasurer.
J. Watson, Cert. of Nsg.Ed, B.Sc (Hons), Ph.d, JP, MLA		Minister for Aboriginal Affairs; Multicultural and Ethnic Affairs; Seniors; Minister assisting the Minister for Women's Interests.
E.S. Ripper, BA, Dip.Ed,	MLA	Minister for Community Services.
J.A. McGinty, BA, B.Juris (Hons), LL.B, JP,	MLA	Minister for Housing; Construction; Services; Heritage.
W.J. Thomas, BA	MLA	Parliamentary Secretary of the Cabinet.

The division process, which included opportunities for public submissions and comment, was completed on 29 April 1988, when the final division was gazetted. This division was applied to the election held in February 1989 and will apply to subsequent general elections for the Legislative Assembly.

A further provision of the Act extends the terms of members of both Houses of Parliament to four years, commenced from the Thirty-third Parliament.

## ELECTIONS

### The Federal Parliament

General elections for the Federal Parliament were held on 24 March 1990. The Australian Labor Party, led by R.J.L. Hawke, AC, was elected to office with seventy-eight seats in the House of Representatives.

After distribution of Senate seats the Australian Labor Party representation in the Senate remained at thirty-two.

TABLE 5.5 – ELECTORAL REGIONS AND ELECTORAL DISTRICTS

<i>Electoral region</i>	<i>Electoral districts</i>
North Metropolitan	Balcatta Cottesloe Dianella Floreat Glendalough Kingsley Marrangaroo Mannion Nedlands Nollamarra Perth Scarborough Wanneroo Whitford
South Metropolitan	Applecross Cockburn Fremantle Jandakot Melville Peel Riverton Rockingham South Perth Victoria Park

TABLE 5.5 – ELECTORAL REGIONS AND ELECTORAL DISTRICTS – *continued*

<i>Electoral region</i>	<i>Electoral districts</i>
East Metropolitan	Armadale
	Belmont
	Darling Range
	Helena
	Kenwick
	Maylands
	Morley
	Roleystone
	Swan Hills
	Thornlie
South-West	Albany
	Bunbury
	Collie
	Mandurah
	Mitchell
	Murray
	Stirling
	Vasse
	Warren
	Wellington
Agricultural	Avon
	Geraldton
	Greenough
	Merredin
	Moore
	Roe
	Wagin
Mining and Pastoral	Ashburton
	Eyre
	Kalgoorlie
	Kimberley
	Northern Rivers
	Pilbara

TABLE 5.6 – MEMBERS OF THE LEGISLATIVE COUNCIL: FEBRUARY 1991

<i>Name</i>	<i>Political party</i>	<i>Electoral region</i>
J.M. Berinson	A.L.P.	North Metropolitan
J.M. Brown	A.L.P.	Agricultural
T.G. Butler	A.L.P.	East Metropolitan
J.N. Caldwell	N.P.A.	Agricultural
S.G.E. Cash	Lib.	North Metropolitan
E.J. Charlton	N.P.A.	Agricultural
C.M. Davenport	A.L.P.	South Metropolitan
R.E. Davies	Lib.	North Metropolitan
G.J. Edwards	A.L.P.	North Metropolitan
G.M. Evans	Lib.	North Metropolitan
P.G. Foss	Lib.	East Metropolitan
C.E. Griffiths	Lib.	South Metropolitan
S.J. Halden	A.L.P.	South Metropolitan
E.K. Hallahan	A.L.P.	East Metropolitan
T.R. Helm	A.L.P.	Mining & Pastoral
B.J. House	Lib.	South-West
B.L. Jones	A.L.P.	South-West
G.K. Kelly	A.L.P.	South Metropolitan
P.H. Lockyer	Lib.	Mining & Pastoral
M. McAleer	Lib.	Agricultural
F.E. McKenzie	A.L.P.	East Metropolitan
M.S. Montgomery	N.P.A.	South-West
N.F. Moore	Lib.	Mining & Pastoral
M.W. Nevil	A.L.P.	Mining & Pastoral
M.G. Patterson	Lib.	South-West
P.G. Pandal	Lib.	South Metropolitan
S.M. Piantadosi	A.L.P.	North Metropolitan
R.G. Pike	Lib.	North Metropolitan
T.G. Stephens	A.L.P.	Mining & Pastoral
W.N. Stretch	Lib.	South-West
R.J. Thomas	A.L.P.	South-West
D.G. Tomlinson	Lib.	East-Metropolitan
D.W. Wenn	A.L.P.	South-West
D.J. Wordsworth	Lib.	Agricultural

## SUMMARY

Australian Labor Party (A.L.P.)	16
The Liberal Party of Australia (Western Australian Division) Incorporated (Lib.)	15
National Party of Australia (N.P.A.)	3

## LEGISLATION DURING 1990

## The State Parliament

At the conjoint election for the Legislative Council and the Legislative Assembly held on 4 March 1989, the Australian Labor Party, led by Peter Dowding, MLA, was elected to office with a majority in the Legislative Assembly of five seats. Mr Dowding stood down from the Premiership on 24 February 1990; he was succeeded by Dr Carmen Lawrence MLA, who became the first woman Premier in Australian history.

During the second session of the thirty-third Parliament, which lasted from 1 May to 6 December 1990, the Western Australian legislature enacted 106 Public Statutes and dealt with 49 Bills which were introduced but not passed.

The full text of the legislation enacted is contained in the volumes of The Acts of the Parliament of Western Australia.

TABLE 5.7 - MEMBERS OF THE LEGISLATIVE ASSEMBLY: MARCH 1991

Name	Political party	Electoral district
R.A. Ainsworth	N.P.A.	Roe
Dr I.C. Alexander,	Ind.	Perth
C.J. Barnett	Lib.	Cottesloe
Hon. M. Barnett	A.L.P.	Rockingham
Hon. P.A. Beggs	A.L.P.	Whitford
B.R. Blaikie	Lib.	Vasse
J.L. Bradshaw	Lib.	Wellington
Hon. E.F. Bridge	A.L.P.	Kimberley
Hon. P.A. Buchanan.	Ind.	Ashburton
N.M. Catania	A.L.P.	Balcatta
J.G. Clarko.	Lib.	Marmion
R.F. Court.	Lib.	Nedlands
H.J. Cowan	N.P.A.	Merredin
E.J. Cunningham	A.L.P.	Marangaroo
F.A. Donovan	A.L.P.	Morley
C.L. Edwards	Lib.	Kingsley
Dr J.M. Edwardes	A.L.P.	Maylands
Dr G.I. Gallop	A.L.P.	Victoria Park
L. Graham	A.L.P.	Pilbara
Hon. W.L. Grayden,	Lib.	South Perth
Hon. J.F. Grill	A.L.P.	Eyre
Hon. Y.D. Henderson	A.L.P.	Thornlie
Hon. G.L. Hill	A.L.P.	Helena
M.G. House	N.P.A.	Stirling
G.D. Kierath	Lib.	Riverton
J.C. Kobelke	A.L.P.	Nollamara
Dr. C.M. Lawrence	A.L.P.	Glendalough
K.J. Leahy	A.L.P.	Northern Rivers
K. Lewis	Lib.	Applecross
B.J. MacKinnon	Lib.	Jandakot
J.A. McGinty	A.L.P.	Fremantle
W.J. McNee	Lib.	Moore
N.R. Marlborough,	A.L.P.	Peel
Hon. A. Mensaros	Lib.	Floreat
K.J. Minson	Lib.	Greenough
R.K. Nicholls	Lib.	Mandurah
P.D. Omodei	Lib.	Warren
Hon. R.J. Pearce	A.L.P.	Armadale
K. Read	A.L.P.	Murray
E.S. Ripper	A.L.P.	Belmont
D.J. Shave	Lib.	Melville
Hon. D.L. Smith	A.L.P.	Mitchell
P.J. Smith.	A.L.P.	Bunbury
G.J. Strickland	Lib.	Scarborough
Hon. I.F. Taylor	A.L.P.	Kalgoorlie
W.I. Thomas	A.L.P.	Cockburn
Hon. I.D. Thompson	Ind.	Darling Range
M.W. Trenorden,	N.P.A.	Avon
Hon. G.J. Troy	A.L.P.	Swan Hills
F.C. Tubby	Lib.	Roleystone
Dr H. Turnbull	N.P.A.	Collie
J.P. Watkins	A.L.P.	Wanneroo
Dr J. Watson	A.L.P.	Kenwick
L.H. Watt,	Lib.	Albany
R.L. Wiese,	N.P.A.	Wagin
Hon. K.J. Wilson,	A.L.P.	Dianella

## SUMMARY

Australian Labor Party (A.L.P.)	28
The Liberal Party of Australia (Western Australian Division) Incorporated (Lib.)	19
National Party of Australia (N.P.A.)	6
Independent	3

## GOVERNMENT ADMINISTRATION

## Australian Government

A comprehensive guide to the organisation and functions of the Australian Government is given in the Commonwealth Government Directory, including an outline of the activities of each Department of State together with similar information concerning Boards, Committees, Councils, Commissions and other Instrumentalities. A list of Australian Government Departments, the principal matters dealt with by each Department, and details of the statutes administered by the relevant Federal Minister are published from time to time in the Commonwealth of Australia Gazette.

## State Government

The Public Service of Western Australia operates under the provisions of the *Public Service Act 1978* and consists of a number of Departments established in accordance with the Act. The establishment, abolition or alteration of Departments is subject to the approval of the Governor.

Other parts of the State Public Service normally referred to as Statutory Authorities or Instrumentalities, function under separate Acts although they largely follow the conditions prescribed in the Public Service Act.

## THE JUDICATURE

The two major factors in the development of the Australian legal system have been its British origin and the Commonwealth Constitution of 1900. This Statute, an Act of the Imperial Parliament in London, limited the legislative power of State parliaments in some respects and created a federal legislature. Since 1942, however, the Imperial Parliament can legislate for Australia only at Australia's request. The sources of Australian law of today are, therefore, found in Commonwealth and State legislation, in some Imperial legislation, and in the common law. Independence of the judiciary is an essential part of the Australian legal system.

Particulars of Western Australian courts and Commonwealth courts appear in Chapters 9 and 21.

**TABLE 5.8 - SELECTED WESTERN AUSTRALIAN GOVERNMENT DEPARTMENTS**  
(Public Service Act 1978)

<i>Department</i>	<i>Address</i>	<i>Department</i>	<i>Address</i>
Aboriginal Affairs Planning Authority	35 Havelock Street West Perth 6005	Department of Marine and Harbours	1 Essex Street Fremantle 6160
Agriculture Department	Baron-Hay Court South Perth 6151	Mines Department	100 Plain Street East Perth 6004
Department for the Arts	Perth Cultural Centre Stirling Street Perth 6000	Department of Occupational Health Safety & Welfare	1240 Hay St West Perth 6005
Office of Auditor General	815 Hay Street Perth 6000	Department of Planning and Urban Development	469 Wellington St Perth 6000
Authority for Intellectually Handicapped Persons	53 Ord Street West Perth 6005	Police Department	2 Adelaide Terrace East Perth 6004
Building Management Authority of	2 Havelock Street West Perth 6005 Western Australia	Ministry of the Premier and Cabinet	197 St George's Terrace Perth 6000
Department for Community Services	189 Royal Street East Perth 6000	Department of Productivity & Labour Relations	220 St Georges Tce Perth 6000
Department of Conservation and Land Management	Hackett Drive Crawley 6009	Public Service Commission	469-489 Wellington Street Perth 6000
Ministry of Consumer Affairs	251 Hay Street East Perth 6004	Office of Racing and Gaming	3 Plain Street East Perth 6004
Corporate Affairs Department	565 Hay Street Perth 6000	Department of the Registrar, Industrial Relations Commission	815 Hay St Perth 6000
Department of Corrective Services	441 Murray Street Perth 6000	Ministry of State Development	170 St George's Terrace Perth 6000
Crown Law Department	109 St George's Terrace. Perth 6000	Department of State Services	3 Havelock Street West Perth 6005
Ministry of Education	151 Royal Street East Perth 6004	Ministry of Sport and Recreation	Sir Thomas Meagher Pavilion Perry Lakes Stadium Floreat 6014
Department of Employment and Training	18-20 Howard Street Perth 6000	Office of Government Accommodation	2 Havelock St West Perth 6005
Environmental Protection Authority	1 Mount Street Perth 6000	State Taxation Department	20 Barrack Street Perth 6000
Fisheries Department	108 Adelaide Terrace. Perth 6000	Department of Technical and Further Education	151 Royal St East Perth 6004
Government Employees Superannuation Board	10 Kings Park Road Perth 6000	Department of Transport	136 Stirling Highway Nedlands 6009
Health Department of Western Australia	189 Royal Street East Perth 6004	Treasury Department of Western Australia	197 St George's Terrace Perth 6000
State Housing Commission (Homeswest)	99 Plain Street East Perth 6004	Water Authority of Western Australia	629 Newcastle Street Leederville 6007
Department of Land Administration	Cathedral Avenue Perth 6000	Worker's Compensation and Rehabilitation Commission	15 Rheola Street West Perth 6005
Local Government Department	32 St George's Terrace. Perth 6000	Western Australian Electoral Commission	480 Hay Street Perth 6000
		Western Australian Office of Higher Education	151 Royal St East Perth 6004

**STATE REPRESENTATION OVERSEAS  
AND IN OTHER STATES**

Western Australia has been represented in the United Kingdom by an Agent General since 1892, the first appointment to the post being that of Sir Malcolm Fraser. An Office is maintained at Western Australia House, 115 Strand, London, W.C.2. Its functions include the representation of all Government Departments which have business

in Britain and Europe, the purchase of government stores and equipment, the attraction of migrants, the encouragement of overseas private investment in Western Australia, and the provision of various types of assistance to visitors from Western Australia. In addition, the Office acts as agent for the State Treasury and as a receiving agency for The Rural and Industries Bank of Western Australia. Western Australia's European Public Relations Office and its tourist officer for the

**TABLE 5.9 - OVERSEAS REPRESENTATION IN WESTERN AUSTRALIA**

<i>Country</i>	<i>Address of representative</i>	<i>Country</i>	<i>Address of representative</i>
Austria	T.A. Holmes, Honorary Consul, 95 St George's Terrace Perth 6000	Nepal	H.L. Roberts, Honorary Consul-General 2/16 Robinson St Nedlands 6009
Belgium	L Bae, Honorary Consul, 16 St George's Terrace Perth 6000	Netherlands	T.C. Dercksen, Honorary Consul, 83 Mill Point Rd. South Perth 6151
Canada	J. Lyall, Hon. Consul 11/111 St George's Terrace Perth 6000	New Zealand	D.J. Robertson, Consul, 16 St George's Terrace Perth 6000
Denmark	S.L. Jørgensen, Honorary Consul, 19 Phillimore St Fremantle 6160	Norway	D.G. Lynn, Honorary Consul, 11 Cliff St Fremantle 6160
Finland	P.K. Howard, Honorary Consul, 1/85 MacLeod St Applecross 6153	Pakistan	M.A. Khan, Honorary Consul 26 Camarvon Cr Mt. Lawley 6050
France	Dr R. Peace, Honorary Consul, 21/231 Adelaide Terrace Perth 6000	Philippines	B.V. Richards, Honorary Consul, 16 Cavella Court Willetton 6155
Germany, Federal Republic of	A.E. Blankensecao, Honorary Consul, 16 St George's Terrace Perth 6000	Portugal	M. Zarcos Palma, Honorary Consul 242 South Terrace Fremantle 6160
Greece	I. Raptakis, Consul, 16 St George's Terrace Perth 6000	Seychelles	G.F. Robert, Honorary Consul, 23 Marri Cr Lesmurdie 6076
Honduras	E. de Newmann, Honorary Consul, 44 Troy Terrace Daglish 6008	Spain	A. Quintela, Honorary Consul General, 181 St George's Terrace Perth 6000
Indonesia	R.C.H. Manser, Honorary Consul, 4 Judd St South Perth 6151	Sri Lanka	Major W. White, Honorary Consul, 2/66 Mill Point Rd South Perth 6151
Ireland	G.M. Nolan, Honorary Consul-General, 10 Lilika Rd City Beach 6015	Sweden	H. Morgan, Honorary Consul, 23 Walters Drive Herdsman 6106
Italy	V Schioppa, Consul, 31 Labouchere Rd. South Perth 6151	Switzerland	R. Abplanalp, Honorary Consul, 5 Marie Way Kalamunda 6076
Japan	H. Sakuma, Consul-General, 221 St George's Terrace Perth 6000	Thailand	Brigadier W.D. Jamieson, Honorary Consul-General, 135 Victoria Avenue Dalkeith 6009
Malaysia	A.B. Junus, Consul, 195 Adelaide Terrace Perth 6000	United Kingdom	L. Boyes, Consul-General, 95 St George's Terrace Perth 6000
Malta	A.V. Scibberras M.D., Honorary Consul, Bassendean Medical Centre 1 Old Perth Rd. Bassendean 6054	United States of America	J. Whitney, Consul-General, 16 St George's Terrace Perth 6000
Mexico	R.C. Hemery, Honorary Consul 16 Gladstone Rd Rivervale 6103	Yugoslavia	D. Tomisic, Consul, 24 Colin St West Perth 6005

United Kingdom and Europe also operate from Western Australia House. The Agent General for Western Australia, Mr R. Davies, is the personal representative in Britain of the State Premier.

The State is also represented in Japan, an Office being maintained by the Western Australian Government at Sankaido Building, 9-13 Akasaka, 1-CHOME, Minato-Ku 107, Tokyo.

The Western Australian Tourism Commission has travel centres in the Eastern States and overseas. Those offices are located at:

Cnr King William and Grenfell Streets,  
Adelaide;

243 Edward Street, Brisbane;

35 Elizabeth Street, Melbourne;

92 Pitt Street, Sydney;

505 Commercial House, 35 Road, Hong Kong  
Central, Hong Kong;

8th Floor, Sankaido Building, 9-13 Akasaka,  
1-CHOME, Minato-Ku 107, Tokyo, Japan;

6th Floor, UBN Tower Letterbox 51, 10 Jalan  
P Ramlee 50250, Kuala Lumpur, Malaysia;

13th Floor, 44-48 Emily Place, Auckland,  
New Zealand;

Unit 03-03, Thong Sia Building 30 Bideford  
Road, Singapore;

Kiangwan House, 140 Wireless Road,  
Bangkok 10330, Thailand;

Western Australia House, 115 Strand, London  
W.C. 2, United Kingdom;

2121 Avenue of the Stars, Suite 1210, Century  
City, Los Angeles, U.S.A.;

Moltkestrasse 3, 5300 Bonn 2, West Germany.

Whilst primarily concerned with promoting and facilitating travel to Western Australia, travel centre managers also provide liaison on behalf of Government Departments which have business in these cities.

There are thirty countries represented in Western Australia by a consular agent, vice-consul, consul, consul-general, or trade representative.

## THE LOCAL GOVERNMENT SYSTEM

The function of local government in Western Australia is performed by a number of Councils (or, in special circumstances, by Commissioners appointed by the Governor) exercising powers conferred by the Parliament of the State. Each of the Councils consists of members elected by a local community and is responsible for the provision of many of the services necessary for the organisation and welfare of the community which it represents.

### Local government districts

On presentation of a petition signed by a prescribed minimum number of electors, the Governor may, by Order, constitute any part of the State as a Town; constitute as a new Shire any part of an existing Shire; divide a Shire into two or more Shires; sever a portion of a district and annex the portion to an adjoining district, or constitute the portion as a new Town or Shire; divide a district into wards; or abolish a district and dissolve the local governing authority. In some cases the electors of a district have the right to demand that a poll be held on the question of boundary changes.

On the petition of the local authority concerned, the Governor may by Order declare to be a City any district which satisfies certain specified requirements. These requirements are that during the three years immediately preceding the declaration, it shall have maintained a population of not less than 30,000 persons if situated in the metropolitan area as declared for the purposes of the Act, or not less than 20,000 persons if situated outside that area; and have maintained a gross revenue of \$200,000 for each of the three years. In addition the district must be clearly distinguishable as a centre of population having a distinct civic centre with adequate halls and cultural facilities, and must have sufficient residential, commercial, and industrial centres to justify its declaration as a separate city.

There are now nineteen cities, ten towns and 109 shires in Western Australia.

The *Local Government Act 1960* establishes a Local Government Boundaries Commission of three members. The Minister may refer to the Commission any question concerning the constitution or alteration of the constitution of local government districts. Every case where authorities are unable to agree on a matter of



amalgamation or severance of territory must be referred to the Commission.

The boundaries of local government districts as they existed at 30 June 1990 are delineated on the maps of the State inside the back cover and the names and designations as at that date are given in the lists in the Appendix.

### Constitution and electoral provisions

The provisions of the Local Government Act relating to the composition of a Council require that the minimum number of members be five with no limit set for the maximum number.

Provision is made for local government elections to be held on the first Saturday in May of each year but in specified circumstances the Governor may, by proclamation, appoint a Saturday in May, later than the first Saturday, to be the election date. Voting is not compulsory. Membership of a Council is elective in all cases, the qualified electors being adult Australian citizens, resident in the district and enrolled for the Legislative Assembly, or who own or occupy rateable land in the district. The preferential system of voting is used and representation is generally on the basis of wards into which the district may be divided. Each elector is entitled to one vote. Subject to disqualification on certain specified grounds, all electors, other than corporation nominees, are eligible for election to the Council of the district whether as Mayor, President or councillor.

The term of office of a Mayor or a President is three years if elected by the electors of the district, or one year if elected by the Council. Councillors are elected for a term of three years, as near as practicable to one-third of their number retiring each year. On the expiration of their term of office all members, including the Mayor and the President, are eligible for re-election if not subject to any of the disqualifications contained in the Act.

### Functions of Local Authorities

The functions and powers of local authorities are extremely diverse in character. They are prescribed in detail in the Local Government Act and some of the more important of them are referred to in later Chapters of the Western Australian Year Book. For example, reference to local government activity in the fields of road construction and maintenance will be found in Chapter 23; the provision of parks, gardens and recreation grounds in Chapter 11; libraries in Chapter 11; public

transport facilities in Chapter 19; water supplies in Chapter 12; and town planning and building control in Chapter 18. Among the many other powers of local authorities are those relating to hospitals and nursing services, kindergartens, hostels for school children, community centres, dental clinics, infant and maternal health centres, day nurseries, control of dogs, jetties, swimming pools, sanitation and disposal of refuse, fire prevention, eradication of noxious weeds and vermin, aerodromes, abattoirs, quarries, pounds and cemeteries. Under the provisions of the Health Act local authorities are responsible for certain aspects of health administration.

### Financial Provisions

Local government authorities have four major sources of finance. They are moneys received from rates, loans, government grants and personal income tax entitlements. Financial powers of local authorities, although derived mainly from the Local Government Act, are also provided by other Statutes, including the Health Act, the Fire Brigades Act, the Cemeteries Act, and the Library Board of Western Australia Act.

**Rates.** The general rate for a local government district in any year is determined by dividing the sum required to make up the difference between anticipated expenditure and estimated revenue from sources other than rates for that year by the total value of rateable property in the district. However, a Council may impose a rate which would yield less than the amount required to balance its budget, subject to approval by the Minister. In assessing the value of rateable property, every local authority must adopt valuations made by the Valuer-General under the provisions of the *Valuation of Land Act 1978*. The *Land Valuation Tribunals Act 1978* provides for the constitution of Land Valuation Tribunals, to which appeals may be made on matters concerning valuations of property.

Valuations may be on the basis of either 'unimproved value' or 'gross rental value'. The unimproved value generally represents the price which the rated land might be expected to realise if sold on the open market and, as the term implies, excludes any improvements. The gross rental value is an estimate of the gross rental value of the property including improvements. Generally, City Councils and Town Councils are required to assess the general rate on the basis of gross rental value, and Shire Councils on unimproved value. Councils may charge a penalty on unpaid rates or offer a discount for early

payment. The prescribed maximum percentage for penalty or discount is 10 per cent.

**Loans.** Local authorities are authorised to raise loans for works and undertakings and for the liquidation of existing loan debts. A Council may, with the written consent of the Minister, obtain advances from a bank for a budget deficiency, for the installation of sewerage connections and septic tanks, and for other work approved by the Governor.

Certain of the works and undertakings for which loan moneys may be used are specified in the Local Government Act. They include the construction of streets, roads and bridges, sewers, drains and water works; the erection or purchase of electric lighting plant, gas works and stone quarries; the provision of hostels for school children, libraries and other recreational facilities; the construction of civic and other buildings; and the purchase of land, materials and equipment. Where a particular work or undertaking is not specified in the Act the Governor may approve of it as a project for which money may be borrowed.

**Government grants.** Government grants constitute an important source of revenue for local government authorities. These are mainly specific purpose payments for road works.

**Personal income tax entitlements.** The *Local Government (Personal Income Tax Sharing) Act 1976* requires each State to allocate not less than 30 per cent of the funds among local government authorities on a population basis, but account may also be taken of the area of the authority, population density or any other matter agreed upon between the Commonwealth and the State.

The remaining funds are to be allocated having regard to the special needs and disabilities of local authorities.

**General.** The financial transactions of local government authorities are subject to annual audit either by an auditor (or auditors) appointed by the Council or by the Auditor-General or persons appointed by him. To qualify for the office of auditor, a person must be a member of a specified institute or society of accountants and be registered as an auditor under the Companies Act. Appointment is for a term not exceeding three years, at the end of which time the holder of the office is eligible for reappointment.

The financial year for all Councils ends on 30 June.

Details of the revenue and outlays of local authorities during the financial year 1988-89 are given in the section Local Government Finance in Chapter 23.

## STATISTICAL DIVISIONS

The local government districts are used as the basis of presentation of data derived not only from the population census but also from many of the regular statistical collections. Information presented in this way is valuable when considering activities in particular local government areas but is often more detailed than is required for a broader geographical assessment. For this reason, the local government districts are combined into statistical divisions which provide significant areas for the publication of statistics in a convenient summary form.

## Chapter 6

# POPULATION AND VITAL STATISTICS

## Population

The State of Western Australia, although comprising almost one third of the total area of Australia, contains only about one eleventh of the population.

At the end of 1829, the year of establishment of the Colony, there were 1,000 non-Aboriginal persons in Western Australia. Estimates of the number of Aborigines in the State at colonisation vary. Crawford<sup>1</sup>, in the *Western Australian Year Book*, No. 24—1984, Chapter 1, notes that 'There has, therefore, been some consensus that the population prior to European settlement was in the 50,000 to 60,000 bracket.' Progress in the early years was slow, and in 1849 the non-Aboriginal population was still less than 5,000. Transportation of convicts, begun in the following year, resulted in some acceleration, but it was not until the discovery of gold in the Kimberley in 1885 and the rich finds at Coolgardie in 1892 and at Kalgoorlie in 1893 that any marked increase took place. This development was so rapid that, in the last decade of the century, the non-Aboriginal population was almost quadrupled, from 48,500 at the end of 1890 to 180,000 in 1900, representing an average annual rate of increase of 14.01 per cent. The rate of growth in those years has never been approached in the present century, but the average annual rate of increase of Western Australia's population from the Census of 1901 to June 1989, 2.48 per cent, has been higher than that of any other State and of Australia as a whole (1.71 per cent).

TABLE 6.1 - POPULATION OF WESTERN AUSTRALIA AND AUSTRALIA (a)  
References: Catalogue Nos. 3101.0, 3201.0

Year ended 30 June	Western Australia	Australia	Proportion of Australia	Western Australia	
				Sex ratio (b)	Annual growth rate
	persons	persons	per cent		per cent
1971 (c)	1,053,834	13,067,265	8.06	104.83	6.30
1976 (c)	1,178,342	14,033,083	8.40	103.73	2.03
1981 (c)	1,300,056	14,923,260	8.71	102.25	2.44
1986 (c)	1,459,019	16,018,350	9.11	101.83	2.85
1987	1,500,507	16,263,319	9.23	101.94	2.84
1988	1,544,806	16,538,153	9.34	102.05	2.95
1989	1,594,745	16,833,085	9.47	102.05	3.23

(a) Estimated resident population. (b) Number of males per 100 females. (c) Census date.

1 I.M. Crawford, *A History of the Aboriginal Population*.

In the decade from 30 June 1979 to 30 June 1989 the State's average annual rate of increase has been 2.49 per cent compared with a national figure of 1.49 per cent.

**ESTIMATES OF POPULATION**

The conceptual basis for population estimation in Australia changed in June 1981. Estimates since that date, together with revisions back to June 1971, have been made on the basis of the State of usual residence of persons. Census date estimates are derived by adjusting census count, place of usual residence data for under enumeration and adding residents who are temporarily overseas on census night.

For dates other than those of the periodic censuses of population, estimates are based on records of births and deaths and movements of population interstate and overseas. Estimates of the population of Australia and of each of the States and Territories are prepared by the Australian Statistician at 31 March, 30 June, 30 September and 31 December in each year. Because the available records of interstate movement are incomplete, these intercensal estimates as they

apply to States and Territories are approximate and are revised when the results of the next census become known.

Further information on estimated resident population is contained in the publication *Population Estimates: An outline of the New Conceptual Basis of ABS Population Estimates* (Catalogue No. 3216.0) issued by the Australian Statistician, Canberra.

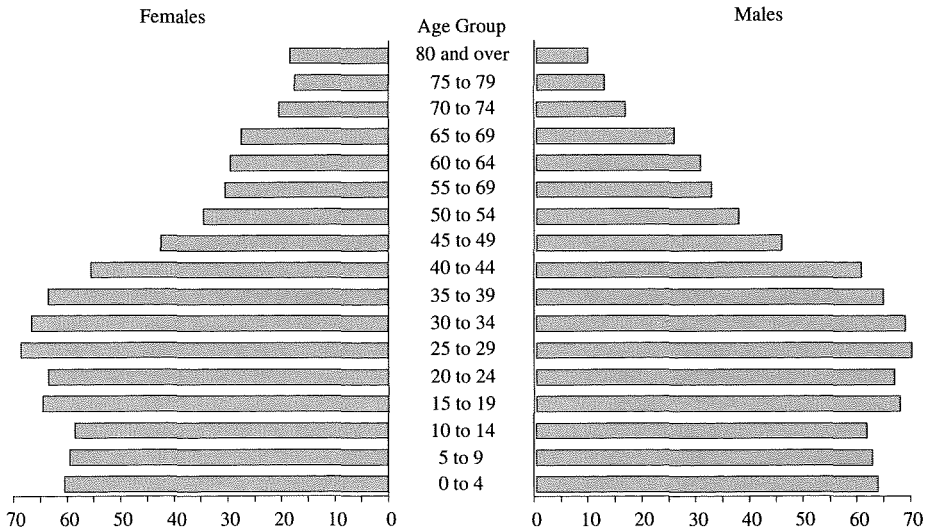
**MEAN POPULATION**

It is often useful to relate a given characteristic to population in order to express it in *per capita* terms or as 'per head of population.' Mean population is used for this purpose. The formula to calculate mean population is:

$$\frac{1}{12} (a + 4b + 2c + 4d + e)$$

where *a* represents the population at the beginning of the year and *b*, *c*, *d* and *e* the populations at the end of the first, second, third and fourth quarters respectively.

**DIAGRAM 1.1**  
**ESTIMATED RESIDENT POPULATION**  
**AGE LAST BIRTHDAY, BY SEX: 30 JUNE 1989**  
(\*000)



**TABLE 6.2 – ESTIMATED RESIDENT POPULATION**  
(\*000)

Reference: Catalogue No. 3101.0

Year	Population at end of year			Increase during year			Mean population		
				Natural increase (a)	Estimated net migration (b)	Estimated total increase (c)			
	Males	Females	Persons						
YEAR ENDED 30 JUNE									
1987	757.5	743.0	1,500.5	14.7	26.8	41.5	746.7	733.0	1,479.8
1988	780.3	764.5	1,544.8	15.1	29.2	44.3	768.6	753.5	1,522.1
1989	805.5	789.3	1,594.7	15.4	34.6	50.0	793.6	777.7	1,571.3
YEAR ENDED 31 DECEMBER									
1987	767.6	752.7	1,520.3	14.4	26.4	40.8	757.2	743.0	1,500.2
1988r	793.6	777.8	1,571.4	15.6	35.5	51.1	781.0	765.3	1,546.3
1989p	815.4	799.5	1,614.8	15.5	27.9	43.4	805.3	789.2	1,594.5

(a) Excess of births registered over deaths registered by State of usual residence. (b) Interstate and overseas. (c) Differences between the sum of natural increase and net migration, and total increase are due to distribution of the intercensal discrepancy.

### POPULATION IN STATISTICAL LOCAL AREAS

Table 6.3 shows the estimated resident population in statistical local areas. The names and designations are as they existed at 30 June 1989. The Cities of Fremantle, Perth and Stirling are comprised of a number of statistical local areas. Statistical local areas are marked (C) for City, (T) for Town or (S) for Shire.

**TABLE 6.3 – ESTIMATED RESIDENT POPULATION IN STATISTICAL LOCAL AREAS : AT 30 JUNE (a)**  
(persons)

Reference : Catalogue No. 3203.5

Statistical local area	1987	1988	1989
Albany (S)	8,750	8,966	9,251
Albany (T)	14,755	14,791	14,998
Armadale (C)	45,200	45,890	47,781
Ashburton(S)	8,658	8,754	8,904
Augusta-Margaret River (S)	5,251	5,508	5,720
Bassendean (T)	13,673	13,788	14,050
Bayswater (C)	44,666	45,524	46,539
Belmont (C)	29,540	29,623	29,777
Beverley (S)	1,485	1,477	1,464
Boddington (S)	1,059	1,219	1,219
Boypup Brook (S)	1,850	1,860	1,870
Bridgetown-Greenbushes (S)	3,601	3,679	3,765
Brookton (S)	1,060	1,054	1,026
Broome (S)	6,505	6,926	7,434
Broomehill (S)	593	587	573
Bruce Rock (S)	1,306	1,312	1,288
Bunbury (C)	25,307	25,838	26,469
Busselton (S)	12,376	12,963	13,458
Canning (C)	66,576	67,823	69,272
Capel (S)	4,177	4,366	4,539
Carnamah (S)	1,433	1,435	1,534

**TABLE 6.3 – ESTIMATED RESIDENT POPULATION IN STATISTICAL LOCAL AREAS : AT 30 JUNE (a) – cont.**  
(persons)

Reference : Catalogue No. 3203.5

Statistical local area	1987	1988	1989
Carnarvon (S)	7,590	7,676	7,707
Chapman Valley (S)	773	775	775
Chittering (S)	1,485	1,581	1,699
Claremont (T)	8,652	8,697	8,754
Cockburn (C)	44,692	47,388	49,923
Collie (S)	9,715	9,744	9,792
Coolgardie (S)	5,157	5,247	5,371
Coorow (S)	1,431	1,472	1,486
Corrigin (S)	1,440	1,439	1,407
Cottesloe (T)	7,273	7,286	7,318
Cranbrook (S)	1,256	1,252	1,240
Cuballing (S)	644	652	652
Cue (S)	579	688	927
Cunderdin (S)	1,462	1,457	1,432
Dalwallinu (S)	1,801	1,812	1,818
Dandaragan (S)	2,281	2,383	2,449
Dardanup (S)	4,522	4,592	4,681
Denmark (S)	2,887	2,973	3,034
Derby-West Kimberley (S)	7,138	7,301	7,352
Donnybrook-Balingup (S)	3,827	3,885	3,943
Dowerin (S)	961	967	945
Dumbleyung (S)	1,004	988	953
Dundas (S)	2,305	2,334	2,190
East Fremantle (T)	6,098	6,161	6,233
East Pilbara (S)	9,902	10,083	9,883
Esperance (S)	9,931	9,988	10,074
Exmouth (S)	2,505	2,543	2,599
Fremantle (C) (b)—			
Inner	691	691	671
Remainder	23,059	23,168	23,367
Total	23,750	23,859	24,038
Geraldton (C)	20,222	20,660	21,024
Gingin (S)	2,756	2,842	2,930
Gnowangerup (S)	2,180	2,083	1,979
Goomalling (S)	1,194	1,174	1,154
Gosnells (C)	66,399	69,157	72,037

TABLE 6.3 - ESTIMATED RESIDENT POPULATION IN STATISTICAL LOCAL AREAS : AT 30 JUNE (a) - cont. (persons)

Reference : Catalogue No. 3203.5

Statistical local area	1987	1988	1989
Greenough (S)	5,985	6,204	6,492
Halls Creek (S)	2,918	2,931	2,946
Harvey (S)	10,595	10,901	11,421
Irwin (S)	1,878	1,984	2,073
Jerramungup (S)	1,345	1,348	1,354
Kalamunda (S)	45,410	47,340	48,868
Kalgoorlie-Boulder (C) (c)	24,859	26,103	26,885
Katanning (S)	4,852	4,846	4,822
Kellerberrin (S)	1,420	1,411	1,394
Kent (S)	977	972	954
Kojonup (S)	2,439	2,404	2,373
Kondinin (S)	1,155	1,148	1,138
Koorda (S)	685	678	645
Kulin (S)	1,176	1,181	1,152
Kwinana (T)	15,193	15,711	16,851
Lake Grace (S)	2,114	2,110	2,060
Laverton (S)	1,409	1,465	1,720
Leonora (S)	2,259	2,380	2,468
Mandurah (T)	20,375	21,729	23,169
Manjimup (S)	9,618	9,670	9,766
Meekatharra (S)	1,654	1,947	2,204
Melville (C)	76,066	81,015	85,799
Menzies (S)	335	374	481
Merredin (S)	4,159	4,150	4,120
Mingenew (S)	702	690	674
Moora (S)	2,812	2,802	2,757
Morawa (S)	1,165	1,168	1,160
Mosman Park (T)	7,467	7,488	7,488
Mount Magnet (S)	1,262	1,349	1,446
Mount Marshall (S)	869	857	840
Mukinbudin (S)	828	805	783
Mullewa (S)	1,425	1,403	1,381
Mundaring (S)	27,102	28,249	28,921
Murchison (S)	144	144	147
Murray (S)	7,084	7,215	7,535
Nannup (S)	1,157	1,186	1,195
Narembeen (S)	1,188	1,194	1,176
Narrogin (S)	668	661	639
Narrogin (T)	5,062	5,068	5,090
Nedlands (C)	19,947	20,050	20,133
Northam (S)	2,517	2,591	2,622
Northam (T)	6,917	6,928	6,985
Northampton (S)	3,084	3,127	3,150
Nungarin (S)	318	328	316
Peppermint Grove (S)	1,612	1,648	1,675
Perenjori (S)	807	787	852
Perth (C) (b)—			
Inner	929	929	919
North	21,474	21,560	21,653
Outer	14,582	14,612	14,612
South	24,708	24,787	24,968
Wembley-Coastal	20,187	20,277	20,425
Total	81,880	82,165	82,577
Pingelly (S)	1,369	1,364	1,333
Plantagenet (S)	4,161	4,150	4,138
Port Hedland (S)	13,623	13,757	13,857
Quairading (S)	1,257	1,264	1,249
Ravensthorpe (S)	1,400	1,424	1,422

TABLE 6.3 - ESTIMATED RESIDENT POPULATION IN STATISTICAL LOCAL AREAS : AT 30 JUNE (a) - cont. (persons)

Reference : Catalogue No. 3203.5

Statistical local area	1987	1988	1989
Rockingham (S)	34,271	36,561	40,831
Roebourne (S)	17,741	17,787	16,537
Sandstone (S)	151	184	260
Serpentine-Jarrahdale (S)	6,891	7,198	7,565
Shark Bay (S)	1,097	1,125	1,130
South Perth (C)	34,439	34,674	34,895
Stirling (C) (b)—			
Central	100,753	102,255	103,582
West	55,463	55,937	56,574
South-Eastern	21,449	21,583	21,842
Total	177,665	179,775	181,998
Subiaco (C)	15,544	15,634	15,680
Swan (S)	41,252	44,138	48,425
Tambellup (S)	827	820	804
Tammin (S)	552	547	517
Three Springs (S)	1,005	992	969
Toodyay (S)	1,945	2,067	2,226
Trayning (S)	555	552	539
Upper Gascoyne (S)	256	257	253
Victoria Plains (S)	1,225	1,220	1,197
Wagin (S)	2,159	2,147	2,117
Wandering (S)	397	396	390
Wanneroo (C)	142,191	151,930	163,722
Waroona (S)	2,584	2,605	2,632
West Arthur (S)	1,089	1,079	1,056
Westonia (S)	500	528	527
Wickepin (S)	928	912	898
Williams (S)	1,131	1,126	1,111
Wiluna (S)	1,832	1,879	2,006
Wongan-Ballidu (S)	1,909	1,902	1,872
Woodanilling (S)	433	430	423
Wyalkatchem (S)	766	742	713
Wyndham-East Kimberley (S)	6,180	6,289	6,346
Yalgoo (S)	285	324	512
Yilgarn (S)	2,069	2,227	2,787
York (S)	2,302	2,373	2,381
<b>Total</b>	<b>1,500,507</b>	<b>1,544,806</b>	<b>1,594,745</b>

(a) Based on the 1986 Census of Population and Housing. (b) Cities of Fremantle, Perth and Stirling are comprised of a number of statistical local areas. (c) The Shire of Boulder and the Town of Kalgoorlie amalgamated on 1.2.89 to form the City of Kalgoorlie-Boulder. For ease of comparison the figures for 1987 and 1988 have been combined.

## CHARACTERISTICS OF THE POPULATION

**Age.** Table 6.4 shows the numbers and proportions of the population of Western Australia in selected age groups at 30 June 1987, 1988 and 1989. The age groups represent, in a general sense, sectors such as the pre-school population, children of school age, minors, the economically active population and those beyond normal working age.

TABLE 6.4 – ESTIMATED RESIDENT POPULATION IN SELECTED AGE GROUPS : AT 30 JUNE  
(persons)

Reference: Catalogue No. 3201.0

Age last birthday (years)	Number in each age group			Per cent of total		
	1987	1988	1989	1987	1988	1989
Under 6	142,966	146,141	149,573	9.53	9.46	9.38
6 – 12	161,721	165,344	169,965	10.78	10.70	10.66
6 – 15	237,676	239,366	243,787	15.84	15.49	15.29
Under 18	433,772	440,612	447,041	28.91	28.52	28.03
Under 21	507,795	517,330	528,424	33.84	33.49	33.14
15 – 44	738,172	763,162	788,666	49.19	49.40	49.45
15 – 64	1,007,103	1,039,663	1,075,377	67.12	67.30	67.43
65 and over	139,578	145,198	150,819	9.30	9.40	9.46
<b>All ages</b>	<b>1,500,507</b>	<b>1,544,806</b>	<b>1,594,745</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>

**Religion and birthplace.** The religion and birthplace of the population as recorded at the censuses of 1976, 1981 and 1986 are shown in Tables 6.5 and 6.6. The *Census and Statistics Act 1905* provides that there shall be no penalty for failure to answer the question on religion, and a statement to this effect is contained in the census schedule.

TABLE 6.5 – RELIGION OF THE POPULATION (a)  
CENSUS 30 JUNE  
(‘000 persons)

Religion	1976	1981	1986
Christian—			
Anglican	360.3	375.8	371.3
Baptist	14.4	15.9	16.9
Catholic	283.2	316.3	347.7
Churches of Christ	12.6	14.2	14.4
Methodist	77.0	51.2	(b)
Presbyterian	42.6	32.0	31.6
Uniting	(b)	(b)	82.9
Other	85.0	131.6	113.3
<b>Total Christian</b>	<b>875.2</b>	<b>937.1</b>	<b>978.0</b>
Non-Christian—			
Buddhist	(c)	(c)	7.2
Hebrew	2.9	3.2	3.9
Muslim	1.9	3.6	5.5
Other	3.3	4.9	6.4
<b>Total Non-Christian</b>	<b>8.1</b>	<b>11.6</b>	<b>23.0</b>
Non-classifiable	5.5	8.0	6.0
No religious denomination	119.5	172.1	235.3
Not stated	136.6	144.8	164.3
<b>Total</b>	<b>1,144.9</b>	<b>1,273.6</b>	<b>1,406.9</b>

(a) Figures as counted. (b) The Uniting Church in Australia, which was formed in June 1977 by the union of all the Methodist Churches and most of the Congregational and Presbyterian Churches, replaced the Methodist Church as a major category in the 1986 Census. (c) Included in Other, Non-Christian.

TABLE 6.6 – BIRTHPLACE OF THE POPULATION (a)  
CENSUS 30 JUNE  
(‘000 persons)

Birthplace	1976	1981	1986
Australia	832.4	911.0	997.8
Europe—			
United Kingdom and Eire	176.6	186.1	194.0
Italy	29.3	29.2	27.8
Netherlands	10.6	11.3	11.6
Yugoslavia	10.4	11.0	11.2
Germany	7.4	8.1	9.5
Poland	4.4	5.0	6.5
Greece	4.5	4.3	4.0
Other	15.3	15.8	17.3
<b>Total Europe</b>	<b>258.6</b>	<b>270.9</b>	<b>281.8</b>
Asia—			
India	9.9	10.1	10.6
Malaysia	4.0	5.4	8.7
Vietnam	-	2.8	5.9
Burma	4.0	4.4	4.5
Singapore	2.5	3.4	4.7
Other	8.9	11.4	16.0
<b>Total Asia</b>	<b>29.3</b>	<b>37.6</b>	<b>50.5</b>
Oceania—			
New Zealand	8.9	18.5	25.2
Other	1.1	1.6	3.4
<b>Total Oceania</b>	<b>9.9</b>	<b>20.0</b>	<b>28.6</b>
Africa—			
Republic of South Africa	2.3	4.2	6.3
Other	5.2	7.2	9.1
<b>Total Africa</b>	<b>7.6</b>	<b>11.4</b>	<b>15.4</b>
America—			
United States of America	3.6	4.1	5.1
Other	3.4	4.4	5.1
<b>Total America</b>	<b>7.1</b>	<b>8.5</b>	<b>10.1</b>
<b>Total (b)</b>	<b>1,144.9</b>	<b>1,273.6</b>	<b>1,406.9</b>

(a) Figures as counted. (b) Includes those born at sea and not stated.

### Aborigines and Torres Strait Islanders

The 1986 Census of Population and Housing counted 37,789 Aborigines and Torres Strait Islanders in Western Australia compared with 31,351 in 1981. The 1986 figure represented 2.7 per cent of all persons counted in the State.

Table 6.7 shows the age distribution of Aborigines and Torres Strait Islanders at 30 June 1976, 1981 and 1986. At 30 June 1986 nearly 63 per cent were less than 25 years of age and 3.5 per cent were 65 years of age or older. Equivalent figures for the total State population were 41.2 per cent and 9.3 per cent respectively. There were relatively fewer Aborigines and Torres Strait Islanders in each age group above 20-24 years than for the total State population.

**TABLE 6.7 - ABORIGINES AND TORRES STRAIT ISLANDERS - AGE DISTRIBUTION CENSUS 30 JUNE (persons)**

<i>Age last birthday (years)</i>	<i>1976</i>	<i>1981</i>	<i>1986</i>
0 - 4	3,890	4,108	5,349
5 - 9	4,146	4,580	4,702
10 - 14	3,823	4,616	4,866
15 - 19	3,006	3,827	4,712
20 - 24	2,298	3,089	4,098
25 - 29	1,836	2,367	3,182
30 - 34	1,347	1,772	2,472
35 - 39	1,157	1,421	1,933
40 - 44	1,029	1,259	1,499
45 - 49	885	1,099	1,193
50 - 54	657	910	1,025
55 - 59	501	575	800
60 - 64	457	590	615
65 - 69	479	478	523
70 and over	612	666	818
<b>Total</b>	<b>26,126</b>	<b>31,351</b>	<b>37,789</b>

Most Aborigines and Torres Strait Islanders—22,605 or 60 per cent of the total in Western Australia—were located in urban centres at 30 June 1986. The principal urban and remote community population centres in which Aborigines and Torres Strait Islanders were counted in the 1986 Census are shown in Table 6.8.

**TABLE 6.8 - ABORIGINES AND TORRES STRAIT ISLANDERS - MAJOR POPULATION CENTRES CENSUS 30 JUNE 1986**

<i>Locality</i>	<i>Persons</i>
URBAN CENTRES	
Albany	377
Broome	1,359
Bunbury	590
Carnarvon	878
Derby	946
Fitzroy Crossing	662
Geraldton	1,290
Halls Creek	719
Kalgoorlie-Boulder	929
Kununurra	748
Kwinana	354
Meekatharra	373
Mullewa	318
Northam	301
Perth	8,830
Port Hedland	1,407
Roebourne	597
Wyndham	539
REMOTE AREA COMMUNITIES	
Balgo	443
Beagle Bay	241
Billiluna/Lake Gregory	256
Central Reserves	629
Gogo	259
Jigalong	353
La Grange	410
Looma	207
One Arm Point/Lombardina	413
Turkey Creek	258
Warburton	361

## Vital Statistics

Registration of births, deaths and marriages in Western Australia is compulsory. Particulars reported to District Registrars are sent to the Registrar-General at Perth, where a central registry is maintained. Local registers are kept at each district office.

Births are required to be registered within sixty days of the event, and a fetal death (stillbirth) must

be registered both as a birth and a death. Deaths are required to be registered within fourteen days. Marriage certificates must be lodged for registration within fourteen days of the date of marriage.

Statistics of births, deaths and marriages are prepared from registration documents.



## BIRTHS

Table 6.9 shows that although there were more males than females born in each of the years included, the sex ratio (number of male live births per 100 female live births) declined during the period. However, this figure tends to fluctuate and the movement shown does not necessarily indicate a trend. The average sex ratio for the last three years (105.4) is only marginally lower than for the last ten years (105.6). The crude birth rate (number of live births registered during the calendar year per 1,000 of mean population) has fluctuated over the three year period being higher in 1988 than for the other two years. The trend has been for this rate to decline, the average for the last three years being 15.8 compared with 16.3 for the last ten years.

**TABLE 6.9 - BIRTHS REGISTERED (a)**  
Reference: Catalogue No. 3301.0

	1987	1988	1989
Births (b)—			
Males	12,044	12,874	12,783
Females	11,288	12,269	12,268
Persons	23,332	25,143	25,051
Sex ratio (c)	107.0	104.9	104.2
Crude birth rate (d)	15.5	16.3	15.7

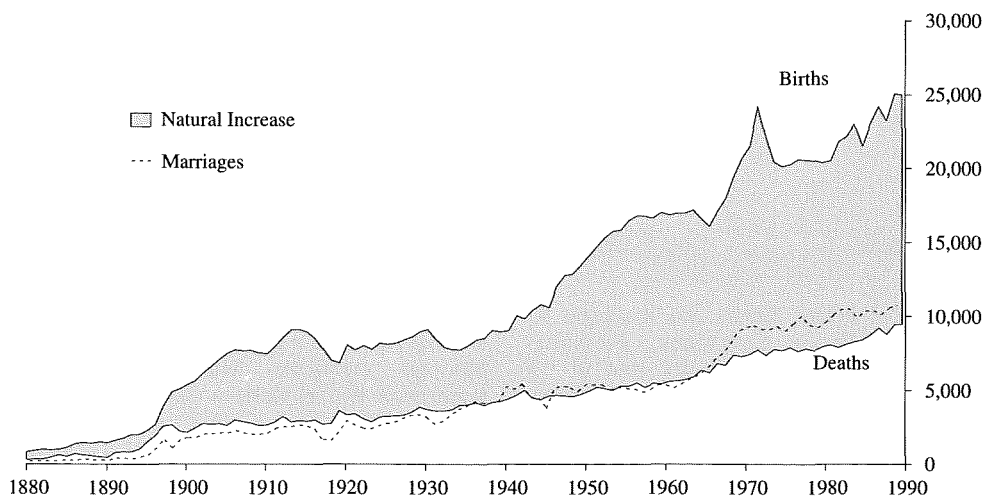
(a) Figures relate to state of usual residence of mother. (b) Includes ex-nuptial births. (c) Number of male live births per 100 female live births. (d) Number of live births registered during the calendar year per 1,000 of mean population.

The proportion of ex-nuptial births has increased over the period shown. Table 6.10 shows total and ex-nuptial births registered according to age of mother. The figures show an overall decrease in the proportion of both total and ex-nuptial births to mothers under the age of 25 years, and an increase in the proportion of births to mothers in the age groups from 25 to 39 years. The proportion of ex-nuptial births to mothers in the under 25 years age groups is consistently higher than the proportion of total births to mothers in the same age groups. In all other age groupings the situation is reversed.

**Ex-nuptial live births.** A birth is registered as ex-nuptial if the parents are not married to each other at the time of the confinement. Ex-nuptial births in 1989 comprised 21.6 per cent of all live births registered.

**Legitimations.** Under the provisions of the *Marriage Act 1961* (Commonwealth) which came into operation on 1 September 1963, a child whose parents are not married to each other at the time of its birth becomes legitimised on the subsequent marriage of its parents. The legitimation takes place whether or not there was a legal impediment to the marriage of the parents at the time of the child's birth and whether or not the child was still living at the time of the marriage, or in the case of a child born before 1 September 1963, at that date.

**DIAGRAM 1.2**  
**BIRTHS, DEATHS AND MARRIAGES, 1880 to 1989**



**TABLE 6.10 – BIRTHS REGISTERED (a)  
BY AGE OF MOTHER**  
Reference: Catalogue No. 3301.0

Age of mother (years)	1987	1988	1989
<b>TOTAL BIRTHS (b)</b>			
Under 20	1,381	1,534	1,441
20 – 24	5,435	5,601	5,272
25 – 29	9,237	9,737	9,648
30 – 34	5,467	6,141	6,445
35 – 39	1,585	1,875	1,972
40 – 44	211	248	256
45 and over	11	4	11
Not stated	5	3	6
<b>Total</b>	<b>23,332</b>	<b>25,143</b>	<b>25,051</b>
<b>EX-NUPTIAL BIRTHS</b>			
Under 20	1,083	1,224	1,161
20 – 24	1,587	1,851	1,896
25 – 29	1,167	1,285	1,294
30 – 34	555	654	739
35 – 39	201	251	278
40 – 44	22	45	40
45 and over	3	1	1
Not stated	5	3	6
<b>Total</b>	<b>4,623</b>	<b>5,314</b>	<b>5,415</b>

(a) Figures relate to State of usual residence of mother. (b) Includes ex-nuptial births.

**Age-specific birth rates.** As a measure of fertility, the crude birth rate has the advantage of simplicity in calculation. The data necessary for its computation are usually readily available from published statistics and it is therefore useful in comparing the fertility of the populations of regions for which no additional data are available. However, it is of limited use since it does not take into account the important factors of age and sex composition of the population. Age-specific birth rates, which do have regard to these factors, therefore provide a better measure of fertility. Age-specific birth rates represent the number of live births to women of specified ages per thousand women of those particular ages and thus take cognisance of the variations in fertility experienced by women at the successive stages of their child-bearing life.

**Gross and net reproduction rates.** The gross reproduction rate is derived from age-specific fertility rates which indicate the number of *female* births to women of specified ages per thousand women of those particular ages. It provides a measure of the number of daughters who would be born, on the average, to every woman assuming that they live through the whole of the child-bearing period and that the basic fertility rates remain unaltered throughout.

The gross reproduction rate assumes that all females survive to the end of their child-bearing capacity. A more accurate measure, which takes into account the effect of mortality among women during this period, is the net reproduction rate. This rate represents the average number of daughters who would be born to women during their lifetime, if they were subject in each succeeding year of life to the fertility and mortality rates on which the calculation is based. The net reproduction rate is a measure of the number of women who, in the next generation, will replace the women of reproductive age in the current generation. It provides a useful indication of likely future population trends. A rate remaining stationary at unity indicates an ultimately static population. If a rate greater than unity is maintained, an ultimate increase of population will result, while a continuing rate less than unity will lead to an ultimate decline.

Table 6.11 provides comparative data for Western Australia and Australia on number of births, birth rates and reproduction rates for 1989. The figures show that the crude birth rate (the number of total births per thousand mean resident population) for Western Australia (15.7 per cent) is higher than for Australia as a whole (14.9 per cent). The percentage of ex-nuptial to total births in Western Australia is also higher (21.6 per cent) than the figure for Australia (20.2 per cent).

**TABLE 6.11 – BIRTHS, WESTERN AUSTRALIA IN  
RELATION TO AUSTRALIA, 1989**  
Reference: Catalogue No. 3301.0

	Western Australia	Australia
Number of births—		
Nuptial	19,636	200,065
Ex-nuptial	5,415	50,788
<b>Total</b>	<b>25,051</b>	<b>250,853</b>
Crude birth rate (a)	15.7	14.9
Age-specific birth rate (b)—		
15 – 19	22.2	20.6
20 – 24	82.2	78.6
25 – 29	139.9	136.2
30 – 34	96.1	96.0
35 – 39	30.8	32.5
40 – 44	4.6	5.0
45 – 49	0.3	0.2
Gross reproduction rate (c)	0.920	0.900
Net reproduction rate (d)	0.907	0.884

(a) Per 1,000 mean resident population. (b) Live births per 1,000 women in each age group. Births to mothers under 15 are included in the 15-19 age group, and births to mothers aged 50 and over are included in the 45-49 age group. (c) Sum of the female age-specific fertility rates multiplied by 5 and divided by 1,000. (d) Based on Annual Life Tables calculated by the Australian Statistician. Because of the method of calculation, these figures are subject to annual fluctuations which may not be indicative of a longer term trend.

## DEATHS

**Causes of death.** Statistics in Tables 6.12 and 6.14 are classified according to the Ninth (1975) Revision of the World Health Organisation's *International Classification of Diseases* which was adopted for world-wide use from 1979. The term 'cause of death', as used in these tables and

elsewhere in this Chapter, means '(a) the disease or injury which initiated the train of morbid events leading directly to death, or (b) the circumstances of the accident or violence which produced the fatal injury'.

**TABLE 6.12 – PRINCIPAL CAUSES OF DEATH, 1989 (a)**  
Reference: Catalogue No. 3303.0

Causes of death and International number (b)	Western Australia			Australia		
	Persons	Per cent of all deaths	Rate (c)	Persons	Per cent of all deaths	Rate (c)
Infectious and parasitic diseases (000-139)	51	0.5	3.20	761	0.6	4.52
Neoplasms (140-239)—						
Malignant (140-208)—						
Digestive organs and peritoneum (150-159)	679	7.1	42.58	8,650	7.0	51.39
Trachea, bronchus and lung (162)	545	5.7	34.18	6,236	5.0	37.05
Genito-urinary organs (179-189)	388	4.1	24.33	4,768	3.8	28.33
Other	898	9.4	56.32	10,490	8.4	62.32
Benign, other and unspecified (210-239)	21	0.2	1.32	280	0.2	1.66
Endocrine, nutritional and metabolic diseases (240-279)	187	2.0	11.73	2,989	2.4	17.76
Diseases of blood and blood-forming organs (280-289)	27	0.3	1.69	438	0.4	2.60
Mental disorders (290-319)	155	1.6	9.72	2,157	1.7	12.81
Diseases of the nervous system and sense organs (320-389)	260	2.7	16.31	2,390	1.9	14.20
Diseases of the circulatory system (390-459)—						
Ischaemic heart disease (410-414)	2,443	25.6	153.21	32,639	26.3	193.90
Cerebrovascular disease (430-438)	946	9.9	59.33	12,579	10.1	74.73
Other	758	7.9	47.54	11,611	9.3	68.98
Diseases of the respiratory system (460-519)—						
Chronic obstructive pulmonary disease (490-496)	490	5.1	30.73	7,180	5.8	42.65
Other	288	3.0	18.06	3,431	2.8	20.38
Diseases of the digestive system (520-579)	345	3.6	21.64	4,244	3.4	25.21
Diseases of the genito-urinary system (580-629)	148	1.6	9.28	1,929	1.6	11.46
Complications of pregnancy, childbirth and the puerperium (630-676)	1	(d)	0.06	13	(d)	0.08
Diseases of the skin and subcutaneous tissue (680-709)	-	-	-	144	0.1	0.86
Diseases of the musculoskeletal system and connective tissue (710-739)	40	0.4	2.51	692	0.6	4.11
Congenital anomalies (740-759)	75	0.8	4.70	773	0.6	4.59
Certain conditions originating in the perinatal period (760-779)	81	0.8	5.08	853	0.7	5.07
Symptoms, signs and ill-defined conditions (780-799)	59	0.6	3.70	814	0.7	4.84
Accidents, poisonings and violence (800-999)—						
Motor vehicle traffic accidents (810-819)	232	2.4	14.55	2,828	2.3	16.80
Suicide and self inflicted injury (950-959)	185	1.9	11.60	2,096	1.7	12.45
Other	241	2.5	15.11	3,247	2.6	19.29
<b>All causes</b>	<b>9,543</b>	<b>100.0</b>	<b>598.48</b>	<b>124,232</b>	<b>100.0</b>	<b>738.02</b>

(a) Based on State of usual residence. Fetal deaths are excluded. (b) Classified in accordance with the *International Classification of Diseases* (Ninth revision, 1975), operative from 1 January 1979. (c) Per 100,000 of mean resident population. (d) Less than 0.1.

**Perinatal deaths.** Since deaths within the first four weeks of life (neonatal deaths) are mainly due to conditions originating before or during birth and the same conditions can cause fetal death (stillbirth), special tabulations are prepared combining the two. These are termed 'perinatal deaths'. The statistical definition of perinatal deaths in Australia was amended in 1979 and now includes all fetuses and infants delivered weighing at least 500 grams or, when birthweight is unavailable, the corresponding gestational age (22 weeks) or body length (25cm crown-heel). The rates for fetal deaths and perinatal deaths are calculated per thousand live births only. The live births figure used to calculate these rates excludes those infants known to have weighed less than 500 grams at delivery.

**TABLE 6.13 – PERINATAL DEATHS – NUMBER AND RATES, 1989**  
Reference: Catalogue No. 3304.0

	Western Australia		Australia	
	Number	Rate	Number	Rate
Fetal deaths	111	4.4	1,451	5.8
Neonatal deaths—				
Under 1 day	52	2.0	(a)499	2.0
1 day and under 7 days	39	1.6	333	1.3
7 days and under 28 days	19	0.8	222	0.9
<i>Total</i>	<i>110</i>	<i>4.3</i>	<i>(b)1,058</i>	<i>4.2</i>
<b>Total perinatal deaths</b>	<b>221</b>	<b>8.8</b>	<b>2,509</b>	<b>9.9</b>

(a) Includes 2 cases of 'hours not stated'. (b) Includes 4 cases of 'days not stated'.

**TABLE 6.14 – INFANT DEATHS – CAUSES OF DEATH, 1989 (a)**

Causes of death and International number (b)	Western Australia		Australia	
	Number	Per cent of all infant deaths	Number	Per cent of all infant deaths
Causes mainly of prenatal and natal origin (740-779)—				
Congenital anomalies (740-759)	54	27.7	493	24.6
Immaturity (765)	22	11.3	223	11.1
Birth trauma (767)	2	1.0	25	1.2
Hypoxia and birth asphyxia (768)	6	3.1	78	3.9
Respiratory distress syndrome (769)	24	12.3	120	6.0
Other respiratory conditions (770)	9	4.6	188	9.4
Infections specific to the perinatal period (771)	10	5.1	49	2.4
Fetal and neonatal haemorrhage (772)	5	2.6	92	4.6
Other	3	1.5	69	3.4
<i>Total</i>	<i>135</i>	<i>69.2</i>	<i>1,337</i>	<i>66.7</i>
Causes mainly of postnatal origin—				
Sudden death, cause unknown (798)	42	21.5	470	23.5
All other causes	18	9.2	197	9.8
<i>Total</i>	<i>60</i>	<i>30.8</i>	<i>667</i>	<i>33.3</i>
<b>All causes</b>	<b>195</b>	<b>100.0</b>	<b>2,004</b>	<b>100.0</b>

(a) Based on State of usual residence. Fetal deaths are excluded. (b) Classified in accordance with the *International Classification of Diseases*, (Ninth revision), operative from 1 January 1979.

Table 6.15 provides comparative data for deaths in Western Australia and Australia on number of deaths and death rates for 1989. The figures show that the crude death rate (the number of deaths per thousand of mean resident population) in Western Australia (6.0) is lower than the Australian figure of 7.4. With the exception of the 5-9 and 15-19 years age groups the age-specific death rates for Western Australia are lower than for Australia.

**TABLE 6.15 - DEATHS - WESTERN AUSTRALIA  
IN RELATION TO AUSTRALIA, 1989**  
Reference: Catalogue No. 3302.0

	<i>Western Australia</i>	<i>Australia</i>
Number of deaths	9,543	124,232
Crude death rate (a)	6.0	7.4
Infant death rate (b)	7.8	8.0
Age-specific death rate (years) (c)—		
Under 1 year	7.87	8.04
1 - 4	0.38	0.42
5 - 9	0.25	0.19
10 - 14	0.21	0.21
15 - 19	0.73	0.71
20 - 24	0.85	0.95
25 - 29	0.76	0.96
30 - 34	0.87	0.99
35 - 39	1.06	1.21
40 - 44	1.40	1.60
45 - 49	2.42	2.66
50 - 54	4.19	4.56
55 - 59	6.89	7.63
60 - 64	11.87	12.71
65 - 69	18.31	20.02
70 - 74	30.00	33.61
75 - 79	49.49	53.06
80 - 84	81.70	87.81
85 and over	147.28	167.99

(a) Per 1,000 mean resident population. (b) Infant deaths per 1,000 live births. (c) Number of deaths per 1,000 persons in each age group. Excludes fetal deaths.

### LIFE EXPECTANCY

A life table is a life history of a hypothetical group, or cohort, of people, as it is diminished gradually by deaths. A key value in life tables is the expectation of life remaining at each age. ABS has produced life tables for Western Australia dating back to 1971 and in that year expectation of life at birth was 68.4 years for males and 75.3 years for females. In 1989 it had risen to 74.27 and 80.42 years respectively. Life expectancy at birth for males has therefore increased slightly more than for females over this period, however female life expectancy is still more than six years greater than for males. In 1989 Western Australian life expectancy at birth was slightly higher than for Australia as a whole for which figures were, males 73.3 years and females, 79.55 years.

**TABLE 6.16 - COMPLETE EXPECTATION OF LIFE  
AT SELECTED AGES (a) - WESTERN AUSTRALIA  
(years)**

Age	<i>Expectation of life (b)</i>		
	1987	1988	1989
Birth—			
Males	73.79	73.75	74.27
Females	80.49	80.14	80.42
1 year—			
Males	73.53	73.48	73.91
Females	80.03	79.73	79.98
20 years—			
Males	55.10	55.05	55.54
Females	61.33	61.06	61.29
40 years—			
Males	36.28	36.24	36.79
Females	41.79	41.62	41.72
60 years—			
Males	18.82	18.66	19.06
Females	23.36	23.18	23.38

(a) Based on annual life tables calculated by the Australian Statistician. These figures are based on estimated resident population. (b) The average number of additional years a person of given age and sex might expect to live if the age-specific death rates of the given period continued throughout their lifetime.

### MARRIAGES

Marriages may be celebrated either by ministers of religion registered for the purpose with the Registrar of Ministers of Religion in each State or Territory, by the Registrar-General, the Deputy Registrar-General or other State officers appointed under the *Registration of Births, Deaths and Marriages Act, 1961* (State), or since 1973, by other persons authorised by the Commonwealth Attorney-General.

**TABLE 6.17 - MEDIAN (a) AGES OF BRIDEGROOMS  
AND BRIDES  
(years)**

Reference: Catalogue No. 3306.0

<i>Marital status</i>	1987	1988	1989
Bridegrooms—			
Never married	25.9	26.2	26.3
Widowed	58.8	62.7	61.6
Divorced	38.6	39.5	39.9
<b>All bridegrooms</b>	<b>27.8</b>	<b>28.2</b>	<b>28.2</b>
Brides—			
Never married	23.7	23.9	24.1
Widowed	51.3	53.2	54.2
Divorced	34.7	35.4	35.9
<b>All brides</b>	<b>25.3</b>	<b>25.6</b>	<b>25.8</b>

(a) The median age is that age which divides the reference population into two halves, one half being below the median age and one half above.

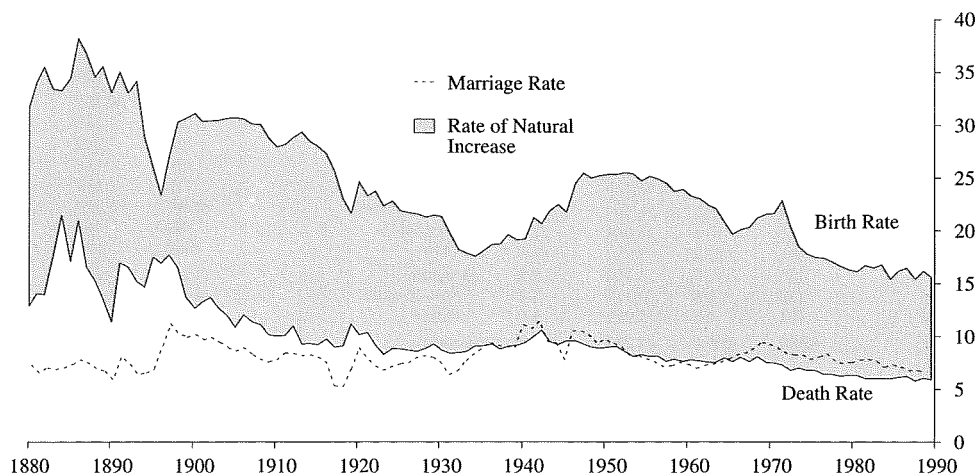
TABLE 6.18 – RELIGIOUS AND CIVIL MARRIAGES, 1989

Reference: Catalogue No. 3306.0

Category of authorised celebrant	Western Australia		Australia	
	Number	Per cent of total	Number	Per cent of total
Registered ministers of recognised religious denominations (a)—				
Christian denominations (a)—				
Anglican Church of Australia	1,192	11.1	15,212	13.0
Assemblies of God in Australia	57	0.5	850	0.7
Baptist Union of Australia	149	1.4	1,843	1.6
Christian Bretheren	14	0.1	222	0.2
Church of Jesus Christ of Latter Day Saints	21	0.2	291	0.2
Church of the Four Square Gospel in Australia	22	0.2	55	—
Churches of Christ in Australia	201	1.9	1,231	1.1
Lutheran Church of Australia Incorporated	59	0.5	1,360	1.2
New Church in Australia	78	0.7	82	0.1
Orthodox Churches (b)	65	0.6	2,917	2.5
Potter's House Christian Fellowship	27	0.3	39	—
Roman Catholic Church	1,862	17.3	23,576	20.1
Salvation Army	75	0.7	769	0.7
Seventh-day Adventist Church	38	0.4	315	0.3
Uniting Church of Australia	790	7.4	12,196	10.4
Other	277	2.6	5,225	4.5
<i>Total</i>	<i>4,927</i>	<i>45.9</i>	<i>66,183</i>	<i>56.5</i>
Non Christian denominations—				
Hebrew, Jewish	50	0.5	337	0.3
Muslim, Islam	30	0.3	692	0.6
Other	32	0.3	531	0.5
<i>Total</i>	<i>112</i>	<i>1.0</i>	<i>1,560</i>	<i>1.3</i>
<b>Total</b>	<b>5,039</b>	<b>46.9</b>	<b>67,743</b>	<b>57.8</b>
Civil officers—				
Registrar-General, etc.	1,095	10.2	12,665	10.8
Civil celebrants	4,605	42.9	36,768	31.4
<b>Total</b>	<b>5,700</b>	<b>53.1</b>	<b>49,433</b>	<b>42.2</b>
<b>TOTAL MARRIAGES</b>	<b>10,739</b>	<b>100.0</b>	<b>117,176</b>	<b>100.00</b>

(a) Under authority of the Marriage Act. (b) Includes denominations grouped under this heading in the proclamation made under the Marriage Act.

DIAGRAM 1.3  
RATES OF BIRTHS, DEATHS AND MARRIAGES,  
Per Thousand of Mean Population, 1880 to 1989



## DIVORCES

The *Family Law Act 1975* (Commonwealth), which came into operation on 5 January 1976, repealed the *Matrimonial Causes Act* and made new provisions relating to divorce. It also established the Family Court of Australia.

In Western Australia, jurisdiction relating to the *Family Law Act* (Commonwealth) is vested in the Family Court of Western Australia constituted by the *Family Court Act 1975* (State).

The *Family Law Act* provides that an application by a party to a marriage, for a decree of dissolution of the marriage shall be based on the grounds that the marriage has broken down irretrievably. A decree of dissolution is made if and only if, the Court is satisfied that the parties separated and thereafter lived separately and apart for a period of not less than twelve months immediately preceding the date of the filing of the application for dissolution of marriage, provided that the Court is satisfied that there is no reasonable likelihood of cohabitation being resumed.

The Family Court of Western Australia also exercises jurisdiction in matters concerning the adoption of children, and the guardianship, custody or maintenance of children.

In both Western Australia and Australia almost one half of marriage dissolutions occurred when the duration of the marriage was 9 years or less. Dissolutions were highest in marriages with a duration of between 5 and 9 years.

TABLE 6.19 – DISSOLUTIONS OF MARRIAGE, 1989  
Reference: Catalogue No. 3307.0

Duration (years)	Marriages dissolved			
	Western Australia		Australia	
	Number	Per cent of total	Number	Per cent of total
Under 5	729	17.8	8,662	20.9
5 – 9	1,153	28.2	11,703	28.3
10 – 14	782	19.1	7,061	17.1
15 – 19	584	14.3	5,752	13.9
20 – 24	426	10.4	4,104	9.9
25 – 29	230	5.6	2,177	5.3
30 and over	184	4.5	1,923	4.6
<b>Total (a)</b>	<b>4,089</b>	<b>100.0</b>	<b>41,382</b>	<b>100.0</b>

(a) Includes duration of marriage not stated.

## OVERSEAS MIGRATION

Migration to Australia is regulated by the *Migration Act 1958* (Commonwealth) which came into force on 1 July 1959.

Permanent movement deals with arrivals of settlers (persons who hold migrant visas regardless of stated intended period of stay), New Zealand citizens who indicate an intention to settle and those who are otherwise eligible to settle, for example, the overseas born children of Australian citizens. Permanent movements also include the departures of Australian residents, including former settlers, who on departure state that they do not intend to return to Australia.

TABLE 6.20 – PERMANENT (SETTLER) ARRIVALS  
BY SELECTED COUNTRY OF BIRTH

Country of birth	1987	1988	1989
<i>Africa</i>	1,460	1,390	1,030
South Africa	820	790	590
Zimbabwe	170	190	200
Other	480	410	230
<i>America</i>	550	630	780
Canada	130	120	130
Chile	90	90	50
El Salvador	20	120	290
USA	200	200	220
Other	100	90	90
<i>Asia</i>	4,960	6,710	5,570
Burma	110	130	100
China	210	200	190
Hong Kong	250	340	250
India	360	420	350
Indonesia	250	230	340
Iran	110	140	110
Malaysia	1,310	2,090	1,710
Philippines	380	610	380
Singapore	600	740	610
Sri Lanka	180	230	120
Taiwan	50	120	160
Thailand	150	150	100
Vietnam	420	500	640
Other	580	800	520
<i>Europe</i>	8,050	10,560	9,370
Germany	220	220	150
Poland	250	240	200
Portugal	130	140	100
Romania	110	130	90
UK & Ireland	6,290	8,790	8,140
Yugoslavia	390	340	200
Other	660	690	490
<i>Oceania</i>	2,070	3,770	2,530
New Zealand	1,950	3,620	2,440
Other	120	150	90
<b>Total</b>	<b>17,090</b>	<b>23,050</b>	<b>19,290</b>

**TABLE 6.21 – PERMANENT ARRIVALS BY  
SEX AND AGE**

Reference: Catalogue No. 3404.0

Age group (years)	1987	1988	1989
<b>MALES</b>			
0 – 4	1,050	1,330	1,110
5 – 14	1,600	2,300	1,860
15 – 24	1,180	1,550	1,350
25 – 44	3,510	4,990	4,010
45 – 64	810	1,070	950
65 and over	380	410	310
<b>Total</b>	<b>8,530</b>	<b>11,640</b>	<b>9,580</b>
<b>FEMALES</b>			
0 – 4	940	1,310	1,070
5 – 14	1,510	2,090	1,810
15 – 24	1,220	1,620	1,460
25 – 44	3,510	4,850	4,020
45 – 64	900	1,060	960
65 and over	480	480	390
<b>Total</b>	<b>8,560</b>	<b>11,410</b>	<b>9,700</b>
<b>PERSONS</b>			
0 – 4	2,000	2,640	2,180
5 – 14	3,110	4,390	3,660
15 – 24	2,400	3,170	2,810
25 – 44	7,020	9,840	8,030
45 – 64	1,710	2,140	1,910
65 and over	860	890	700
<b>Total</b>	<b>17,090</b>	<b>23,050</b>	<b>19,290</b>

**TABLE 6.22 – PERMANENT DEPARTURES BY  
CATEGORY**

Reference: Catalogue No. 3404.0

Period	Former settlers	Other residents	Total
<b>ANNUAL AVERAGES</b>			
1971–1975	3,550	950	4,490
1976–1980	2,270	1,010	3,280
1981–1985	1,970	1,010	2,980
<b>ANNUAL TOTALS</b>			
1987	1,650	1,040	2,690
1988	1,740	1,090	2,840
1989	2,140	1,520	3,650

## REFERENCES

### ABS publications

*Census 86 — Catalogue of 1986 Census Tables* (2175.0).

*Estimated Resident Population by Age and Sex in Statistical Local Areas, Western Australia* (3203.5).

*Births, Australia* (3301.0).

*Deaths, Australia* (3302.0).

*Causes of Death, Australia* (3303.0).

*Perinatal Deaths, Australia* (3304.0).

*Marriages, Australia* (3306.0).

*Divorces, Australia* (3307.0).

*Overseas Arrivals and Departures, Australia* (3404.0).



## Chapter 7

### SOCIAL WELFARE

The Commonwealth and State Governments and a large number of voluntary agencies provide social welfare services for the population. The Commonwealth Government is concerned largely with providing fixed monetary pensions and benefits and repatriation services. It also provides, either directly or through State and local government authorities and voluntary agencies, a wide range of welfare services for people with special needs. During 1988-89, \$26,328.5 million were expended in Australia on social security and welfare by the Commonwealth, which is 30.3 per cent of the total Government outlay. State agencies operate in the field of child welfare and distribute emergency relief in circumstances where Commonwealth Government assistance is not available. The voluntary agencies, many of which receive government aid, provide a wide range of services in various fields of social welfare. At the beginning of 1991 there were about 519 licensed charitable organisations in Western Australia.

#### INCOME SUPPORT THROUGH THE DEPARTMENT OF SOCIAL SECURITY

The introduction of a pension for aged persons in 1909 began Australia's national provision of social security payments. Since then a number of other regular income payments have been introduced to meet specific cases of perceived need for people incapacitated for work, for spouses of age or invalid pensioners and for sole supporting parents. In addition, disability and service pensions have been provided through the Department of Veterans' Affairs for returned servicemen and women and their dependants.

The Department of Social Security administers income support legislation for the aged, the disabled, the sick, widows and sole parents, the unemployed and families with children. The conditions relating to payment of the pensions and benefits described in this section are intended only as a general guide and more detailed information about the eligibility criteria and current rates of benefit should be obtained from the Department of Social Security.

In 1989-90 Western Australians were paid more than \$1,527 million in the form of pensions and

benefits through the Department of Social Security.

TABLE 7.1 - MAIN BENEFITS PAID UNDER THE SOCIAL SECURITY ACT: 1989-90

<i>Pension/benefit type</i>	<i>Number of beneficiaries</i>	<i>Expenditure</i>
		\$m
Age Pension (a)	108,584	640.0
Family Allowance	(b)185,522	178.4
Invalid Pension (a)	40,108	260.3
Sole Parent's Pension	24,558	229.7
Unemployment Benefit (c)	(d)34,770	278.1

(a) Includes wife/carer. (b) Number of families. (c) Excludes an average of 1,470 job search allowees on benefit at the end of each week; expenditure totalled \$4.5 million. (d) Average number on benefit at end of each week during year.

#### Age pension

Women aged 60 years and over and men aged 65 years and over are eligible for the age pension subject to income and assets conditions and residential qualifications.

There were 108,584 persons (including wives and carers) on age pension at 30 June 1990, an increase of over one per cent on the previous year. Outlays amounted to \$640 million. The rate of pension at the end of June 1990 was \$235.40 for married couples (combined) and \$141.20 for a single person without dependants.

### **Invalid pension**

An invalid pension is payable to persons aged 16 years and over who are permanently blind or 85 per cent permanently incapacitated for work. The invalid pension cannot be paid unless a major part of the person's incapacity for work is directly caused by physical or mental impairment. Non-medical factors cannot predominate in the assessment of eligibility. At 30 June 1990, 40,108 persons were receiving this pension, an increase of 2.7 per cent on the number at June 1989. The total amount paid was \$260 million.

### **Sheltered employment allowance**

A sheltered employment allowance is payable to disabled people who are employed in approved sheltered workshops and are otherwise qualified to receive an invalid pension or would become qualified if they ceased to be provided with sheltered employment. At June 1990, there were 793 sheltered employment allowees and 64 wives of these allowees. The total value of allowances paid was nearly \$6.5 million.

### **Rehabilitation allowance**

Persons undertaking a rehabilitation program with the Commonwealth Rehabilitation Service and otherwise eligible for a social security pension or benefit can receive a non-taxable rehabilitation allowance equivalent to the invalid pension, subject to the same income and assets tests conditions. The allowance is paid during treatment or training. At June 1990, 378 persons were receiving rehabilitation allowances and 131 wives/carers were receiving a wife's pension.

Recipients of the invalid pension, sheltered employment allowance and rehabilitation allowance, may also be eligible for supplementary payments — additional payment for each child, mother's/guardian's allowance, rent assistance, remote area allowance and special temporary allowance on the death of a pensioner spouse.

### **Mobility allowance**

Mobility allowance of \$11 a week may be paid to people with disabilities who are employed or undertaking vocational training and who, because of their disabilities, cannot use public transport without substantial assistance. At 21 June 1990, 851 persons were in receipt of this allowance with \$515,000 being paid during 1989-90.

### **Wife's pension**

The wife of an aged or invalid pensioner or of a sheltered employment allowee may be paid a pension if she does not qualify for a pension in her own right.

### **Carer's pension**

A carer's pension may be paid to a person who provides a 'severely handicapped' age or invalid pensioner or rehabilitation allowee with substantial personal care and attention or constant supervision in the home where they both live. Persons already in receipt of a social security payment or service pension are not eligible to receive a carer's pension.

### **Sole parent's pension**

The sole parent's pension was introduced from 1 March 1989. It amalgamates the former Class A widow's pension and the supporting parent's benefit. The sole parent's pension is subject to the income and assets test and is taxable.

The Jobs, Education and Training (JET) scheme to assist sole parent pensioners enter the workforce was announced in the 1988-89 Budget. Although the scheme is open to all sole parent pensioners, it is especially targeted at those with school-age children; those who may lose their pension within two years when their youngest child turns 16 years; and teenage sole parents. The scheme is entirely voluntary.

An amount of \$229.7 million was paid to 24,558 sole parent pensioners during 1989-90.

### **Widow's pension**

The widow's pension was introduced in 1942 to provide a regular income for women who had lost the support of their partner.

Prior to 1 March 1989, there were three classes of widow pensioners: Class A — a widow with at least one qualifying dependent child; Class B — a widow of at least 50 without a qualifying child, or a widow who was at least 45 when her Class A widow's pension ceased because she no longer had a qualifying child in her care; Class C — any widow under 50 with no child and in needy circumstances within 26 weeks of her husband's death.

From 1 March 1989, Class A pension was amalgamated with supporting parent's benefit to form the sole parent's pension.

Class B pension commenced to be phased out from 1 July 1987 and most cases should cease to be payable by the year 2002.

From 1 March 1989, Class C pension was extended to widowed males in needy circumstances, and became the 'widowed person's allowance'.

At June 1990, there were 6,488 Class B widows and 20 widowed person's allowance recipients.

### **Unemployment benefit**

To be eligible for unemployment benefit a person must:

- have been unemployed for the period covered by the benefit;

- be capable of undertaking and willing to undertake suitable paid work;

- be taking reasonable steps to obtain work;

- not be unemployed due to industrial action; and

- be registered for work with the Commonwealth Employment Service.

Unemployment benefit may be paid to people aged between 18 and 64 years in the case of men, or under 60 years in the case of women, subject to income and assets conditions and residency qualifications.

*Newstart* assists long term unemployed back to work. A number of the measures introduced in February 1989 as part of *Newstart* are available to all long-term unemployed beneficiaries to encourage them to move back into employment. These include the employment entry payment,

waiver of the waiting period and the option to improve employability through voluntary work or study.

During 1989-90 the average number on the unemployment benefit at the end of each week was 34,770 persons.

### **Job search allowance**

From 1 January 1988 unemployment benefit for 16 to 17 year-olds was replaced by a job search allowance which is subject to a parental income test, an unemployment benefit work test, and after six months of continuous registration with the Commonwealth Employment Service, to the activity test. This initiative was designed to encourage unemployed 16 to 17 year-olds to take up training and employment opportunities rather than become dependent on long-term unemployment benefits, and to remove any financial incentive to leave school early. On average there were 1,470 job search allowance recipients at the end of each week during 1989-90.

### **Young homeless allowance**

A young homeless allowance may be paid to single unemployment, sickness and special beneficiaries under 18 years of age who are 'homeless' and without parental or custodial support.

There were 188 young homeless allowance recipients at June 1989.

### **Sickness benefit**

A sickness benefit is paid to people who have been temporarily incapacitated for work because of sickness or injury and who have suffered a loss of income as a result of the incapacity or who, but for the incapacity, would qualify for the unemployment benefit.

Outlays on sickness benefit amounted to \$38 million and was paid to an average 5,228 persons each week in 1989-90.

### **Family allowance**

The family allowance is paid to a person caring for a child or children under sixteen years of age or full-time dependent students aged 16 to 24 years who are not in receipt of a prescribed education scheme payment. For those aged 18 to 24 years additional qualifications must be met.

Payment is usually made to the mother and is subject to an income test. The family allowance may only be paid to Australian citizens or people who have been granted permanent entry. Payment ceases once a parent or child has been temporarily overseas for three years. Approved charitable, religious or government establishments may be paid family allowances for children in their care.

At 30 June 1990, 185,522 families were receiving the family allowance.

### **Family allowance supplement**

Claimants for the family allowance supplement must be qualified to receive the family allowance.

This payment is an income and assets tested non-taxable supplement for families not in receipt of any other pension/benefit for the child.

At 30 June 1989, there were 17,505 families receiving \$51 million in family income supplement for 42,880 children.

### **Multiple births payment**

Additional payments for multiple births are subject to the same parental income test as family allowance. Payments are made in addition to family allowances until the children reach six years.

### **Child disability allowance**

The child disability allowance is payable to parents or guardians of a physically, intellectually or psychiatrically disabled child under 16 years who is cared for at home and is in need of constant care and attention. The allowance continues to be payable for a dependent full-time student aged 16 to 24 years except where the student is in receipt of certain other social security payments. A weekly allowance of \$27.80 is payable free of income test and tax.

At 30 June 1990 there were 4,034 recipients of the allowance in respect of 4,300 disabled children. The amount paid was \$6.8 million.

### **Double orphan's pension**

A guardian or an institution may be paid a double orphan's pension for a child under 16 years, or a dependent full-time student aged 16 to 24 years inclusive, whose parents are dead. The pension is also payable if one parent is dead and:

the whereabouts of the other parent are not known to the claimant;

the other parent has been convicted of an offence and sentenced to imprisonment for at least ten years and is serving that sentence; or

the other parent is an inmate of a mental hospital or a nursing home patient and will require care and treatment in that or a similar hospital for an indefinite period.

A double orphan's pension may also be paid for a refugee child whose parents are both outside Australia or if their whereabouts are unknown.

The pension is paid free of any income test and is not subject to income tax.

### **Special benefit**

A special benefit may be paid to people ineligible for a pension or unemployment or sickness benefit, but who are unable to earn a sufficient livelihood for themselves and their dependants, and are in hardship.

On average there were 2,661 special benefit recipients at the end of each week in 1989-90.

### **Child support**

The Child Support Scheme was introduced in June 1988 to ensure that non-custodial parents who have the capacity to do so, contribute to the support of their children. The Child Support Agency located in the Australian Taxation Office was set up to collect maintenance liabilities under the Child Support Act. The Department of Social Security is responsible for forwarding these payments to the custodial parent.

### **Additional payments for beneficiaries**

Additions to basic payments are made for certain special needs which apply to a number of income support categories — age pension, sole parent's pension, Class B widow's pension, widowed person's allowance, unemployment benefit, job search allowance and sickness benefit. These additions recognise higher costs incurred by those maintaining children, by those who pay high private rent or by clients who live in remote areas.

**Additional payment for children.** An additional pension is paid to Social Security beneficiaries for dependent children. This additional pension is not

payable for children who are in receipt of an education scheme payment or pension, benefit or allowance in their own right.

**Mother's/Guardian's allowance.** An additional payment of \$12.90 a week is payable to single pensioners and beneficiaries who have at least one dependent child. It may be payable where couples are living apart indefinitely owing to ill-health.

**Rent assistance/incentive allowance.** Rent assistance is a tax-free allowance which may be paid to beneficiaries who pay rent, lodging, board and lodging, a site rent for a boat, caravan or other accommodation which the person occupies as their home, or for services provided in a retirement village.

All recipients of sheltered employment allowance and invalid pensioners undertaking training receive, in lieu of rent assistance, a non-taxable incentive allowance.

**Remote area allowance.** A weekly allowance of \$7 for a single person and \$12 for a married couple is payable to beneficiaries living in specified remote areas. At 30 June 1990, 4,790 persons were in receipt of this allowance.

**Bereavement package.** The package was announced in the 1989-1990 Budget. It involves the replacement of *funeral benefit* (a \$20 or \$40 payment) and *special temporary allowance* with a more generous and less intrusive set of arrangements which commenced on 1 January 1990.

The bereavement package has four elements:

*Married pensioners* — a lump sum bereavement payment will be made to the survivor of a pensioner couple where his or her partner dies,

*Single pensioners* — the estate of a deceased single pensioner will be credited with one extra pension payment,

*Carer's pensioners* — carer's pension will continue for seven fortnightly paydays after the death of the pensioner being cared for,

*Deceased child* — sole parent pension will continue for seven fortnightly paydays after the death of the only qualifying child; or,

low income families will receive a lump sum equal to the total of all social security payments that would have been made for the child during the 14 weeks after his or her death.

### **Fringe benefits**

The majority of beneficiaries are entitled to a range of non-cash fringe benefits upon presentation of a concession card.

The Department issues four types of health cards: pensioner health benefits card; health benefits card; health care card; and pharmaceutical benefits concession card. These cards are issued depending on the income and assets of the claimant and the type of social security payment being received. The cards may entitle the holder to a wide range of concessions including health, transport, household and recreation concessions.

The concessions are provided by Government and semi-Government authorities and private organisations.

### **INCOME SUPPORT THROUGH THE DEPARTMENT OF VETERANS' AFFAIRS**

The Department provides income support to compensate veterans and their dependants for the premature ageing and loss of earning power which could result from the intangible effects of qualifying (theatre of war) service and to allow veterans and their dependants to enjoy a living standard which is at least equal to that provided by other Government income support programs and, whenever practicable, consistent with veterans' special standing in the community.

#### **Service pension**

The Department of Veterans' Affairs provides service pensions to male veterans aged 60 years and over and female veterans aged 55 and over. At June 1990, 35,570 service pensions were being paid, 20,651 to veterans and 14,919 to wives and widows of veterans. During 1989-90, \$196 million was expended on service pensions.

TABLE 7.2 - SERVICE PENSIONS: 30 JUNE 1990

<i>War service</i>	<i>Number of pensions</i>
1914-18 War	189
1939-45 War	26,513
Korea and Malaya	763
British Commonwealth	6,513
Allied Forces	749
Special Overseas Service	472
Mariners	371
<b>Total</b>	<b>35,570</b>

### Disability pension

The Department of Veterans' Affairs provides a disability pension to veterans as compensation for incapacity accepted as war service related. At 30 June 1990, 30,285 disability pensions were being paid to 14,032 incapacitated veterans, 10,190 dependants of incapacitated veterans and 6,063 dependants of deceased veterans. During 1989-90, \$47 million was expended in disability pensions.

TABLE 7.3 - DISABILITY PENSIONS: 30 JUNE 1990

<i>War service</i>	<i>Number of pensions</i>
1914-18 War	805
1939-45 War	23,898
Korea/Malaya/F.E.S.R. (a)	800
Special Overseas Service	2,020
Peacetime Forces	2,748
Seamen's War Pension	14
<b>Total</b>	<b>30,285</b>

(a) Denotes Far East Strategic Reserve.

### Allowances

Several allowances are provided to supplement service and disability pensions. These allowances vary according to the severity of disablement and the special needs of the pensioner. They include attendant's allowance, loss of earnings allowance, recreation transport allowance and domestic allowance. An education allowance is paid for children of special rate pensioners and children of veterans who died as a result of service.

### War widow's pension

War widow's pensions are granted automatically to the widows of veterans receiving the special rate pension, or equivalent at the time of death. Other claims for the war widow's pension require

determination that the veteran's death was war caused. During 1989-90, a total of \$45 million was paid in widow's pensions and allowances in Western Australia.

TABLE 7.4 - MAXIMUM WEEKLY RATES OF BENEFIT PAYABLE THROUGH THE DEPARTMENT OF VETERANS AFFAIRS: JUNE 1990

	\$
Disability pension—	
Special rate (TPI) (a)	259.40
Intermediate rate	178.65
General rate (100%)	97.80
Extreme disablement adjustment allowance	146.70
War and Defence widows' pensions	153.20
Service pension—	
Single person	141.20
Married couple	235.40
Orphan's pension—	
High rate (both parents deceased)	47.80
Low rate (veteran parent deceased)	23.90
Attendant's allowance—	
High rate	78.20
Low rate	39.10
Clothing allowance—	
High rate	3.35
Low rate	1.55
Recreational transport allowance—	
High rate	20.80
Low rate	10.40
Vehicle Assistance Scheme (annual rate)	780.00
Veterans' Children Education Scheme—	
Tertiary students—	
Maximum	105.15
Minimum	57.60
Secondary students—	
Maximum	105.15
Minimum	10.00
Allowances paid to service pensioners—	
Guardian's Allowance	12.90
Additional pension for each child—	
Under 13 years	24.15
13-15 years	35.25
Student 16-24 years (if eligible)	17.00
Remote Area Allowance—	
Single person	7.00
Married couple	12.00
Children	3.50

(a) Totally and permanently incapacitated.

## DEPARTMENT OF COMMUNITY SERVICES AND HEALTH

The Department of Community Services and Health administers programs which provide or subsidise services providing universal access to primary health care, illness prevention and promotion of better health, as well as services for the aged, children, people with disabilities and people who need accommodation. Reference to the activities of the Department primarily relating to Health are to be found in Chapter 8.

### Housing and related assistance programs

A range of programs has been developed to assist households in the owner-occupied, public housing and private rental housing sectors. The Commonwealth Government provides funds for public housing, supported accommodation services, crisis accommodation, mortgage and rent relief, home purchase loans, and home purchase assistance to individuals and families. The bulk of the Commonwealth financial assistance for housing is provided through the First Home Owners Scheme and the Commonwealth-State Housing Agreement.

**First Home Owners Scheme.** This scheme provides financial assistance to low and moderate income earners. Assistance may be paid either as a series of monthly payments over five years, or as an initial lump sum payment with smaller monthly payments over five years. The scheme provides eligible first home buyers with a tax free benefit of up to \$5,000.

During 1988-89, 3,813 claims were approved and expenditure on new and continuing subsidies totalled \$21 million. In 1989-90 the Department will provide \$17 million for this scheme which will help an estimated 3,300 households buy their first homes and provide continuing monthly subsidies to a further 34,000 home buyers.

**Commonwealth-State Housing Agreement Assistance.** Public rental housing and home purchase assistance is provided for people in need. Untied grants are provided to the State Government which has flexibility in managing housing programs within the guidelines set out in the Agreement. Assistance is available irrespective of age, sex, marital status, race, religion, disability or lifestyle; however, priority is on the basis of need.

TABLE 7.5 - COMMONWEALTH- STATE HOUSING AGREEMENT (\$'000)

	Expenditure 1988-89	Appropriation 1989-90
Untied	48,502	66,266
Rental assistance to pensioners	3,268	4,153
Rental assistance to Aborigines	12,121	15,862
Mortgage and rent relief	2,471	2,898
Crisis Accommodation Program	1,824	3,717
Local Government and Community Housing Program	1,494	2,288
<b>Total</b>	<b>69,680</b>	<b>95,184</b>

**Supported Accommodation Assistance Program.** This program provides for a cost-shared arrangement between the Commonwealth Government and State Governments to assist organisations in providing a range of supported accommodation and related services to people who are homeless as a result of crisis. The program is directed at persons needing assistance to move towards independent living, wherever possible and appropriate, and tries to improve their status, dignity and self-esteem.

TABLE 7.6 - SUPPORTED ACCOMMODATION ASSISTANCE PROGRAM (\$'000)

	Expenditure 1988-89		Appropriation 1989-90	
	Commonwealth	State	Commonwealth	State
Recurrent base funds	5,375	3,560	6,031	4,178
Growth funds	413	457	436	436
Allowance for indexation	243	161	266	184
<b>Total</b>	<b>6,031</b>	<b>4,178</b>	<b>6,733</b>	<b>4,798</b>

### Programs for families with children

The Commonwealth Government provides funds for services to families with children through the Children's Services Program. Grants are made directly to State Government or local government authorities and non-profit community organisations to provide child care services. The State Government also contributes towards the capital and recurrent costs of the program.

The program aims to ensure that parents and children have access to quality, affordable child care services which meet their needs.

TABLE 7.7 - CHILD CARE SERVICES

	No.	Expenditure	
		Services provided 1989-90	1990-91 (estimate)
Aboriginal and isolated care	24	\$'000 783.6	\$'000 738.5
Disabled special services	7	314.7	314.7
Family day care	13	3,420.6	3,413.4
Family support	6	357.9	321.8
Long day care	85	9,980.0	9,995.2
Migrant special services	2	262.9	262.9
Occasional care	28	1,553.7	1,549.7
Outside school care	71	1,129.4	749.8
Program support	16	512.1	405.1
Supplementary workers	30	619.7	597.9
<b>Total</b>	<b>282</b>	<b>18,934.5</b>	<b>18,349.0</b>

### Programs for people with disabilities

As well as funding services and programs for people with disabilities, the Commonwealth provides direct rehabilitation services, hearing aids and other audiological services. Other community support services for people with disabilities are funded under the Home and Community Care Program.

**TABLE 7.8 - SERVICES FUNDED UNDER DISABILITY PROGRAMS: 30 JUNE 1989**

<i>Sub-program (a)</i>	<i>Number</i>
Rehabilitation	11
Hearing services (b)	3
Accommodation	58
Employment	45
Community participation	26

(a) Rehabilitation and hearing services are provided directly by the Commonwealth Government; all other services are provided by the voluntary sector with Commonwealth Government financial assistance.  
(b) Permanently staffed hearing centres only.

**Disability Services Program.** Under this program, non-profit community based organisations, State Government and local government authorities can be funded to provide a range of services for people with disabilities, providing these services meet their ongoing support needs.

**TABLE 7.9 - DISABILITY SERVICES PROGRAM - EXPENDITURE (\$'000)**

	<i>1988-89</i>	<i>1989-90 (estimate)</i>
Ongoing program (salaries and rental)	15,117.9	18,177.1
Equipment/maintenance	397.6	182.0
One-off assistance	—	1,153.1
Handicapped Children's Benefit	125.7	130.0
Training Fee/Incentive Bonus	19.5	23.0
Attendant care	328.5	389.0
New services recurrent	111.4	624.7
New services capital and establishment	484.4	413.0
Transition	560.9	854.0
<b>Total</b>	<b>17,145.9</b>	<b>21,945.8</b>

**Rehabilitation services.** The Department provides rehabilitation services directly through the Commonwealth Rehabilitation Service. The services are available to working-age people who have a disability from birth, or as a result of illness or accident. The program aims to help

people obtain or retain employment, live as independently as possible and adjust to their disabilities. Clients have access to occupational therapy, counselling and social work services which are provided by Departmental staff and through private and community organisations such as technical and further education colleges and local health services.

The Department also provides a range of financial assistance to people participating in rehabilitation programs. Rehabilitation services are free to people receiving a Social Security pension or benefit.

The Department also pays for community or other services used during a rehabilitation program. For those not receiving a pension or benefit and in particular those with a compensation or damages claim, costs will be recovered by the Department through a direct charge on the insurance company or employer.

Regional rehabilitation units have been established throughout the metropolitan area, in the south-west at Albany and Bunbury, and in Geraldton, to the north of Perth.

During 1988-89 the rehabilitation services outlaid \$2,733,218 in salaries and \$1,522,951 in other expenditure; \$871,980 was received making the net cost of the services \$3,384,189.

**Home and Community Care Program.** This program is a cost-shared program between the Commonwealth Government and State Governments which aims to provide an integrated range of home and community care services for frail aged, and younger persons with disabilities and their carers, thereby avoiding premature or inappropriate institutionalisation. A wide range of services related to the various aspects of home and community care is funded under the program.

An important principle of the program is the consultation with service providers and users as to the gaps in existing services and priorities for developing new types of services. Other key principles include ensuring that users' rights are observed, and that services are provided in an equitable and accessible manner.

Expenditure during 1988-89 on this program by the Commonwealth Government and State Governments amounted to \$30 million. Of this, the Commonwealth Government contributed \$17 million and the Western Australian Government \$13 million.



**National Acoustic Laboratory.** The Department provides audiological services, including free hearing aids to eligible people through the National Acoustic Laboratory. Services provided include hearing assessment, selecting and fitting hearing aids, maintaining aids, aftercare and free batteries for aids. Services are provided through hearing centres in the metropolitan area and major country centres are visited on a regular basis.

**Attendant Care Scheme.** This scheme enables younger people with disabilities who would otherwise live in nursing homes to receive up to 28 hours a week of assistance with personal care in their own homes. The Department provides funds to specially selected organisations to employ and train attendants. The scheme has a limited number of places.

#### Residential programs for aged people.

Under the Residential Care Program, the Commonwealth Government funds a range of organisations to provide care in nursing homes and hostels for frail aged people. The main aims of the program are to ensure that the aged receive services best suited to their needs, facilities are developed where they are needed, care is of high quality, and facilities are designed and services provided to allow the maximum level of independence. Nursing homes and hostels are only two of the care options available to aged people. Home and Community Care services are also funded for the frail aged or disabled who wish to live at home.

**Capital grants for nursing homes and hostels.** Capital funding is provided to approved organisations to build or buy existing nursing homes and hostels for frail aged people. In some cases funds are also available to help upgrade existing accommodation. An important consideration in funding is that services are located in areas where they are needed most and that they provide frail aged people with as home-like and comfortable a life as possible.

**Recurrent funding for nursing homes and hostels.** The Commonwealth Government also provides financial support to help nursing homes meet the costs of providing care. The operational costs of nursing homes are split into two components. One component covers nursing and personal care services and staff, the other, known as the infrastructure component, covers all other costs such as food, laundry and domestic staff.

Organisations managing hostels may receive hostel care, personal care, and respite care subsidies. The hostel care subsidy helps organisations employ staff. The personal care and respite care subsidies are paid to help meet the cost of providing short term hostel accommodation and care.

**Assessment Program.** High priority is given to ensuring that aged people receive the types and levels of services most suited to their needs and funding is provided to develop assessment services that will assist aged people to choose suitable available services.

TABLE 7.10 - APPROVED NURSING HOMES AND HOSTELS FOR THE AGED

	Period	Nursing homes	Hostels
Number	31 December 1989	112	117
Approved beds—			
Permanent	31 December 1989	} 6,068	{ 4,065
Respite	31 December 1989		
Expenditure (\$m)—			
Recurrent	1988-89	95.7	11.1
Estimated	1989-90	100.0	15.0

**Domiciliary nursing care benefit.** The Department provides a payment of \$42 per fortnight to assist people caring for the chronically ill at home. This benefit is neither means tested nor regarded as income for taxation purposes. To receive the benefit a person must be caring for and living with someone who is eligible for admission to an approved nursing home, receiving adequate nursing care on a 24 hour basis, chronically ill, and at least 16 years old.

**Special Services Program.** Dementia grants help organisations provide special hostel care in separate facilities for people suffering from this condition. Grants are provided for special services and activities, minor capital items and staff development programs.

Funds may also be provided for additional services which prolong the relative independence of aged people in residential care. It also helps develop the provision of services for special groups such as people from non-English speaking backgrounds, Aborigines and people with disabilities who have aged.

## DEPARTMENT FOR COMMUNITY SERVICES, WESTERN AUSTRALIA

The purpose of the Department for Community Services is to contribute to the Western Australian community by promoting and providing welfare services that assist families, individuals, groups and communities achieve their own well-being.

Services are based on the principles of furthering independence, autonomy, social justice and access to opportunity.

In pursuing its purpose of enhancing the well being of people throughout the community, the Department's services are directed towards a number of broad issues. These include the maltreatment and exploitation of children, children cared for outside their natural family, the needs of socially disadvantaged youth, juvenile offending and its consequences, people seeking development of life skills, families or individuals in social crisis situations, the capacity of communities to provide their own support, people without resources to meet essential needs, and natural disasters.

TABLE 7.11 - DEPARTMENT FOR COMMUNITY SERVICES - EXPENDITURE : 1988-89  
\$'000

Salaries, wages and allowances	48,645
Administrative support	4,323
Professional and technical support	1,703
Family, children and aged services	6,814
Youth services	3,896
Community and public affairs	929
Financial and material assistance	4,948
Regional services	4,914
Non-government agency support	22,420
<i>Total expenditure</i>	<i>98,593</i>
<i>Total revenue</i>	<i>9,087</i>
<b>Net expenditure</b>	<b>89,506</b>

The Department's philosophy is that services should be responsive to the needs, aspirations and rights of families, individuals and groups conducive to maintaining the family unit 'as appropriate', sensitive to gender and cultural differences, and just, humane and empowering.

It believes that services should be of a high quality, equitable and accessible and the

Department's operations should be accountable in all respects.

The Acts under which the Department operates are the *Community Services Act 1972*, the *Child Welfare Act 1947*, the *Welfare and Assistance Act 1961* and the *Adoption of Children Act 1986*.

### State financial assistance

The State Government provides a range of concessions to people on low incomes to assist with the purchase of essential goods and services such as energy, water, transport and education. The estimated total value of State concessions in 1988-89 was \$140 million.

Emergency financial assistance may be provided through the offices of the Department for Community Services to people who are experiencing financial crises. The Department also funds a number of financial counselling services at non-government welfare agencies. These provide budgeting advice, advocacy and debt renegotiation to people on low incomes.

### Child welfare

The Department for Community Services is responsible for the care of children who are wards of the State or are the subject of certain orders of the Children's Courts. A child is defined as 'any boy or girl under the age of eighteen years'.

Both Departmental and private sector facilities provide emergency, short and long term accommodation to children who are in need of care or who may be awaiting a decision of a Children's Court. The Department has authority to decide which centre or facility or what form of treatment is appropriate to the needs of a child committed by a Children's Court to the care of the Department.

The Department has a statutory responsibility for issuing licences to all people who have care of children under the age of six years who are not near relatives, and who are providing care on a day-to-day basis.

The Department is also responsible for arranging adoptions.

**Maintenance of children.** The Department for Community Services makes payments to foster parents and establishments having children in their care.

**TABLE 7.12 - STATE GOVERNMENT  
MAINTENANCE OF CHILDREN PAYMENTS  
MAXIMUM WEEKLY RATES  
OCTOBER 1989  
\$**

<i>Subsidy or allowance</i>	<i>Fostered</i>	<i>Group Home</i>	<i>Emergency foster care scheme</i>
<i>Subsidy—</i>			
<i>Wards of the State—</i>			
Primary school age	52.25	56.75	63.50
High school age	59.75	63.55	63.50
<i>Non-wards of the State—</i>			
<i>Departmentally arranged placement—</i>			
Primary school age	52.25	56.75	63.50
High school age	59.75	63.55	63.50
<i>Privately arranged placement—</i>			
Near relative	13.80	..	..
Non-relative	45.00	..	..
Pre-adoptive foster care	52.25	..	..
<i>Additional allowances to wards only—</i>			
<i>Pocket money—</i>			
Primary school age	2.00		
High school — years 8-10	5.00		
— years 11-12	6.50		
Working (awaiting benefits)	10.00		
<i>Clothing allowance (a)</i>			
<i>Initial grant—</i>			
Primary school	200-275		
High school	260-350		
<i>Wear and tear (b)</i>			
Primary school	134		
High school	177		

(a) Payments are not a weekly rate. (b) Payments are made every four months with subsequent payments indexed to Consumer Price Index increase.

One dollar per week for each child maintained is paid to the establishments by the State Lotteries Commission. Where an establishment refuses assistance from the Commission on religious or moral grounds the State Government may grant an equivalent allowance to the establishment for each ward maintained. All establishments and foster parents having the care of children receive family allowances from the Commonwealth Government. At 30 June 1989, there were 386 State wards in foster care (264 non-Aboriginal and 122 Aboriginal) and the Department was subsidising a further 452 non-ward children (204 non-Aboriginal and 248 Aboriginal) in foster care.

**Supervision of children.** A child committed to the care of the Department for Community Services becomes a ward of the Department. Many wards remain living at home with their families, but may be placed in a Departmental centre or facility, boarded out with a relative or other approved person, or placed in suitable employment. Where a child is placed under the control of the

Department, the child's parents retain guardianship but the child may be treated as a ward. Regional Directors of the Department have authority to place wards of working age in employment or apprenticeship.

**Family and children's services.** Any person who provides day-to-day care of children under the age of six years must be approved and licensed by the Department for Community Services. Licensed services are required to meet standards outlined in the Community Services (Child Care) Regulations 1988, in relation to staffing, buildings and physical environment, health and safety, programs and administration.

Family and children's services include privately owned and government funded long day care, occasional care, family day care centres, together with government funded neighbourhood centres, family centres and community houses. Child care centres provide group care on a full-time, part-time or occasional basis. Government funded family day care is a supervised and coordinated system of child care which is conducted by licensed caregivers in their own homes. Community and neighbourhood houses provide day care, occasional care, family support and community outreach programs to their communities. The Department for Community Services provides a support service to family and children's services ensuring the maintenance of satisfactory standards. It provides information to parents using services, persons in the industry, providers and management committees. It also assists community groups to identify child care needs and facilitates in the establishment of new services.

**TABLE 7.13 - NUMBER OF LICENSED PLACES  
IN CHILDREN'S SERVICES  
JUNE 1989**

<i>Type of service</i>	<i>Number</i>
Long day care	5,299
Occasional care	853
Family day care	3,141
<b>Total</b>	<b>9,293</b>

The information in Table 7.13 is from a census of all child care services registered with the Department for Community Services.

**Establishments.** The State Government provides substitute care facilities primarily through the Department for Community Services in the form

of group homes and hostels, with the latter being mainly provided for education purposes.

The Department provides funding to subsidise establishments for children which are operated by the private sector. Most of these are conducted by religious organisations. The private sector primarily provides residential based care with some emphasis on the provision of foster care. At 30 June 1989, 199 beds were being provided by 7 different agencies.

The Department provides four centres in Western Australia for children who are the subject of remand, assessment and sentencing orders. Children in this category may also be accommodated through community support hostels. At 30 June 1989, there were six hostels operating.

**Adoption of children.** Children placed for adoption in Western Australia come under the guardianship of the Director-General of the Department for Community Services. A person wishing to adopt a child (other than a close relative) should apply directly to the Department. Applicants who meet certain criteria must be assessed by the Department for suitability, and an order for the legalisation of an adoption must be obtained from a Judge of the Family Court of Western Australia. Persons wishing to adopt a related child should consult a solicitor.

During 1988-89, nineteen locally born children were placed with adopting parents, compared with forty-six in 1987-88 and fifty-three in 1986-87. Placements are currently being made with applicants who applied in 1984-85. In 1988-89 three locally born older children and five children with special needs were also placed. Twenty children from overseas were placed for adoption in Western Australia during 1988-89, compared with thirty-four in 1987-88.

**Employment of children.** The *Child Welfare Act 1947* provides the conditions under which children may engage in street trading. These provisions are currently under review and are to be expanded to include employment of children in entertainment and advertising.

#### AUTHORITY FOR INTELLECTUALLY HANDICAPPED PERSONS

The Board of the Authority consists of a Chairperson and five Board members who are

appointed by and responsible to the Minister for Health. At June 1990, there were 1,636 staff employed by the Authority.

The Authority has overall responsibility for establishing policy and advising Government on issues impacting on the lives of people who have an intellectual handicap. It is also responsible for maintaining standards and coordinating the provision of services for people within Western Australia with an intellectual handicap. This role includes both the licensing and funding of service providers. The Mission Statement adopted by the Authority is: to advance the rights, responsibilities, dignity, development and community participation of people with an intellectual handicap.

In June 1990, just over 8,700 Western Australians were registered with the Authority, with 4,700 of these regarded as active. A person who learns and develops at a significantly slower rate than others the same age, has more than ordinary difficulty in coping with everyday life, and has shown these problems during childhood, is eligible for registration with the Authority.

People with an intellectual handicap are actively encouraged to use the same services available to the general public; however, the Authority funds necessary additional services through both the government and non-government sectors, i.e. through Irrabena, the direct service arm of the Authority, and non government agencies funded by the Authority. A wide range of services are available to people of all ages. These combined services include thirty-three hostels and seventy-two group homes/duplexes accommodating 796 and 397 persons respectively.

The Authority actively encourages the participation of consumers and their families in the decision making process of the Authority through consultation.

Services are available on a regional basis and cover all areas of life including personal development programs and support for people who are living in the community, accommodation on both a short and extended stay basis as required, education and personal development opportunities in liaison with educational organisations, a wide range of recreational opportunities, and sheltered and supported employment opportunities. Specialist health services such as medical, dental, podiatry, audiology and dietetics are also available.

In addition to the provision of these services there are community education programs to increase community awareness and acceptance of people who have an intellectual handicap, so that they can fully participate in the everyday life of their community.

### **THE WESTERN AUSTRALIAN COUNCIL OF SOCIAL SERVICE**

The Western Australian Council of Social Service (WACOSS) is an independent organisation representing a wide range of interests in the field of social welfare, health and community services. The Council has individual members and organisational members, including voluntary groups, self-help and community groups, professional associations and Commonwealth, State and local government bodies.

WACOSS is part of a network which comprises Councils of Social Service in all States and Territories and a national body (ACOSS) based in Sydney.

WACOSS has four principal roles:

to contribute, through participation in various forums, to the development of social policy in Western Australia;

to offer informed comment on, and to promote understanding of, social welfare and social development issues in the community;

to facilitate coordination and cooperation amongst social welfare agencies in Western Australia; and

to provide a range of services to member agencies.

The following article is part of a series focusing on welfare organisations operating in Western Australia.

### **WESTERN AUSTRALIA'S BIKERS CHARITY RIDE**

On the first Saturday in December each year, Western Australian motorcyclists meet to ride into the city, bringing with them gifts for the needy at Christmas time.

In 1990 this event took place for the 15th year in succession, making it the longest running of any charity ride in Australia.

The Salvation Army received over 3,000 gift items from the 1990 Charity Ride and estimated the value of the gifts at \$22,000. This has grown from 1988 when 2,500 items worth about \$18,000 were received from 2,000 participants. Fifteen years ago, only fifty riders participated in the first Charity Ride.

The motorcyclists left from Brentwood, 9km south of the city and the parade took about 20 minutes to reach Perth. However, with over 2,500 motorcycles in the ride, the head of the parade reached the city just as the last bikes were leaving the starting point.

The motorcyclists met at Forrest Place and were greeted by the Salvation Army Brass Band. The bikers presented their gifts to the Salvation Army, listened to speeches by Father Christmas and the Lord Mayor, and sang a few Christmas Carols before riding off to other activities.

The group which organises the Charity Ride, the Bikes Unlimited Motorcycle Club, is confident that the event will continue to grow and looks forward to many successful Charity Rides in future years.



Bikers leaving Brentwood on Charity ride into Perth.

Photograph: Tony Beeson

## Chapter 8

### HEALTH

The Commonwealth and State Government health authorities, together with local government authorities, cooperate in maintaining health services and in the prevention and control of infectious diseases in Western Australia. Commonwealth activity in the health area is primarily directed towards ensuring that all Australians have access to necessary health service at reasonable cost; it also includes the setting and administering of standards for the safety and efficacy of therapeutic goods and services, support for health research and promotion of better health. During 1989-90, \$11,924 million were expended in Australia on health by the Commonwealth, which was 13.7 per cent of total Commonwealth outlays for that year. The State Government provides a range of health care services including dental and hospital care. Local government authorities have the power to make and enforce by-laws relating to health matters such as sanitation and keeping of animals.

#### COMMONWEALTH GOVERNMENT HEALTH BENEFITS AND ASSISTANCE

Commonwealth financial assistance for health services is provided for both individuals and institutions.

For individuals, benefits are paid for services rendered and goods supplied, in the main, by private professionals and organisations, for example, doctors, pharmacists and nursing home proprietors. As well, individuals can receive assistance through tax expenditures in the form of a rebate for the excess of unreimbursed medical expenses over \$1,000 in the year of income, sales tax exemptions on a wide range of health related goods, and tax deductibility for gifts to eligible organisations.

For institutions, support is provided to State hospital systems through specific purpose hospital funding grants. Health services are also provided directly through the Repatriation hospital system as well as through organisations such as the National Acoustic Laboratories.

#### Medical Services and Benefits

**Medical Benefits.** The universal health insurance program known as Medicare was introduced by the Commonwealth Government on 1 February 1984.

TABLE 8.1 - MEDICARE : 1989-90

	<i>Unit</i>	
Persons enrolled (a)	'000	1,644
Services processed—		
General practitioner attendances	"	6,666
Specialist attendances	"	927
Pathology	"	2,187
Other	"	1,863
<b>Total</b>	"	<b>11,642</b>
Services processed (average number per enrolled person)		
Males		5.4
Females		8.7
Persons		7.1
Benefits paid	\$'000	299,333

(a) At 30 June 1990.

Medicare provides Australians and other eligible people with reimbursement for medical and optometrical services, free shared ward accommodation and treatment, and free outpatient treatment at public hospitals. Those electing to have 'doctor of choice' or private ward accommodation in a public hospital must bear the additional cost or take out appropriate hospital insurance cover. The Commonwealth provides substantial financial assistance to the States to support Medicare services.

**The Health Insurance Commission** pays medical benefits for medical and optometrical services and administers the daily operations of the Medicare program. It also undertakes measures to combat medical fraud and overservicing and provides services for processing of the Department of Veterans' Affairs treatment accounts. The responsibility for payments to pharmacists through the Pharmpay system was transferred from the Department of Community Services and Health to the Health Insurance Commission on 17 July 1989.

**Veterans and Dependants.** The Commonwealth meets the costs for eligible veterans and their dependants of specialist, local medical officer, paramedical, dental services, the supply and maintenance of surgical aids, and travelling and other expenses incurred in obtaining medical treatment.

**Hospital Services**

**State Public Hospitals.** Apart from Commonwealth outlays for free hospital care under Medicare the Commonwealth also contributes to the upgrading of the infrastructure of State public hospitals through the Hospital Enhancement Program. The Commonwealth granted \$302 million in total hospital funding grants to Western Australia and \$5.22 million under the Hospital Enhancement Program grants.

**TABLE 8.2 - HOSPITALS AND BEDS  
30 JUNE 1990**

	<i>Number</i>	<i>Beds</i>
Public hospitals	88	6,212
Private hospitals	20	1,900
Day hospital facilities (a)	4	43
<b>Total</b>	<b>112</b>	<b>8,155</b>
Beds per 1,000 population	..	5.0

(a) Previously included with private hospitals.

**Veterans and Dependants Hospitals.**

Repatriation hospitals and clinics are maintained in each State for the treatment of eligible veterans and their dependants. Community patients are admitted to Repatriation hospitals free of charge if spare beds are available and the facilities are suitable for the treatment required. Conversely, veterans and their dependants may, where appropriate, be admitted to private or State public hospitals, generally at Commonwealth expense. Currently, 51 per cent of bed-days for veterans are provided outside Repatriation hospitals.

The Commonwealth has decided that Repatriation hospitals should be integrated with the State public hospitals system by 1995. Negotiations with the States to ensure the continued availability of high quality hospital care to veterans are currently underway.

**Nurse education.** The Commonwealth provides financial assistance to the States for transferring nurse education from hospital-based facilities to the higher education sector. In 1990, 820 places were funded at the cost of \$1.7 million.

**Health insurance.** Although the Department of Community Services and Health maintains an overall policy role in relation to health insurance matters, its role in the financial supervision of health funds and the administration of the Health Benefits Reinsurance Trust Fund has been taken over by the Private Health Insurance Administration Council.

**TABLE 8.3 HEALTH INSURANCE FUNDS  
MEMBERSHIP AND PERSONS COVERED  
31 MARCH 1990.**

Health Benefits funds operating(a)	No.	6
Basic hospital table (b)		
Membership	'000	291
Persons covered	"	668
Proportion of population covered	per cent	41.1
Supplementary hospital table (c)		
Membership	'000	272
Persons covered	"	624
Proportion of population covered	per cent	38.4
Ancillary table (d)		
Membership	'000	333
Persons covered	"	768
Proportion of population covered	per cent	47.3

(a) State of registration of organisation. Number of funds offering health insurance. (b) Provides cover for hospital accommodation charges for inpatients of public, private and day hospital facilities. (c) Provides additional hospital accommodation benefits to those provided by the basic hospital table. (d) Provides benefits for services such as dental, optical, therapies and other non-accommodation services.

### Pharmaceutical Benefits Scheme (PBS)

Through the payment of pharmaceutical benefits, the Commonwealth aims to ensure access by the Australian community to necessary cost-effective, prescribed medications at the lowest cost to Government and consumers, consistent with reliable supply. Under arrangements applicable from 1 November 1990, pharmaceutical benefits are supplied to the general public at a maximum of \$15 per prescription item.

From 1 January 1991 there will be a \$300 safety net arrangement which will operate on a calendar year basis for each individual or family. Once the \$300 safety net is reached, a safety net charge of \$2.50 per prescription item for general scheme users to a maximum of \$50 per calendar year for each individual or family will apply. After the maximum of \$50 is reached additional PBS items are free of charge.

Low income families, and the Departments of Social Security and Veterans' Affairs pensioners (and dependants), can apply for a Health Care card which entitles them to prescription benefits at a pensioner rate of \$2.50 per prescription item with a compensating pension increase of \$2.50 per week. A \$150 safety net will apply for each

individual or family for the fourteen months to December 1991 and \$130 per calendar year thereafter. For existing concessional beneficiaries a \$130 safety net will be introduced from 1 January 1991.

From January 1991, the Government will introduce a PBS generic pricing policy whereby if there are alternative brands of the same drug available the Government subsidy will be based on the lowest priced brand. Patients wishing to use a higher priced brand will pay the difference between the base price and the price of the preferred brand in addition to their patient contribution.

In 1989-90, 33,200 safety net and prescription benefit entitlement cards were issued which covered 49,500 persons.

Items available under the PBS and the conditions under which they may be prescribed are determined by the Minister for Aged, Family and Health Services on the recommendation of the Pharmaceutical Benefits Advisory Committee. Prices paid to manufacturers are recommended by the Pharmaceutical Benefits Pricing Authority. Pharmacists' remuneration is determined by the Pharmaceutical Benefits Remuneration Tribunal.

TABLE 8.4 - BENEFIT PRESCRIPTIONS : 1989-90

	Unit	General	Concess- ional Pensioner	Total
Number	'000	1,337	748	5,856 (b)7,941
Payments	\$'000	14,238	6,370	(a)64,825 (b)85,433
Patients contributions on general benefit prescriptions	\$'000	14,311	1,875	.. 16,186
<b>Total benefit prescription cost</b>	<b>\$'000</b>	<b>28,549</b>	<b>8,245</b>	<b>64,825 101,619</b>
Average total cost per prescription	\$	21.25	11.01	11.07 12.78

(a) Includes payments for holders of safety net cards. (b) Payments to approved persons.

### Nursing Home Subsidies and Domiciliary Care Services

Nursing home subsidies are provided to ensure that those people who are assessed as needing nursing home care have access to residential support and care which is appropriate to their needs.

Domiciliary nursing home care benefits and services are provided to assist frail aged and

young disabled people, who would otherwise require nursing home admission, to remain in the community.

**Nursing Home Subsidies for the Aged.** Standard daily resident fees and standard Commonwealth benefits for nursing homes commenced on 1 July 1987 and will be phased in over the period to 1 July 1991. These funding arrangements provide a national standard funding component for infrastructure costs, national uniform nursing and



personal care staffing arrangements, and additional standard benefits payable for respite care patients as an incentive for the provision of respite care.

**Nursing care for veterans and dependants.** The Commonwealth meets the costs of nursing home accommodation required for veterans with service-related disabilities and certain categories of veterans and war widows with disabilities not related to service, subject to the payment of a standard contribution by the patient.

**Nursing home subsidies for people with disabilities.** The Commonwealth meets the approved operating deficits of eligible non-profit nursing homes for persons with disabilities. In addition, nursing home benefits are paid to a small number of nursing homes for people with disabilities.

**Domiciliary nursing care benefits.** The Commonwealth pays a benefit of \$42 per fortnight to eligible persons who provide care for approved persons at home as an alternative to nursing home care. Such persons must be aged 16 years or over and would otherwise justify admission to an approved nursing home.

**TABLE 8.5 - DOMICILARY NURSING CARE PATIENTS : JUNE 1990**

<i>Patient age group (years)</i>	<i>Number</i>
16-49	320
50-59	220
60-69	596
70-79	911
80-89	694
90 and over	189
<b>Total</b>	<b>2,930</b>

**Home nursing service.** The Commonwealth funds, under the cost-shared Home and Community Care (HACC) Agreements with the State, certain home nursing services to assist frail aged and younger disabled people at risk of institutionalisation to continue to live in their own homes. For more details on the HACC Program, refer to Chapter 7.

**TABLE 8.6 - HOME AND COMMUNITY CARE SERVICE PROVISION : FEBRUARY 1989.**

<i>Service</i>	<i>Number</i>
Home help	10,726
Home nursing	7,710
Program support	5,347
Home meals	4,521
Transport	3,892
Centre meals	3,777
Centre day care	1,478
Other services	2,770

### **Other Health Services.**

The Commonwealth provides financial assistance to support health research, to promote better health in conjunction with the prevention of disease, and to provide health services supplementary to the mainstream health care system.

**Health research.** Commonwealth support for health research activities covers medical and public health research. It includes financial assistance through the Medical Research Endowment Fund (MREF) and the Public Health Research and Development Committee (PHRDC), and to the Australian Institute of Health.

Payment of available monies from the MREF, received from both the Commonwealth and other sources such as gifts and bequests, is determined by the Minister for Community Services and Health on the advice of the National Health and Medical Research Council. The latter acts, where necessary, in accordance with any conditions imposed by private benefactors. Assistance is provided from the MREF and the PHRDC in the form of project, program, institute and research unit grants and training awards. Assistance may also be provided to Commonwealth and State Government departments.

**Health promotion and disease prevention.** The Commonwealth provides financial assistance for a wide range of health promotion and disease prevention activities that emphasise prevention in contrast to the dominant curative approach.

The National Health Promotion Program supports community based initiatives to promote better health and to prevent illness. In addition it fosters the establishment of preventive health strategies throughout Australia including the development of those recommended by the Better Health Commission.

The National Better Health Program funds projects with the States to encourage reductions in the incidence of hypertension, accident, injury, poor nutrition, skin cancer and preventable health problems in the elderly. In 1988-89 a total grant of \$37,000 was paid to Western Australia.

Under the National Community Health Program the Commonwealth funds national projects which foster community participation, self-help and multi-disciplinary approaches to health care (e.g. through support to voluntary associations operating at the national level).

Financial assistance is also provided to non-government Family Planning Associations for clinical services (part of which is paid in lieu of benefit for medical services provided in clinics) and for education and training.

The Public Health Program provides assistance to tertiary education institutions for courses and programs in public health.

The National Program for the Early Detection of Breast Cancer funds a national screening program to run for five years from 1 October 1990. The program is fully funded by the Commonwealth in the first year and cost shared by the States thereafter.

The Commonwealth also provides grants to the States for women's health screening, to undertake cost shared selected trials of cervical cancer screening.

**AIDS control.** Although primary care and treatment of AIDS patients is a State responsibility, the Commonwealth provides hospital funding grants to the States based on the actual number of AIDS cases treated. Grants are provided for education and prevention, treatment and support services, the National Media Campaign and Research activities.

**National Drug Programs.** The National Campaign Against Drug Abuse activities include drug abuse treatment, rehabilitation and prevention programs, the 'Drug Offensive' public information campaign and the development of a national drug

abuse data system together with research and evaluation. Funding on a dollar for dollar basis is provided to the States. In 1989-90, \$1.8 million was allocated to Western Australia (\$0.6 million for education and \$1.1 million for treatment/rehabilitation).

**Health Support Services.** In addition to its commercial activities, the Commonwealth Serum Laboratories Commission (CSL) carries out functions determined by the Minister to be in the national interest, including research projects, blood fractionation and maintenance of reserve stocks. The Commonwealth reimburses CSL for the cost of carrying out these functions.

The annual operating costs of the Red Cross Society's Blood Transfusion Service (BTS) in the States are shared by the States (60 per cent), the Society (the lower of 5 per cent of operating costs and 10 per cent of the previous year's income from donations) and the Commonwealth (the balance). Approved capital costs are shared between the Commonwealth and the States on a dollar for dollar basis. Blood collected by the BTS is processed by the CSL and blood products are supplied, free of charge (excluding freight), to hospitals and approved pathologists for use in medical treatment and analysis. The Commonwealth reimburses CSL for the cost of processing the blood.

The Commonwealth subsidises the Royal Flying Doctor Service to the extent of about 45 per cent of annual operating costs (matched on a dollar for dollar basis with the States) and also provides a substantial contribution to capital costs.

**Health services for Aborigines.** The Government is committed to raising Aboriginal health standards to the level of other Australians. Strategies emphasise improvement of environmental conditions, domiciliary hygiene and preventative education programs coupled with the promotion of Aboriginal participation and decision making in health care delivery.

**Aids and appliances.** The Commonwealth provides through the National Acoustic Laboratories, at no cost to users, a range of hearing services to eligible pensioners and children under the age of twenty-one. Details of services provided are to be found in Chapter 7.

Commonwealth and patient contributions subsidise the cost of syringes and other materials required by diabetics.

**Other.** This category includes outlays on environmental, social and other public health activities including human quarantine and health advisory committees. Also included is provision for 'act of grace' payments, frequently to meet additional costs incurred in sending patients with life threatening diseases overseas for treatment unavailable in Australia. The Commonwealth contributes to the establishment and operational costs of a national centre for liver transplantation on a cost-shared basis with NSW, reciprocal health care agreements with other countries, and payments towards the operational costs of the Australian Medical Council.

### THE HEALTH DEPARTMENT OF WESTERN AUSTRALIA

The Health Department of Western Australia coordinates and manages health care functions and services throughout the State. The Department administers a wide range of legislation incorporating matters of individual and community health protection, treatment and regulation.

The Department is currently finalising the decentralisation of its health services, with the establishment of regional responsibility for the management of services and the control of funds. There are now seven country regions and three metropolitan regions, each with a director who is responsible for all financial, capital, human and technical resources for health care services and facilities in the region.

The Central Office in Perth maintains responsibility for planning, monitoring, policy development, overall administration and accountability.

In May 1990, the Health Department released its four year strategic plan, 'A Plan For Health', which outlines a comprehensive range of programs for the effective delivery and evaluation of health services across the State.

In setting out strategic initiatives, goals and measurements of performance for all services and programs delivered by the department, 'A Plan For Health' heralds a fundamental shift to a more consumer-orientated and publicly accountable management approach.

### Health Promotion Program

The Department's Health Promotion Program informs the public about the causes and prevention of major preventable illnesses and injuries, and encourages the adoption of attitudes and behaviours that are conducive to health.

Through activities conducted by both central office and regional health promotion officers, the Health Promotion Branch is reaching an ever greater section of the community. Targeted areas include nutrition education, infectious disease control, alcohol, drug and smoking control, skin cancer prevention, hypertension control and Aboriginal health.

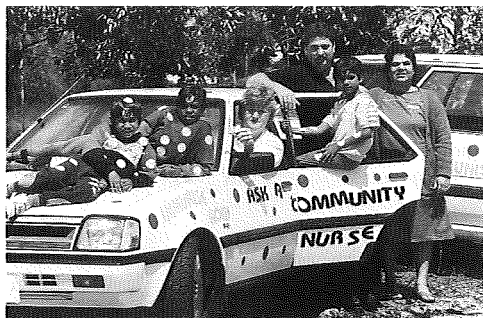
In 1989-90 campaigns such as 'Quit', 'Drinksafe', 'Immunise Now', 'Eat Less Fat', 'Sunsmart' and the Minor Tranquillisers Education Campaign, used advertising media — including press and electronic media, posters, pamphlets, brochures and leaflets, promotional material, competitions and help-lines — to promote their messages.

In addition, health education officers liaised with other health, welfare and education professionals, and community leaders and groups to conduct workshops, seminars and in-service courses, and to respond directly to local health concerns.

Research provides strong evidence that these health promotion messages are increasing public awareness of preventable illness and injury and reducing the incidence of health disorders, disability and premature death.

The 1989 Quit Campaign, aimed at increasing public awareness of smoking as a major heart disease risk factor, achieved campaign awareness of 96 per cent, and 56 per cent of smokers reduced their consumption of tobacco.

Surveys have also shown the public to be changing their habits as a result of the 'Sunsmart' and 'Immunise Now' campaigns. Levels of child immunisation increased considerably in 1989-90. Ninety one per cent of children are now immunised against measles and 75 per cent against mumps. The Measles Control Program, launched in March 1990 aims to eradicate measles by 1995.



The highly successful measles immunisation program has ensured that the majority of children are now protected.

Pictured is Community nurse Chris Harling whose original 'measles' car was painted with the assistance of children from the Culunga Aboriginal School

Photograph: Health Department of Western Australia.

Future prevention and education campaigns will give greater emphasis to target groups who lag behind the general population.

### Health Surveillance and Protection Program

This program monitors the health of the community and the prevalence of environmental factors relevant to health, identifying any changes that may signify a danger.

Responsibilities in this area include waste management, food surveillance, meat hygiene, pesticides/pest control, pharmaceuticals and radiation health.

The year 1989-90 saw significant activity in the area of food surveillance, with surveys conducted on pesticide residues in fruit and vegetables and eggs, a survey of the quality of take-away foods, the production of a food additive guide for consumer use, and encouragement of restaurateurs to declare the presence of monosodium glutamate in their foods.

In the area of radiation health, a survey was launched to measure the gamma and radon radiation levels in homes in WA. This survey is still continuing.

In the interests of improving public awareness, a 'How Safe' series of pamphlets was launched providing information on the safety of such things as household pesticides, medical x-rays, microwave ovens, asbestos cement, food additives,



As part of new activities in the area of food surveillance a program was set up to monitor food contamination by *Listeria*, identified as a potential cause of miscarriage or stillbirth.

Staff from the State Health Laboratory Services are pictured testing food samples for *Listeria monocytogenes* bacterium.

Photograph: Health Department of Western Australia.

backyard eggs, breast milk, and recreational and drinking water.

### Community Health Program

The Community Health Program serves as a community based health delivery service in the form of health promotion, primary health care, immunization, and nursing care which are carried out by nursing staff, community health and allied health staff.

Community health services are targeted at broad groups within the community which have special needs, particularly children, youth, women, the elderly and Aboriginal people.

Some of the health issues targeted by community health services include:

Nutrition (paediatric and adult obesity, heart disease, general nutrition);

Lifestyle Management (stress, assertion, relaxation, diet, exercise);

Paediatrics (speech, language, coordination, developmental delay, fine and gross motor);

Women's Health (antenatal exercise and education, new mum's fitness (postnatal)), and

Accident Prevention (occupational health and safety, child abuse).



As part of the nutrition education program, the 'Fruit 'n' Veg with Every Meal' campaign encouraged people to eat more fruit and vegetables for better health.

Pictured at the start of the campaign is Health Promotion coordinator Margaret Miller.

Photograph: Health Department of Western Australia.

These education programs are designed to address the problems of substance abuse (e.g. alcohol, tobacco abuse, with clients referred by Community Nursing Staff to a Health Education Officer), nutrition (i.e. obesity, failure to thrive), communicable diseases (e.g. measles, sexually transmitted diseases, AIDS), lifestyle related

disorders (e.g. hypertension, diabetes), women's health (e.g. antenatal, menopause, pap smears) and accident prevention (e.g. safety, child abuse).

Of note in 1989-90 was the establishment of an Aboriginal Health Policy Unit which reflects the Government's priority in targeting Aboriginal health care issues.

### Hostels and Nursing Homes Program

Accommodation exists for people with incurable chronic illness and persistent disability, in nursing homes, hostels, group and community homes.

Despite continuing high demand for such accommodation, both Commonwealth and State governments are reducing input to this area in order to place greater emphasis on community care options.

In 1989-90, funding was granted to the W.A. Council of Social Service Training and Development Unit to continue the development and provision of training for Home and Community Care service providers and management staff.

TABLE 8.7 - NURSING HOMES AND BEDS FOR THE AGED : JUNE 1990

	<i>Number</i>	<i>Beds</i>
Non-government (a)	91	4,647
Government (b)	20	1,383
<b>Total</b>	<b>111</b>	<b>6,030</b>

(a) Private enterprise and religious/charitable homes. (b) Conducted by State Government.

### Communicable diseases

The *Quarantine Act 1908* provides for the quarantine of humans, animals and plants. The Commonwealth Department of Health administers the Act in matters relating to humans whereas aspects relating to animals and plants are the responsibility of the Commonwealth Department of Primary Industries and Energy. The *Health Act 1911* provides for the compulsory notification of infectious diseases by doctors.

**TABLE 8.8 – PRINCIPAL INFECTIOUS DISEASES NOTIFIED (a) : 1989-90**

<i>Disease</i>	<i>Notifications</i>
Acquired immune deficiency syndrome (AIDS)	15
Acquired immune deficiency syndrome (AIDS) - (HIV infection)	67
Amoebiasis	18
Ancylostomiasis	95
Bacillary dysentery (shigellosis)	486
Campylobacter infection	723
Giardiasis	490
Hepatitis A (infectious)	83
Hepatitis B (serum)	585
Malaria	39
Measles	15
Meningococcal infection (includes epidemic cerebrospinal meningitis)	37
Pertussis (whooping cough)	347
Puerperal fever	23
Ross River Virus infection	83
Salmonella infection	676
Scarlet fever	17
Tuberculosis (all forms)	133
Venereal disease—	
Gonorrhoea	691
Granuloma inguinale	21
Syphilis	233

(a) Excludes diseases where the incidence was less than eight cases.

### Dental Health Services

A General Dental Health Service operates through a number of Departmental dental clinics in strategic towns, with the itinerant Dental Services bringing dental care to communities which are remote from such clinics. Total combined attendances during 1989-90 were 9,369. A subsidised dental scheme also enables people in areas with no government dental clinic to receive care from a local private practitioner through an income tested subsidy.

The Department's School Dental Service offers dental treatment and oral preventative services to children in Years 1 to 10 throughout the State, and Years 11 to 12 where resources are available. In 1989-90, 214,924 children were treated as part of this service and 235,316 examinations were made.

A Dental Health Education Unit provides advisory and support services for all people involved in dental care, as well as answering requests from high school teachers and the general public.

### Psychiatric Services

To maximise the effectiveness of the Western Australian health system, moves were undertaken in 1988-89 to integrate psychiatric services with other health services and to give them a more regional focus. This involved consultation with community groups, health professionals and other interested parties.

Presently the Health Department of Western Australia administers hospitals for the treatment of mental illness, community mental health centres, child and adolescent clinics, day care facilities, training centres, hostels, sheltered workshops and domiciliary services for psychiatric patients.

The Mental Health Act provides for the admission of patients to hospitals approved for the purpose, either on referral by a medical practitioner or by order of a Justice of the Peace supported by the referral of a medical practitioner. Special provisions exist for the detention for observation or treatment of persons admitted by order of a court or from a prison. The Act also provides for voluntary admissions. A person not less than eighteen years of age may be granted admission on their own request. Younger persons may be admitted on the application of a parent or guardian.

**TABLE 8.9 – PSYCHIATRIC SERVICES: 1989-90**

	<i>Beds (a)(b)</i>	<i>Separations (c)</i>
Approved psychiatric hospitals	517	2,627
Child and adolescent residential units	43	283
Other adult residential psychiatric units (d)	64	17
Psychogeriatric units	226	779

(a) At 30 June. (b) Approved beds. (c) Includes deaths. (d) Whitby Falls Hostel and Heathcote Halfway House.

### Hospitals Program

A \$500 million plan, providing for at least 800, and possibly 1,500, new acute hospital beds for patients in the metropolitan area by the year 2001 was launched in 1990.

The philosophy behind this plan is to make hospital care more accessible to the community

and free central hospitals to concentrate on their roles as specialist centres of excellence.

**TABLE 8.10 – STATE GOVERNMENT ACUTE HOSPITALS (a) : 1989-90**

	<i>Unit</i>	
Staff (b)—		
Medical	Number	1,277
Nursing	"	7,351
Medical support	"	1,918
Other	"	7,301
<b>Total staff</b>	"	<b>17,847</b>
Salaries and wages	\$'000	580,902
Other goods and services (c)	"	258,342
<b>Total</b>	"	<b>831,243</b>

(a) Includes particulars of the Perth Dental Hospital. (b) At 30 June. Full-time equivalents. (c) Payments to visiting medical officers, alterations, equipment, vehicle and repairs, food services, medical and surgical supplies, energy and water, domestic services and all other administrative expenses.

**TABLE 8.11 – ACUTE HOSPITALS NUMBER, BEDS AND IN-PATIENT STATISTICS 1989-90**

	<i>Number</i>	
Public hospitals (a)—		
Number		5
Number of beds		2,577
Other public—		
Number		83
Number of beds		3,635
Repatriation general, Hollywood (b)—		
Number		1
Number of beds		371
Private—		
Number		24
Number of beds		1,900
<b>Total—</b>		
<b>Hospitals</b>		<b>113</b>
<b>Number of beds</b>		<b>8,483</b>
In-patients (c)—		
Treated in—		
Public hospitals		274,817
Private hospitals		86,656
In-patients days—		
Public hospitals		1,569,000
Private hospitals		376,275

(a) At 30 June. (b) Commonwealth. (c) Figures are preliminary. Excludes figures for Repatriation General Hospital, Hollywood.

## OTHER HEALTH SERVICES

### Royal Flying Doctor Service of Australia (Western Australian Section) Incorporated

The Royal Flying Doctor Service of Australia is a non-profit organisation financed by grants from the Commonwealth and State Governments and by private donations. The principal function of the Service is to provide aerial medical services for all persons in Western Australia irrespective of their location and economic situation.

The radio network of the Royal Flying Doctor Service is regularly used in the work of Schools of the Air conducted by the Ministry of Education, and also for the transmission and receipt of telegrams and radio telephone calls. In addition, it may be used, as the need arises, in connection with flood relief, in searching for lost parties and during cyclones or other emergencies.

**TABLE 8.12 – ROYAL FLYING DOCTOR SERVICE OF AUSTRALIA – OPERATIONS OF THE WESTERN AUSTRALIAN SECTION : 1989-90**

	<i>Unit</i>	
Income (operational)	\$'000	8,347
Expenditure (operational)	\$'000	8,768
Medical flights	Number	6,719
Nautical miles flown	"	1,328,281
Patients transported	"	3,687
Patients attended	"	9,530
Radio and telephone consultations	"	4,043
Outpatient services and other clinics	"	13,808

### St. John Ambulance Australia W.A. Ambulance Service Inc.

The W.A. Ambulance Service Inc. is responsible for the road ambulance service and for teaching first aid throughout Western Australia. The Service also cooperates closely with the Royal Flying Doctor Service in transporting patients by air throughout the State.

The W.A. Ambulance Service is a non-profit organisation. The main sources of finance are charges on users of the service, members'

contributions to the Ambulance Benefit Fund, donations by individuals and grants from the State Government and the Lotteries Commission.

The Medic Alert Foundation, administered by St. John in Western Australia, provides bracelets or necklets to persons who have hidden medical conditions which could be life threatening in emergency situations or where inappropriate drugs or medications are administered. Under circumstances where the patient may be unconscious or unable to communicate effectively, the information on the bracelet would enable emergency medical personnel to assess the patient's needs and particular conditions. If necessary, further details can be obtained from Ambulance Service computer records.

Medic Alert membership as at 30 June 1990 was 41,700.

**TABLE 8.13 - ST. JOHN AMBULANCE AUSTRALIA  
W.A. AMBULANCE SERVICE INC. : 1989-90**

	<i>Number</i>
Ambulance service—	
Patients transported	87,800
Kilometres travelled	2,867,000
First aid classes—	
Students taught	25,680

### **Western Australian Alcohol & Drug Authority**

The Western Australian Alcohol & Drug Authority is an independent statutory authority established in November 1974 as a result of the recommendations of the Honorary Royal Commission into Alcohol and Drugs.

The Authority's mission is to contribute to the well-being of the people of Western Australia by the minimisation of problems associated with the use of alcohol and other drugs.

The Authority's three main treatment facilities are the Carrellis Centre, William Street Clinic and Central Drug Unit.

The Carrellis Centre, which includes a detoxification unit, provides residential and non-residential treatment for people with problems relating to alcohol and prescription drugs.

Non-residential assistance to individuals and families with problems arising from the use of

opiates and drugs other than alcohol is available at William Street Clinic. The clinic operates a methadone service as well as providing AIDS education, assessment, counselling and referral services.

The Central Drug Unit provides residential detoxification for persons dependent on illicit drugs. The unit also operates the Court Diversion Service, which takes referrals from the Courts and aims to engage drug dependent offenders in suitable treatment as an alternative to imprisonment.

The Authority has regional offices in Albany, Bunbury, Derby, Geraldton, Kalgoorlie, South Hedland and Karratha. Services include counselling, assessment, referral, professional skills education, prevention, and direct support to non-government organisations active in the field of alcohol and drug treatment.

An Education and Research directorate provides drug-related education and training to people working or studying in the health and welfare fields, and also formulates strategic advice on legislation, policy and services involving alcohol and other drug-related issues.

Information, confidential counselling and referral on alcohol, other drug problems and AIDS is available to the public by telephoning the Alcohol and Drug Information Service. A library containing a special collection of print and audiovisual material covering all aspects of addiction is also open for public use.

The Authority provides funding and professional support to non-government organisations engaged in providing services to people with alcohol and other drug problems. Grants made to non-government organisations totalled nearly \$3 million during 1989-90.

Currently the Authority's focus is on providing community based services and directing greater resources to special needs groups identified as being at-risk. These include Aboriginal people, youth, non-English speaking people, and women.

### **The Perth Aboriginal Medical Service**

The Perth Aboriginal Medical Service (PAMS) provides a health and medical service to the Aboriginal community of Perth. Funding is received from the Department of Aboriginal Affairs, the Aboriginal Hostels Ltd, the Department of Community Services and Health,



the Health Department of Western Australia and the National Australian AIDS Council.

At 15 September 1989, PAMS had 14,662 clients on file, an increase of nearly four per cent over the previous year. The Service employs a staff of forty-five people, some of whom are employed under the Department of Employment, Education and Training programs.

The Medical Clinic of the Service in East Perth employs a multi-disciplinary team covering general medical, psychiatry, podiatry and dental services. Four doctors work full-time at the Clinic. Fourth-year medical students are based with the Service for five-week terms as part of their training to gain first hand experience of Aboriginal health.

Service doctors give regular talks to health worker trainees and mental health nursing trainees at Graylands, the Aboriginal Health Unit at Curtin University of Technology and at the Marr Mooditj College.

PAMS community nurses make regular visits to clients in the community to see and understand the client within the context of their work and family situations; and to assess, educate and counsel as necessary. A prison visitor scheme is also in operation.

The Aboriginal Interpreter Service of PAMS maintains close liaison with major hospitals, doctors, social workers and government agencies. With more traditional Aboriginal people being sent to Perth for medical treatment, patients feel more comfortable when the Interpreter Service is present especially when discussing legal and medical problems in their own dialect.

The Interpreter Service also works in close contact with the Welfare section of PAMS. Donations of toiletries, personal items and warm clothing from welfare and religious groups are distributed to patients in hospitals, especially those from the Central Desert and northern regions, and to clients from the north of the State and Kalgoorlie.

The Welfare section of the Service liaises with other Aboriginal agencies and Government Departments on behalf of clients for food parcels, extension of time for bills payment and donations of clothing and household items.

The Transport section of the Service delivers patients to and from hospital appointments, picks

up medical supplies, delivers specimens to hospitals and other general transport duties.

The Service operates the Boomerang Hostel set up to relieve the homelessness of the Nyungar people of Perth. The Hostel is located in East Perth and has eight beds.

The Marr Mooditj College, which provides education in Aboriginal health care, is also part of the Service. During 1988-89, fifteen students graduated with the Aboriginal Health Workers Certificate. The College also offers refresher courses for qualified health workers and enrolled nurses wishing to work with Aborigines. A post-graduate medication course was offered in 1988-89 and a certificate course in venepuncture was being planned.

Both staff and students of Marr Mooditj were involved in delivering talks to the community and institutes of higher education. During 1988-89, talks were delivered to the University of Western Australia, Curtin University of Technology, the Western Australian College of Advanced Education, church groups, women's groups and prisons.

A new initiative of the Service is the Mum-Ba-Gee Program which aims to create employment for Aborigines with the Silver Chain Nursing Association and the Home of Peace. Programs within educational institutions and Marr Mooditj College will be examined in order to enhance students' capabilities in preparation for permanent employment with the two organisations.

#### **Family Planning Association of WA (Inc)**

The Family Planning Association is a community based non-profit organisation financed by grants from both State and Commonwealth Government and with self generated funds. The Association strives to achieve excellence in sexual health care by providing services that affirm that all people are sexual throughout life and have a right to information and to personal choice, and that acceptance of sexuality is integral to health.

The Association operates from central premises in Northbridge and from two regional centres, The Options Sexual Health Centre at Mirrabooka and Quarry Youth Health Centre in Fremantle. The Fremantle centre addresses the particular needs of people under the age of 25 years of age. Clinical, community education, professional training and

information services are open to any person within the community and are available to varying degrees from each of these centres.

The clinical services are staffed by doctors and nurses who have developed their knowledge in the area of sexual health. This includes gynaecology, pregnancy counselling, sexually transmitted infection, cervical screening and sexual dysfunction.

Confidential counselling and information services in all areas of sexuality are available at all centres. The library in Northbridge has the most comprehensive collection of literature about human sexuality in the State and is open to members of the community. The Telephone Information Service operates during weekdays and access is available to non-metropolitan areas through a 008 line.

The education and training services offer regular programs for professional development at undergraduate and post-graduate levels and community oriented presentations are conducted. Specific programs may be developed by the education professionals to meet the needs of

particular groups or specific subject areas. Family Planning Association certificate courses are conducted annually for doctors and nurse practitioners. Clinical training placements are also available to specific professional groups. Currently, trainee placements are offered to the Family Medicine Program trainees and to some under-graduate nursing students.

TABLE 8.14 - FAMILY PLANNING ASSOCIATION OF WA (INC) : 1989-90

Funding	(\$)
Commonwealth Government	1,279,980
State Government	133,820
Project grants	80,500
Self generated funds	313,913
<b>Total</b>	<b>1,933,193</b>
Services	
Clinical consultations	20,500
Counselling consultations	600
Telephone Information consultations	14,000
Community Education programs	75
Participants in Community Education programs	1,854
Professional Education programs	79
Participants in Professional Education programs	2,047
Library book loans	4,500

## Chapter 9

### LAW, ORDER AND PUBLIC SAFETY

The law in force in Western Australia is contained in The Statutes of Western Australia, comprising legislation passed by the Western Australian Parliament and certain Imperial Acts which have been adopted, and in the Commonwealth Acts in so far as they apply to Western Australia. Under the Constitution of the Commonwealth of Australia, 'when a law of a State is inconsistent with a law of the Commonwealth, the latter shall prevail, and the former shall, to the extent of the inconsistency, be invalid.'

#### CROWN LAW DEPARTMENT

The Crown Law Department is administered, subject to the control of the Attorney-General, by the Under Secretary for Law. The Department is responsible for the Supreme Court Registry, the District Court Registry, the Family Court Registry, Children's Court of Western Australia Registry, Court Offices throughout the State, the Crown Solicitor's Office, and the Parliamentary Counsel's Office. The Department, in addition to administering the Acts which come under the portfolio of the Attorney-General, conducts Crown legal business and, when required, acts for and advises State Government departments and instrumentalities. Subject to the control of the Minister for Justice, the Under Secretary for Law is also responsible for two sub-departments, the Public Trust Office and the Registrar General's Office. The Law Reform Commission is an independent body responsible directly to the Attorney-General.

#### LAW COURTS

In Chapter 21, reference is made to the Federal Court of Australia, the Industrial Relations Commission, the Western Australian Industrial Appeal Court, and The Western Australian Industrial Commission.

#### High Court of Australia

The High Court of Australia is the Federal Supreme Court. The Constitution requires that there shall be a Chief Justice and not less than two other Justices of the High Court. At 31 December 1990 there were six other Justices. Sittings are held in the capital city of each State as occasion requires. The High Court exercises both original and appellate jurisdiction, acting as a court of appeal for Australia.

#### Supreme Court of Western Australia

The Supreme Court of Western Australia, consisted of a Chief Justice, twelve other Judges and three Masters at 31 December 1990. The jurisdiction of the Court in both civil and criminal matters is exercised by a single Judge, sitting alone or with a jury, unless it is provided that an action must be brought before a Full Court. Criminal cases are heard before a jury. Appeals are heard against judgements of the Supreme Court and the District Court as well as against decisions of the magistrates in the Courts of Petty Sessions. Appeal from a judgement of the Supreme Court of Western Australia in some cases lies to the High Court of Australia.

### The District Court of Western Australia

At 31 December 1990 the District Court of Western Australia consisted of a Chief Judge and fourteen other Judges. The jurisdiction of the Court is exercised by a Judge sitting alone or with a jury. Criminal cases must be heard before a Judge and jury.

The Court has the same jurisdiction as the Supreme Court in actions claiming damages for death or bodily injury. Otherwise, its civil jurisdiction exists broadly up to a maximum of \$80,000. Criminal jurisdiction exists for indictable offences except those for which the penalty may be life imprisonment or strict security life imprisonment, such cases being under the jurisdiction of the Supreme Court.

Appeals from a District Court Judge lie, in the civil jurisdiction, to the Full Court of the Supreme Court and, in the criminal jurisdiction, to the Court of Criminal Appeal.

### Family Court of Western Australia

The Family Court of Western Australia consisted of a Chairman of Judges and four other Judges, at 31 December 1990. The jurisdiction of the Court is exercisable by one Judge.

The Court hears petitions for divorce and has jurisdiction in the welfare and custody of children and in disputes about maintenance and property of marriage.

Appeals relating to federal jurisdiction matters lie to the Full Court of the Family Court of Australia and appeals relating to non-federal jurisdiction matters lie to the Full Court of the Supreme Court of Western Australia.

TABLE 9.1 – FAMILY COURT  
OF WESTERN AUSTRALIA

	1987	1988	1989
Dissolution of marriage—			
Number of—			
Applications filed	3,962	4,074	4,204
Decrees made	4,044	3,964	4,089

### Courts of Petty Sessions

Courts of Petty Sessions are held at centres of population throughout the State. Two or more Justices of the Peace sitting together in petty

sessions may deal with cases which could be decided by a magistrate sitting alone.

### Children's Courts

Children's Courts in Western Australia are now established under the *Children's Court of Western Australia Act 1988* which came into force on 1 December 1989. The Court is headed by a President who may deal with any offence committed by a child. Magistrates and members of the Children's Court have different jurisdiction under the Act.

### Local Courts

Local Courts are held throughout the State to determine minor civil issues. Jurisdiction is limited in most cases to claims not exceeding \$10,000. A Small Disputes Division of the Local Court provides a quick and less expensive means of recovering debts of less than \$3,000 and caters for disputes between landlord and tenant under the provisions of the *Residential Tenancies Act 1987*.

### Coroner's Courts

Coroner's Courts may be held to inquire into the circumstances of sudden, unnatural and suspected deaths or the cause and origin of fires. A coroner may charge a person with a major offence and commit that person for trial at a higher court.

### Liquor licensing

The *Liquor Licensing Act 1988* regulates the sale, supply and consumption of liquor, the use of premises on which liquor is sold, and the services and facilities provided in conjunction with or ancillary to the sale of liquor. The Act, which repeals the *Liquor Act 1970*, constitutes the Licensing Authority which comprises the Liquor Licensing Court headed by a Judge, and the Director of Liquor Licensing.

Under the new Act classes of licences and permits have been divided into two categories. Category A comprises hotel (including tavern and restricted hotel), cabaret, liquor store, special facility licences and casino liquor licences. Category B comprises restaurant, club (including club restricted), wholesale, producer and occasional licences.

If an objection is received against an application for the grant or removal of a Category A licence, the matter is referred to the Liquor Licensing Court for determination. If no objection is lodged,

it is determined by the Director of Liquor Licensing, Office of Racing and Gaming. The Director has a quasi-judicial role as well as being responsible for the administration of the Act.

All other applications, including the grant or removal of a Category B licence or the transfer of any licence, are determined by the Director whether or not objections are received.

**TABLE 9.2 - LIQUOR LICENCES**  
(Source: Office of Racing and Gaming)

	1988	1989	1990
NUMBER			
At 30 June—			
Current licences	2,229	2,274	2,339
Applications received	(a)23,915	(a)20,672	8060
\$ MILLION			
Year ended 30 June—			
Licence fees and penalties	n.a	56.7	62.2
General fees (b)	n.a	0.3	0.4
Premiums (c)	n.a	0.5	..
<b>Total revenues received</b>	<b>51.9</b>	<b>57.6</b>	<b>62.6</b>

(a) Includes applications received by Clerks of Court outside the Metropolitan area (b) Liquor Licensing Regulations 1984 (c) Paid under the repealed Act.

As well as determining contested applications for the grant or removal of Category A licences, the Liquor Licensing Court hears applications to review decisions of the Director, and complaints for disciplinary action to be taken against licensees.

### Small Claims Tribunals

Small Claims Tribunals deal with claims involving amounts less than \$3,000. A Tribunal is

constituted by a referee sitting alone and may be constituted at any place in the State.

**TABLE 9.3 - SMALL CLAIMS TRIBUNAL**  
**YEAR ENDED 30 JUNE 1990**  
(Source: Small Claims Tribunal)

Claims lodged	1,562
Sittings	1,826
Claims determined—	
Withdrawn	25
Settled	251
Dismissed	200
Totally in favour of respondent	36
Totally in favour of claimant	366
Partially in favour of each	348
No jurisdiction	23
<b>Total determined</b>	<b>1,249</b>

### CONVICTIONS IN COURTS

#### Number of convictions

It is important to bear in mind when considering the particulars shown in Table 9.4 that the figures relate to the *number of convictions* recorded and not to the *number of persons* convicted. Thus, when a person is convicted on more than one count each conviction so recorded has been included in the statistics.

Under the provisions of parking facilities legislation and municipal by-laws, fines may be imposed without court action for minor traffic offences. In the year ended June 1990 the total number of infringement notices issued for these minor traffic offences was 540,490, or \$20.6 million.

**TABLE 9.4 - COURT STATISTICS - NUMBER OF CONVICTIONS: 1986-87**  
References: Cat. Nos. 4501.5, 4502.5 4503.5

Code (a)	Description of Offence	Supreme and District Courts	Courts of Petty Sessions	Children's Courts	Total
100	Offences against the person	470	3,386	1,210	5,066
200	Robbery and extortion	135	2	31	168
300	Breaking and entering, fraud, and other offences involving theft	2,897	17,941	14,931	35,769
400	Property damage and environmental offences	50	2,550	1,584	4,184
500	Offences against good order	116	39,129	6,528	45,773
600	Drug offences	232	6,950	1,193	8,375
700	Motor vehicle, traffic and related offences	12	79,955	7,185	87,152
800	Other offences	-	7,491	104	7,595
900	Child welfare matters	-	-	202	202
..	<b>Total</b>	<b>3,912</b>	<b>157,404</b>	<b>32,968</b>	<b>194,284</b>

(a) Related to Draft Australian National Classification of Offences, June 1980.

## THE JURY SYSTEM

The operation of the jury system is governed by the *Juries Act 1957*. Indictable offences are tried before a Judge and twelve jurors sitting in the criminal jurisdiction of either the Supreme Court or District Court, depending on the gravity of the offence. Juries for civil cases comprise six persons.

### Eligibility for jury service

Subject to the Juries Act, a person who is enrolled on any of the rolls of electors entitled to vote at an election of members of the Legislative Assembly of the Parliament of the State is liable to serve as a juror at trials in the jury district in which he or she is shown to live by any of those rolls of electors.

Each year a Juror's Book is prepared by the Chief Electoral Officer for each jury district within the State for persons who appear to be qualified for, and not otherwise ineligible for, service as jurors. Certain persons are excluded from jury service and persons may be excused on the grounds of illness, undue hardship, circumstances of sufficient weight, importance or urgency; or recent jury service.

## LAW REFORM COMMISSION OF WESTERN AUSTRALIA

The Law Reform Commission of Western Australia, established by the *Law Reform Commission Act 1972*, examines proposals for review of aspects of the law referred to it by the Attorney-General. It may also submit to the Attorney-General proposals for review. The Commission usually issues a discussion paper dealing with the issues involved in a particular proposal under consideration and invites comments from interested persons. A report is then made to the Attorney-General.

## PARLIAMENTARY COMMISSIONER FOR ADMINISTRATIVE INVESTIGATIONS

The Parliamentary Commissioner for Administrative Investigations (commonly known as the Ombudsman) is empowered under the *Parliamentary Commission Act 1971* to investigate complaints by a person or a body of persons (whether incorporated or not) affected by the administrative actions of government departments, specified statutory authorities, and local authorities.

The Act does not apply to Courts of Law in the State, a Judge of the Supreme Court, the Family Court or the District Court, a Commissioner of any Court, a Stipendiary Magistrate, a Coroner, the Auditor-General, the Parliamentary Privileges Act, or any decision of the Cabinet or a Minister.

**TABLE 9.5 - ALLEGATIONS RECEIVED BY ORGANISATION(a)**  
**YEAR ENDED 30 JUNE 1990**

(Source: The Parliamentary Commissioner for Administrative Investigations)

	Departments	Local Authorities	Statutory Authorities	Organisations outside jurisdiction
Number received	1,440	212	340	105
No jurisdiction	37	16	17	102
Discontinued because				
rectified or settled	24	13	36	—
Sustained	18	8	18	—
Not sustained	6	—	3	—
Unable to be determined	14	5	5	—
Number processed	1,395	212	332	102

(a) A letter of complaint which concerns two organisations has been counted as two allegations. A letter of complaint signed by multiple complainants e.g. two prisoners about two matters (such as meals and visits) has been recorded as two allegations.

## THE LEGAL PROFESSION

The Barristers' Board has the power to regulate and control the examination of articled clerks, and the qualification and examination of all candidates for admission as practitioners. Practitioners are also required to obtain a Practising Certificate, renewable annually, from the Board.

**TABLE 9.6 - BARRISTER'S BOARD REGISTRATIONS AT 30 JUNE**

	1988	1989	1990
Number of Practising Certificates issued	1,787	2,148	2,102

## LEGAL AID COMMISSION OF WESTERN AUSTRALIA

The Legal Aid Commission provides legal assistance to eligible persons throughout Western Australia. The assistance may be made available at no expense to, or wholly or partly at the expense of, the Commission.

TABLE 9.7 - LEGAL AID: AT 30 JUNE

	1988	1989	1990
Number of persons—			
Seeking assistance	48,900	53,023	53,971
Assisted by duty counsel (in conjunction with private legal practitioners)	20,898	25,224	24,891
Assisted by Legal Advice Bureau staff (duty solicitors)	13,034	13,994	16,379
Assisted by staff lawyers	2,701	2,918	2,560
Amount paid to private legal practitioners for cases undertaken by them (\$ million)	8.6	11.2	9.2

### WESTERN AUSTRALIA POLICE SERVICE

The Western Australia Police Service refers to the combined resources of the Western Australia Police Force (comprising sworn personnel) and the Western Australia Police Department (comprising Public Service staff).

There are five portfolios under the direction of the Commissioner of Police, three operational — crime, traffic and operations, and two non-operational — personnel and services. Also under the direction of the Commissioner of Police is the Secretary (Public Service Head) who is

responsible for all Public Service Act and wages employees of the Department. The Commissioner is appointed by the Governor and is responsible to the Minister for Police.

The maintenance of public peace and good order, the protection of life and property and the prevention of crime through the apprehension and prosecution of criminals remain the foremost objectives of the Service.

There were 3,905 officers in the Police Force at 30 June 1990 (including recruits in training) compared with 3,725 the previous year.

TABLE 9.8 - WESTERN AUSTRALIA POLICE SERVICE - CRIMES REPORTED AND CLEARED  
OFFENDERS : 1989-90

(Source: Western Australia Police Department)

Offence	Number of crimes		Offenders apprehended		
	Reported	Cleared	Male	Female	Total
Homicide	41	39	33	5	38
Indecent assault (excluding assault, sexual/agg)	1,398	1,178	258	1	259
Deprivation of liberty and abduction	153	110	113	3	116
Aggravated sexual assault	302	257	171	1	172
Sexual assault	166	126	68	-	68
Breaking and entering	49,603	6,227	6,309	619	6,928
Robbery	526	214	190	20	210
Serious assault	1,812	1,499	1,169	171	1,340
Assault police	841	800	595	115	710
Common assault	5,101	3,581	2,214	327	2,541
Stealing	63,872	13,000	7,523	3,555	11,078
Stolen motor vehicle	15,835	2,501	2,702	334	3,036
Fraud	9,776	5,003	1,205	424	1,629
Damage - over \$200	8,705	1,737	1,303	142	1,445
Damage - \$200 and less	14,758	3,013	2,114	529	2,643
Arson	121	40	41	1	42
Damage by fire	195	47	25	7	32
Unlawfully on curtilage/premises	3,705	1,020	926	111	1,037
Drugs	8,917	8,917	5,367	947	6,314
Bomb hoax	166	38	23	6	29
Other indictable offences	565	338	218	37	255
<b>Total</b>	<b>186,558</b>	<b>49,685</b>	<b>32,567</b>	<b>7,355</b>	<b>39,922</b>

## PRISONS

The Director of the Department of Corrective Services is responsible, subject to the control of the Minister, for the administration of prisons in Western Australia. Police gaols administered jointly by the Department of Corrective Services and the Police Service hold prisoners awaiting trial and some short-term prisoners. In addition, provision is made for holding some prisoners with very short sentences at police lock-ups throughout the State.

**TABLE 9.9 - NUMBER OF PRISONERS  
DAILY AVERAGES 1988-89**  
(Source: Department of Corrective Services)

Institution	Males	Females	Total
Prisons	1,457.7	95.1	1552.8
Police gaol—			
East Perth	10.8	—	10.8
Police lock-ups	n.a.	n.a.	154.4
Public hospitals	—	—	—
<b>Total</b>	<b>n.a.</b>	<b>n.a.</b>	<b>1,718.0</b>

**TABLE 9.10 - PRISON RECEIVALS: DISTINCT  
PERSONS (a) BY AGE  
1988-89**  
(Source: Department of Corrective Services)

Age (years)	Males	Females	Persons
Under 16	1	1	2
16 - 17	63	1	64
18 - 19	554	59	613
20 - 24	1,077	136	1,213
25 - 29	762	116	878
30 - 34	470	76	546
35 - 39	288	52	340
40 - 44	203	30	233
45 - 49	94	10	104
50 and over	117	20	137
Unknown	2	1	3
<b>Total</b>	<b>3,631</b>	<b>502</b>	<b>4,133</b>

(a) Distinct persons refers to the individuals admitted during the period. A person received more than once during the period is counted only for the first time.

Work and educational opportunities vary from prison to prison. All prisons employ some prisoners in maintenance, cleaning and cooking tasks, whilst at the larger and better equipped institutions, workshops provide additional employment and trades training including

apprenticeships. Prison farms provide employment and some training in various aspects of agriculture. Full-time or part-time educational facilities are available at most prisons.

## PROBATION AND PAROLE SERVICE

Probation is an alternative to imprisonment, being the conditional suspension of punishment. Parole is the conditional release of selected prisoners after the offender has served part of the sentence in a penal institution. One of the main functions of the Probation and Parole Service is to provide pre-sentence reports to assist the Court in coming to a decision as to sentence which is, as far as possible, in the best interests of the community and the offender.

At 30 June 1989 approximately 40 per cent of prisoners subject to parole type sentences were held pursuant to the provisions of the *Offenders Probation and Parole Act 1963* 'automatic' parole. Prisoners subject to Section 37A of this Act may normally expect to be paroled after serving one third of their sentences. A further 41 per cent were held for maximum-minimum type sentences and special term sentences (non automatic parole).

## PUBLIC SAFETY

**TABLE 9.11 - PROBATION AND PAROLE SERVICE  
YEAR ENDED 30 JUNE 1989**  
(Source: Parole Board of Western Australia)

PROBATION	
Number of probation orders—	
Current at beginning of period	2,528
Issued during period	1,979
Terminated—	
By compliance	1,625
Other	302
Current—	
For all or part of period	4,507
At end of period	2,580
PAROLE	
Number of parole orders (a)—	
Current at beginning of period	791
Issued during the period (b)	611
Terminated as a result of—	
Successful completion	262
Cancellation	101
Current at end of period	1,039
Number of persons under supervision during period	1,402

(a) Excludes those released to parole for deportation, extradition or repatriation only. (b) Includes orders for release under supervision, by the Governor in Executive Council.



### Industrial Foundation for Accident Prevention

The Industrial Foundation for Accident Prevention is a non-profit organisation and most of its funds are generated by the provision of its services, with the balance made up of member subscriptions. Employers and Government are represented on the Foundation's Management Committee and Advisory Council.

The Foundation provides occupational safety and health services to industry, commerce and Government departments in Western Australia and other States with the aim of preventing occupational injuries and illness.

### The Western Australian Fire Brigades Board

The Board is responsible for taking, superintending, and enforcing all necessary steps for the prevention and extinguishing of fires and the protection of life and property from fire, and the control of all fire brigade premises and fire brigades.

**TABLE 9.12 – NUMBER OF INCIDENTS ATTENDED**  
(Source: Western Australian Fire Brigades Board)

	1988-89	1989-90
False alarms	3,971	4,048
Property and transport fires	2,358	2,462
Rubbish, grass, or bush fires	4,971	5,278
Special services (including rescue, assistance with hazardous conditions and salvage operations)	763	1,006
<b>Total incidents attended</b>	<b>12,063</b>	<b>12,794</b>

The Metropolitan Fire District has seventeen fire stations, fifteen are staffed by permanent brigade personnel only, one by permanent staff supported by volunteers and one wholly by volunteers. Permanent brigade personnel serve with volunteer brigade personnel in five large country centres and Armadale, and volunteer brigades provide town fire protection at eighty-two other centres. At 30 June 1989, the Board had 901 employees and there were 2,043 volunteer brigade officers and firefighters.

**TABLE 9.13 – NUMBER OF INCIDENTS FOR TOP TEN CAUSES OF FIRE**

(Source: Western Australian Fire Brigades Board)

Cause	1987-88	1988-89
Incendiary (a)	335	1,701
Children misusing fire	879	849
Carelessness with fire	448	489
Inadequate control of open fire	315	443
Short circuit	238	437
Suspicious circumstances	1,307	393
Rekindle/reignition of fires	246	216
Unattended operation	100	215
Part failure, leak, break	110	168
Lack of maintenance	—	138
Other electrical failure	112	—

(a) With the introduction of training by the Fire Investigation Unit, resulting in more accurate reporting of incendiary, suspicious and undetermined causes the classifications have altered dramatically; in total this represents a 5.3% increase.

### Bush Fires Board

The Bush Fires Board is constituted under the *Bush Fires Act 1954*. The principal functions of the Board are to administer the Act; to report to the Minister on methods of preventing or extinguishing bush fires; to recommend the prohibited and restricted burning times to be declared for the whole or any part of the State for any yearly period; to carry out research in connection with fire prevention and control; to conduct publicity campaigns for the purpose of improving fire prevention measures; to provide training facilities for volunteers; and to carry out such fire prevention measures as it considers necessary. The Board operates through its staff liaison officers based in country centres. These officers promote fire protection by the exercise of coordination, liaison and advisory functions.

Local authorities throughout the State handle local administration of the Bush Fires Act.

### State Emergency Service

The Western Australian State Emergency Service is established to assist the community in the event of emergencies and disasters. In 1985 it became part of the Western Australia Police Department where it remains as an identifiable entity. It is currently headed by a director who is a uniformed police officer at Chief Superintendent rank.

The state headquarters is located in the Perth suburb of Belmont with regional headquarters in Port Hedland, Carnarvon, Geraldton, Kalgoorlie, Northam, Bunbury, Albany and two in the Perth Metropolitan area. The state and regional headquarters are staffed by permanent public service staff. Subsidiary units are established in most local government jurisdictions and are closely affiliated to their respective local government authorities. Staffing at local unit, and

to some extent regional headquarters level, is by volunteers.

The volunteer staff of the organisation respond to calls from the police and public to assist in emergency situations of various types including searches for lost people, major vehicle accidents, floods, building collapses, cyclones, storm surges and a number of other minor events. They also provide support for other services in emergencies as and when required.



Members of the State Emergency Service, David Fisher, Herman Hoffman and Rod Ives prepare to descend with a weighted stretcher whilst the leader of the Western Australian Roping School Gordon Lamb looks on.

*Photograph: State Emergency Service*

#### REFERENCES

Office of Racing and Gaming *Annual Report 1989-90*

Report of the Parliamentary Commissioner for Administrative Investigations *1990*

Western Australia Police Service *Annual Report 1990*

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Parole Board of Western Australia *Annual Report 1989*

Western Australian Fire Brigades Board *Annual Report 1989*

## Chapter 10

### EDUCATION

In Western Australia, education at pre-primary, primary and secondary levels is provided at government schools administered and staffed by the Ministry of Education and at non-government schools, most of which are conducted by the principal religious bodies. Technical and further education is offered by the Department of Technical and Further Education, and by three independent regional colleges. The latter also provide higher education facilities. Additional higher education is available through four universities.

#### PRE-PRIMARY EDUCATION

Before commencing primary school, a child may receive pre-primary education at either a government or non-government school. A child may also attend a government staffed community pre-school or an independent pre-school.

Attendance is optional at all centres. Children commence pre-primary education during the year in which they attain five years of age, although they may enrol during their fourth year where vacancies exist.

Every person conducting a pre-school centre is required to hold a permit issued by the Minister for Education and all authorised pre-school centres are subject to inspection by an officer of the Ministry.

TABLE 10.1 - PRE-PRIMARY EDUCATION: JULY

	1988	1989	1990
NUMBER OF CENTRES			
Government—			
Pre-primary	506	511	526
Community pre-school	134	133	128
Non-government—			
Pre-primary	92	103	121
Independent pre-school	24	22	22
<b>Total</b>	<b>756</b>	<b>769</b>	<b>792</b>
NUMBER OF TEACHING STAFF(a)			
Government	594	602	573
NUMBER OF CHILDREN			
Government—			
Pre-primary	23,721	25,215	26,081
Community pre-school	6,859	6,835	6,281
Non-government—			
Pre-primary	2,810	3,078	3,869
Independent pre-school	1,312	1,251	1,126
<b>Total</b>	<b>34,702</b>	<b>36,379</b>	<b>37,357</b>

(a) Numbers shown are for full-time equivalents rounded to the nearest whole number.

#### PRIMARY AND SECONDARY EDUCATION

Children may commence school at the beginning of the year in which they attain the age of six years. Except in special circumstances, attendance is then compulsory to the end of the year in which the child attains the age of fifteen years. Instruction in primary school is provided over a seven-year period. A child who makes normal progress completes the course at the age of twelve years and may then enter secondary school.

Secondary education is provided over a period of five years — from Year 8 to Year 12. Generally, students may leave at the end of Year 10 or continue through to Year 12 to attain a Certificate of Secondary Education.

Western Australia also has two Senior Colleges run by the Ministry which provide 'second chance' secondary education for those people who left the school system before achieving their goals.

The Ministry of Education has a number of programs providing assistance to areas of special need. These areas include Aboriginal and Torres Strait Islander students, students from a non-English speaking background, students with disabilities or from socio-economically disadvantaged areas, and students who are geographically isolated.

**TABLE 10.2 – GOVERNMENT AND NON-GOVERNMENT SCHOOLS, FULL-TIME STUDENTS CLASSIFIED ACCORDING TO AGE (a) JULY 1990**

Age last birthday (years)	Government schools (b)	Non-government schools (c)	Total
Under 6	9,752	2,291	12,043
6	20,669	5,173	25,842
7	20,334	5,188	25,522
8	20,436	5,223	25,659
9	19,619	5,039	24,658
10	19,210	5,071	24,281
11	19,061	5,365	24,426
12	18,125	6,438	24,563
13	17,013	7,141	24,154
14	17,260	6,907	24,167
15	15,058	6,506	21,564
16	11,036	5,591	16,627
17	5,599	2,883	8,382
18 and over	2,340	759	3,099
<b>Total</b>	<b>215,412</b>	<b>69,575</b>	<b>284,987</b>

(a) Excludes pre-primary and technical school students. (b) Includes students attending education support schools, centres and units. (c) Includes students attending special schools.

In Western Australia distance education operates as an adjunct to the general school system. The Distance Education Centre of the Ministry of Education provides schooling to a wide variety of groups in the community who are unable to attend school. These groups include children living in remote areas, isolated Aboriginal communities, students (adults and children) who for various medical and social reasons are unable to attend normal schools, students at smaller schools who cannot have maximum choice of subjects because of the small size of the teaching staff, prisoners in gaols, students travelling interstate and overseas with their parents, and adults seeking a second chance.

A feature of the service offered by the Distance Education Centre is the field support given to students by visiting tutors and teaching staff as well as its links with the five Schools of the Air.

Schools of the Air are conducted through the radio network of the Royal Flying Doctor Service from

bases at Carnarvon, Derby, Kalgoorlie, Meekatharra and Port Hedland. Materials provided by the Distance Education Centre are used to supplement tuition.

**TABLE 10.3 – GOVERNMENT SCHOOLS: JULY**

	1988	1989	1990
NUMBER OF SCHOOLS			
Primary schools	534	539	548
Education support schools/centres	57	61	62
Secondary schools—			
District high schools	59	59	57
High schools	5	6	6
Senior high schools	83	83	85
Senior colleges	2	2	2
Distance Education Centre	1	1	1
<b>Total</b>	<b>741</b>	<b>751</b>	<b>761</b>
NUMBER OF TEACHING STAFF (a)			
Engaged in teaching duties—			
Primary	6,657	7,092	7,302
Secondary	5,869	5,939	6,117
Education support (b)	1,354	370	400
<b>Total</b>	<b>12,880</b>	<b>13,401</b>	<b>13,819</b>
NUMBER OF FULL-TIME STUDENTS			
Level of education—			
Primary (c)	134,181	137,669	140,175
Secondary—			
Years 8, 9 and 10 (c)	51,365	51,227	51,667
Years 11 and 12	22,003	20,965	20,983
Senior colleges	1,387	1,405	1,549
Other (d)	1,132	1,178	1,038
<b>Total</b>	<b>210,068</b>	<b>212,444</b>	<b>215,412</b>
Males	108,277	109,530	110,930
Females	101,791	102,914	104,482

(a) Numbers shown are for full-time equivalents rounded to the nearest whole number. (b) Excludes teachers working in education support units attached to primary and secondary schools. (c) Includes ungraded and education support students (students with intellectual disability) who attend primary or secondary schools. (d) Students attending education support schools and centres who cannot be assigned a level.

### Primary and secondary curricula

The curricula of both the primary and secondary schools are organised into seven study areas: English, Languages and Communication; Mathematics; Science and Technology; Social Studies; Practical and Creative Arts; Personal and Vocational Education; and Physical Education.

The curriculum in Years 1 to 3 of primary school focuses on the development of language abilities and functional literacy and numeracy. Middle and upper primary students study an integrated curriculum which covers the seven broad categories.

**TABLE 10.4 – NON-GOVERNMENT SCHOOLS: JULY**  
(Source: National Schools Statistics Collection)

	1988	1989	1990
NUMBER OF SCHOOLS			
Primary	143	139	143
Secondary	39	38	39
Primary/secondary combined	56	60	60
Special	5	4	2
<b>Total</b>	<b>243</b>	<b>241</b>	<b>244</b>
NUMBER OF TEACHING STAFF (a)			
Primary	1,692	1,757	1,861
Secondary	2,352	2,444	2,515
Special	25	25	(b)—
<b>Total</b>	<b>4,069</b>	<b>4,226</b>	<b>4,376</b>
NUMBER OF FULL-TIME STUDENTS			
Level of education—			
Primary (c)	34,012	35,478	36,735
Secondary—			
Years 8, 9 and 10 (c)	20,346	20,888	21,466
Years 11 and 12	10,896	11,056	11,374
Special	76	81	(b)—
<b>Total</b>	<b>65,330</b>	<b>67,503</b>	<b>69,575</b>
Males	32,552	33,686	34,660
Females	32,778	33,817	34,915

(a) Numbers shown are for full-time equivalents rounded to the nearest whole number. (b) From 1990 students and the staff from special schools have not been identified separately. (c) Includes students in ungraded classes.

Lower secondary school students, Years 8 to 10, progress through the Unit Curriculum which is designed to ensure a general and balanced education whilst providing scope for a choice of units from those offered. Each unit is intended to take about forty hours. Generally, students are expected to study four units of English and Mathematics in each year and to complete at least one unit from each of the seven curriculum components.

Students in Years 11 and 12 study year-long courses which lead to their accreditation and admittance to higher education.

The Secondary Education Authority (SEA) approves the courses of study and issues certificates recording student achievement in secondary education in Western Australia (more details are given later in this chapter).

Education in government schools is secular in character but periods may be set aside during which representatives of various religious denominations may attend to give special religious instruction. In addition, elements of religion may be included, in one or more of the seven study areas, by individual teachers.

Agricultural education in the form of full-time residential courses is available at a number of centres. Day instruction is also provided at a number of secondary schools. Some private schools offer courses in agriculture.

### The Secondary Education Authority (SEA)

The SEA prepares syllabuses for subjects in which students will be assessed, assesses student performance, accredits courses, issues certificates of student performance, and collaborates and consults with secondary and post-secondary institutions. The SEA is responsible to the Minister of Education for all of these functions.

### Student achievement

Lower school students who study under the Unit Curriculum system receive the Certificate of Lower Secondary Studies at the completion of Year 10. This certificate lists the units satisfactorily completed in the last two years of compulsory schooling — Years 9 and 10.

The Certificate of Secondary Education is awarded to students who have completed at least one SEA approved Year 11 or Year 12 course. Students in these years study year-long courses selected from 150 accredited courses and a range of registered courses approved by the SEA. Assessment is school-based and grades in accredited courses are moderated by the SEA to ensure comparability across all schools in the State. Grades in registered courses are not moderated.

In the twenty-eight Year 12 accredited courses which can contribute to a student's Tertiary Entrance Score (called TES subjects) an external examination is conducted. A numerical score (Scaled Mark) for TES subjects is reported on the Certificate of Secondary Education, as well as a grade. This numerical score is a 50:50 combination of the standardised moderated school assessment and the standardised examination mark. The combined mark is scaled using the Australian Scholastic Aptitude Test (ASAT).

Entrance to higher education institutions is based on TES, which is a weighted average of scores in a student's best three, four or five TES subjects. Ten per cent of the student's ASAT score is also included. The maximum TES is 510. The student must also have satisfied the requirements for Secondary Graduation, satisfactory performance and English Language competence.

## POST SECONDARY EDUCATION

### The Western Australian Higher Education Council (WAHEC)

WAHEC provides a forum for the discussion of matters relating to higher education in Western Australia and for advising the State Minister for Education. The Western Australian Office of Higher Education supports the operation of the Council through the provision of administrative, secretarial and research services and, as a government department, undertakes a range of activities which facilitate the provision of higher education in Western Australia.

### Technical and Further Education

The Department of Technical and Further Education (TAFE) coordinates the provision of technical and further education in Western Australia, although three independent colleges also offer TAFE programs (details of their operations are shown later in this chapter).

The Department's mission is 'to meet client needs for skills formation with quality services which contribute to economic and social development'. The term 'skills formation' integrates individual and organisational learning, including initial formal education, induction, continuous on-the-job learning, recurrent off-the-job learning and continuous personal development.

TAFE is geared to provide skills formation programs which meet industry needs identified by the State Employment and Skills Development Authority.

Skills formation programs are provided for managers, supervisors, technicians, skilled tradespersons, semi-skilled personnel and other kindred support staff required by industry and commerce.

These programs also provide an alternative to those of the upper secondary schooling system. Included are vocationally related courses, bridging and link courses for young people aged fifteen to nineteen years of age. Increasingly, TAFE programs are becoming available as part of the upper secondary school curriculum. Further services provided include specialist and mid-career training and retraining, and a range of cultural, recreational and leisure programs for the State's adult population.

Short intensive skills training and retraining courses are also provided to meet specific vocational needs, such as small business management. Since 1989, TAFE has expanded its user-pays capacity for meeting industry needs through the creation of the TAFE Customised Training Agency. Business managers and labour market training consultants are appointed to metropolitan colleges.

TABLE 10.5 - TECHNICAL AND FURTHER EDUCATION

	1988	1989	1990
NUMBER OF INSTITUTIONS			
Colleges	16	16	9
Evening technical schools	8	8	8
Technical centres	99	100	85
NUMBER OF TEACHING STAFF (a)			
Colleges	1,767	1,806	1,602
Evening technical schools	61	69	—
Technical centres	89	85	—
NUMBER OF STUDENT ENROLMENTS (b)			
Colleges	83,647	85,636	82,893
Evening technical schools	23,323	26,307	26,525
Technical centres	20,934	20,613	19,280

(a) Full-time equivalent. Following reorganisation of the Department, staff of Evening Technical Schools and Technical Centres are treated as part of the college responsible for the area. (b) Each student is counted only once, even though they may have enrolled in more than one course, or on more than one occasion during the year.

The TAFE Counselling Service provides education, vocational and general guidance to students and prospective students of TAFE. A limited range of consultancy services are also available to industry and commerce, in areas such as staff selection, training and evaluation.

The Department of TAFE, in conjunction with a number of Commonwealth Government agencies, provides a range of courses to meet the particular needs of women, Aborigines, migrants, disabled persons and adults with literacy problems. The major objective of these programs is to enhance the students' prospects of gaining employment or pursuing further education and training.

The Department of Technical and Further Education has developed a variety of mechanisms to make its programs more accessible to students. It operates a network of four metropolitan colleges, five regional colleges (including the TAFE External Studies College located in West Perth) and centres in Broome and Kununurra, which offer a wide range of courses in the days and evenings.

The four metropolitan colleges are multi-campus institutions aligned to broad geographic and economic regions. They also include seven metropolitan evening technical schools which operate from local community and high school premises. Although some evening technical centres offer daytime classes, most cater for part-time evening students.

Non-metropolitan services are delivered by regional colleges located in Albany, Bunbury, Midland and Geraldton, and centres in Broome and Kununurra. Technical centres, including full-time TAFE centres in several major country towns, are distributed throughout the rural areas of the State and are controlled by the Regional College responsible for the area. These facilities provide for the needs of the local communities wherever there is sufficient demand for classes. For those students who have difficulty in attending institutional based programs, the TAFE External Studies College provides a comprehensive range of courses.

The TAFE Rural Coordinator Scheme operates in several country centres, and serves the needs of the local populations for vocational programs by harnessing the resources and expertise in the regions.

### The Colleges

Multi-level post-secondary education colleges have been established by the Minister for Education, on the advice of the former Western Australian Post-Secondary Education Commission.

Such colleges may, with the Minister's approval, provide advanced education, technical and further education, and education at other levels in specified circumstances.

Hedland College and Karratha College are situated in the Pilbara region in the north-west of the State and Kalgoorlie College is situated in the Eastern Goldfields region in the south-east of the State.

The Hedland, Karratha and Kalgoorlie Colleges provide courses mainly in the technical and further education sector. Currently the Colleges, together with regional colleges of TAFE, provide higher education courses under contract to Perth-based institutions. These colleges provide a focus for educational and cultural activities within their respective communities. In addition to academic subjects, the colleges also provide personal interest courses.

## HIGHER EDUCATION

### The Universities

**Edith Cowan University.** The University (formerly the Western Australian College of Advanced Education) was established on 1st January 1991 as a multi-campus institution with over 15,000 students and 160 programs of study. It is one of Australia's largest degree awarding institutions. Academic courses are offered at the Churchlands, Mount Lawley, Joondalup and Bunbury Campuses. The University's Claremont Campus is used for a variety of non-teaching purposes, including



North face, Joondalup Campus, Edith Cowan University

Photograph: Edith Cowan University.

conferences. The Western Australian Academy of Performing Arts is an academy of the University, and is located on the Mount Lawley Campus.

Along with some other universities in the State, the University's name perpetuates the memory of an outstanding Western Australian citizen. As the first woman of an Australian parliament, Edith Cowan, OBE (1861-1932), was concerned with many social issues including the advancement of women, nursing, education and law.

The University is vocationally orientated, providing multi-level courses to meet specific community needs for 30 per cent of the State's university students. The courses are flexible in approach to entry requirements, teaching methods, modes of study and design.

The academic profile of Edith Cowan University is broadly based with a wide array of undergraduate and postgraduate courses based on a structure of six Schools: the Arts and Applied Sciences, Business, Community and Language Studies, Education, Nursing, and the Performing Arts.

The University's study programs range through bachelor, graduate and postgraduate diplomas, masters, up to doctoral level to provide students with the degree of specialisation necessary for an increasingly demanding technological world. All courses are accredited and listed in the Register of Australian Tertiary Education.

School leavers are expected to meet normal admission requirements with a suitable tertiary entrance score or equivalent. Mature age applicants are invited to demonstrate their capacity for tertiary study in several ways, provided they are at least twenty years of age.

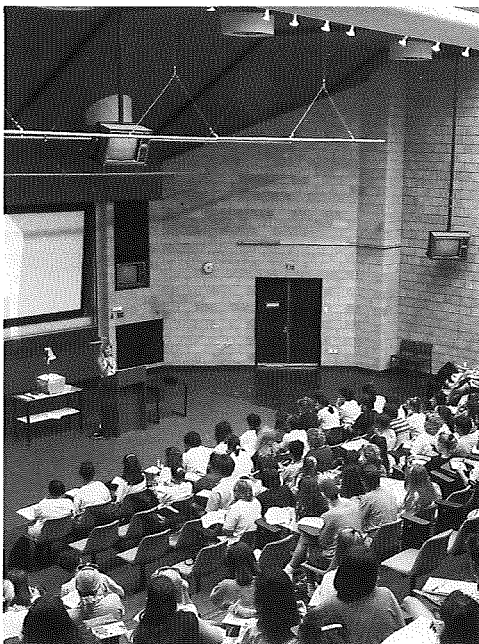
Women represent 62 per cent of the total student body, of which 40 per cent are enrolled in the School of Education.

Fifty-five per cent of students pursue full-time studies, while 33 per cent and 12 per cent study part-time and externally, respectively.

**TABLE 10.6 - EDITH COWAN UNIVERSITY - NUMBER OF COMPLETING STUDENTS, 1989**  
(Source: Western Australian Office of Higher Education)

	Higher Degree	Bachelors	Total(a)
Field of study—			
Arts	—	219	384
Business	—	336	442
Education	1	1014	1396
Health	—	86	248
Law	—	—	1
Science	—	46	127
<b>Total</b>	<b>1</b>	<b>1701</b>	<b>2598</b>

(a) Total includes Diplomas, Postgraduate diplomas etc.



Lecture Theatre 2, Churchlands Campus, Edith Cowan University.

Photograph: Edith Cowan University.

In 1989, Edith Cowan University attracted more mature age undergraduate students than any other tertiary institution in Australia. Over 3,000 mature age students entered the institution, nearly half of all mature age undergraduate students in Western Australia. This intake represented 60 per cent of the University's total undergraduate enrolment.

The University fosters strong links with the community by providing research and consultancy services, implementing training programs for industry and offering a broad variety of community courses. The Claremont Campus has become the focal point for these special activities.

Research has taken on an important role in the University's academic activities. The University affirms a commitment to the growth of staff and student research and development.



**TABLE 10.7 – EDITH COWAN UNIVERSITY – FINANCE (a)**  
(\$'000)

	1988	1989	1990
<b>INCOME</b>			
Commonwealth Government grants	54,027	59,922	
State Government grants	9,544	10,299	
Fees and charges	6,978	8,151	
Donations and bequests	n.a.	86	355
Investment income	4,050	4,388	
Trading income	1,374	1,948	
Other	1,084	1,695	
<b>Total</b>	<b>69,332</b>	<b>77,143</b>	<b>86,758</b>
<b>EXPENDITURE</b>			
Teaching and research	34,713	38,937	
Libraries	2,916	3,340	
Computing	168	193	
Other	n.a.	3,331	3,327
Student services	1,791	2,450	
Public services	2,961	3,788	
Administration and overheads	15,233	20,377	
<b>Total</b>	<b>60,083</b>	<b>61,113</b>	<b>72,412</b>

(a) Year ended 31 December.

Some 670 full fee-paying overseas students are enrolled, mainly from Malaysia, Singapore, Hong Kong, Indonesia, and the People's Republic of China. Thirty-one countries are represented by the students.

The University makes awards for postgraduate study to eligible students, including selected overseas students.

Provision is made for on-campus medical services, child care facilities, and student housing, all of which are being expanded progressively to meet growing demand.

Community education programs are provided by Edith Cowan University on a fee-paying basis for all ages.

*The Western Australian Academy of Performing Arts* enjoys a semi-autonomous brief within the University. Administratively, it is treated as a school of the University having access to its resources and facilities. The purpose of the Academy is to prepare persons who seek full-time professional employment in the performing arts.

The Academy is organized in two major divisions: the Western Australian Conservatorium of Music providing courses in classical music and jazz; and, the School of Dramatic Arts providing courses in arts management, dance, musical theatre, media performance, production and design, and theatre.

**The University of Western Australia (UWA).** The UWA was established in 1911 and teaching began in 1913. The University is located close to the city of Perth, adjacent to the Swan River.

The University has five residential colleges and a hall of residence for students, an art gallery, a museum of geology and a museum of anthropology. There are also five theatres, a music auditorium and Winthrop Hall which is used for arts attractions, mainly orchestral and choral works. These venues are used by arts practitioners from within and outside the University and are used particularly during the annual Festival of Perth.

As well as admitting students with a sufficiently high TES who satisfy individual faculty pre-requisites, entry may also be offered to an applicant who has satisfied the admission requirements of another university in Australia or of an overseas university in which there is a reasonable correspondence in admission requirements. Persons twenty years of age or older may be admitted without the necessary pre-requisites if they are able to demonstrate that there is a reasonable prospect of their being able to assimilate and benefit from their course.

**TABLE 10.8 – THE UNIVERSITY OF WESTERN AUSTRALIA – NUMBER OF COMPLETING STUDENTS, 1989**

(Source: Western Australian Office of Higher Education)

	Higher Degree	Bachelors	Total(a)
Field of study—			
Agriculture	32	30	67
Architecture	—	21	22
Arts	54	796	858
Business	63	329	394
Education	18	20	183
Engineering	20	119	142
Health	12	139	152
Law	6	249	255
Science	66	507	615
<b>Total</b>	<b>271</b>	<b>2210</b>	<b>2688</b>

(a) Total includes Diplomas, Postgraduate diplomas, etc.

The University offers bachelor, honours, masters and doctoral degrees. Bachelor degrees vary between three and six years duration, some requiring successful completion of the first year course of another faculty for admission and others the completion of a first degree course. Honours degrees generally entail an additional year of study. Masters and doctoral degrees are conferred in a number of disciplines and a postgraduate Diploma in Education is also available.

University Extension is responsible for community education activities, of which the annual Summer School, with its long tradition, is an important component.

The University makes awards of research studentships for postgraduate study to eligible students. Graduates may also apply for Hackett Studentships for overseas study. Some large private industrial concerns also make awards for study at postgraduate level.

Some \$23.7 million was expended on research activity in the University in 1989. This came from a number of sources including the Australian Government through the Commonwealth Department of Employment, Education and Training, which provided general support to departments; from a number of outside granting agencies which support individual projects; and from bequests and benefactions from members of the public.

**TABLE 10.9 - THE UNIVERSITY OF WESTERN AUSTRALIA - FINANCE (a)**  
(\$'000)

	1987	1988	1989
INCOME			
Commonwealth Government grants—			
Specific capital purposes (b)	1,902	2,611	528
Other	83,490	87,340	98,280
State Government grants	1,751	1,247	2,614
Donations and endowments	18,449	18,586	21,358
Other	10,183	15,734	28,606
<b>Total</b>	<b>115,775</b>	<b>125,518</b>	<b>151,386</b>
EXPENDITURE			
Teaching and research	74,458	80,856	90,523
Administration and general overheads	11,245	12,526	14,385
Libraries	6,310	6,862	8,831
Buildings, premises, grounds	10,109	13,259	18,080
Sundry auxiliary expenditure	4,703	4,980	7,840
<b>Total</b>	<b>106,825</b>	<b>118,483</b>	<b>139,659</b>

(a) Year ended 31 December. (b) Income received specifically for new buildings, major alterations and additions to buildings, installation of services, purchase of land and buildings and major equipment.

**Murdoch University.** Established in 1973, the University is situated some 13km from Perth, and comprises over 220 hectares.

Murdoch is one of the fastest growing of Western Australia's universities having doubled in size in the 5 years since 1985.

The gardens are a feature of the University and some 60,000 native trees, plants and wildflowers have been planted which attract many native birds. There is also a Chinese garden, the materials for which were donated by Chinese communities in Asia. Craftspeople from Taiwan visited Perth to assemble the garden.

On campus, accommodation is provided for 430 students. Student Village provides self-service accommodation with each student having a single study/bedroom. Groups of students share common kitchen, dining and lounge areas.

School leavers wishing to gain admission to Murdoch University are expected to meet normal admission requirements based on the TES or equivalent. Mature age applicants are invited to demonstrate their capacity for tertiary study in one of a number of ways which permit consideration of a range of educational, professional and employment backgrounds and allows each application to be considered on its merit.

The University admitted full fee-paying overseas students for the first time in 1987, with an intake

**TABLE 10.10 - MURDOCH UNIVERSITY - NUMBER OF COMPLETING STUDENTS, 1989**  
(Source: Western Australian Office of Higher Education)

	Higher Degree	Bachelors	Total(a)
Field of study—			
Agriculture	—	1	3
Arts	31	282	318
Business	7	175	187
Education	19	72	143
Engineering	—	9	12
Science	9	159	183
Veterinary Science	7	97	104
<b>Total</b>	<b>73</b>	<b>795</b>	<b>950</b>

(a) Total includes Diplomas, Postgraduate diplomas, etc.

of ninety-eight students. In 1990 there were 644 full fee-paying overseas students enrolled in several areas of study including commerce, computer science and communication studies. In addition, there were a number of exchange students from the USA studying under the Study Abroad Scheme. The University is an Australasian study centre for the New York based Centre for International Educational Exchange.

The University offers bachelor degrees, graduate and postgraduate diplomas, honours, masters and doctoral degrees. Bachelor degrees are between

three and five years duration; honours degrees, when available, require a further year of study. Special provision has been made for external students, and a substantial and innovative program of external studies has been developed.

Professional development programs are provided and the University has a very successful conference office.

Undergraduate and postgraduate scholarships are offered and private organisations also provide awards for postgraduate studies.

Various government authorities and private organisations provided \$5.5 million for basic and applied research during 1989. The University Company (Unico) is the 'corporate arm' of the University.

Substantial funding has been received from State Government sources to establish a Science and Technology Policy Institute.

Capital expenditure on building projects during 1989 was \$5.1 million of which \$1.6 million was provided by the Commonwealth Government and \$50,000 by the State Government.

**TABLE 10.11 – MURDOCH UNIVERSITY – FINANCE (a)**  
(\$'000)

	1987	1988	1989
<b>INCOME</b>			
Commonwealth Government grants—			
Specific capital purposes (b)	1,374	1,387	1,645
Other	33,499	35,637	40,482
State Government grants	627	1,398	1,612
Donations and endowments	297	811	1,560
Other	3,311	5,419	7,939
<b>Total</b>	<b>39,108</b>	<b>44,652</b>	<b>53,238</b>
<b>EXPENDITURE</b>			
Teaching and research	22,307	26,404	29,385
Administration and general overheads	5,121	6,079	7,148
Libraries	2,429	2,692	3,520
Buildings, premises, grounds	8,250	6,101	7,927
Sundry auxiliary expenditure	3,553	3,856	4,694
<b>Total</b>	<b>41,660</b>	<b>45,132</b>	<b>52,674</b>

(a) Year ended 31 December. (b) Income received specifically for new buildings, major alterations and additions to buildings, installation of services, purchase of land and buildings.

**Curtin University of Technology.** The main campus of the University is set on 112 hectares of landscaped parkland in the Perth suburb of

Bentley, 10 kilometres from the city centre. The Schools of Occupational Therapy, Physiotherapy and Podiatry are located in the Royal Perth (Rehabilitation) Hospital grounds at Shenton Park. Specialist campuses are located at the Muresk Institute of Agriculture in the Avon Valley near Northam and two campuses of the Western Australian School of Mines are at the gold mining centre of Kalgoorlie and at the coal mining town of Collie.

**TABLE 10.12 – CURTIN UNIVERSITY OF TECHNOLOGY - NUMBER OF COMPLETING STUDENTS, 1989**

(Source: Western Australian Office of Higher Education)

	Higher Degree	Bachelors	Total(a)
Field of study—			
Agriculture	—	35	49
Architecture	1	115	126
Arts	17	427	547
Business	46	459	659
Education	26	84	317
Engineering	7	206	232
Health	30	446	868
Science	11	154	217
<b>Total</b>	<b>138</b>	<b>1,926</b>	<b>3,015</b>

(a) Total includes Diplomas, Postgraduate diplomas, etc.

Curtin is concerned with technology and the range of ideas, operations and materials by which people apply knowledge to real situations. The University fosters close links with the local, national, and international community through its teaching programs and research and development activities.

Minimum entrance requirements for undergraduate courses are based on TES. Holders of other qualifications which are assessed as equivalent and who possess evidence of adequate literacy may be considered for selection. Mature age provisions allow for alternative assessment methods for applicants at least twenty years of age.

The University offers 193 courses at undergraduate and postgraduate levels leading to associate diploma, diploma, bachelor degree, graduate and postgraduate diploma, masters degree or doctoral qualifications. The courses vary in duration according to the level and may be undertaken as full-time or part-time studies. It is also possible to study some courses on an external (correspondence) basis.

**TABLE 10.13 - CURTIN UNIVERSITY OF TECHNOLOGY: FINANCE (a)**  
(\$'000)

	1987	1988	1989
INCOME			
Commonwealth Government grants—			
Specific capital purposes (b)	1,942	3,195	7,747
Other	64,256	73,063	81,855
State Government grants	8,144	4,122	4,422
Donations and endowments	1,236	2,872	1,157
Other	23,578	39,309	43,750
<b>Total</b>	<b>99,156</b>	<b>122,561</b>	<b>138,931</b>
EXPENDITURE			
Salaries and wages	50,717	56,975	65,169
Library	1,056	1,280	1,539
Buildings, grounds and equipment	11,556	15,705	28,024
Sundry auxiliary expenditure	32,897	42,851	45,887
<b>Total</b>	<b>96,226</b>	<b>116,811</b>	<b>140,619</b>

(a) Year ended 31 December. (b) Income received specifically for new buildings, major alterations and additions to buildings, installation of services, purchase of land and buildings and major equipment.

*Western Australian School of Mines.* The Western Australian School of Mines comprises the Departments of Mineral Exploration and Mining Geology; Minerals Engineering and Extractive Metallurgy; and Mining Engineering and Mine Surveying. Associate diploma, bachelor degree, postgraduate diploma and masters degree courses are offered.

The increasing emphasis on applied research and consultancy within the School led to the establishment of the Brodie-Hall Mining Research and Consultancy Centre in Kalgoorlie.

The Collie Federated School of Mines is also a campus of the Curtin University of Technology where the first year of the degree programs is being run as well as an Associate Diploma in Coal Mining Technology. The development of teaching and research facilities at Collie has consolidated the role of the School and expanded its base as a South-West Regional/Bentley Campus research centre.

*Muresk Institute of Agriculture.* Muresk Institute of Agriculture is situated near Northam. Muresk offers a range of courses which allows its graduates to fill almost any role in the rural industries.

The campus of some 1,800 hectares contains a cereal and sheep farm. Research facilities include laboratories, glass and tunnel houses and the Clyde Smith Rural Management Centre which houses the Rural Management Unit and its wide range of microcomputer hardware and software. Through this unit and with the establishment of the Farm Management Foundation of Australia (Inc.) on the campus, Muresk has expanded its applied research profile in the agricultural business field. This research concentrates on the development and application of new technologies in both broadacre and intensive farming systems and on assisting farmers to incorporate these developments into decision support systems.

Numerous short courses are held at Muresk, including in-service training schools for personnel of the Department of Agriculture and for field and service staff of agricultural firms.

**TABLE 10.14 - UNIVERSITY STAFF AND ENROLMENTS, APRIL 1990**  
(Source: Western Australian Office of Higher Education)

	Edith Cowan (a)	UWA	Murdoch	Curtin	Total
NUMBER OF STAFF					
Teaching—					
Full-time—					
Professor/Vice-chancellor (b)	1	66	23	32	122
Associate professor,	30	97	41	59	227
Senior lecturer	88	191	80	155	514
Lecturer	355	176	71	321	923
Assistant lecturer/tutor/demonstrator	45	83	58	96	282
Other	-	1	170	-	171
<b>Total</b>	<b>519</b>	<b>614</b>	<b>443</b>	<b>663</b>	<b>2,239</b>
Part-time—					
Professor	-	2	-	1	3
Associate professor	-	3	-	-	3
Senior lecturer	-	8	-	6	14
Lecturer	9	6	3	26	44
Assistant lecturer/tutor/demonstrator	3	10	12	13	38
Other	-	-	19	-	19
<b>Total</b>	<b>12</b>	<b>29</b>	<b>34</b>	<b>46</b>	<b>121</b>

TABLE 10.14 – UNIVERSITY STAFF AND ENROLMENTS, APRIL 1990 — *continued*  
(Source: Western Australian Office of Higher Education)

	<i>Edith Cowan (a)</i>	<i>UWA</i>	<i>Murdoch</i>	<i>Curtin</i>	<i>Total</i>
NUMBER OF STAFF (continued)					
Research staff—					
Full-time	4	310	80	35	429
Part-time	—	52	19	5	76
Other—					
Full-time	598	1,111	263	939	2,911
Part-time	103	152	26	97	378
<b>Total staff</b>	<b>1,236</b>	<b>2,268</b>	<b>865</b>	<b>1,785</b>	<b>6,154</b>
NUMBER OF STUDENTS					
Internal—					
Full-time	8,043	8,701	3,683	9,831	30,258
Part-time	4,806	2,084	1,204	5,851	13,945
External	1,792	30	1,336	1,160	4,318
<b>Total</b>	<b>14,641</b>	<b>10,815</b>	<b>6,223</b>	<b>16,842</b>	<b>48,521</b>
Males	5,612	5,647	2,909	8,203	22,371
Females	9,029	5,168	3,314	8,639	26,150

(a) Figures as shown relate to the Western Australian College of Advanced Education. (b) Includes Vice-chancellors, Deputy vice-chancellors, Principals and Professors.

### The Tertiary Institutions Service Centre (Incorporated)

The Tertiary Institutions Service Centre (Incorporated) processes applications for admission to the higher education institutions and carries out such other functions as agreed by the institutions.

Applicants seeking admission to a first year undergraduate course (or later years in the case of Curtin University of Technology, Murdoch University and the University of Western Australia) or to a Diploma in Education course apply through a joint system operated by the Centre. Applicants list four preferences from all the higher education courses available and offers are then made by the institutions for each course on the basis of a ranked order.

In January 1991 8,667 places were offered during the first round to 19,860 students who had applied to study at University. In 1990 8,690 places were offered to 18,145 applicants.

### The Higher Education Contribution Scheme

From 1989, the Commonwealth Government introduced the Higher Education Contribution Scheme for students enrolled at higher education institutions.

In 1990 students were liable for an annual course charge of \$1,882 for each year of equivalent full-time study that they undertake. They are able to pay this charge through tax instalment deductions or as a payment in advance with a 15 per cent discount. No payment is required until personal annual income reaches \$23,583 at which time payment commences at the rate of 1 per cent of taxable income. For annual incomes of \$26,799 to \$37,518 the rate is 2 per cent and for those of \$37,519 and over, it is 3 per cent.

### COMMONWEALTH GOVERNMENT ASSISTANCE FOR EDUCATION

The State Government has the major responsibility for education, including the administration and substantial funding of primary, secondary and technical and further education in Western Australia. The Commonwealth Government provides supplementary finance to the State and is responsible for the total funding of the four universities. The Commonwealth also has special responsibility for Aboriginal people and for migrants, as well as the power to provide assistance for students.

The National Board of Employment, Education and Training was established in 1988, one function being the provision of advice and information on education to the Commonwealth Government.

**TABLE 10.15 – COMMONWEALTH GOVERNMENT ASSISTANCE FOR EDUCATION: WESTERN AUSTRALIA (\$'000)**

(Source: Commonwealth Budget Paper Number 4)

<i>Nature of assistance</i>	1988-89	1989-90
Assistance of a revenue nature—		
Higher education	r206,242	220,737
Technical and further education	11,642	11,858
Government schools	60,451	69,609
Non-government schools	80,574	94,316
Joint school programs	3,464	4,517
National Policy on Languages	780	690
Aboriginal advancement	2,749	2,782
<i>Total</i>	<i>r364,902</i>	<i>404,509</i>
Assistance of a capital nature—		
Higher education	13,704	19,434
Technical and further education	14,617	15,414
Government schools	17,860	17,819
Non-government schools	5,419	4,132
Aboriginal education	—	1,103
<i>Total</i>	<i>51,600</i>	<i>57,902</i>
<b>Total</b>	<b>r417,502</b>	<b>462,411</b>

### Financial assistance for students

**Assistance for Isolated Children Scheme.** This scheme assists families whose homes are too remote for normal daily access to government schools. It provides allowances for eligible students living away from home to attend school, for students studying by correspondence or when a second home is maintained for student occupation. The scheme also covers children regarded as isolated owing to medical disability.

**AUSTUDY.** In 1987 AUSTUDY replaced the Tertiary Education Assistance Scheme, Adult Secondary Education Allowance Scheme, and the Secondary Allowances Scheme as the main scheme for community-wide student assistance.

Subject to eligibility criteria, AUSTUDY provides support for full-time students 16 years of age and older studying secondary, technical and further education, undergraduate and some postgraduate courses at universities and colleges of advanced education. Higher degree students, who are eligible for postgraduate awards do not qualify for AUSTUDY.

**TABLE 10.16 – AUSTUDY: WEEKLY RATES OF BENEFIT: JANUARY 1991**

	\$
Student living at home—	
Secondary and tertiary—	
16-17 years of age	62.05
18 years of age and over	74.55
Student not living at home or independent (a)—	
16-17 years of age	102.40
18 years of age and over	113.25

(a) Not available for secondary students under the age of 19.

**Postgraduate Award Scheme.** This scheme provides awards to selected higher degree students undertaking masters and doctor of philosophy programs at Australian universities and colleges of advanced education. They are made on academic merit, are taxable and, although not income-tested, are not available if a certain level of income is received from other awards.

### EXPENDITURE ON EDUCATION BY STATE AND LOCAL AUTHORITIES

#### Financial Assistance for Schools and Students

The State Government provides financial aid to non-government schools by means of a direct annual grant for each student enrolled. The grant incorporates a needs component and separate rates are applicable to pre-primary, primary and secondary students.

Assistance is also given to non-government schools by way of low interest loans and interest subsidies on moneys borrowed to help meet expenditure on new residential accommodation, classrooms and associated facilities and school site acquisition. The scheme also applies to the provision of teacher accommodation north of the Twenty-Sixth Parallel.

The State Government provides an allowance to parents eligible for the family allowance of \$50 for each primary pupil and \$100 for each secondary student to assist in meeting education costs.

**TABLE 10.17 - STATE AND LOCAL GOVERNMENT AUTHORITIES (a) - OUTLAY ON EDUCATION (b) (\$m)**

	1986-87	1987-88
Pre-school education and education not definable by level—		
Current	46.5	51.5
Capital	—	0.5
Primary and secondary education—		
Current	665.6	696.3
Capital	64.5	57.9
Tertiary education—		
Technical and further education—		
Current	r117.4	117.1
Capital	26.5	27.9
University education		
Current	98.0r	109.5
Capital	46.4	-11.2
Other higher education		
Current	88.0	83.9
Capital	19.9	23.9
Education n.e.c. (c)—		
Current	17.5	27.6
Capital	-0.8	-1.1
Transportation of students—		
Current	29.2	31.5
<b>Total</b>	<b>r1,218.7</b>	<b>1,215.3</b>
Current	r1,062.2	1,117.4
Capital	156.5	97.9

(a) State authorities comprise State Government departments and instrumentalities. Local authorities refer to municipal governments set up under local government legislation. (b) Includes expenditure from Commonwealth Government grants for education. (c) Includes special education and education not definable by level.

A 'boarding away from home' allowance, to supplement the isolated children's allowance paid by the Commonwealth Government is also provided. An allowance of \$500 per annum is paid to an isolated child who is obliged to live away from home to attend school.

The State Government Additional Assistance and Clothing Assistance Schemes are also available to needy parents who have children in Years 8 to 12 aged under 16. These schemes aim to assist families on low incomes to meet the costs of books, materials and clothing.

#### REFERENCE

#### ABS Publications

*Schools, Australia* (4221.0)

## Chapter 11

# CULTURE, TOURISM AND RECREATION

## Culture

The Perth Cultural Centre, located in Northbridge close to central Perth, provides a focus for the arts and culture. Its heart is a large paved plaza with an amphitheatre for outdoor performances. Around the perimeter are housed the Library and Information Service of Western Australia in the Alexander Library, the Western Australian Museum, the Art Gallery of Western Australia and the Perth Institute of Contemporary Art.

Around the Perth Cultural Centre are a number of arts resource organisations, including the National Exhibitions Touring Structure, responsible for taking small exhibitions to Western Australian country centres; Artemis Women's Art Forum; the Australian Association of Dance Education; Evos Music, exponents of contemporary music; and the Australian and Regions Artists' Exchange, a body established to enable dialogue and exchange between artists from Australia and the Pacific region. Artists' studios are also located in and near the Centre. The Forrest Chase development links the Cultural Centre with the city.

The last few years have seen the development of regional arts facilities and there is a steady flow of country touring activity by professional companies.

### DEPARTMENT FOR THE ARTS

The Western Australian Department for the Arts was established to advance the cultural development of Western Australia. The arts portfolio includes the Western Australian Film Council and the statutory authorities of the Western Australian Museum, the Art Gallery of Western Australia, the Library and Information Service of Western Australia (LISWA) and the Perth Theatre Trust. The Department for the Arts also includes the State Censorship Office.

Central to the role of the Department is support for the range of arts organisations and creative cultural practices that enrich the lives of Western Australians.

Major funded performing arts organisations include the Western Australian Theatre Company,

Hole in the Wall Theatre, Deckchair and Swy Theatres, Spare Parts Theatre, the Western Australian Opera Company, Youth Orchestra and Ethnic Music Centre, the West Australian Ballet and 2 Dance Plus.

The Department also administers financial support to individuals and agencies as recommended by peer group assessment panels in each artform. Financial assistance is considered for projects of a developmental nature. Fremantle Arts Centre and its Press receive support as does the Perth Institute of Contemporary Art. Artists are assisted and nurtured through a Creative Development Fund, arts traineeships and study exchanges.

Specific art forms are serviced by the Arts Development Officers in each field: literature; visual arts; music; dance; theatre; film; Aboriginal arts; community arts and multicultural arts. The



potential of country areas is also of special concern, and three strands of research, the WA Touring Arts Review, the Country Arts Development Committee Report and the Community Arts in Rural Areas of WA Review have resulted in the development of a Regional Arts Plan.

Other areas currently receiving attention include cultural tourism, international cultural development, public art, corporate sponsorship for the Arts, housing the Arts and women and the Arts.

**TABLE 11.1 - DEPARTMENT FOR THE ARTS  
GRANTS TO ARTS AGENCIES (a)  
1989-90  
(\$'000)**

	<i>Base grants</i>	<i>Special purpose grants</i>	<i>Equipment grants</i>	<i>Total</i>
Aboriginal arts	50.0	-	-	50.0
Community arts	42.8	-	-	42.8
Dance	738.6	20.0	-	758.6
Film and television	234.0	-	30.0	264.0
Literature	193.5	-	-	193.5
Multi-art forms	1182.0	42.5	30.0	1,254.5
Music	1,989.5	-	1.5	1,991.0
Theatre	1,540.0	27.5	13.7	1,581.2
Visual arts and crafts	842.2	16.4	-	858.6
<b>Total</b>	<b>6,812.6</b>	<b>106.4</b>	<b>75.2</b>	<b>6,994.2</b>

(a) In 1989-90, additional financial assistance of \$2.9 million was provided for peer panels, the Creative Development Fund, the Regional Arts Panel, conferences and seminars, Discretionary Grants and minor capital works.

### THE LIBRARY BOARD OF WESTERN AUSTRALIA

The Library Board of Western Australia is constituted to advise the Minister and local authorities on matters of general policy relating to libraries and to administer the funds made available by Parliament for The Library and Information Service of Western Australia (LISWA).

Funding is used to provide fully processed bookstock to all Western Australian public libraries and to resource the Reference and Information Service housed within the Alexander Library Building.

LISWA comprises five Directorates: Collection Management; Corporate Services; Public Libraries and Lending Services; Reference and Information Services and the State Archives. These directorates are coordinated by the Chief Executive Officer and State Librarian to provide an integrated and

comprehensive library and information service throughout the State. Each directorate delivers a specific program to the people of Western Australia.

**TABLE 11.2 - THE LIBRARY BOARD OF WESTERN  
AUSTRALIA : 1989-90**

	<i>Unit</i>	
CRF Allocation	\$	22,315,327
Staff (a) (b)	Number	270
Associated public libraries	"	224
Books—		
Total circulation stock (a)	"	2,156,631
Received and dispatched in the exchange program with local libraries	"	853,164
Inter-library requests received	"	124,394
Visitors to reference libraries	"	774,365

(a) At 30 June. (b) Number of full-time staff plus full-time equivalent units of part-time staff.

### Collection Management

The Collection Management Directorate provides the program of services for supporting and maintaining all collections within the organisation. The Branches are Acquisitions, Cataloguing, Information Technology and Preservation Services.

### Corporate Services

The Corporate Services Directorate consists of four administration branches. These are Finance, Human Resources, Publications and Display, and Building Services. The main objective of the Directorate is to provide centralised administrative and support services to the organisation.

### Reference and Information Services

The Reference and Information Services Program offers reference and information services from the Alexander Library Building through five branches. These are the Humanities and Social Sciences Branch; Infolink Government and Community Information; J S Battye Library of Western Australian History; State Music Library and the Science, Technology and Commerce Branch. The objective of the Program is to provide responsive reference and information services to the people of the State. The J S Battye Library of Western Australian History has a mandate to seek out, acquire and make available local materials for research covering printed records, film archives

and oral history. Infolink has responsibility for providing community and State Government information services to the public. The State Music Library provides a cassette and musical scores lending service to the general public in addition to its reference and information services.

### Public Libraries and Lending Services

Public libraries in Western Australia are managed as a cooperative venture between the Library Board of Western Australia and the 139 local government authorities throughout the State. The Public Libraries and Lending Service Program provides to public libraries fully processed bookstock and other resource materials and professional consultancy services. It also provides a centralised inter-library loans system available not only to public libraries but all government, private and academic library services within the State. The State Film and Video Library provides a free film and video lending service to groups and organisations throughout Western Australia.

### The State Archives

Under legislation passed in 1974 the Board has responsibility for the control and custody of all State archives. These include the records of the State Government, local authorities and all other bodies established under statute. When records cease to be in current use they become the responsibility of the Board and their destruction is prohibited without the approval of the Board.

In 1990 a new branch, the Records Management Branch, was created to enable the Archives to focus on the creation, maintenance and archiving of government records.

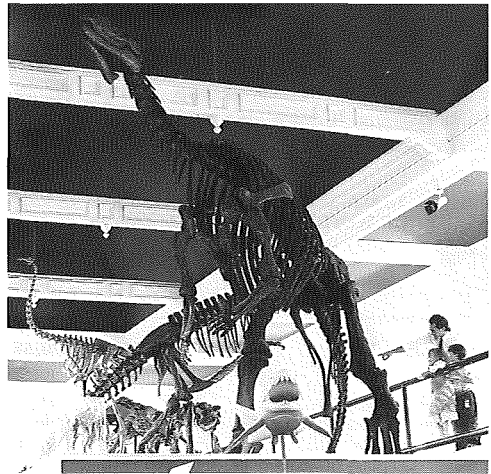
### THE WESTERN AUSTRALIAN MUSEUM

The Western Australian Museum has its headquarters and principal display galleries in Perth, in the heart of the Cultural Centre. It has branches in Fremantle (Fremantle Museum, Western Australian Maritime Museum, Samson House and Sails of the Century); Albany (Albany Residency Museum); Geraldton (Geraldton Museum); and Kalgoorlie (Museum of the Goldfields). The Museum has special responsibilities for Aboriginal material including sites, for historic shipwrecks and for meteorites. The Director also has delegated powers for wrecks and material under Commonwealth control.

The Museum is a vital resource centre, its collections and displays reflecting the research and

fieldwork constantly being undertaken by its curatorial staff. Emphasis in both display and research is on natural sciences and human studies, past and present, and on the State's rich culture and colourful maritime history.

The Trustees of the Museum are empowered to assist in establishing and maintaining local museums. The Museum is able to assist such museums with expertise, advice on the maintenance of collections, conservation and restoration, design and display, and by providing objects for display in recognised museums. At present eighteen local museums are recognised under the Museum Act. The Museum plays an important role in the sphere of education from primary schools to tertiary institutions and the community in general. This is achieved through a variety of activities and endeavours including school visits, organised holiday activities (in the Museum and its branches) and lectures by scientific staff in tertiary institutions and public venues.



The popular Diamonds to Dinosaurs Gallery in the Western Australian Museum which celebrates its centenary in 1991. The Museum's Dinosaur Club has thousands of members across Australia and it is hoped that subscriptions will help finance the completion of the gallery

Photograph: Western Australian Museum.

The Museum is often called upon to act in an advisory capacity to government departments. Senior staff serve on government committees dedicated to the protection of heritage, the environment and wildlife. The Museum is assisted in certain fields by Honorary Associates, some of whom serve on advisory committees appointed by the Trustees, and by education volunteers.

**TABLE 11.3 - THE WESTERN AUSTRALIAN MUSEUM: 1989-90**

	<i>Unit</i>	
Expenditure(a)	\$	8,592,332
Staff (b)	Number	229
Days spent on field work	"	3,293
Public attendance—		
Western Australian Museum Perth	"	244,314
Fremantle Museum	"	46,671
Western Australian Maritime Museum	"	90,715
Samson House	"	3,080
Sails of the Century	"	38,980
Albany Residency Museum	"	90,901
Geraldton Museum	"	30,859
Museum of the Goldfields, Kalgoorlie	"	75,097
<b>Total public attendance</b>	<b>"</b>	<b>620,617</b>

(a) Excludes capital works. (b) At 30 June 1990.

### THE ART GALLERY OF WESTERN AUSTRALIA

The Art Gallery of Western Australia incorporates seven major galleries, an auditorium, conservation laboratories, a prints and drawings study room, a restaurant and a bookshop. The Gallery Administration Centre, incorporates a library, a theatre and the Art Gallery Society rooms.

**TABLE 11.4 - THE ART GALLERY OF WESTERN AUSTRALIA: 1989-90**

	<i>Unit</i>	
Expenditure	\$	5,136,974
Staff (a)	Number	84
Exhibits for display (a)	"	12,238
Exhibitions for year	"	27
Visitor attendances	"	281,316

(a) At 30 June.

As well as exhibiting works from the permanent collection, activities of the Gallery involve the presentation of important exhibitions from overseas, lectures and exhibitions by visiting artists, and an artist-in-residence program. In 1989-90 the Gallery achieved a program of exhibitions which toured internationally and nationally. All of these exhibitions focused on aspects of contemporary art practice and many of them contained works of art owned by the Gallery.

The gallery was honoured to accept the role of organising gallery for the exhibition to officially

represent Australia at the 44th *Venice Biennale*. The work of two Aboriginal artists, Rover Thomas (Western Australian) and Trevor Nicholls, was presented in the Australian Pavilion.

Two other exhibitions, initiated by the Gallery, were *Romance and Irony in Recent American Art* and the *First Perth International Crafts Triennial*. The *Brian Blanchflower* exhibition continued the program of exhibitions by Western Australian artists.

The Gallery's collection includes both Australian and international art, and is divided into four curatorial departments: Aboriginal and Asian; Craft; Painting and Sculpture; and Prints and Drawings.

Current acquisition policy concentrates on contemporary and Aboriginal art. A highly selective international component, representing artistic pinnacles and the evolution of style since 1960, is included. It incorporates significant pieces from other regional cultures, especially Latin America and South-East Asia. The Australian component reviews in depth outstanding artists illustrating the evolution of certain key artists and providing a systematic view of artistic developments over the past three decades. The most intensive focus is on the art of Western Australia.

The Art Gallery has over fifty volunteer guides who maintain a regular program of guided tours to the public. Their aim is to enrich personal experience and public awareness of the collection and exhibition program.

The Art Gallery Society supports the Gallery through functions organised both within the Gallery and at other venues. Donations from their fund raising efforts make possible the acquisition of many important art works which otherwise may not have been obtained.

#### Geraldton Regional Art Gallery

The Geraldton Regional Art Gallery opened in August 1984 in the former Town Hall building. In 1989-90, the Gallery organised 29 exhibitions, four of which showed Aboriginal art. The highlights were the *Contemporary Aboriginal Art* exhibition, the *Geraldton-Greenough Rotary Awards, Urban Experience* (a section of the *Perth International Crafts Triennial*) and *Send Me More Paint*.

Attendance for the year 1989-90 was 21,814.

### Bunbury Regional Art Gallery

In February 1987, the Bunbury Regional Art Gallery opened as part of the launching of the Bunbury Arts Complex. The Gallery is housed in the historic former Convent of Mercy.

The Gallery consists of an upper gallery which was formerly the chapel and the lower gallery, previously the sisters' sleeping quarters. The lower gallery leads through an open foyer area to the City of Bunbury Art Gallery (distinct from the Bunbury Regional Art Gallery).

During 1989-90 there were twenty-two exhibitions presented. The major exhibition in this period was the *South West Survey* sponsored by the Commonwealth Bank, the South West Development Authority and the South West Times. As in previous years, the project was well supported by local artists and attracted over 4,000 visitors.

Other major exhibitions were the *Miriam Stannage* exhibition, the Bunbury Society of Artists and an exhibition of paintings from the City of Bunbury Permanent Collection.

Attendances for the year were 16,447.

### THE ABORIGINAL ARTS COMMITTEE

The existence and operation of the Aboriginal Arts Committee and its art form Panels is based on indigenous people of Australia determining the future of their own cultural heritage. The Committees' responsibility is to provide support to promote and develop activities.

This involves traditional cultural practices and their associated art forms, the representations and preservation of Aboriginal and Torres Strait Islander culture generally, and the generation of new forms of artistic expression among Aboriginal and Torres Strait Islander peoples in urban and country areas.

The Committee aims to promote awareness of the dynamic culture of these indigenous peoples within their own communities and amongst the wider community throughout Australia.

The Aboriginal Arts Committee awarded 44 grants totalling \$704,148 for arts programs in Western Australia during 1989-90. This compares with 88 grants totalling \$1,447,869 awarded for Western Australian Aboriginal arts projects in 1988-89.

## Science

### PERTH OBSERVATORY

The Perth Observatory, previously a research institution with limited public access, has now changed focus to more readily cater for the public. Emphasis is also being placed on the needs of schools.

The Education Program includes night tours, the demand for which has resulted in the tours being booked out at least six months in advance. A Sunday afternoon tour is also popular. Other daytime tours for school groups are usually booked for the week of the full moon, when Observatory staff are not engaged in observing programs. Participants see astronomical objects at first hand through Observatory telescopes.

In addition to 'on site' tours, the acquisition of two portable 20 cm telescopes has enabled Observatory staff to conduct field nights at remote locations. Typical interested groups include

primary and high schools, as well as service organisations.

An annual *Astronomical Handbook* is produced, and a new Museum display gives an insight into past and present astronomy.

On the scientific side of astronomy, collaboration has continued with overseas organisations in cooperative observing programs.

A joint initiative with the local universities has seen the formation of the Perth Astronomical Research Group. The primary objective of this group has been the establishment of a fully automated telescope equipped with a Charge Coupled Device camera.

The Observatory has four telescopes operational on site. These include the 61 cm Lowell-Perth reflector, the 33 cm Astrographic Refractor, the University of Western Australia 45 cm reflector, and a 35 cm Celestron reflector. The Celestron has

been used mainly as a 'visitors' telescope, and several amateur astronomers have undertaken 'deep sky' photography programs.

### CHEMISTRY CENTRE, WESTERN AUSTRALIA

The Chemistry Centre (WA), formerly the Government Chemical Laboratories, is a division of the Department of Mines and provides a wide range of scientific, analytical and consultancy services to government, industry and the general public. The Centre assists in mineral processing, soil and fertiliser analysis, agricultural trials, water quality assessment, food nutritional quality evaluation, forensic science, environmental monitoring, chemical aspects of occupational and physical environments, and materials testing. It undertakes research and development in all these areas.

TABLE 11.5 - CHEMISTRY CENTRE (WA) : 1989-90

	<i>Staff Numbers</i>
Laboratory—	
Agricultural chemistry	26
Environmental chemistry	20
Forensic science	17
Health chemistry	12
Kalgoorlie metallurgical	8
Materials science	7
Mineral processing	16
Mineral science	23
Racing chemistry	5
Administration	19
<b>Total</b>	<b>153</b>

### COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATION

The Commonwealth Scientific and Industrial Research Organization (CSIRO), the largest scientific research organisation in Australia, is a statutory body employing some 7,000 staff in more than 100 laboratories and field stations throughout Australia. Several laboratories and field stations employing around three hundred staff operate in Western Australia.

The work of the CSIRO is carried out within six institutes: Information and Communications Technologies; Industrial Technologies; Minerals, Energy and Construction; Animal Production and Processing; Plant Production and Processing; and

Natural Resources and Environment. Each institute consists of several divisions. Of these divisions, two, Water Resources and Exploration Geoscience, have their headquarters in Perth. Divisional groups from Forestry and Forest Products, Entomology, Animal Production, and Plant Industry and Soils, are represented in the Laboratory for Rural Research (Perth). Other divisions established in Western Australia include Fisheries and Oceanography in the Marine Laboratories (Marmion), Food Processing, Geomechanics, Mathematics and Statistics, Mineral Products, Wildlife and Ecology, and Building, Construction and Engineering.

CSIRO maintains strong links with tertiary institutions, industry and the community to ensure that its research effort is targeted to national needs. Advisory committees make a significant contribution to divisional operations. Further industry input is obtained by the appointment of individuals to Sector Advisory Committees.

### BOTANIC GARDEN

The Western Australian Botanic Garden is in Kings Park (see following section *Public Parks and Reserves*). It specialises in the display of the State's native flora, in particular, that of the South-West. Much of the indigenous flora occurs naturally only in this region. Many species are spectacularly beautiful and some are curiously adapted to the harsh environmental conditions. Seed and other materials have been collected from the wild and the propagation of these plants investigated to bring them into cultivation and maintain the garden collections of over 2,000 species native in this State. Nearly 1,000 more are in nursery, glasshouse and other living collections or stages of introduction into cultivation.

Also growing in Kings Park and the Botanic Garden are about 1,500 species from other parts of the world, especially those which share with Perth a Mediterranean climate—cool, moist winters alternating with hot, dry summers.

The main Botanic Garden occupies more than twenty hectares, of which nearly seventeen hectares are devoted to Western Australian flora, and about one hectare each to plants from California, South Africa and the Mediterranean basin.

More than fourteen hectares are planted with native trees in an arboretum. There are other smaller collections embellishing particular features

such as a bed planted with native species suitable for Perth suburban gardens at the Hale Recreation Area, where there is also a sensory trail of trees having contrasting scents, textures, colours and growth habits. Aromatic herbs and shrubs have been planted in a raised bed in the Ivey Watson Playground.

The display glasshouses extend the range of plants exhibited with species unsuited to growing in the open ground. These include some species from the drier inland parts of the Pilbara and Kimberley regions of the State, salt bushes and other succulents. Plants requiring humid conditions, such as carnivorous plants and ferns, are kept in separate sections of the display glasshouse complex. A collection of cycads surrounds a pool with aquatics in the central courtyard. Nearby

there is a garden planted with rare and endangered species.

There is active scientific research by the botanical and horticultural staff into the biology, propagation and cultivation of the native flora, especially species threatened with extinction. Surplus seed and tissue cultures are distributed to botanical institutions throughout the world. Public interest in, and motivation towards, the conservation of the flora are fostered through advice on the growing of native plants, educational and interpretative programs. These and many other aspects are put on show during the annual spring Wildflower Festival, which is a major tourist attraction, as are Kings Park and the Botanic Garden throughout the year.

## Recreation

### PARKS AND RESERVES

Land and water may be reserved for a variety of purposes servicing the public interest.

Some Crown land is reserved for public recreation and amusement, national parks, marine parks, other public parks and nature reserves specifically for the conservation of flora and fauna. Such reserves are often placed under the control of statutory bodies, some of which are dealt with in this section.

#### Department of Conservation and Land Management

The Department of Conservation and Land Management manages public lands, waters and wildlife for the benefit of present and future generations of Western Australians. National parks management encourages public enjoyment of the natural attributes of these lands, meeting the diverse needs of the community, but in a manner that does not compromise conservation objectives.

National parks and marine parks are vested with the National Parks and Nature Conservation Authority, a statutory body responsible to the Minister for Conservation and Land Management. A majority of the Authority's members represent community interests.

The State's 4.9 million hectares of national parks contain picturesque landscapes ideally suited to more passive nature-based activities such as

sightseeing, photography, bushwalking, nature study, picnicking and camping in designated areas. This system of fifty-nine national parks is complemented by almost two million hectares of State forest, which offers opportunities for picnicking, camping, backpacking, canoeing, fishing, marroning, orienteering and other pursuits. Within certain specified areas, other activities including horse and trail bike riding are permitted, subject to certain management controls.

Nature reserves are for the purposes of wildlife and landscape conservation, scientific study and protection of features of archaeological, historic or scientific interest. Wildlife may not be commercially exploited, and no recreation which damages natural ecosystems is allowed. At 30 June 1990, there were 10.4 million hectares of nature reserves.

TABLE 11.6 - DEPARTMENT OF CONSERVATION  
AND LAND MANAGEMENT  
TERRESTRIAL ESTATE : 30 JUNE 1990

	<i>Hectares</i>
Nature reserves	10,425,883
National parks	4,854,571
State forests	1,750,357
Marine parks	263,485
Conservation recreation reserves	188,928
Timber reserves	144,399
Freehold	32,518
Sandalwood reserve	320,957
<b>Total</b>	<b>18,113,098</b>

Marine Parks are managed for marine conservation and recreation, with areas zoned for commercial fishing on a sustained yield basis. There are six marine parks in Western Australia; Hamelin Marine Reserve in Shark Bay has been set aside for environmental and scientific study, Marmion (off Perth), Ningaloo (off Exmouth), Rowley Shoals (north-west of Broome), Shoalwater Islands (south of Perth), Swan Estuary (Perth). The area of marine parks and reserves at 30 June 1990 was some 395,485 hectares.

Extensive limestone caves are features at several places in the South-West part of the State as well as in the Kimberley and the Nullabor Plain. Some between Cape Naturaliste and Cape Leeuwin, and at Yanchep, have been developed for public inspection, and areas of the surrounding land have been reserved within Leeuwin-Naturaliste National Park, adjacent areas at Yallingup, Margaret River and Augusta, and within Yanchep National Park.

The total Department of Conservation and Land Management terrestrial estate constitutes 7.2 per cent of the land area of Western Australia.

**Cape Range National Park** on the Western Australian North West Cape and the adjacent

Ningaloo Marine Park that extends for 260 kms along a barrier reef exemplify the modern management of conservation reserves in Western Australia. Management plans involving public participation have been produced for both parks, a visitors guide, park notes and the park guide booklet 'Range to Reef' have been produced to assist visitors appreciation, understanding of park values and sites developed to facilitate recreational opportunities. The Milyering Visitors Centre interprets the park and provides a plan for further learning about the natural environment and its management for wildlife and people.

### Kings Park

The Kings Park Board administers an area of approximately 400 hectares close to the centre of Perth. There are several scenic vantage points on Mount Eliza overlooking the city and Swan River with views to the Darling Scarp. The original purpose when development began in 1895 was to provide for public recreation, health and enjoyment. This is still catered for by drives, dual use paths, grassed walks, formal gardens, picnic lawns and barbecue facilities, and playgrounds of various types. Subsequently other roles have been added.



Young cyclists from Subiaco Primary School celebrated Children's Week by participation in the opening of the Children's Bicycle Training Track at the Hale Recreation Area, Kings Park. The track was a joint project of Bikewest, Kings Park Board, Main Roads Department of Western Australia, Road Surfaces Pty Ltd and Thornlie TAFE College.

Photograph: Main Roads Department of Western Australia

The State War Memorial, the Pioneer Women's Memorial, avenues of dedicated trees and many other features commemorating the service and sacrifice of Western Australians in peace and war have been placed here making Kings Park the State's principal shrine. There are also several historic sites in Kings Park, visited by early explorers or used by the pioneer settlers and the Aborigines before them.

The decision in 1959, implemented three years later, to create the Western Australian Botanic Garden in Kings Park has led to the display in gardens and glasshouses of 2,000-3,000 species of native flora, and the undertaking of research into its biology, conservation and propagation, especially that of rare and endangered plants. About two-thirds of Kings Park is still native bushland, scarred in places by the extraction of timber, firewood and kindling by the early settlers, subsequent weed invasion and too frequent bushfires. Nevertheless the resilience of the indigenous vegetation and active rehabilitation programs have combined to make Kings Park a remnant nature reserve unique in its proximity to a capital city.

The Kings Park Guides are volunteers who give their time to operate an information centre and to lead walks through Kings Park and the Botanic Garden to share its many interesting aspects with tourists and other visitors.

### **Perth Zoological Gardens**

In South Perth, close to the Swan River, 18 hectares are set aside for the Perth Zoo. Set in landscaped gardens, and boasting a most comprehensive display of rare palms, the Zoo is a popular tourist attraction having the highest visitation rate per capita of any zoo in Australia.

Perth Zoo cares for the State's largest and most complete collection of Australian animals, as well as an extensive collection of exotic species. Perth Zoo cares for nearly 1,500 animals; 503 specimens in 38 families of mammals; 759 specimens in 47 families of birds; 184 specimens in 11 families of reptiles and a further 43 specimens of amphibians, fish and molluscs.

The Zoo is administered by the Zoological Gardens Board and is recognised internationally as a successful haven for many endangered species. It has adopted the fundamental objective of 'contributing to the development of positive attitudes towards wildlife and the conservation of

community life on earth'. Recent and future developments have all been designed with this in mind, and conservation education in Western Australia.

The rehousing of animals in naturalistic enclosures, the building of an educational complex (the Bicentennial Education Centre) and the recent addition of two new attractions (the Conservation Discovery Centre and Microworld), all underline the Zoo's primary conservation role. These new attractions use electronic devices and 'state of the art' technology to provide learning experiences quite different from those traditionally associated with zoos.

During 1991 a new East African exhibit will open. Described as the best and most advanced of its kind in the world, this exhibit will give visitors the experience of walking through an African savannah surrounded by free ranging animals.

Also opened recently was harmony farm. A working Western Australian farm, it is designed as an example of sustainable living. Complementing the existing Australian wildlife park with its koala and kangaroo exhibits, harmony farm provides opportunities for animal contact and education on energy conservation.

Other principal attractions are the nocturnal house, otter and bear enclosures, lemur and gibbon islands, the water bird lakes, shady picnic areas and the new numbat enclosure which is the only place in the world where numbats, the Western Australian mammal emblem, can be seen on display.

Perth Zoo opens to the public every day of the year. During the year ended 30 June 1990, some 511,612 visitors took advantage of this opportunity. The Zoo has a permanent staff of ninety. A further hundred and twenty trained volunteers, called Docents, liaise with the public and provide guided tours on request.

### **Rottneest Island**

The Rottneest Island Authority administers, as a tourist and holiday resort, a reserve of 1,930 hectares comprising almost the whole of Rottneest Island, which is situated about eighteen kilometres west of Fremantle.

During the year ended 30 June 1990, 250,954 persons visited the Island by the daily commercial air and sea transport services.



### LOCAL GOVERNMENT RESERVES

Many local authorities hold land for recreational purposes, the areas having been either Crown land vested in the Council, acquired by purchase, or received under private bequest. Included in these local government reserves are areas required to be surrendered to the Crown by private owners to provide recreation areas where land is divided into private residential lots. The reserves are frequently developed as public parks or to provide facilities for sports or camping.

### MINISTRY OF SPORT AND RECREATION

The Ministry's main aim is to improve the well-being of all West Australians through sport and recreation.

Throughout the State, it works closely with sporting and community organisations and the three tiers of government to increase participation and performance in sport, community fitness and health.

The Ministry, which is responsible to the Minister for Sport and Recreation, has four specialist divisions.

**Sport.** The Ministry assists State sporting associations through funding, management support, research, information-sharing and consultancy, facility planning, coach education and talent identification/development.

Specialist programs have been established by the Ministry in the junior and Aboriginal sport areas.

**Recreation.** The Ministry provides a wide range of recreational opportunities and actively encourages community-based recreation groups.

The main objectives in this area are to improve community fitness and quality of life.

Many programs have been designed to attract those people for whom sporting activities are not always readily available, particularly older adults. Special attention is also given to the recreational needs of women.

Another key initiative in the recreation area is the development of the Ministry's wellness program. This is an important program in achieving health enhancement.

**Regional Services.** This division is responsible for the delivery of all Ministry programs throughout the State and encourages and assists country people to take part in sport and recreation.

The Ministry has a comprehensive network of regional offices — Goldfields (based in Kalgoorlie), Great Southern (Albany), South-West (Bunbury), Central South and Midlands (both based in Northam), Mid-West (Geraldton), Gascoyne (Carnarvon), Pilbara (Karratha) and Kimberley (Kununurra).

**Corporate Development and Services.** This division provides support services and advice to assist the Ministry achieve its corporate objectives.

The Ministry manages a chain of twelve camps which are available for hire by sport and recreation groups, schools, churches, community groups and families.

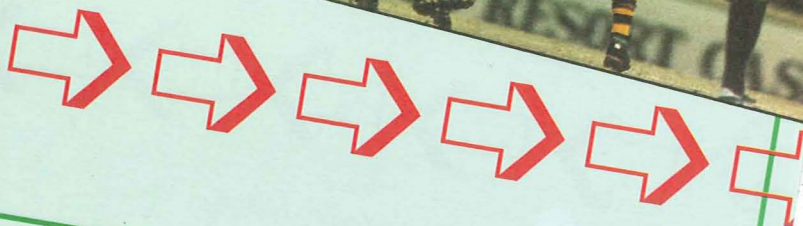
# SPORTING WESTERN AUSTRALIANS

Regardless of the reason - enjoyment, socialising, fitness or challenge - Western Australians love their sport and leisure activities.

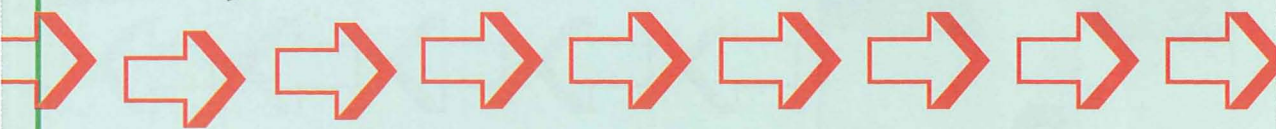
Encouraged by an excellent climate all year round, first class facilities and a positive attitude toward participation, many Western Australians can lay claim to at least one sporting interest.

Supported at State Government level through the Ministry of Sport and Recreation, sport and recreational options have become a professional and highly organised industry offering revenue in excess of \$4 billion each year to the State's economy.

The main goal of the Ministry of Sport and Recreation is 'to improve the well being of Western Australians through sport and recreation'.

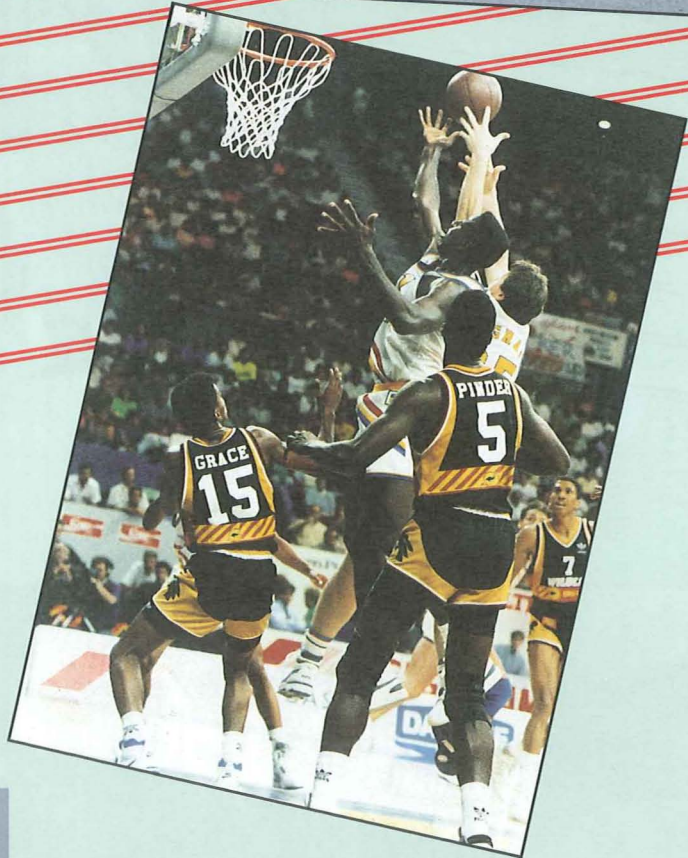
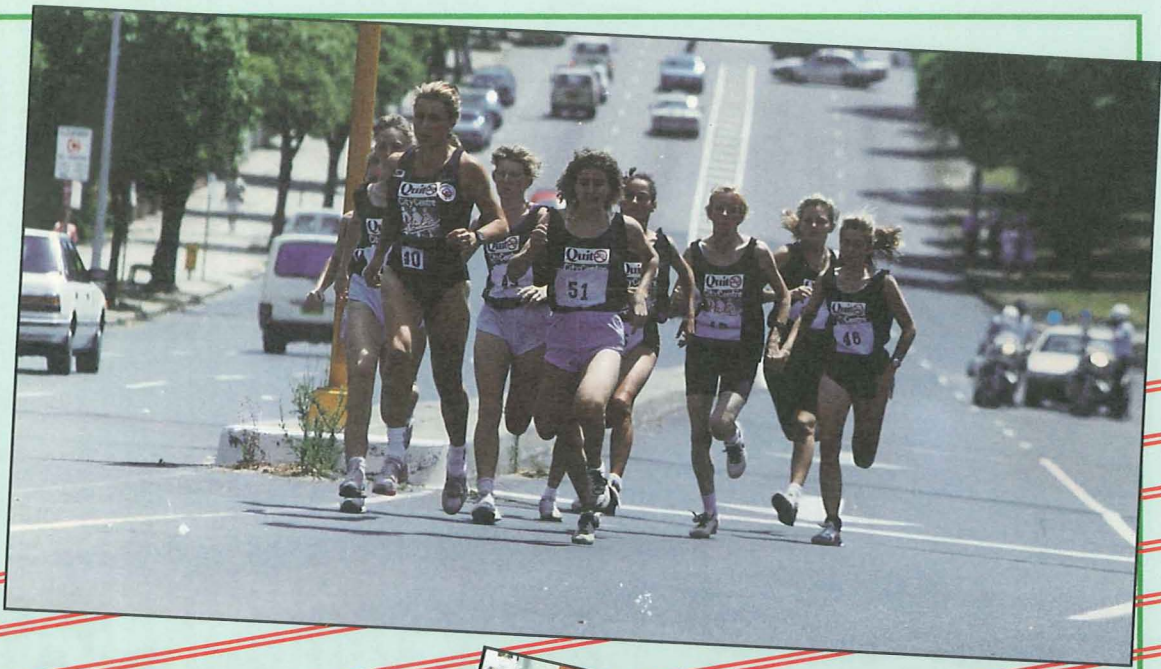






*'Photographs: West Australian Newspapers Limited'*



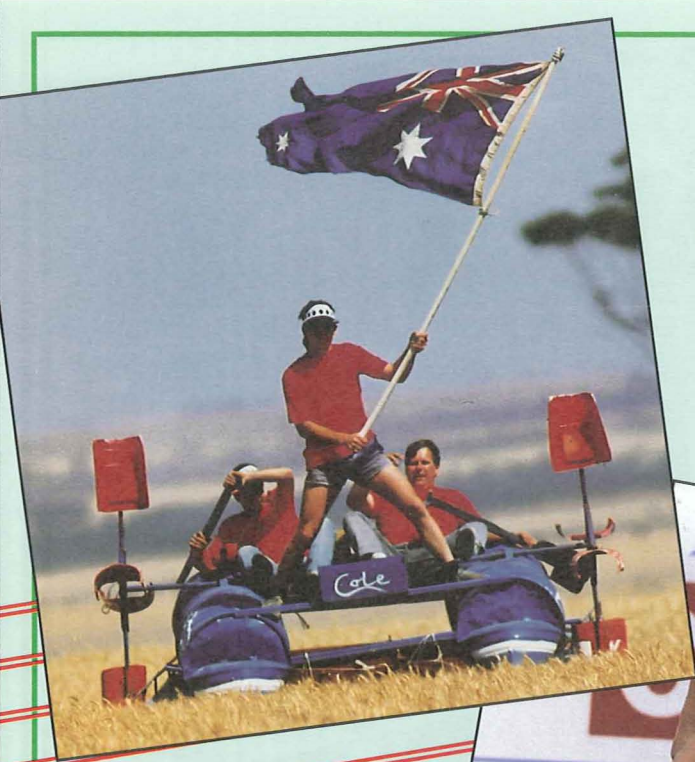


In striving to achieve this aim, all sections of the community are catered for by unique and innovative programs.

In addition, the Ministry actively encourages a sustainable, community-based sport and recreation system through its various regional offices within the State. To achieve this, the Ministry offers support and services for participants, coaches, administrators, association personnel, umpires and referees, and volunteer groups.







## Chapter 12

### WATER

Of the inhabited continents, Australia has the lowest average rainfall and the highest proportion of rainfall that is lost back to the atmosphere through evaporation and transpiration. Western Australia's average annual rainfall is 310mm compared with the Australian average of 420mm, and the average annual run-off from this western third of the continent is only eleven per cent of the nation's total.

#### WATER RESOURCES

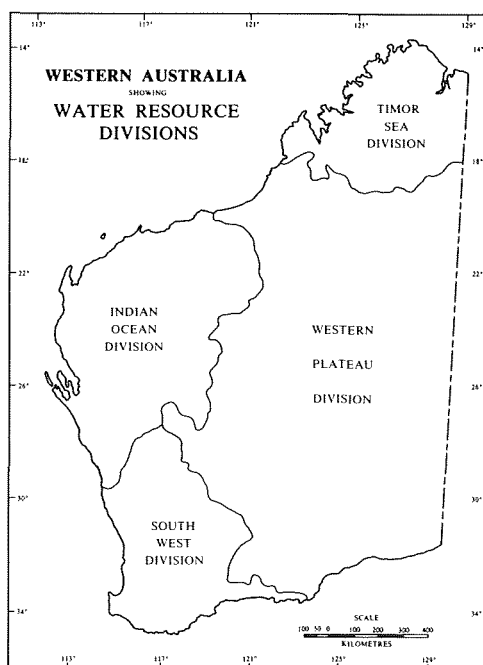
The amount of usable surface and groundwater resources available in each of the drainage divisions of Western Australia is shown in Table 12.1. These divisions, which are based on surface water hydrological boundaries, are shown in Diagram 12.1.

Eighty-six per cent of the State's fresh/marginal water resources (on a sustainable yield basis) are surface water and fourteen per cent are groundwater. The majority of the resources, seventy-three per cent of the State's total, are in the Timor Sea Division. The next most abundantly endowed division is the South-West, with twenty-two per cent of the State's potable resources. The remaining five per cent of divertible potable resources are in the Indian Ocean Division and the Western Plateau Division.

**TABLE 12.1 – DIVERTIBLE SURFACE AND GROUNDWATER RESOURCES**  
(million cubic metres per annum)

Drainage division	Surface	Ground-water	Total
South-West	1,860	876	2,735
Indian Ocean	285	262	546
Timor Sea	8,660	523	9,183
Western Plateau	1	155	156
<b>Total</b>	<b>10,806</b>	<b>1,815</b>	<b>12,620</b>

**DIAGRAM 12.1**



#### WATER AUTHORITY OF WESTERN AUSTRALIA

The Water Authority of Western Australia controls the majority of water-related services in Western Australia.

DIAGRAM 12.2  
 MAJOR WATER SUPPLY REGIONS, WESTERN AUSTRALIA  
 AT 30 JUNE 1990

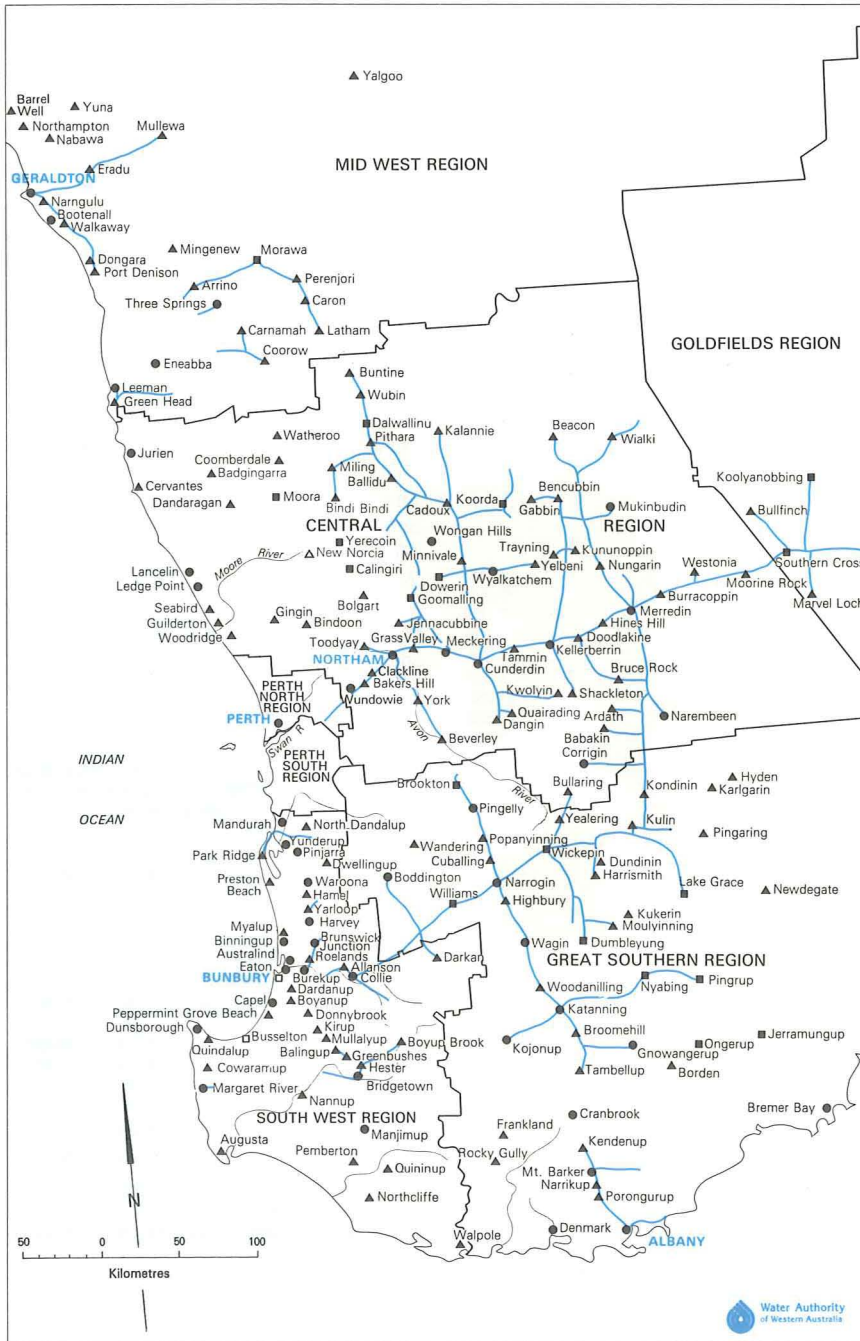


- ▲ Water Authority of W.A. Water Supply
  - Water Authority of W.A. Water Supply and Sewerage
  - Water Authority of W.A. Water Supply, Other Authority Sewerage
  - Water Authority of W.A. Sewerage, Other Authority Water Supply
  - + Water Authority of W.A. and Other Authority Water Supply and Sewerage
  - △ Other Authority Water Supply
  - Other Authority Water Supply and Sewerage
  - ▽ Major Aboriginal Community Water Supply
  - ⊙ Major Aboriginal Community Water Supply and Sewerage
- PERTH** Regional Centre
- Main Water Pipeline
  - Region Boundary





DIAGRAM 12.3  
 MAJOR WATER SUPPLY REGIONS, SOUTH WEST OF WESTERN AUSTRALIA  
 AT 30 JUNE 1990



- ▲ Water Authority of W.A. Water Supply
- Water Authority of W.A. Water Supply and Sewerage
- Water Authority of W.A. Water Supply, Other Authority Sewerage
- Water Authority of W.A. Sewerage, Other Authority Water Supply
- △ Other Authority Water Supply
- Farmlands Retiulation
- PERTH Regional Centre
- Main Water Pipeline
- Region Boundary





It is responsible for the following water-related services: water supply in the Perth metropolitan area and the majority of country towns; water resources assessment and management throughout the State; Government irrigation schemes; sewerage schemes in the Perth metropolitan area and many country towns; major drains in the Perth metropolitan area and drainage in several country areas.

### WATER SUPPLY

Western Australia has a great variation in the size and complexity of water supply schemes, ranging from town schemes serving fewer than 100 people to the Perth metropolitan scheme servicing a population of more than one million.

**TABLE 12.2 – DAMS AND RESERVOIRS – STORAGE CAPACITY (a)**  
(\*000 kilolitres)

<i>Dam or reservoir</i>	<i>Storage capacity</i>
Big Brook Dam	700
Canning Reservoir	90,500
Churchman Brook Reservoir	2,200
Drakes Brook Dam	2,290
Fitzroy Dam	4,650
Glen Mervyn Dam	1,490
Harding Dam	63,800
Harris Dam	71,661
Harvey Weir	9,126
Kununurra Diversion Dam (b)	97,400
Logue Brook Dam	24,300
Mundaring Weir	77,000
North Dandalup Pipehead Dam	(c)
Ord River Dam (Lake Argyle)	5,797,000
Quickup Dam	1,250
Samson Brook Dam	9,170
Serpentine Pipehead Reservoir	2,640
Serpentine Reservoir	194,500
17-Mile Dam (d)	5,489
South Dandalup Reservoir	208,000
Stirling Dam	56,123
Waroona Dam	14,954
Wellington Dam	184,900
Wungong Reservoir	60,000

(a) At 30 June 1987. (b) Ord River Diversion Dam. (c) Diversion weir only.  
(d) On Uralla Creek, an anabranch of the Fitzroy River.

Considerable use is made of groundwater by individual farmers, pastoralists, market gardeners and others and it is estimated that over 92,000 bores are in use in the State. The quality of water is variable and much of it is too saline for irrigation or even for stock. Groundwater sources are used to supply or augment the supplies of numerous towns, including such major centres as Perth, Albany, Bunbury, Busselton, Carnarvon, Dampier, Esperance, Exmouth, Geraldton,

Karratha and Port Hedland. In a number of mining towns in the north-west and Goldfields, mining companies are responsible for the provision of their own water supplies.

Industries also use groundwater in substantial quantities, particularly in the processing of titanium, iron and alumina. Gold producers in the Eastern Goldfields use hypersaline groundwater extensively for gold ore processing. Recent mineral discoveries in several areas have given rise to very large demands for water, the search for which has had to be intensified. Marked advances in the knowledge of aquifers and quality of water in the main sedimentary basin have been made as a result of extensive geological surveys and exploratory drilling by the Geological Survey (a branch of the Department of Mines), several oil companies, and the Water Authority.

### Perth Metropolitan Water Supplies

The sources of the metropolitan water supply are South Dandalup Reservoir, Serpentine Reservoir and Pipehead Reservoir, Canning Reservoir, Wungong Reservoir, Churchman Brook Reservoir, Victoria Reservoir, North Dandalup Pipehead Dam, groundwater from the shallow unconfined aquifers of the Swan Coastal Plain and artesian water from the deep confined aquifers.

**TABLE 12.3 – METROPOLITAN WATER SUPPLY QUANTITIES OF WATER DRAWN**  
(\*000 kilolitres)

<i>Source</i>	<i>1987-88</i>	<i>1988-89</i>	<i>1989-90</i>
Canning Reservoir	22,148	38,313	23,904
Churchman Brook Reservoir	2,952	5,166	2,043
Mundaring Weir	920	7,253	807
North Dandalup Pipehead Dam	8,969	15,567	11,903
Serpentine and Serpentine Pipehead Reservoirs	52,518	20,432	40,467
South Dandalup Reservoir	18,334	12,623	16,911
Victoria Reservoir	3,362	4,193	1,931
Wungong Reservoir	21,344	17,727	23,673
<b>Total hills sources output</b>	<b>125,169</b>	<b>121,274</b>	<b>121,644</b>
<b>Total groundwater output</b>	<b>73,274</b>	<b>79,743</b>	<b>78,182</b>
Gross output	198,443	201,017	199,827
Less output to Mandurah	4,015	4,602	4,717
<b>Output to Metropolitan Area</b>	<b>194,428</b>	<b>196,415</b>	<b>191,315</b>

Work began in early 1991 on a new Victoria Dam, to replace the original Victoria Dam which was decommissioned in May 1990. The new dam will be built 200 metres upstream from the existing

dam with an estimated cost of \$31 million. Its capacity will be ten times greater than that of the old reservoir.

Water from storages in the Darling Range is conveyed to the metropolitan area by large trunk mains, including tunnels as part of the conveyancing system from Canning and Wungong Dams. It is then distributed by feeder, distribution and reticulation mains, either directly from the trunk main or from large storage service reservoirs at Mount Yokine, Mount Eliza, Bold Park, Mount Hawthorn, Richmond, Melville, Buckland Hill, Hamilton Hill, Thompson Lake, Greenmount, Mirrabooka, Wanneroo, Whitfords and Tamworth Hill and from summit tanks and water towers situated at high points throughout the area supplied. The Canning and Wungong Tunnels are designed to help meet the peak summer demand for water by producing high capacity links to Canning Dam and Wungong Reservoir respectively. In addition, groundwater is distributed, after treatment, into the supply system. The groundwater is treated at water treatment plants situated at Gwelup, Mirrabooka, Wanneroo and Jandakot. Groundwater from artesian wells is also fed into service reservoirs.

TABLE 12.4 - METROPOLITAN WATER SUPPLY

	1987-88	1988-89	1989-90
Number of services	368,389	368,435	379,903
Length of water mains (kilometres)	9,396	9,735	9,937
Water supplied ('000 kilolitres)	191,645	194,266	189,597

### Country Water Supplies

The Water Authority is responsible for all town water supply schemes in the country towns of Western Australia, with the exception of the Bunbury and Busselton schemes which are run by local Water Boards. There are also a small number of town water supply schemes operated by mining companies. Individual water supplies serve railways, timber mill towns, isolated mines, pastoral properties, stock routes and agricultural areas, mainly from dams, tanks, wells and bores.

In country areas total control has been exercised on groundwater usage in Broome, Carvarvon, Swan and South-West coastal groundwater areas. The control of other areas has been tailored to specific problems which are known to exist.

**Great Southern Towns Water Supply.** This scheme provides water to the coal mining town of Collie, together with towns and farmlands in the Great Southern Area. Water has been drawn from Wellington Dam, and supplied to towns from Brookton and Kondinin in the north to Kojonup and Gnowangerup in the south. However, the new Harris Dam near Collie was completed in 1990. The dam supplies water to all towns, communities and farmlands within the Great Southern Scheme. Its reservoir capacity is almost 72,000 megalitres with a catchment area of 321 square kilometres.

Following commissioning of the Harris system, the Wellington Reservoir will be opened for controlled recreation activities. Reforestation of the reservoir catchment is expected to reduce salinity to acceptable levels for future domestic supply in 15 to 20 years.

TABLE 12.5 - GREAT SOUTHERN TOWNS WATER SUPPLY

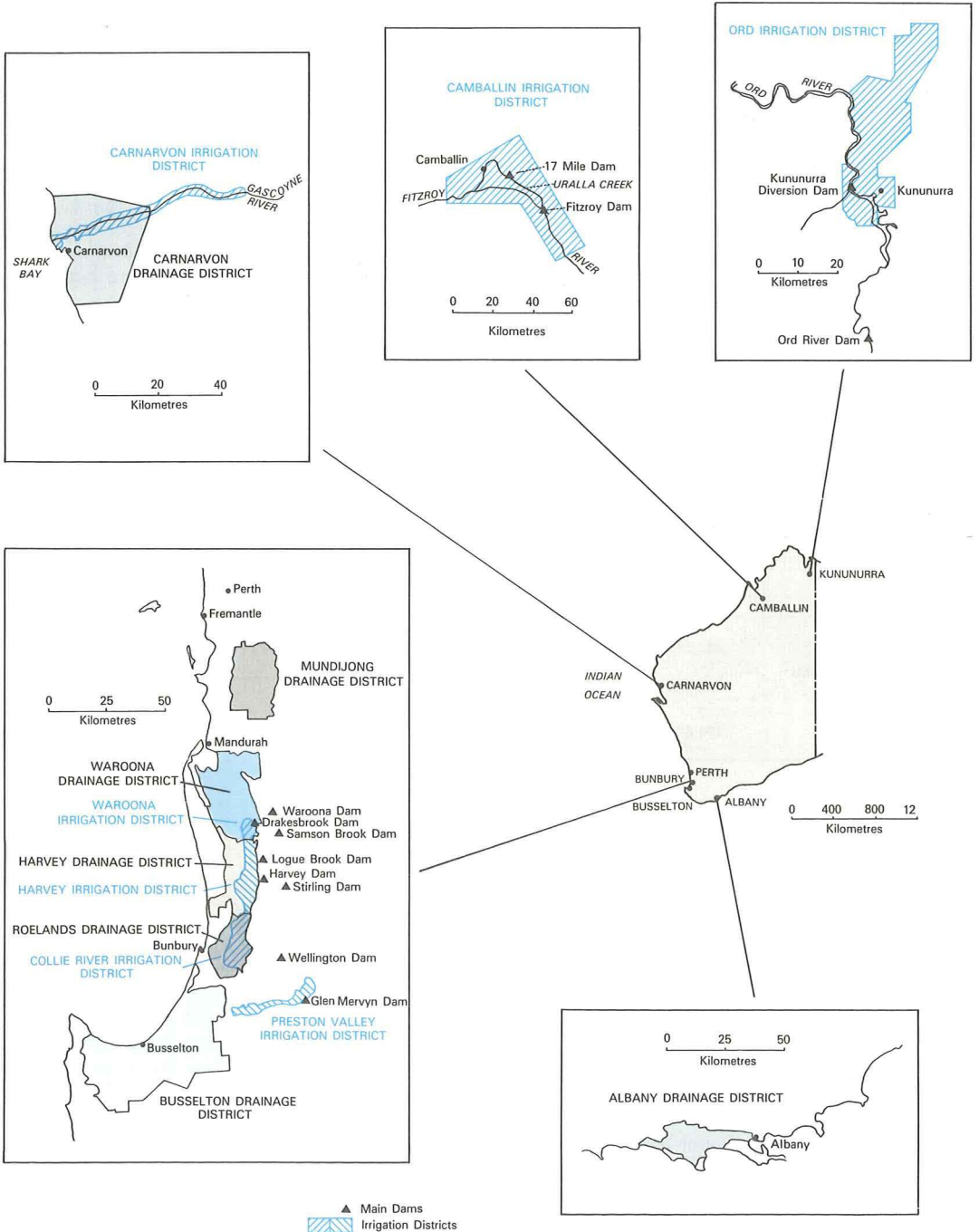
Item	1987-88	1988-89	1989-90
Number of services	13,691	13,914	14,030
Length of water mains (kilometres)	2,320	2,333	2,333
Water supplied ('000 kilolitres)	7,326	6,196	6,851

TABLE 12.6 - GOLDFIELDS AND AGRICULTURAL AREAS WATER SUPPLY

	1987-88	1988-89	1989-90
Number of services	30,774	31,175	30,888
Length of water mains (kilometres)	8,138	7,981	7,981
Water supplied ('000 kilolitres)	25,637	27,421	27,812

**Goldfields and Agricultural Areas Water Supply.** This scheme provides water to consumers in the Central agricultural areas and eastern Goldfields. Water is supplied to 93 towns and to 2,650,000 hectares of farmland in the central and north-eastern wheatbelt. Water is pumped from Mundaring Weir on the Helena River, augmented by the Lower Helena Pipehead Dam and supplemented by the metropolitan system when necessary. The main pipeline between Mundaring and Kalgoorlie is 554 kilometres long, with eighteen pumping stations and extensions to country towns and agricultural areas at several points.

DIAGRAM 12.4  
IRRIGATION AND DRAINAGE DISTRICTS  
AT 30 JUNE 1989



## Local and Regional Schemes

### Lower Great Southern Towns Water Supply.

This scheme supplies the towns of Albany, Mount Barker and Kendenup. Water is drawn from three sources: Two Peoples Bay east of Albany (the water from which is treated for colour removal), Limeburners's Creek, and bores which are located on the west of Princess Royal Harbour.

**Mandurah Regional Water Supply.** This scheme provides water to the town of Mandurah, plus the localities of Yunderup, Furnissdale, Ravenswood, Riverside Gardens and Coodanup (located east of Mandurah), together with Erskine, Falcon, Avalon, Wannanup, Placid Waters, Florida, Melros and Dawesville (located south of Mandurah).

Approximately 90 per cent of the water consumed is supplied by gravity from the South Dandalup Dam with the remainder being injected into the supply main from metropolitan hills storages and bores at Ravenswood. At present the scheme supplies some 14,650 services and is the most rapidly growing scheme in the State.

**Geraldton Regional Water Supply.** The Geraldton Regional Water Supply serves consumers in the towns of Geraldton, Dongara, Port Denison, Mullewa, Walkaway, Drummonds Cove, Eradu and Narngulu with water being drawn from the Wicherina, Allanooka and Wye Springs borefields.

**Port Hedland Regional Water Supply.** The Port Hedland Regional Water Supply provides water for the consumers of Port Hedland, Finucane Island and South Hedland from the complementary De Grey and Yule River borefields.

**West Pilbara Water Supply.** The West Pilbara Water Supply serves the towns of Dampier, Karratha, Roebourne, Wickham and Point Samson, and also the industrial complexes at Dampier, the Burrup Peninsula and Cape Lambert in the north of the State. Water is drawn from the Harding Dam in conjunction with the Millstream aquifer.

**Supplies to other Country Towns.** One hundred and eight towns are supplied with water from stream flow, dams, tanks, wells and bores, the schemes being administered under the provisions of the Country Areas Water Supply Act 1947.

The Water Authority is also responsible for the provision and maintenance of tanks and wells as a source of cartage water for a number of small communities in gold mining and agricultural areas.

TABLE 12.7 - OTHER REGIONAL SCHEMES

	1987-88	1988-89	1989-90
Number of services	74,994	80,299	127,983
Length of water mains (kilometres)	4,124	3,993	14,386
Water supplied ('000 kilolitres)	57,929	57,867	92,983

**Aboriginal Communities.** The Water Authorities involvement with Aboriginal communities throughout the State continues at a high level on a consultancy/contractual basis. Four coordinators at Kununurra, Port Hedland, Kalgoorlie and Geraldton operate in conjunction, with overall coordination by officers in Karratha.

During 1989-90 water supply and sewerage facilities were constructed at Aboriginal communities at a cost of \$5.9 million, jointly funded by the Commonwealth and the State. In addition, \$1 million was spent on the maintenance of facilities at sixty-two communities. Investigations were carried out at a cost of \$1 million to assess the potential for supplying groundwater to a further twenty-three communities throughout the State.

### Water Resources Assessment and Management

The Water Authority, in conjunction with the Western Australian Water Resources Council, is responsible for the assessment and management of water resources in Western Australia.

**Supply and Development.** The Authority is responsible for the evaluation, measurement and general management of surface and groundwater resources, including research, investigation and hydrological studies.

**Water Quality.** The Authority monitors and controls salinity and contamination of water supplies by an extensive sampling and treatment program. It also monitors land use management in catchment areas, particularly in relation to bauxite mining and forest management.

### IRRIGATION SCHEMES

Irrigation activities conducted by the Water Authority are restricted to designated schemes within the North-West, Mid-West and South-West Regions.

Water entitlements vary between schemes. The Ord River Scheme at Kununurra in the North-West Region provides virtually an open water entitlement owing to the small scope of the existing irrigation area in relation to the potential capacity of the scheme. Water is used throughout the year from surface storage.

All other schemes limit water entitlement in relation to the rated irrigable land of each irrigation area. Water entitlements vary according to seasonal factors and water availability.

Schemes in the South-West Region, at Waroona, Harvey, Collie River and Preston Valley, provide water only during the summer months from surface storages replenished over the preceding winter. Entitlements vary between schemes and between sub-areas of schemes depending on available storages.

The Carnarvon scheme in the Mid-West Region provides water throughout the year from underground sources beneath the Gascoyne riverbed. The Authority's scheme supplements the irrigated supply from their own underground sources. Use of water from all sources is limited by individual entitlements which vary from year to year. Entitlements are affected by the length of time since underground aquifers were last replenished by a river flow.

TABLE 12.8 - IRRIGATION

	1987-88	1988-89	1989-90
Length of channels and drains (kilometres)	890	911	757
Assessments (number)	1,382	1,556	1,536
Area irrigated (hectares)	18,929	18,050	19,131
Water consumed ('000 kilolitres)	148,279	215,816	200,083

## DRAINAGE

The Water Authority is responsible for the provision of a number of drainage and drainage-related services throughout Western Australia.

It is responsible for the preparation and implementation of an arterial drainage scheme for the metropolitan area, whereby it receives surplus water from local drainage systems into controlled

main drains and disposes of it through outlets to the sea or rivers, or by groundwater recharge where practicable. This scheme provides a means of coordinating the Water Authority's drainage planning activities with those of local authorities, particularly for potential areas of new land development.

The Water Authority operates and maintains proclaimed Drainage Districts, which are mainly located on the coastal plain south of Perth between Wungong/Serpentine and Busselton. Other declared Drainage Districts are between Denmark and Albany, and at Carnarvon. Many of these drainage districts are an inseparable adjunct to irrigation schemes on the coastal plain. Local authorities are responsible for drainage activities in other areas.

Advice on flood plain management and river improvement matters is provided by the Water Authority. This involves performing flood studies in order to identify and assess flood-prone areas of the State. This service has received increased attention in recent years.

## SEWERAGE SCHEMES

The Water Authority aims to ensure the effective collection, conveyance, treatment and disposal of waste-water and industrial waste so as to safeguard community health and protect the environment.

### Metropolitan Sewerage

The Water Authority operates five major waste-water treatment plants throughout the metropolitan area.

Over ninety-eight per cent of the treated effluent from these plants is discharged to the ocean where it is diluted and dispersed by currents and wave action. The remainder is discharged to effluent soakage basins for land disposal.

TABLE 12.9 - METROPOLITAN SEWERAGE SYSTEMS

	1987-88	1988-89	1989-90
Number of sewered assessments	303,640	320,113	334,767
Length of sewers (kilometres)	5,088	5,352	5,532

### Country Towns Sewerage

At 30 June 1988 the Water Authority operated sixty-three town sewerage schemes throughout the country areas of Western Australia. In addition, a further twenty-three sewerage schemes are operated by local government authorities under provisions of the Health Act, and a number by major mining companies in towns established to service mining operations. Several other local government authorities have reached an advanced stage of planning to commence schemes in future years.

### REFERENCES

Water Authority of Western Australia, *Annual Report 1989*.

Western Australian Water Resources Council, *Water Resource Perspectives Western Australia; Report No. 2 — Water Resources and Water Use*.

TABLE 12.10 - COUNTRY SEWERAGE SYSTEMS

	1987-88	1988-89	1989-90
Number of towns sewered	63	65	68
Length of sewers (kilometres)	1,466	1,514	1,622
Number of services	59,641	62,525	67,566

## Chapter 13

# AGRICULTURE, FORESTRY AND FISHING

## Agriculture

### INTEGRATED AGRICULTURAL STATISTICS

The principal source of statistics relating to the agricultural sector is the Integrated Agricultural Commodity Census, which is conducted annually by the ABS. Units (establishments)

included in the census are defined and classified in accordance with the Australian Standard Industrial Classification (ASIC).

TABLE 13.1 - NUMBER OF ESTABLISHMENTS WITH AGRICULTURAL ACTIVITY  
INDUSTRY AND ESTIMATED VALUE OF AGRICULTURAL OPERATIONS: 1989-90

Reference: Catalogue No. 7102.0

Industry of establishment ASIC code	Description	Estimated value of agricultural operations (\$'000)					Total	
		Less than 20	20- 49	50- 99	100- 199	200- 499		500 and over
0124	Poultry for meat	—	2	2	21	22	4	51
0125	Poultry for eggs	2	6	10	11	33	28	90
0134	Grapes	26	64	27	14	1	3	135
0135	Plantation fruit	1	13	45	39	5	—	103
0136	Orchard and other fruit	37	121	100	87	38	9	392
0143	Potatoes	2	7	26	48	52	13	148
0144	Vegetables (except potatoes)	33	101	106	92	56	29	417
0181	Cereal grain (incl. oil seeds)	10	26	49	84	196	145	510
0182	Sheep - cereal grains	5	58	263	1,168	2,621	982	5,097
0183	Meat cattle - cereal grains	—	3	1	8	1	1	14
0184	Sheep - meat cattle	16	126	172	158	103	25	600
0185	Sheep	99	374	580	1,047	1,196	286	3,582
0186	Meat cattle	95	432	216	119	83	50	995
0187	Milk cattle	2	17	82	274	112	9	496
0188	Pigs	4	14	16	20	32	21	107
0191	Sugar cane	—	—	—	—	—	—	—
0192	Peanuts	—	—	—	—	—	—	—
0193	Tobacco	—	—	—	—	—	—	—
0194	Cotton	—	—	—	—	—	—	—
0195	Nurseries	57	37	28	28	27	23	200
0196	Agriculture n.e.c.	15	90	57	33	10	3	208
01	Total agriculture	404	1,491	1,780	3,251	4,588	1,631	13,145
..	Other industries	13	38	40	31	19	4	145
..	Total all industries	417	1,529	1,820	3,282	4,607	1,635	13,290

While no financial data are collected in the census, an 'estimated value of agricultural operations' (EVAO) is calculated for each establishment by applying unit values to reported production and/or stock data. This procedure enables establishments in the census to be classified according to industry (ASIC) and also according to size of operations.

Since 1976-77, small establishments have been excluded from the census, to reduce ABS processing costs and minimise respondent burden. From 1976-77 to 1980-81 an EVAO cut-off of \$1,500 was used. The cut-off was raised to \$2,500 in 1981-82, and further raised to \$20,000 in 1986-87.

**TABLE 13.2 - NUMBER OF ESTABLISHMENTS WITH AGRICULTURAL ACTIVITY  
INDUSTRY AND AREA OF ESTABLISHMENT: 1989-90**  
Reference: Catalogue No. 7102.0

Industry of establishment		Area of establishment (hectares)					100,000 and over	Total
		0-49	50- 499	500- 2,499	2,500- 9,999	10,000- 99,999		
ASIC code	Description							
0124	Poultry for meat	49	2	—	—	—	51	
0125	Poultry for eggs	78	12	—	—	—	90	
0134	Grapes	108	26	1	—	—	135	
0135	Plantation fruit	99	3	1	—	—	103	
0136	Orchard and other fruit	269	119	4	—	—	392	
0143	Potatoes	28	106	14	—	—	148	
0144	Vegetables (except potatoes)	331	75	9	—	2	417	
0181	Cereal grains (incl. oilseeds n.e.c.)	2	43	268	188	9	510	
0182	Sheep - cereal grains	1	179	3,270	1,599	48	5,097	
0183	Meat cattle - cereal grains	—	2	12	—	—	14	
0184	Sheep - meat cattle	6	319	230	22	2	600	
0185	Sheep	49	969	2,052	262	72	3,582	
0186	Meat cattle	22	665	148	16	9	995	
0187	Milk cattle	10	425	61	—	—	496	
0188	Pigs	28	50	26	2	1	107	
0191	Sugar cane	—	—	—	—	—	—	
0192	Peanuts	—	—	—	—	—	—	
0193	Tobacco	—	—	—	—	—	—	
0194	Cotton	—	—	—	—	—	—	
0195	Nurseries	182	14	4	—	—	200	
0196	Agriculture n.e.c.	99	94	11	4	—	208	
01	Total agriculture	1,361	3,103	6,111	2,093	141	13,145	
..	Other industries	48	57	30	4	1	145	
..	Total all industries	1,409	3,160	6,141	2,097	142	13,290	

The effect of the pre-1986-87 cut-offs on statistics, other than counts of establishments, is minimal. The \$20,000 cut-off applying from 1986-87 does have a significant effect on some items, and estimates of the under coverage are available from the ABS.

Statistics on the financial performance of the agricultural sector are obtained from the Agricultural Finance Survey, which has been conducted periodically by the ABS. This survey, which provides estimates of turnover, expenditure, cash operating surplus, capital expenditure and indebtedness was recommenced on an annual basis from 1986-87. Detailed definitions and explanatory notes about the survey were published in the bulletin *Agricultural Industries, Financial Statistics, Australia 1986-87* (Catalogue No. 7507.0).

**TABLE 13.3 - FINANCIAL STATISTICS,  
AGRICULTURAL ENTERPRISES**  
(\$ million)

Reference: Catalogue No. 7507.0

	1987-88	1988-89p
Sales of crops	1,069.9	1,132.6
Sales of livestock	405.7	466.2
Sales of livestock products	1,088.9	1,144.2
Turnover	2,705.2	2,889.0
Purchases and selected expenses	1,475.5	1,516.4
Value added	1,408.5	1,514.8
Adjusted value added	1,266.2	1,367.2
Gross operating surplus	1,064.9	1,203.3
Total interest paid	205.6	192.2
Cash operating surplus	729.0	935.7
Total net capital expenditure	257.8	295.2
Gross indebtedness	1,557.0	1,522.9
Number of enterprises	11,070	11,337



### VALUE OF AGRICULTURAL COMMODITIES PRODUCED

For agricultural production the gross value is based on the wholesale price realised in the market place. Where commodities are consumed at the place of production or where they become raw material for secondary industry within the State, these points of consumption are taken as the market places.

The local value is the value at the place of production and is obtained by deducting marketing costs from the gross value. Marketing costs comprise freight, cost of containers, commission, and other charges incurred in marketing. Gross values provide a reliable measure of the value of production of any particular commodity or group but when comparing or combining values for agricultural industries with those for secondary industries the value added series of financial statistics from the Agricultural Finance Survey should be used.

Wool (including fellmongered and exported on skins) was the most important item in 1989-90

with a gross value of \$1,254 million, followed by wheat with \$954 million.

**TABLE 13.4 - GROSS VALUES, MARKETING COSTS  
AND LOCAL VALUES OF AGRICULTURAL  
COMMODITIES**

(\$ million)  
Reference: Catalogue No. 7503.5

	1987-88	1988-89 <sup>r</sup>	1989-90
<b>Crops and pastures—</b>			
Gross value of production	1,211.4	1,799.7	1,546.3
Marketing costs	167.4	239.5	228.4
Local value of production	1,044.1	1,560.2	1,318.0
<b>Livestock slaughterings and other disposals—</b>			
Gross value of production	435.5	424.9	454.0
Marketing costs	35.5	39.0	47.4
Local value of production	400.0	385.9	406.6
<b>Livestock products—</b>			
Gross value of production	1,347.4	1,495.0	1,370.0
Marketing costs	33.9	39.0	42.6
Local value of production	1,313.5	1,455.9	1,327.4
<b>Total agriculture—</b>			
Gross value of production	2,994.3	3,719.6	3,370.3
Marketing costs	236.8	317.5	318.3
Local value of production	2,757.6	3,402.1	3,052.0

**TABLE 13.5 - SUMMARY OF AUSTRALIAN STATISTICS: 1989-90**

References: Catalogue Nos. 7330.0, 7503.0

	Unit	NSW	Vic	Qld	SA	WA	Tas	Australia (a)
<b>Agricultural establishments—</b>								
Number	..	37,540	33,306	26,619	14,636	13,410	3,699	129,539
Area	'000 ha	61,984	13,062	152,340	57,480	110,881	1,933	466,560
Area of crops	"	4,080	1,989	2,580	3,042	5,174	83	16,956
Sown pasture	"	6,992	6,504	4,822	3,786	7,724	856	30,781
<b>Gross value of—</b>								
Crops	\$m	2,552	1,821	2,362	1,437	1,546	222	9,961
Livestock slaughterings and disposals	"	1,734	1,247	1,671	403	454	134	5,719
Livestock products	"	2,556	2,142	748	720	1,370	261	7,810

(a) Excludes Northern Territory and Australian Capital Territory.

### LAND USE ON AGRICULTURAL ESTABLISHMENTS

In 1989-90 there were 13,410 agricultural establishments with an estimated value of agricultural operations over \$20,000 in the State, comprising 111 million hectares of land, or about 44 per cent of the total area of Western Australia.

Of the total area of these establishments, 5.2 million hectares were used for crops and 7.7 million hectares were under sown pasture in 1989-90. The balance consisted mainly of uncleared land (most of which is pastoral leases held by sheep and cattle stations), but it also included cleared land which was used for grazing or which was resting during the season, fallowed areas and newly cleared land.

**TABLE 13.6 – LAND USE IN EACH STATISTICAL DIVISION 1989-90**  
Reference: Catalogue No. 7411.5

Statistical division	Agricultural establishments (number)	Cleared land	Land use during the season ('000 hectares)			Total area of establishments ('000 hectares)
			Used for crops	Under sown pastures	Lucerne (all purposes)	
Perth	1,127	58.0	6.6	34.7	0.2	78.4
South-West	2,286	650.7	29.1	532.6	1.2	779.5
Lower Great Southern	2,360	2,436.4	480.7	1,874.2	1.8	2,822.9
Upper Great Southern	1,971	3,011.6	974.6	1,750.4	—	3,407.8
Midlands	3,243	5,670.8	2,401.1	1,715.8	0.5	7,085.7
South-Eastern	768	1,388.4	306.6	1,072.5	1.6	17,157.5
Central	1,469	2,351.1	971.0	736.7	0.4	42,597.9
Pilbara	57	—	—	—	—	14,195.4
Kimberley	129	14.6	3.7	1.5	—	22,755.8
<b>Total</b>	<b>13,410</b>	<b>15,581.5</b>	<b>5,173.6</b>	<b>7,718.5</b>	<b>5.6</b>	<b>110,881.0</b>

Table 13.6 gives details of rural land use according to statistical division for 1989-90. Maps showing the boundaries of the statistical divisions and their component statistical local areas are located inside the back cover.

land settlement policies and the introduction of new marketing practices is contained on pages 365-7 of the *Western Australian Year Book*, No. 20 — 1982.

**TABLE 13.7 – LAND USE**  
Reference: Catalogue No. 7411.5

Unit	1987-88	1988-89	1989-90
Agricultural establishments	No. 13,543	13,461	13,410
Land use during the season—			
Used for crops	'000 ha 5,334	5,082	5,174
Under sown pasture	" 7,556	7,781	7,718
Lucerne (all purposes)	" 5	6	6
Other	" 100,580	99,762	97,983
<b>Total area of establishments</b>	<b>" 113,476</b>	<b>112,631</b>	<b>110,881</b>

**TABLE 13.8 – WHEAT FOR GRAIN AREA AND PRODUCTION**  
Reference: Catalogue No. 7321.5

Unit	1987-88	1988-89	1989-90
Area	'000 ha 3,312	3,297	3,476
Production—			
Total	'000 t 3,882	5,225	4,800
Per hectare	tonnes 1.17	1.58	1.38
Gross value	\$'000 649,969	1,122,328	954,292

**AGRICULTURE**

**Wheat**

Although wheat has been grown from the earliest years of settlement, cultivation was confined to limited areas as late as 1890 when an area of approximately 14,000 hectares was grown. In 1989-90 3.48 million hectares were sown. This was well below the 1982-83 figure of 4.87 million hectares, which was the largest area ever sown to wheat in the State.

A summary of the history of the wheat industry in Western Australia, which covers the development of new areas, the effects of such factors as the decline in the goldmining industry, government

**TABLE 13.9 – ESTABLISHMENTS GROWING WHEAT FOR GRAIN CLASSIFIED ACCORDING TO AREA SOWN SEASON 1989-90**  
Reference: Catalogue No. 7321.5

Area of wheat for grain	Establishments	Total area sown to wheat for grain
Hectares	No.	'000 hectares
1 – 9	58	0.3
10 – 49	300	8.9
50 – 99	357	25.9
100 – 249	1,206	205.0
250 – 499	1,467	534.1
500 – 999	1,355	944.5
1,000 – 1,499	624	741.5
1,500 and over	464	1,016.2
<b>Total</b>	<b>5,831</b>	<b>3,476.4</b>

**Size Classification of Farms with Wheat.** Of the 13,410 agricultural establishments in the State in 1989-90, wheat for grain was grown on 5,831 or 43.5 per cent of the total. The median wheat crop was just over 400 hectares.

**Bulk handling of wheat.** The rapid increase in the production and export of wheat between 1910 and 1920 caused problems of transport and storage, and proposals for the bulk handling of the grain led to the formation of a company for this purpose in 1920. This original undertaking did not commence operations owing to technical difficulties and problematical savings in handling costs. Constant attempts were made during the 1920s to find cheaper methods of storage and transportation of wheat.

A series of experiments in the 1930s led to the development of an economical bulk handling system and the grower cooperative company, Co-operative Bulk Handling Limited was set up in 1933 to operate the system. A detailed account of the history of Co-operative Bulk Handling Limited's method of operation and the techniques developed for handling the State's grain production is given on pages 369-70 of the *Western Australian Year Book*, No. 20 — 1982.

**Marketing of wheat.** Until 30 June 1989, the Australian Wheat Board was the sole marketing authority for wheat, operating under the authority of the *Wheat Marketing Act 1984*. From 1 July 1989, marketing of wheat for use within Australia was deregulated, and producers are now free to make their own marketing arrangements for wheat for domestic use. The Australian Wheat Board retains sole authority for export of wheat.

**Exports of wheat.** Most of the State's wheat is exported as grain. Flour exports, which had been as high as 160,000 tonnes in the mid 1950s, now account for a minimal proportion of the State's wheat crop.

**TABLE 13.10 - OVERSEAS EXPORTS OF WHEAT**  
(<sup>'000 tonnes</sup>)

	1987-88	1988-89	1989-90
Wheat	4,201	r4,870	4,503

## Oats

Although oats have been grown in Western Australia since the early development of wheat farming, cultivation was somewhat limited until stimulated by the introduction of large-scale sheep raising in the agricultural areas, when their high

**TABLE 13.11 - OATS FOR GRAIN**  
**AREA AND PRODUCTION**  
Reference: Catalogue No. 7321.5

	Unit	1987-88	1988-89	1989-90
Area	'000 ha	373	389	340
Production—				
Total	'000 t	502	618	529
Per hectare	tonnes	1.35	1.59	1.56
Gross value	\$'000	52,167	r83,697	50,714

nutritional worth as stock feed made them a very valuable crop. In addition to their importance as local stockfeed, significant quantities of oats are also exported. The area sown to oats for grain increased from 78,000 hectares in 1920 to a peak of 538,000 in 1960. More recently, area sown has been subject to considerable fluctuations.

## Barley

Barley grows well over a wide range of climatic and soil conditions and generally yields better than other cereals. It is more successful on saline soils where other crops may not do well, and as a first crop on newly-developed land. Both 'two-row' and 'six-row' barley are grown. Part of the crop is retained on farms for stockfeed, while the balance is sold locally and overseas for malting or stockfeed manufacture.

**TABLE 13.12 - BARLEY FOR GRAIN**  
**AREA AND PRODUCTION**  
Reference: Catalogue No. 7321.5

	Unit	1987-88	1988-89	1989-90
Area	'000 ha	461	383	421
Production—				
Total	'000 t	617	552	628
Per hectare	tonnes	1.34	1.44	1.49
Gross value	\$'000	82,907	r88,691	108,740

In terms of area sown, barley was for some years the second most important crop in the State, after wheat. The 623,000 hectares sown in 1970-71 moved barley ahead of oats for the first time. Since that year, although barley plantings fluctuated from a low of 387,000 hectares in 1974-75 to a high of 965,000 hectares in 1984-85, they exceeded oat plantings each year. In 1988-89 barley became the second most valuable crop in the state, after wheat.

**Lupins**

The large-scale growing of lupins has been undertaken in Western Australia since the early 1970s. Apart from the drought-affected 1985-86 season, area sown has increased significantly each year from 1980-81 to 1987-88. Since 1988-89 lupins area fell as sheep numbers remained high. Farmers continued to expand their sheep flocks at the expense of cropping.

**TABLE 13.13 - LUPINS FOR GRAIN  
AREA AND PRODUCTION**  
Reference: Catalogue No. 7321.5

	Unit	1987-88	1988-89	1989-90
Area	'000 ha	876	720	676
Production—				
Total	'000 t	730	790	619
Per hectare	tonnes	0.83	1.10	0.92
Gross value	\$'000	126,950	156,423	103,954

**Other grains and oilseeds.**

There was considerable interest in the production of rapeseed in the early 1970s, and plantings reached 42,000 hectares in 1972-73. Subsequent problems with disease saw plantings reach a low of 200 hectares in 1982-83. Since then area sown has expanded and reached 4,800 hectares in 1986-87. Plantings fell back to 576 hectares in 1989-90.

Triticale, a wheat/rye cross, was first recorded in the Agricultural Census in 1978-79, and since then plantings increased each year to 1984-85 when 39,000 hectares were sown. Area planted dropped back to 13,900 hectares in the 1989-90 season.

Field peas is another crop with significant increases in planting over the past decade. Recorded area reached 1,000 hectares in the 1982-83 season, was 4,100 hectares in 1985-86, and had expanded to 47,100 hectares by 1988-89.

However, plantings fell back to 26,900 hectares in the 1989-90 season.

Grain sorghum, linseed, rye, vetches, safflower and sunflower are also grown but only in small quantities.

**Hay**

Large quantities of pasture hay are cut from clover and grass pastures, production in 1989-90 being 380,000 tonnes from 107,000 hectares. The principal cereal hay crop is oats and 334,000 tonnes of oaten hay were cut in 1989-90 from 88,000 hectares. Wheat is the only other cereal crop which is used extensively for this purpose and in 1989-90 the production was 78,000 tonnes from 26,000 hectares. Barley, vetches, rye and lupins are also used for hay making but they are of minor importance.

**TABLE 13.14 - HAY - AREA AND PRODUCTION**  
Reference: Catalogue No. 7321.5

	Unit	1987-88	1988-89	1989-90
Pasture (a)—				
Area	'000 ha	103	119	107
Production	'000 t	342	402	380
Crop (b)—				
Area	'000 ha	140	129	122
Production	'000 t	435	471	430

(a) Includes lucerne. (b) Principally from oats and wheat.

**Pastures**

Of the 7.7 million hectares of improved pastures in the south-west region over 6 million are sown to the legume subterranean clover. Other species used include medic, rose clover, serradella, lucerne and a variety of grasses, principally Wimmera ryegrass. The use of perennial grasses such as perennial ryegrass, kikuyu, phalaris and cocksfoot is restricted to a small area having a long growing season along the south coast.

Dominant legume pastures are initially easily established following the clearing of the native vegetation. As most of the soils are infertile a range of fertilisers must be used. Phosphorus, as superphosphate, is usually applied annually while minor elements such as copper, zinc and sometimes molybdenum, have to be applied at least once. Over time, other elements may also need to be applied for good pasture growth to be

maintained. Potassium in particular can become deficient on the sandy soils of high rainfall areas.

While pastures are green for only four to nine months of the year, sufficient feed is produced for sheep and cattle to be maintained on the paddocks all year. Supplementary feeding of breeding stock is sometimes required, particularly if the autumn break to the season comes late. At such times the dry paddock feed is almost exhausted and the regenerating pasture is growing slowly.

An active legume breeding and selection program, centred at Perth, has produced many cultivars. From the cultivars now available it is possible to select one or more that are suited to environments ranging in annual rainfall from 350 to 1200 millimetres and in soil type from acid to alkaline. Cultivars have been selected that are persistent, tolerant of a range of diseases and insect pests, and that are low in fertility-reducing oestrogenic compounds.

**TABLE 13.15 - PASTURE SEED HARVESTED**  
Reference: Catalogue No. 7321.5

	Unit	1987-88	1988-89	1989-90
<b>Subterranean clover—</b>				
Area harvested	'000 ha	18.1	23.8	12.5
Production	tonnes	3,775	4,916	2,272
<b>Lupins—</b>				
Area harvested	'000 ha	3.3	4.1	1.9
Production	tonnes	739	854	524
<b>Barrel Medic—</b>				
Area harvested	'000 ha	4.4	7.7	4.5
Production	tonnes	677	1,350	659
<b>Total pasture seed—</b>				
Area harvested	'000 ha	<b>28.0</b>	<b>39.0</b>	<b>21.4</b>

## Vegetables

The State's vegetable production is aimed principally at providing for the local fresh market. Market gardens for fresh produce are concentrated in the outer suburbs of the Perth Statistical Division, although some of these areas are now becoming urbanised. Growing of vegetables for processing was restricted to peas and beans for a long time. More recently, there has been a significant increase in both the volume and variety of vegetables grown for processing, with potatoes forming a major proportion of this market. Exports of vegetables have also assumed greater importance in recent years, with some growing operations being set up either wholly or principally for supplying the export market.

Potatoes are the major and most valuable vegetable crop, accounting for over a quarter of the State's vegetable area. Production is concentrated in the higher rainfall areas of the south-west, principal growing centres being Manjimup, Busselton, Donnybrook and Albany. Compared with the total State crop, the Perth Statistical Division is relatively unimportant as a potato producer. In 1989-90 the area of potatoes was 40 per cent higher than in 1986-87, as openings of potato-processing facilities provided an expanded market for growers.

Apart from potatoes, a wide variety of other vegetables are grown in the State. Among these, cauliflowers rank as the second most valuable crop, with carrots the third most valuable.

However, in terms of exports for 1989-90, carrots and cauliflowers generated the highest income — each worth approximately \$8.5 million.

Over half the State's carrot production is grown in the Perth Statistical Division, while the main cauliflower growing area is the Manjimup district in the far south-west of the State.

**TABLE 13.16 - PRINCIPAL VEGETABLES  
AREA, PRODUCTION AND GROSS VALUE**  
Reference: Catalogue No. 7321.5

	Unit	1987-88	1988-89	1989-90
<b>Carrots—</b>				
Area	hectares	785	852	790
Production	tonnes	30,266	30,988	30,942
Gross value	\$'000	11,707	r15,409	13,277
<b>Cauliflowers—</b>				
Area	hectares	671	754	724
Production	tonnes	14,364	17,866	17,438
Gross value	\$'000	9,727	r12,288	15,754
<b>Lettuce—</b>				
Area	hectares	444	437	403
Production	tonnes	13,841	14,505	13,898
Gross value	\$'000	7,052	r7,206	7,969
<b>Onions—</b>				
Area	hectares	411	412	471
Production	tonnes	21,280	21,622	25,399
Gross value	\$'000	6,564	r7,922	6,677
<b>Potatoes—</b>				
Area	hectares	2,034	2,188	2,497
Production	tonnes	72,290	78,464	98,705
Gross value	\$'000	24,124	r31,070	26,303
<b>Tomatoes—</b>				
Area	hectares	277	246	250
Production	tonnes	8,059	7,910	7,070
Gross value	\$'000	9,802	9,090	7,089
<b>All vegetables—</b>				
Area	hectares	<b>7,786</b>	<b>8,141</b>	<b>9,127</b>
Gross value	\$'000	<b>97,161</b>	<b>r113,072</b>	<b>109,180</b>

A significant proportion of the State's tomato production is grown at Carnarvon, on the State's upper west coast. Because of the warmer winter climate, Carnarvon growers are able to produce 'out of season' crops of tomatoes and other vegetables for the Perth market. Similar factors are assisting the development of vegetable production at Kununurra in the far north of the State, where significant quantities of melons and pumpkins are being grown.

**Fruit**

Fruit production is largely confined to the temperate regions between Gingin to the north of Perth and Albany on the south coast. The cool, wet winters and warm, dry summers of this area permit the successful cultivation of a wide variety of fruits. In the southern and south-western sections, apples, pears and stone fruits are grown extensively, and grapes are of increasing importance, while in the districts around Perth the principal crops are apples, stone fruits, citrus fruits and grapes. Outside this main fruit-growing area, banana plantations have been established at Carnarvon in the north-west and at Kununurra in the north.

**TABLE 13.17 - FRUIT - AREA AND GROSS VALUE OF PRODUCTION**  
Reference: Catalogue No. 7322.5

	Unit	1987-88	1988-89	1989-90
<b>Area—</b>				
Orchard fruit	ha	5,292	5,287	5,150
Plantation and berry fruit	"	599	524	529
Grapes	"	1,765	1,930	2,039
<b>Total</b>	<b>"</b>	<b>7,656</b>	<b>7,742</b>	<b>7,718</b>
<b>Gross value of production—</b>				
Orchard fruit	\$'000	39,794	41,910	34,553
Plantation and berry fruit	"	14,017	13,493	17,113
Grapes	"	11,395	12,839	10,938
<b>Total</b>	<b>"</b>	<b>65,206</b>	<b>68,241</b>	<b>62,604</b>

**Apples and pears**

Apples, which are the principal fruit crop, account for more than half of the total orchard area. Donnybrook, Manjimup and the hills area near Perth are the most important centres but other districts in the south-west still produce significant quantities. In 1989-90, the number of apple trees recorded in the Census was 687,000. Granny

Smiths accounted for 68 per cent of the 44,835 tonnes produced. Pears are usually grown in conjunction with apples, and although apples are still considerably more important, pear tree numbers have increased by over 50 per cent in the last 10 years. Exports of both apples and pears are significant, mainly to South East Asian countries.

**Citrus fruit**

The Shire of Chittering, north of Perth, is a major citrus fruit producer, while other important areas near Perth are in the Shires of Kalamunda and Swan and the City of Armadale, and in the south-west, in the Shires of Harvey and Capel. Although oranges are by far the most important crop, substantial quantities of lemons and mandarins, and lesser quantities of grapefruit are also produced. Production is largely for local consumption but there is some export trade, especially in lemons.

**TABLE 13.18 - ORCHARD FRUIT - TREES, PRODUCTION AND GROSS VALUE**  
References: Catalogue Nos. 7322.5, 7503.5

	Unit	1987-88	1988-89	1989-90
<b>Apples—</b>				
Trees	'000	702	667	687
Production	tonnes	40,196	46,695	44,835
Gross value	\$'000	21,329	24,041	18,671
<b>Pears—</b>				
Trees	'000	132	143	169
Production	tonnes	6,604	6,974	7,192
Gross value	\$'000	4,409	3,797	3,015
<b>Lemons and limes—</b>				
Trees	'000	21	18	18
Production	tonnes	1,440	1,322	1,105
Gross value	\$'000	741	1,223	701
<b>Mandarins—</b>				
Trees	'000	44	43	48
Production	tonnes	878	867	1,004
Gross value	\$'000	846	978	901
<b>Oranges—</b>				
Trees	'000	179	198	187
Production	tonnes	5,217	5,087	4,503
Gross value	\$'000	2,084	2,396	1,616
<b>Nectarines—</b>				
Trees	'000	88	99	116
Production	tonnes	1,120	1,112	1,425
Gross value	\$'000	1,185	1,529	1,525
<b>Peaches—</b>				
Trees	'000	110	112	114
Production	tonnes	2,503	1,819	2,157
Gross value	\$'000	3,192	2,724	2,195
<b>Plums and prunes—</b>				
Trees	'000	130	138	146
Production	tonnes	2,801	2,072	2,712
Gross value	\$'000	3,573	2,588	3,276

### Stone fruits

Stone fruits are grown mainly in the hills districts in the Darling Ranges near Perth, and in the Shires of Manjimup and Donnybrook-Balingup in the south-west of the State; however some stone fruits are grown in many other districts of the south-west.

### Vineyards

Historically, the 'Swan Valley' region in the Shire of Swan has dominated the State's viticulture industry. In the early 1970s this region accounted for some 70 per cent of the State's vineyard area. Since then, pressures of urban growth in the Swan Valley have reduced the area under vines there, and new vineyards have been developed elsewhere in the state; principally at Margaret River/Busselton, Mount Barker/Frankland and Bindoon/Gingin. As a result, the Swan Valley now accounts for just over 32 per cent of the State's vineyard area. The Margaret River/Busselton, and Mount Barker/Frankland grape production is almost entirely used for winemaking; in other areas table and drying grapes are also significant.

TABLE 13.19 - GRAPES - AREA AND PRODUCTION  
Reference: Catalogue No. 7322.5

	Unit	1987-88	1988-89	1989-90
Area of vines—				
Bearing	ha	1,584	1,684	1,701
Not yet bearing	"	182	246	338
Grapes for wine making and table use—				
Quantity	tonnes	8,500	9,299	10,769
Gross value	\$'000	10,145	r11,666	10,314
Dried vine fruits—				
Quantity	tonnes	515	480	359
Gross value	\$'000	1,250	1,171	624
Wine production—				
Beverage	kilolitres	4,633	4,916	5,941
Distillation	"	12	4	13

### Other fruit

Production of bananas is mainly confined to a narrow strip of land along the Gascoyne River at Carnarvon, with small, but increasing areas at Kununurra on the Ord River. The Carnarvon plantations are dependent on water pumped from bores which tap a subterranean flow in the sands of the usually dry river bed. As a surface flow in the river channel results only from heavy rains, which do not occur every year, a problem is presented in the falling-off of water supplies and

in the increase in the salt content of the underground water during long dry periods. These conditions and also periodic damage from cyclones cause fluctuations in the area cropped and in production, as occurred in the 1988-89 season. Apart from such weather-caused interruptions, production has consistently increased over the last 20 years. The crop is transported by road to Perth and sold locally in competition with bananas imported from other Australian States.

Strawberry production has increased significantly in recent years. Nearly 90 per cent of the area planted is within the Perth Statistical Division.

TABLE 13.20 - BANANAS - AREA AND PRODUCTION  
Reference: Catalogue No. 7322.5

	Unit	1987-88	1988-89	1989-90
Area of plants—				
Bearing	ha	399	346	366
Not yet bearing	"	82	97	66
Production—				
Total quantity	tonnes	14,251	9,908	11,268
Gross value	\$'000	10,261	r9,426	12,684

### Nurseries

The main concentration of commercial nurseries is in the Perth Statistical Division in the areas of Wanneroo, Armadale and Cockburn. Most nurseries produce ornamental shrubs and trees; some specialise in the production of bedding plants while others concentrate on cut-flower production. Fruit trees, mainly citrus, are produced by specialist nurseries in the Perth Statistical Division while pome and stone fruit trees are mostly produced in the South-West Statistical Division at Manjimup and Donnybrook. The value of cultivated turf has declined during the last two years and accounts for 9 per cent of the total gross value of nurseries and turf. The cultivation of native plants, generally on a less extensive scale than is the case with exotic plants, is also now of increasing importance.

TABLE 13.21 - NURSERIES (a)  
AREA AND GROSS VALUE  
Reference: Catalogue Nos. 7321.5, 7503.5

	Unit	1987-88	1988-89	1989-90
Area	hectares	1,841	1,972	1,871
Gross value	\$'000	41,603	r50,751	45,189

(a) Including cultivated turf.

**Artificial fertiliser**

Soils in Western Australia are acutely deficient in phosphate and regular applications of phosphatic fertiliser are required for crop and pasture growth. Newly cleared land in particular requires heavy applications of superphosphate for satisfactory yields. Nitrogen deficiencies are also common. Legume pastures and lupins have assisted greatly in increasing nitrogen supplies. Potassium deficiency is primarily a problem on sandy soils in high rainfall areas.

Many Western Australian soils and particularly sandy soils are also deficient in trace elements. The use of fertilisers is therefore a significant factor in the State's farming activity.

**TABLE 13.22 - ARTIFICIAL FERTILISER USED ON RURAL HOLDINGS**

Reference: Catalogue No. 7411.5

	Unit	1987-88	1988-89	1989-90
<b>Crops—</b>				
Area fertilised	'000 ha	5,000	4,592	4,735
Quantity used—				
Superphosphate	'000 t	314	281	264
Other	"	279	290	331
<b>Total</b>	<b>"</b>	<b>593</b>	<b>572</b>	<b>595</b>
<b>Pastures—</b>				
Area fertilised	'000 ha	4,782	5,483	5,691
Quantity used—				
Superphosphate	'000 t	507	622	628
Other	"	49	50	51
<b>Total</b>	<b>"</b>	<b>566</b>	<b>672</b>	<b>679</b>

**PASTORAL PRODUCTION**

Throughout this section, where mention is made of the 'pastoral areas' the portion of the State referred to comprises the Kimberley and Pilbara Statistical Divisions and the Sub-divisions of Lefroy, Gascoyne and Carnegie. The balance of the State, referred to as the 'agricultural areas', comprises the Perth, South-West, Upper Great Southern, Lower Great Southern and Midlands Statistical Divisions and the Sub-divisions of Johnston and Greenough River.

In the early days of settlement, pastoral activities in Western Australia were confined largely to what are now the agricultural areas and were usually associated with the cultivation of crops. However, beginning with Captain George Grey's visit in 1838 to the area known as the West Kimberley, explorers increasingly drew attention to the

pastoral possibilities of large sections of the present Kimberley, Pilbara and Central Statistical Divisions.

In 1857 and 1858, F.T. Gregory noted the existence of good pastoral country in the Murchison and the Gascoyne districts and in the course of a journey further to the north in 1861 he discovered the Ashburton, Fortescue, De Grey and Oakover Rivers. His reports of good grazing lands in the area led to the establishment of sheep stations by pastoralists from the south, the first of such ventures in 1863, being in the De Grey district of what is now the Pilbara Statistical Division. Graziers were also turning their attention to the south-east and in the 1870s pastoral lands were being taken up in the coastal areas to the south of the Nullarbor Plain. Another development in the extension of pastoral activity began with Alexander Forrest's journey through the Kimberley in 1879 and his favourable reports on the suitability of the country for grazing. Leases along the Fitzroy and the Ord Rivers were stocked not only with livestock shipped from the south and from the other Australian Colonies but also with cattle brought overland to the area, principally from Queensland and New South Wales, by remarkable feats of droving.

**Sheep**

From the end of the Second World War, the State's sheep numbers increased almost continuously until the mid 1970s, to peak at 34.8 million in 1976. Since then, numbers have fluctuated, reflecting variations in seasonal conditions and in the prices for wool and meat relative to grain prices. Since 1984, sheep numbers have risen significantly, owing to a strong wool market and relatively low wheat prices. The previous peak sheep population of 1976 was exceeded for the first time in 1989 and subsequently in 1990 when the flock numbered 38.4 million. However, with the collapse of prices for medium to coarse grade wool and removal of the floor prices in February 1991, sheep numbers are expected to decrease.

In the agricultural areas, sheep farming is usually carried out in conjunction with grain growing, while in the pastoral areas sheep are generally grazed on large specialist 'sheep stations'. As a result, large flocks predominate in the pastoral areas. In 1990, the average flock size in agricultural areas was 3,646; in pastoral areas 10,238. Based on the 1988-89 Agricultural Census, Merinos are the dominant breed — purebred merinos comprised 97.4 per cent of the



State's sheep flock, while merino comebacks accounted for a further 0.7 per cent.

**TABLE 13.23 - SHEEP NUMBERS AND DISTRIBUTION AT 31 MARCH**

Reference: Catalogue No. 7221.5

	In agricultural areas		In pastoral areas		State total
	Number	Proportion of State total	Number	Proportion of State total	
	'000	per cent	'000	per cent	'000
1960	13,396	81.6	3,016	18.4	16,412
1970	29,844	88.7	3,790	11.3	33,634
1980	28,730	94.4	1,701	5.6	30,431
1988	31,525	92.8	2,426	7.2	33,951
1989	34,760	93.7	2,330	6.3	37,090
1990	35,924	93.5	2,498	6.5	38,422

### Marketing of lamb

**Lamb Marketing Board.** All lamb produced for slaughter south of the twenty-sixth parallel in Western Australia is marketed through the Western Australian Lamb Marketing Board. The Board was established by the *Marketing of Lamb Act 1971* and began operations in December 1972. It came into being mainly as a result of pressure from, and following a referendum of, the State's lamb producers, who looked to the Board to improve the stability of their industry and increase returns.

**TABLE 13.24 - SHEEP FLOCKS AT 31 MARCH 1990 CLASSIFIED ACCORDING TO SIZE OF FLOCK**

Reference: Catalogue No. 7221.5

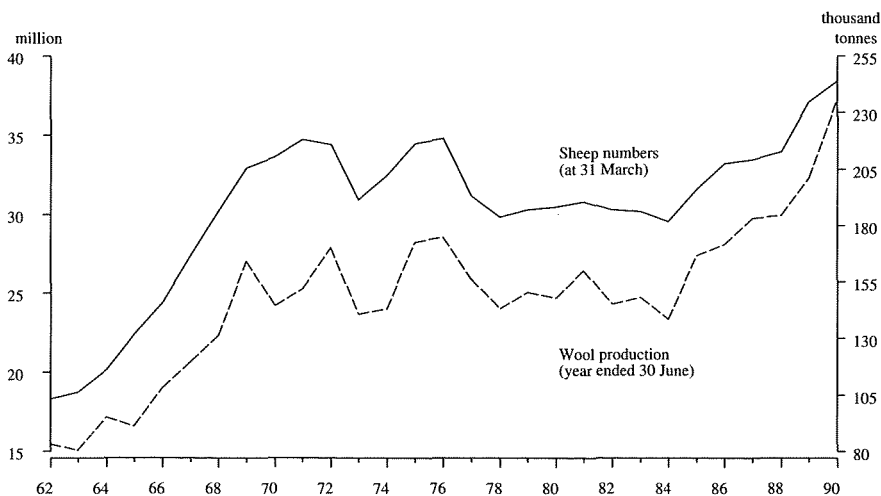
Size of flock	Flocks	Sheep
		'000
1 - 99	230	10
100 - 999	1,291	714
1,000 - 1,999	1,895	2,825
2,000 - 4,999	4,310	14,059
5,000 - 9,999	1,832	12,390
10,000 - 19,999	461	6,111
20,000 and over	79	2,313
<b>Total</b>	<b>10,098</b>	<b>38,422</b>

**TABLE 13.25 - SHEEP SHORN AND WOOL PRODUCTION**

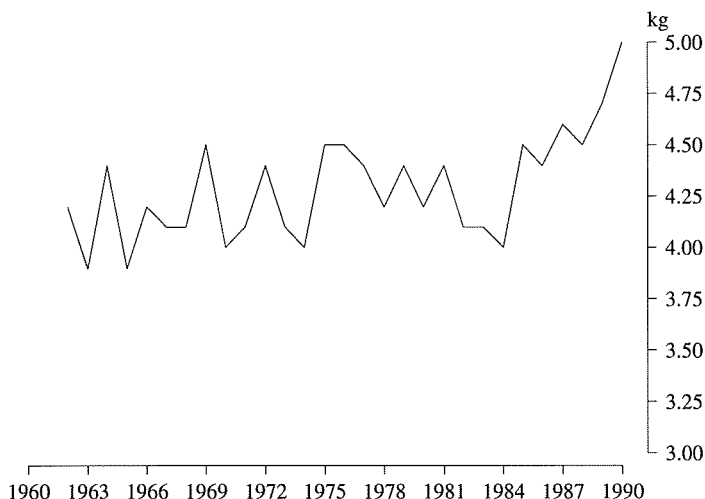
Reference: Catalogue No. 7221.5

Unit	1987-88	1988-89	1989-90
Sheep shorn	'000 31,670	r33,899	36,479
Lambs shorn	" 8,912	r8,880	10,116
<b>Total</b>	<b>" 40,582</b>	<b>r42,779</b>	<b>46,595</b>
Average weight of wool shorn	kg 4.54	4.69	4.97
Wool production (greasy)—			
Shorn	'000 t 184	r201	232
Dead, fellmongered, exported on skins	" 4	3	4
<b>Total</b>	<b>" 189</b>	<b>203</b>	<b>236</b>

**DIAGRAM 1.1  
SHEEP NUMBERS AND WOOL PRODUCTION 1962 TO 1990  
(EXCLUDES WOOL EXPORTED ON SKINS)**



**DIAGRAM 1.2**  
**AVERAGE WEIGHT OF WOOL PER SHEEP SHORN**



The major aims of the Board are to administer an orderly method of marketing and encourage producer participation in lamb marketing, to operate an advance price schedule and a weight and grade system, and to rationalise procedures throughout the industry.

Apart from promoting lamb on the local market the Board is also responsible for lamb exports. During the period of the Board's operations there has been a marked change in the pattern of export sales of Western Australian lamb with reliance on the traditional United Kingdom market being replaced by other markets to the extent that the Board now exports to a wide diversity of overseas countries.

**Wool**

Increasing sheep numbers in recent years, combined with improving average clips per head, resulted in a further record shorn wool production in 1989-90. The 46.6 million sheep and lambs shorn returned a clip of 231,732 tonnes of wool. A further 4,348 tonnes was accounted for by dead and fellmongered wool and wool exported on skins.

During the war years wool was compulsorily acquired by the Commonwealth Government in accordance with an agreement with the United Kingdom. Government control ceased after the war and the auction system was reintroduced. Since then, there has been a range of legislative action taken with the aim of promoting the use of wool and wool products, encouraging efficient marketing and providing a steadying influence on market prices. A summary of this government action is contained on page 386 of the *Western Australian Year Book*, No. 20 — 1982.

**TABLE 13.26 – GROSS VALUE OF WOOL PRODUCTION**  
**(\$'000)**

Reference: Catalogue No. 7503.5

	1987-88	1988-89	1989-90
Shorn wool	1,239,739	r1,388,361	1,244,908
Dead wool and fellmongered wool	862	813	817
Wool exported on skins	12,072	5,942	7,912
<b>Total</b>	<b>1,252,674</b>	<b>r1,395,116</b>	<b>1,253,637</b>

A major development in the administration of the wool industry was the passing of the *Wool Industry Act 1972*, which brought into existence the Australian Wool Corporation on 1 January 1973. The functions of the Corporation relate to wool marketing, wool use promotion, wool research and the management of wool stores.

## Cattle

Cattle statistics are classified according to the two broad categories of 'meat production' and 'milk production', regardless of breed. At 31 March 1990, meat cattle comprised over 93 per cent of the State's cattle herd. More than 55 per cent of the State's meat cattle are located in the pastoral areas of the State, where extensive grazing on very large cattle stations is carried out. In 1990, the average meat cattle herd size in the pastoral areas was 3,801 compared to 175 in the agricultural areas. These calculated averages exclude small semi-commercial operations, of which there are significant numbers in the south west of the state.

The cattle which were originally shipped or driven overland from the other Australian Colonies to start the industry in the northern pastoral areas were predominantly shorthorn breeds and these still form the great bulk of all cattle kept for meat production in those areas. However, Brahman and Brahman-infused breeds are increasing.

Although the greater proportion of the wool clip is exported in the grease, scouring or degreasing is done in the State and degreased wool is an appreciable item in the external wool trade. During 1989-90 exports of greasy and degreased wool were 106,388 tonnes and 17,427 tonnes respectively. Further details of overseas exports of greasy and degreased wool, are given in Chapter 20 — Foreign and Interstate Trade.

## Slaughtering

Beef from cattle slaughtered at Broome in the Kimberley Division is principally for export. The local market for meat is supplied mainly from abattoirs at Fremantle, Waroona, Harvey, Bunbury, Albany, Woorooloo, Geraldton and Katanning. Most of these establishments also slaughter for the export trade. Small establishments operating in country towns also contribute to total production, and most stations and many farms slaughter sufficient for all or part of their own requirements. Over half of all exports are destined for the United States of America.

While the agricultural areas account for over 44 per cent of the State's cattle numbers, higher productivity and turnoff than in the pastoral areas enables the agricultural areas to account for about 75 per cent of the State's beef production.

TABLE 13.27 — CATTLE FOR MEAT PRODUCTION AT 31 MARCH  
CLASSIFIED ACCORDING TO SIZE OF HERD AND LOCATION

Reference: Catalogue No. 7221.5

Size of herd	In agricultural areas		In pastoral areas		Whole state		
	Number of		Number of		Number of		
	Herds	Cattle	Herds	Cattle	Herds	Cattle	
		'000		'000		'000	
1990—							
1 — 29	924	11.4	10	0.2	934	11.6	
30 — 99	1,130	68.1	10	0.6	1,140	68.7	
100 — 299	1,339	234.1	26	5.3	1,365	239.3	
300 — 499	305	117.0	16	6.0	321	123.1	
500 — 999	189	129.6	23	15.7	212	145.3	
1,000 — 1,999	54	70.2	37	54.7	91	124.9	
2,000 — 4,999	12	35.7	54	163.2	66	198.9	
5,000 — 9,999	4	25.0	24	167.0	28	192.1	
10,000 and over	—	—	27	450.0	27	450.0	
<b>Total herds</b>	<b>1990</b>	<b>3,957</b>	<b>691.1</b>	<b>227</b>	<b>862.9</b>	<b>4,184</b>	<b>1,554.0</b>
	1989	4,037	688.9	234	901.8	4,271	1,590.7
	1988	4,049	666.9	240	923.3	4,289	1,590.2

**TABLE 13.28 - LIVESTOCK SLAUGHTERED AND MEAT PRODUCED**

Reference: Catalogue Nos. 7221.5, 7503.5

	Unit	1987-88	1988-89	1989-90
Livestock slaughtered (a)—				
Sheep	'000	3,167	2,234	3,815
Gross value (b)	\$'000	47,715	36,557	19,945
Lambs	'000	1,141	972	1,469
Gross value (b)	\$'000	27,549	23,533	31,375
Cattle and calves	'000	494	458	506
Gross value (b)	\$'000	171,131	183,641	216,813
Meat produced (c)—				
Mutton and lamb	tonnes	75,216	61,109	95,651
Beef and veal	"	101,523	94,312	106,542

(a) Mainly slaughterings for human consumption but also includes quantities condemned and small numbers of livestock slaughtered for boiling down. (b) Value on hoof at principal market. (c) Dressed carcass weight; excludes condemned carcasses and offal.

**OTHER LIVESTOCK**

**Dairying**

Compared with the wheat, wool and meat producing industries, dairying as a major well-organised rural activity is of fairly recent origin. Its growth was retarded initially by the difficulty of clearing heavily-timbered country in the south-west and the need for special methods of pasture establishment. As these problems were progressively overcome dairying became a significant feature of primary production. After a period of intense rationalisation in the 1970s, the industry has been concentrated on the production of milk for the local liquid milk and fresh dairy products markets.

**TABLE 13.29 - CATTLE FOR MILK PRODUCTION AT 31 MARCH ('000)**

Reference: Catalogue No. 7221.5

	1988	1989	1990
Bulls	1	1	1
Bull calves (a)	—	—	—
Commercial dairy—			
Cows	65	63	64
Heifers	27	26	25
Heifer calves (a)	20	19	20
House cows and heifers	2	1	1
<b>Total</b>	<b>115</b>	<b>111</b>	<b>111</b>

(a) Under one year.

A summary of the history of the dairying industry in Western Australia, with specific reference to legislative and marketing arrangements, price instability and subsidy schemes, is contained on

pages 391-2 of the *Western Australian Year Book*, No. 20 — 1982.

**TABLE 13.30 - CATTLE FOR MILK PRODUCTION CLASSIFIED ACCORDING TO SIZE OF HERD AT 31 MARCH**

Reference: Catalogue No. 7221.5

Size of herd	Number of herds	Total cattle
		'000
1 - 9	519	1.4
10 - 49	56	1.3
50 - 99	48	3.8
100 - 149	85	10.7
150 - 199	116	20.2
200 - 249	104	23.1
250 and over	141	51.0
<b>Total</b>	<b>1,069</b>	<b>111.5</b>

The bulk of the State's dairy cattle are concentrated in the high rainfall, near-coastal strip from Pinjarra to Augusta, with lesser numbers being found further east to Albany. Irrigation of pastures during the drier summer months plays an important role in the industry.

**TABLE 13.31 - WHOLE MILK PRODUCTION (a)**

Reference: Catalogue No. 7221.5

	Unit	1987-88	1988-89	1989-90
Quantity	million L	250	245	267
Gross value	\$'000	62,325	66,686	80,321

(a) Includes milk used for processing.

**Pig raising**

The principal pig raising districts are the grain growing areas of the Midlands and the Upper and Lower Great Southern Statistical Divisions. At 31 March 1990, 64 per cent of pigs were within these divisions. Although the greater proportion of production is consumed locally, there is some export trade.

**TABLE 13.32 - PIG NUMBERS AT 31 MARCH ('000)**

Reference: Catalogue No. 7221.5

	1987-88	1988-89	1989-90
Boars	3.4	3.0	2.7
Breeding sows	34.5	30.9	30.5
Gilts for breeding	4.9	5.3	5.6
Other pigs	264.2	245.6	233.8
<b>Total</b>	<b>307.0</b>	<b>284.8</b>	<b>272.5</b>

**TABLE 13.33 - PIGS SLAUGHTERED AND MEAT PRODUCED**

Reference: Catalogue No. 7221.5

	Unit	1987-88	1988-89	1989-90
Pigs slaughtered	'000	508	503	461
Gross value (a)	\$'000	51,694	62,924	63,293
Pigmeat produced (b)	tonnes	29,393	29,228	26,883
Bacon and ham produced	"	8,377	9,384	9,937

(a) Value 'on hoof' at principal market or at factory door. (b) Dressed carcass weight; excludes condemned carcasses and offal but includes quantities used to produce ham.

Intensive piggeries have assumed greater importance in recent years, and there has been a reduction in the number of pigs being raised in small or 'mixed farm' operations. While there has been little change in pig numbers since the mid 1970s, the number of herds at 31 March 1990 was less than half the number in 1976. Over the same period the proportion of pigs which were in herds of 500 or more has increased from 20 per cent to 71 per cent.

**TABLE 13.34 - PIG HERDS AT 31 MARCH 1990 CLASSIFIED ACCORDING TO SIZE OF HERD**

Reference: Catalogue No. 7221.5

Size of herd	Number of herds	Total pigs
		'000
1 - 9	97	0.4
10 - 49	250	7.0
50 - 99	134	9.3
100 - 199	132	18.8
200 - 499	142	44.1
500 - 999	80	56.8
1,000 and over	46	136.1
<b>Total</b>	<b>881</b>	<b>272.5</b>

## Livestock in Australia

**TABLE 13.35 - LIVESTOCK NUMBERS AT 31 MARCH 1990, AUSTRALIA ('000)**

Reference: Catalogue No. 7221.0

State or Territory	Sheep	Cattle		Pigs
		Milk	Meat	
New South Wales	62,109	380	5,125	865
Victoria	29,268	1,445	2,200	428
Queensland	16,675	309	9,180	600
South Australia	18,363	139	830	437
<b>Western Australia</b>	<b>38,422</b>	<b>111</b>	<b>1,562</b>	<b>272</b>
Tasmania	5,337	136	433	42
Northern Territory	1	2	1,326	2
Australian Capital Territory	122	—	12	—
<b>AUSTRALIA</b>	<b>170,297</b>	<b>2,523</b>	<b>20,668</b>	<b>2,648</b>

## Poultry farming

Poultry farming in Western Australia is a specialised industry located almost entirely within the Perth Statistical Division. A few commercial egg farms are established in the more populous of the country areas.

**TABLE 13.36 - POULTRY NUMBERS AT 31 MARCH ('000)**

Reference: Catalogue No. 7221.5

	1988	1989	1990
Fowls	5,144	r5,210	5,398
Ducks	3	2	3
Turkeys	2	r29	13

Almost all the egg production and a large proportion of the chicken meat production is on holdings which specialise in the production of either eggs or poultry meat. A few laying birds are kept for commercial production on orchards, dairy farms and wheat farms throughout the agricultural areas.

The Western Australian Egg Marketing Board, constituted under the *Marketing of Eggs Act 1945*, is the statutory authority controlling the commercial production of eggs. Two other Acts, the *Poultry Industry Levy Act 1965* and the *Chicken Meat Industry Act 1977*, are used to regulate and control poultry farming.

**TABLE 13.37 - EGG PRODUCTION AND POULTRY SLAUGHTERED FOR TABLE PURPOSES YEAR ENDED 30 JUNE**

Reference: Catalogue No. 7221.5

Unit	1988	1989	1990	
Egg production—				
Quantity (a)	'000 dozen	17,597	17,859	18,768
Gross value	\$'000	26,874	29,651	32,690
Poultry slaughtered for table purposes—				
Dressed weight	tonnes	34,449	33,623	36,950
Gross value	\$'000	52,721	55,288	60,345

(a) Source: Western Australian Egg Marketing Board.

Details of how these Acts control and regulate poultry farming is contained on page 311 of the *Western Australian Year Book*, No. 24 — 1986.

**Beekeeping**

Commercial producers of honey in Western Australia may be divided into three categories. There are a comparatively small number of specialist apiarists, engaged solely or mainly in honey production, who operate on a large scale and transport their hives from district to district. There are also some substantial producers who are engaged in agricultural activities and use their farms as a central site from which they may transport their hives to other areas as necessary. Finally there are the many farmers and orchardists who keep a few hives and produce honey as a minor supplementary activity.

**TABLE 13.38 - BEEKEEPERS, BEEHIVES AND HONEY PRODUCTION 1989-90**

Reference: Catalogue No. 7221.5

	Numbers of hives					800 and over
	Less than 200	200-299	300-399	400-499	500-799	
Beekeepers— Number	3	8	17	14	13	11
Productive beehives ('000)	0.2	1.8	4.4	5.4	6.7	8.3
Honey production (tonnes)	8	85	421	507	703	606

**TABLE 13.39 - BEEHIVES AND PRODUCTION OF HONEY AND BEESWAX**

Reference: Catalogue No. 7221.5

	Unit	1987-88	1988-89	1989-90
Beehives— Productive	'000	26	26	27
Unproductive	"	7	7	7
Honey production	tonnes	2,510	2,182	2,330
Beeswax production	"	45	39	41

**THE DEPARTMENT OF AGRICULTURE**

A Bureau of Agriculture was formed in 1894 and became the Department of Agriculture in 1898. At that time cleared, arable land in Western Australia was less than one per cent of present farm land.

The Department of Agriculture, which has expanded progressively, has a broad role to foster the State's agriculture and to advise on marketing

of its products. By representation on the Australian Agriculture Council, it helps establish nationally acceptable policies.

It is the branch of the State Government service which communicates scientific advice to farmers, pastoralists and allied industries, conducts a wide range of research and administers relevant Acts of Parliament. It maintains services to assist farmers and its regulatory work consists of carrying out the provisions of some of the laws relating to agriculture.

The Head Office at South Perth houses the main administrative, research, specialist and diagnostic staff and there are 25 district offices and 19 research stations. Most research stations are for the wheat and sheep, beef, and dairying industries but specific stations cater for fruit, vegetables, poultry, pigs, viticulture and tropical agriculture.

The greater part of the Department's extension activities are carried out by the advisers and veterinary officers stationed at its Regional and District Offices. Research is carried out at head office, and at 4 outer metropolitan and 15 country research stations.

A detailed description of the Department of Agriculture, including its history, structure and the services it provides to the agricultural sector is contained in pages 313-318 of the *Western Australian Year Book*, No. 24 — 1986.

**AGRICULTURE PROTECTION BOARD**

The Agriculture Protection Board is the body responsible for ensuring that the State's agriculture resources are protected from the sometimes devastating effects of plant and animal pests.

The Board administers the Agriculture and Related Resources Protection Act which replaced the Noxious Weed Act and the Vermin Act in 1976. Plants and animals can be declared by the Board to be 'declared animals' for the purposes of the Act.

The Agriculture Protection Board's role is to coordinate the control effort and see that declared plants and declared animals are dealt with according to its policies. In addition to coordinating overall agriculture protection policies, the Board advises on methods of control, maintains services to prevent pest animals and plants entering the State, and conducts research into the biology and control of vertebrate pests.

### ADVISORY COMMITTEES

Responsibility for advising the Minister for Agriculture on various aspects of agricultural activity is vested in a number of advisory committees, whose members are drawn from government departments and authorities, industry organisations and marketing and storage organisations.

These committees include the State Wheat Advisory Committee, the State Coarse Grains and Seeds Advisory Committee, the State Soil Conservation Advisory Committee, Drought Consultative Committee and the Ord Project Co-ordinating Committee.

### HERD IMPROVEMENT SERVICE OF WESTERN AUSTRALIA

The Herd Improvement Service of Western Australia (HIS) was established in November 1984 under the provisions of the *Herd Improvement Service Act 1984*. HIS is an independent corporate body based in Bunbury. It was created to

amalgamate the services previously provided by the Artificial Breeding Board and the Department of Agriculture's Dairy Herd Recording Scheme. Accordingly, the purpose of HIS is to promote improvements in the quality and productive genetics of Western Australia's livestock through extensive use of advanced artificial breeding practices and scientific measurement of production as with the Dairy Herd Recording Service.

### FARM MANAGEMENT SERVICE LABORATORY

The University of Western Australia, by resolution of the Senate, approved the establishment of the Farm Management Service Laboratory within the University in 1966. The aims of the Laboratory are to develop concepts and services in management accounting, computer planning and animal breeding which are specially suited to the needs of farmers; to make these developments available to farmers; and to use information processed by the Laboratory for teaching and research at the University of Western Australia.

## Forestry

### FORESTS FOR WOOD, WATER AND WILDLIFE

Most of Western Australia's native hardwood forests grow in the south-west of the State, between Walpole and Perth. From these forests are drawn a wide variety of essential resources, both tangible and intangible: the beauty and durability of their timbers is renowned world-wide, and generates a considerable income for Western Australia each year; the forests also provide an increasingly popular environment for recreation, within easy reach of major cities and towns. Catchment areas, which supply high quality water for domestic and agricultural use to the most populated areas of the State, occur throughout the forests; and conservation areas for native wildlife and plants ensure the long-term survival of many species, as well as providing an invaluable scientific and educational resource.

At present 1,750,357 hectares have been permanently dedicated as State forest, 144,399 hectares are held as timber reserves, and 32,518 hectares of freehold land is vested mainly for pine production.

### THE PRIME INDIGENOUS FORESTS

Jarrah (*Eucalyptus marginata*) is the State's principal timber and the prime forest covers almost 1.4 million hectares. Karri (*E. diversicolor*) is next in importance and is distributed over some 126,000 hectares. Wandoo (*E. wandoo*) accounts for a smaller portion of the dedicated area (106,000 hectares) and Tuart (*E. gomphocephala*), another valuable timber, has a restricted area of about 1,000 hectares. Blackbutt (*E. patens*) occurs in patches throughout the jarrah and karri forests and is an important milling timber with properties and uses similar to jarrah. Marri (*E. calophylla*), the most widespread of the commercial eucalypts, is used to a limited extent as building scantling, pole timber and as the principal material for an export woodchip industry based in the Manjimup region.

Other eucalypts and many trees of different genera occur within the prime forest belt but they are not of major economic importance. The main distribution of the prime forests, is practically confined to the south-western portion of the State.

### THE INLAND FORESTS

East of the area of prime forest is an inland woodland, within which are a number of eucalypts (both tree and mallee form), as well as several types of Acacia, such as the wattles and mulgas, tea tree (*Melaleuca spp.*) and casuarinas. Sandalwood (*Santalum spicatum*), indigenous to the wheat belt and semi-arid areas of the State, is exported to Asian countries for use in the manufacture of incense.

The major emphasis of forestry activities in the goldfields area is the conservation of woodlands. During recent years, soil conservation in the regions of low rainfall has received increasing attention and the importance of controlling clearing, grazing and firewood cutting has been recognised. The Department of Conservation and Land Management maintains a staff to exercise these controls and to advise on tree planting. Work is proceeding with demarcation of areas representing important inland ecotypes for which long-term conservation proposals have been prepared.

### FORESTRY ADMINISTRATION

Forests in Western Australia are managed by the Department of Conservation and Land Management, within a General Working Plan of multiple use management and regulation of an allowable hardwood sawlog cut. Major uses include wood production, water production, forest and catchment protection, recreation, flora, fauna and landscape conservation, scientific study and education, public utility and mining.

Timber harvesting in both natural forests and plantations is tightly controlled and closely monitored to meet environmental protection and disease management requirements, and to achieve the most efficient use of the resource.

To supplement native forest production, pine forests have been established throughout the south-west. There are over 68,000 hectares of State owned plantations and an increasing amount of forests planted on private land. *Pinus radiata* and *Pinus pinaster* are the principal species.

Other major forest-related roles of the department include reduction of forest diseases, particularly

jarrah dieback (*Phytophthora cinnamomi*), fire surveillance and control measures and the granting of sawmilling permits and forest produce licences.

### FOREST PRODUCTION

Sawn timber from jarrah and karri is the principal form of forest wood production, but there will be a gradual increase in the use of pine in the future. Karri and locally grown pine logs together with imported logs are used for plywood. During recent years, there has been a greater use of local logs for plywood manufacture. Small sized logs from thinning pine plantations and manufacturing residues are used for the production of particleboard. Hardwood mill wastes and bush residues of marri and karri form the basis of an important export woodchip industry located in the southern forests.

In addition to these major wood products, the State's forest wealth includes sandalwood for export, firewood for general purposes, and various seeds and plants for propagation both in Australia and abroad. The karri, wandoo, marri and some inland scrub species are important nectar producers for apiarists, who move their bees to various forest sites to follow the nectar flow.

Of the hardwood chiplogs supplied from State forest in 1989-90, 27 per cent were karri and 73 per cent were marri.

Sawmilling and production are also referred to under Manufacturing in Chapter 16.

TABLE 13.40 - TIMBER PRODUCTION  
(cubic metres)

	1987-88	1988-89	1989-90
Sawlog production (a)—			
Hardwood	792,292	862,749	814,332
Softwood	127,556	135,737	140,861
Other log production (b)—			
Hardwood	809,851	705,162	585,475
Softwood	206,052	239,539	277,524
Sawn timber production—			
Hardwood	270,723	289,665	268,989
Softwood	47,929	53,240	55,094

(a) Sawlog timber from all sources, including veneer, but excluding chiplogs, firewood, piles and poles. Includes sawlogs and logs used in the production of plywood veneer. (b) Includes chiplogs, pine particle board material and pine rounds.



## Fisheries

### GENERAL FISHERIES

Rock lobsters are the most important item of production of the Western Australian fishing industry. The most important commercial species of rock lobster in Western Australian waters is the western rock lobster, which is fished off the south-west coast between Murchison River and Bunbury. The principal localities around which rock lobsters are caught are the Abrolhos Islands, Geraldton, Dongara, Green Head, Jurien Bay, Cervantes, Lancelin, Ledge Point and Fremantle. The industry is protected from overfishing by numerous measures and the catch is processed at shore stations licensed under the *Fisheries Act 1905* as processing establishments.

The catches of Australian salmon, which school in the bays on the south and lower south-western coasts, yield a significant proportion of the production of inshore and beach fishing and are used almost exclusively for canning. The remainder of the catch from this type of fishing comprises chiefly Australian herring, western sand whiting and sea mullet sold mainly as wet fish on the local market, and pilchard and scaly mackerel, sold as bait and for pet food. There is an important fishery for southern bluefin tuna on the south coast of the State and investigations are being conducted on the commercial potential of tuna stocks in northern waters.

TABLE 13.41 – FISH, CRUSTACEANS AND MOLLUSCS – CATCH AND VALUE

Reference: Catalogue No. 7601.5

Species—Common name	Quantity (a) (tonnes)			Value (b) (\$'000)		
	1986-87	1987-88r	1988-89	1986-87	1987-88r	1988-89
<b>Fish—</b>						
Barramundi (Giant perch)	69	101	69	393.7	574.2	390.9
Cobbler	97	162	171	493.0	843.9	930.4
Emperor (North-west snapper)	r278	442	496	r686.7	1,159.0	1,284.9
Herring, Australian	980	1,266	1,346	817.1	1,211.3	1,341.8
Jewfish, Westralian	206	218	216	1,607.2	1,894.7	1,846.1
Mackerel, Spanish	222	270	196	783.4	823.3	657.6
Mullet, sea	509	639	511	534.7	785.2	613.6
Mullet, yellow-eye	246	454	452	200.9	411.6	345.5
Pilchard	6,161	7,392	7,527	2,625.2	3,735.4	3,273.1
Salmon, Australian	1,538	1,315	1,433	794.0	747.5	839.6
Scaly mackerel	478	224	183	357.7	209.7	174.2
Shark, bronze whaler	392	463	456	1,499.0	1,878.0	1,885.3
Shark, whiskey	256	341	310	834.6	1,182.8	1,089.6
Shark, other	r634	1,344	844	1,566.1	3,051.4	1,753.8
Snapper	1,064	919	914	3,254.3	3,131.6	3,095.4
Tuna, southern bluefin	947	1,278	699	1,115.7	2,241.6	975.0
Whiting, western sand	139	181	159	337.0	533.6	571.0
Other species	r1,677	1,980	2,146	r3,494.7	4,911.6	4,648.2
<b>Total fish</b>	<b>15,893</b>	<b>18,989</b>	<b>18,128</b>	<b>21,395.0</b>	<b>29,326.4</b>	<b>25,716.0</b>
<b>Crustaceans—</b>						
Crabs	193	197	241	676.7	575.8	945.5
<b>Prawns—</b>						
Banana	217	211	230	2,154.7	2,466.0	2,644.2
Brown tiger	693	672	564	8,864.3	9,052.3	7,421.1
Endeavour	175	300	354	1,005.6	2,116.8	2,458.1
Western king	1,630	1,872	1,556	17,609.4	22,108.1	14,460.0
Other species	130	259	455	309.2	752.3	2,078.4
<b>Total prawns</b>	<b>2,845</b>	<b>3,314</b>	<b>3,160</b>	<b>29,943.1</b>	<b>36,495.5</b>	<b>29,061.8</b>
Rock lobsters	7,718	10,873	11,776	119,461.2	174,260.2	177,910.3
<b>Total crustaceans</b>	<b>10,756</b>	<b>14,384</b>	<b>15,177</b>	<b>150,081.0</b>	<b>211,331.4</b>	<b>207,917.6</b>
<b>Molluscs—</b>						
Abalone	224	262	250	2,963.3	3,378.9	4,075.9
Scallops	2,370	2,814	1,346	7,314.1	9,291.2	3,635.3
Other molluscs	366	616	491	667.5	1,070.8	1,067.2
<b>Total molluscs</b>	<b>2,960</b>	<b>3,692</b>	<b>2,087</b>	<b>10,944.9</b>	<b>13,740.9</b>	<b>8,778.4</b>
<b>TOTAL WESTERN AUSTRALIA</b>	<b>29,609</b>	<b>37,064</b>	<b>35,392</b>	<b>182,420.9</b>	<b>254,398.8</b>	<b>242,412.0</b>

(a) Live (whole) weight. (b) Gross value paid to fishermen.

The coastal waters northward from the mouth of the Murchison River to North West Cape and Exmouth Gulf are the source of several species of commercial importance. Snapper are caught between the Murchison River and North West Cape during the northern schooling season from May to August. Cod and Spanish mackerel, though in smaller quantities, are also caught between the Murchison River and North West Cape.

Prawn fisheries have been established at Shark Bay and Exmouth Gulf, with the catch processed at Carnarvon and Learmonth respectively. The major species caught are western king prawns and brown tiger prawns, as well as quantities of banana and endeavour prawns. In these areas and the smaller fisheries at Nickol Bay and Onslow the number of boats licensed to fish for prawns is restricted as a conservation measure.

Important catches of scallops are taken in Shark Bay with smaller catches occurring at the Abrolhos Islands. In 1988-89 the value of the scallop fisheries was over \$3.6 million.

Shark fishing is an important activity on the lower west and south coasts. The other major species caught offshore in this region is the Westralian jewfish.

Abalone are taken by licensed divers in the southern half of the State with most production coming from the south coast. Species taken are greenlip, blacklip, brownlip and Roe's abalone. The 1988-89 value of the catch was almost \$4.1 million.

The first fishing grounds to be exploited were the estuaries and rivers and, although they are not now as important as other grounds, they still provide substantial quantities of fish of a fairly wide variety. The principal species are cobbler and yellow-eye mullet, sea mullet and Perth herring most of which are caught in the Swan and Harvey Estuaries and the Peel and Leschenault Inlets. Other species taken include sand whiting, King George whiting, tailor, garfish and pilchard. Crabs, school prawns and western king prawns are also caught commercially in these waters.

#### **FISHERIES ADMINISTRATION**

The Western Australian Fisheries Department conducts research on a wide range of commercially important fish species such as rock lobsters, prawns, snapper, Australian salmon, pearl oysters and tuna. The Department is also involved

in research on recreational fisheries, estuaries, freshwaters and environmental matters relating to fisheries. Much of this research is carried out in association with the Commonwealth Scientific and Industrial Research Organization, other State and Commonwealth bodies and tertiary education institutions.

Research is carried out chiefly at two centres. The marine research centre at Waterman, was built for the Fisheries Department and incorporates several separate laboratories and a large aquarium with circulating water, for experiments and studies on a wide range of species. A second centre, the Commonwealth Scientific and Industrial Research Organization marine research centre at Marmion was opened in 1976.

#### **AQUACULTURE AND INLAND FISHING**

Limited commercial production of marron began in 1977 following the passing of legislation which established fish farming guidelines, including licensing of marron farms. A number of other aquaculture ventures are proposed and some in place, including the commercial rearing of prawns, Atlantic salmon, brine shrimp and abalone.

Brown trout, rainbow trout and English perch have been introduced into the streams of the south-west, and rainbow trout are also reared commercially on a number of fish farms. These species together with indigenous stocks of freshwater cobbler, marron, barramundi and cherabin, provide sport for amateur inland fishermen.

#### **PEARL-SHELL FISHING AND PEARL CULTURE**

Pearl and pearl-shell fishing has been a valuable industry for many years, the main centre being Broome. The natural pearls obtained were once an important feature of production but the success of the industry now depends almost entirely on the shell produced and the price obtainable for it, and cultured pearl production from licensed farms.

#### **AUSTRALIAN FISHING ZONE**

The Australian Fishing Zone (A.F.Z.) covering waters within 200 nautical miles of Australia was declared on 1 November 1979. Under licence from the Commonwealth Government, foreign fishing vessels are permitted to fish within the Zone. A number of joint-venture feasibility studies and test fishing programs have been conducted in the Zone since its declaration.

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Department of Conservation and Land Management, *Annual Report*.

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## THE HISTORY OF THE ROYAL AGRICULTURAL SOCIETY OF WESTERN AUSTRALIA (INC)

From the time of its inception on 28 May 1831, the Royal Agricultural Society of Western Australia (RAS) became a public voice in the new colony, concerning itself with the diverse interests of the whole settlement.

The families who pioneered the State of Western Australia also pioneered the RAS. It was through their enthusiasm and endeavour, and that of their successors in spirit, that the Society has grown to its present stature in the community, continually striving to assist in the State's advancement.

There are few institutions that can trace their origins to the first years of the colony. Fewer still have made such a contribution to the developing standards of local industry and the quality of life enjoyed by Western Australians today. The history of the State and the Society are interwoven to such an extent that it is impossible to examine one without being drawn inexorably into the other.

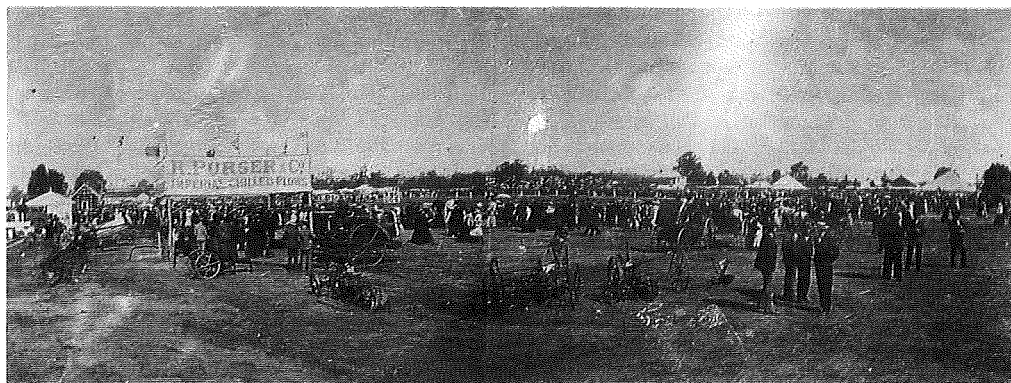
It was possibly because of this close relationship that the Society has enjoyed from its inception, the active support and patronage of the Governors of the State. The first Governor, Sir James Stirling, took an active interest in the Society's formation, and rendered valuable assistance, attending the monthly meetings held at the Cielkum Inn in Guildford until they were relocated to the Woodbridge Hotel.

Society Directors appointed in September 1833 included names indelibly inscribed in the State's records of pioneers in primary production. They were the Hon. Peter Brown, Messrs E.B. Lennars, W. Tanner, S.F. Moore, M. Clarkson, J.R. Phillips, W. Burges, T.N. Yule, H. Bull, John Hardy, with W.L. Brockman as secretary.

On January 3, 1834, at a meeting of the Society, Secretary Brockman succeeded in having a resolution passed that there be an annual subscription by the Society of such a sum 'as may be deemed sufficient for giving rewards to meritorious servants and that an Animal Cattle Show be held at Guildford, on which occasion, the rewards to be distributed'. The Annual Show had begun, and the first Fair and Cattle Show was held on Friday, November 7 of the same year.

From 1844 through to 1904, the Society conducted its annual show at Woodbridge. Although there was substantial progress over this period, fortunes inevitably fluctuated with 1870 standing out as a year of great hardship for the colony and equally serious problems for the Society.

However by 1890, the Annual Show had been expanded to become a two day affair in order to provide more amusement and accommodation for the public. This was to be a landmark year for the Society. In May, the Governor announced that he



Guildford Showgrounds — 1901 Royal Show

Photograph: Royal Agricultural Society of Western Australia.

had received a despatch from the Colonial Secretary, Lord Knutsford, saying that the Queen had been pleased to grant permission to the Society to assume the title of 'Royal'.

In 1893, the two-day attendance exceeded 5,000, and the show was acclaimed the largest and best ever conducted. By 1894, the land and buildings of the Society were valued at 2,000 pounds with a balance of assets over liabilities of 780 pounds — substantial amounts in those times.

Improvements to facilities kept pace with increased attendances with the emphasis on amenities and hygiene for exhibitors and public alike. The Society embarked on promotional enterprises more spectacular than anything before, and although these undertakings proved costly, their importance was obvious, and their effects significant.

In 1902, the Government granted the Society a 35 acre site (later to be increased) in Claremont, and a great new era began as the Society transferred to its new headquarters.



Claremont showgrounds — early 1900s

Reproduced courtesy of Royal Agricultural Society of Western Australia.

Five years later, in August 1907, representatives of the various agricultural societies which had come into existence in a number of country centres, met and decided to affiliate. After a short delay caused by a change in government, a Bill was passed investing the RAS with the necessary powers to direct affiliation with any other society, formed or unformed, in the State.

Since then, the Society has progressed steadily. At the 1965 Royal Show, the 60th anniversary of the opening of the Claremont Showgrounds, the attendance topped the quarter million mark for the first time, with 255,164 admissions. By the

following year, that figure had risen by almost 30,000, with a total attendance of 285,141.

In 1970, the RAS established its permanent headquarters at the Claremont Showgrounds in the Rothmans Building. In 1974 the Royal Show ran for the first time on a Sunday. Over the ten days, a new record attendance of 394,067 was achieved. A new Wool Pavilion was opened for the Show in the same year, featuring a theatre capable of seating over 300 people.

For the RAS, 1979 was a special year for several reasons.

Of special significance was the visit of His Royal Highness, Prince Philip, President of the Royal Agricultural Society of the Commonwealth. Prince Philip officially opened the 1979 Show, and presided over the Royal Agricultural Society of the Commonwealth Conference, which was held in Western Australia for the first time.

To contribute to the State's 150th Anniversary celebrations, the Show was held for an extended period of 16 days to allow more people the opportunity of seeing the exhibits and attractions. Despite inclement weather, the attendance reached a new record of 427,701. The year was also marked by a record number of entries in many sections of the livestock and produce championships.

In 1981, to celebrate the Society's 150th Anniversary, Her Majesty the Queen and His Royal Highness the Duke of Edinburgh visited the Perth Royal Show. The Queen's Cup was presented to the Western Australian exhibitor who

accumulated the highest number of points in one or more of seven key sections: cattle, sheep, pigs, horses, breeding goats, trade cattle and wool.

The early 1980s presented the Society with many problems brought on by the continuance of a period of drought and bad seasons as well as the loss of the traditional mid-week show holiday. However, in the midst of all this, the Council of the RAS continued to have the support of exhibitors from country areas.

In recent years, the period of the Royal Show has been shortened from 10 to 8 days, a decision appreciated by exhibitors and the public alike. The configuration of the overall exhibits has also altered to provide a bigger coverage for agricultural exhibits and competitions, so much so, that it is difficult to find a rural initiative which is not represented on the Showgrounds in some form during the Perth Royal Show.



Aerial view of the Claremont showgrounds 1934

Photograph: Royal Agricultural Society of Western Australia.

The Council has upgraded the family picnic areas at the Showgrounds and has provided facilities suitable for the large crowds which patronise the 8 day event. The Council was also aware of the age of many of the buildings and had a desire to improve the sectional layout of the grounds.

Accordingly during 1985, a development concept for the Showgrounds for the next 15 to 20 years was accepted in principle by the Council. The recommendations to be implemented stage by stage as finance permitted.

More than ever, the RAS Council is convinced that the Perth Royal Show has a major role to play in this State's approach to the economic problems facing the Government and citizens of Western Australia.

There needs to be mutual support between the metropolitan dwellers and the inhabitants of our country areas. Genuine support is not possible without full understanding of mutual problems. The Royal Show provides the ideal arena for mutual mingling, discussion and understanding.

## CHAPTER 14

### MINING

**Western Australia is a world-scale producer of a range of minerals. The export-orientated mining industry is one of the most significant contributors to the State economy.**

#### MINING IN WESTERN AUSTRALIA

Gold mining was the mainstay of the State's mining industry from the 1890s through to the 1960s, when iron ore, nickel, bauxite and oil assumed prominence. Since the late 1970s, however, high gold prices and technological advances in processing methods have led to renewed growth in the industry. Production has increased significantly every year since 1981-82, and in 1987-88 gold again became the single most valuable mineral produced. Major gold mine developments and expansions have occurred, not only in the traditional areas around Kalgoorlie and other Eastern Goldfields centres, but also in the Pilbara and at Boddington in the South-West.

Other significant mineral projects in Western Australia are the giant iron ore mines in the Pilbara, nickel in the Eastern Goldfields, bauxite on the Darling Scarp, mineral sands principally at Capel and Eneabba, and diamonds in the Kimberley. Coal and solar salt production are also commercially important. Copper and zinc mining recommenced in 1988 and production of both is expected to reach significant levels.

The North-West Shelf Project, which supplies liquefied natural gas (LNG) for export, gas for industrial and domestic purposes and condensate, is the most important project in the State's oil and gas sector. Over \$12 billion is expected to be

spent on the development of this project, which will generate annual exports worth over \$2 billion. (Further information on this project is contained in Chapter 15, Energy). Several significant oil projects have also recently been developed in shallow waters near the existing Barrow Island field.

Apart from the 1989 commissioning of the LNG plant, other 'value-added' developments in the mining industry include synthetic rutile production from ilmenite, and the extraction of liquefied petroleum gas (LPG) at Kwinana from gas piped from the north-west. Other significant recent developments relate to the further processing of minerals, and are covered in Chapter 16, Manufacturing.

A more comprehensive picture of the history of mining and mineral exploration can be found in the *Western Australian Year Book—No. 24, 1986*.

In Western Australia the development of minerals occurs under a variety of statutes, notably the Mining Act administered by the Department of Mines. The Department of State Development has the responsibility for coordinating major resource development projects in recognition of the special approach required to effectively support projects of the magnitude undertaken in this State.



### The Western Australian Department Of Mines

The primary role of the Department is to facilitate the orderly exploration and development of minerals and petroleum in Western Australia for the benefit of the community, now and in the future. It also provides scientific and technical advice to Government agencies and the public on geo-technical and mining related matters, provides chemical consultancy services, regulates and records the ownership of mining tenements and regulates for public safety in matters concerning explosives and dangerous goods.

The Department is responsible for the collection of royalties for minerals owned by the Crown. Royalties for the State Government in 1989-90 amounted to \$264 million.

### The Western Australian Department Of State Development

By presenting a single point of contact with the Government, the Department of State Development facilitates development projects by coordinating the activities of government agencies in relation to a particular project and resolves issues between agencies and the developer or between agencies themselves.

### MINING STATISTICS

#### Australian Standard Industrial Classification (ASIC)

Information presented in this and the following three chapters comes mainly from a system of integrated economic censuses based on the Australian Standard Industrial Classification (ASIC). ASIC classifies all economic activities into four hierarchic levels. At the broadest level of the classification, economic activities are grouped into 'industry divisions'. Each industry division is further divided into industry sub-divisions, groups and classes.

For a detailed explanation of ASIC refer to *Australian Standard Industrial Classification, Volume 1*—1983 edition (Catalogue No. 1201.0)

#### Census of Mining Establishments

The 1988-89 census differed from previous mining censuses in that the construction materials and other non-metallic minerals industries were excluded. Complete mining censuses, including these industries, will be conducted on a triennial basis with the next one scheduled for the 1989-90 financial year. As a consequence, figures in the following tables and graphs show data for only those industries surveyed in 1988-89.

**TABLE 14.1 - MINING ESTABLISHMENTS - SUMMARY OF OPERATIONS BY INDUSTRY SUB-DIVISION**  
Reference : Catalogue No. 8404.5

Industry sub-division	Number of establishments (a)	Persons	Wages and	Turnover	Value	Capital	
		employed (a)(b)	salaries (c)		added	expenditure	
			\$m	\$m	\$m	\$m	
1988-89							
Metallic minerals	113	17,690	665.4	5,605.4	3,343.7	1,318.4	
Coal, oil and gas	15	2,923	126.9	886.3	740.2	990.5	
<b>Total mining (d)</b>	<b>1988-89</b>	<b>128</b>	<b>20,613</b>	<b>792.4</b>	<b>6,491.7</b>	<b>4,083.8</b>	<b>2,308.9</b>
	1987-88	157	19,151	680.7	5,790.8	3,904.0	2,173.1
	1986-87	144	18,246	619.2	4,734.5	3,146.7	n.a

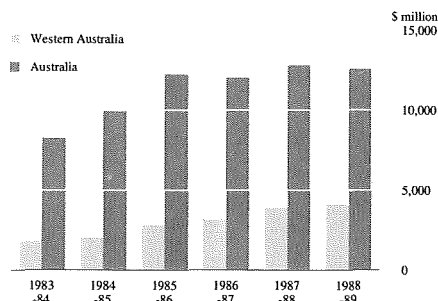
(a) At 30 June. (b) Includes working proprietors. (c) Excludes drawings of working proprietors. (d) Excludes Construction materials and Other non-metallic minerals.

**TABLE 14.2 - MINING ESTABLISHMENTS - PERSONS EMPLOYED, VALUE ADDED AND CAPITAL EXPENDITURE BY INDUSTRY SUB-DIVISION  
WESTERN AUSTRALIA AND AUSTRALIA : 1988-89**  
Reference : Catalogue No. 8404.5

Industry sub-division	Persons employed (a)			Value added			Capital expenditure		
	Western Australia	Western Australia as a percentage of Australia		Western Australia	Western Australia as a percentage of Australia		Western Australia	Western Australia as a percentage of Australia	
		'000	'000		%	\$m		\$m	%
Metallic minerals	17.7	32.6	54	3,343.7	5,948.5	56	1,318.4	1,913.0	69
Coal, oil and gas	2.9	32.9	9	740.2	6,618.4	11	990.5	1,834.3	54
<b>Total mining (b)</b>	<b>20.6</b>	<b>65.5</b>	<b>31</b>	<b>4,083.8</b>	<b>12,566.8</b>	<b>32</b>	<b>2,308.9</b>	<b>3,747.3</b>	<b>62</b>

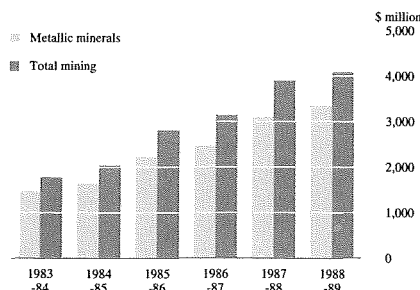
(a) At 30 June. Includes working proprietors. (b) Excludes Construction materials and Other non-metallic minerals.

**DIAGRAM 14.1  
MINING ESTABLISHMENTS (a); VALUE ADDED  
WESTERN AUSTRALIA AND AUSTRALIA**



(a) Excludes those establishments in the Construction materials and Other non-metallic minerals sub-divisions.

**DIAGRAM 14.2  
MINING ESTABLISHMENTS; VALUE ADDED  
METALLIC MINERALS AND TOTAL MINING (a)**



(a) Excludes those establishments in the Construction materials and Other non-metallic minerals sub-divisions.

In 1988-89 Western Australia remained as the most significant state of the Commonwealth in terms of turnover and value added for mining. Major new projects in iron ore, gold and nickel, and the LNG phase of the North West Shelf Project were the main contributors.

Employment in the mining industry continued to improve with an increase of more than 7 per cent in the industries surveyed. This resulted in Western Australia's share of employment in the Australian mining industry rising from 28 per cent to 31 per cent. The industries showing significant increases were gold mining and iron ore mining.

### Mineral Production

Gold continues to be the most valuable mineral produced in Western Australia with production of 121 tonnes of contained metal in 1988-89; an increase of thirty-three per cent over production in 1987-88.

Iron ore, which has been at the forefront in Western Australia since the first commercial shipments to overseas destinations commenced in 1966, declined by a further 11 per cent from the 1987-88 level of \$1.7 billion.

Other minerals which provide strong contributions to the State's value of mineral production and have shown increases over their 1987-88 levels are bauxite, coal, diamonds, mineral sands and nickel concentrate.

TABLE 14.3 - MINERAL PRODUCTION

Reference : Catalogue No. 8404.5

Mineral	Unit	1986-87		1987-88		1988-89	
		Quantity	Value (a)	Quantity	Value (a)	Quantity	Value (a)
			\$'000		\$'000		\$'000
<b>Metallic minerals—</b>							
Bauxite (b)	'000 tonnes	20,438	n.p.	20,957	n.p.	22,134	n.p.
Copper concentrate	"	—	—	(c)10	n.p.	(c)34	n.p.
Copper ore	tonnes	—	—	8,892	n.p.	(c)59,266	n.p.
Gold bullion	kilograms	75,450	1,295,854	106,764	1,839,478	137,079	1,923,156
Iron ore	'000 tonnes	92,468	1,801,585	97,967	1,669,762	92,977	1,479,716
<b>Mineral sands concentrates—</b>							
Ilmenite (incl. synthetic rutile)	"	1,070	78,840	1,265	141,914	1,428	179,068
Leucoxene	"	26	10,437	23	5,704	20	6,111
Monazite	"	11	7,135	(b)10	(b)6,961	(b)10	(b)7,446
Rutile	"	(d)88	n.p.	(b)85	(b)51,169	(b)100	(b)62,491
Xenotime	tonnes	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.
Zircon	'000 tonnes	291	51,672	(d)340	n.p.	(d)340	(d)151,609
<i>Total value mineral sands</i>	..	..	196,851	..	n.p.	..	n.p.
Nickel concentrate	'000 tonnes	(b)406	n.p.	(b)389	n.p.	(b)354	n.p.
Tin concentrate	tonnes	(b)731	n.p.	(b)434	(b)2,856	n.p.	n.p.
Other (e)	..	..	511,011	..	834,737	..	1,056,231
<b>Total value metallic minerals</b>	..	..	<b>3,756,524</b>	..	<b>4,552,580</b>	..	<b>4,865,830</b>
<b>Coal, oil and gas—</b>							
Coal	'000 tonnes	(f)3,782	n.p.	(b)3,702	(b)150,965	(b)3,800	(b)161,241
Crude oil (including condensate) (d)	megalitres	2,174	n.p.	(d)3,100	n.p.	3,205	n.p.
L.P.G. (d)	"	—	n.p.	1	n.p.	—	n.p.
Natural gas (d)	gigalitres	3,377	n.p.	3,887	n.p.	4,072	n.p.
<b>Total value coal, oil and gas</b>	..	..	<b>n.p.</b>	..	<b>n.p.</b>	..	<b>888,290</b>
<b>Construction materials—</b>							
Building and monumental stone	'000 tonnes	79	n.p.	78	n.p.	n.a.	n.a.
<b>Crushed and broken stone—</b>							
Limestone	"	2,124	n.p.	1,613	n.p.	n.a.	n.a.
Other	"	4,605	39,915	4,089	42,419	n.a.	n.a.
<b>Total value construction materials</b>	..	..	<b>n.p.</b>	..	<b>n.p.</b>	..	<b>n.a.</b>
<b>Other non-metallic minerals—</b>							
Clays	'000 tonnes	1,756	11,729	n.p.	11,183	n.a.	n.a.
Diamonds (b)	'000 carats	32,165	284,095	30,218	248,203	36,470	354,746
Gypsum	'000 tonnes	201	1,331	107	694	(b)166	(b)1,326
Limestone	"	1,507	6,134	n.p.	n.p.	n.a.	n.a.
Salt (b)	"	5,051	107,382	5,534	107,165	6,023	106,706
Silica	"	332	2,349	461	3,137	(b)364	(b)3,052
Spodumene	tonnes	(c)9,150	n.p.	(c)27,466	n.p.	(b)32,812	(b)5,742
Talc	'000 tonnes	(c)181	n.p.	n.p.	n.p.	(b)195	(b)14,992
Other (h)	..	..	14,679	..	26,658	..	3,047
<b>Total value other non-metallic minerals</b>	..	..	<b>427,698</b>	..	<b>397,040</b>	..	<b>(i)489,610</b>
<b>TOTAL VALUE ALL MINERALS</b>	..	..	<b>5,009,887</b>	..	<b>5,935,544</b>	..	<b>(f)6,243,729</b>

(a) Ex-mine value. (b) Source: Department of Mines. (c) Source: Production from published producers' reports. (d) Source: Department of Primary Industries and Energy. (e) Includes gold concentrate, gold ore, lead concentrate, tantalite-columbite concentrate and those metallic minerals for which values are not publishable. (f) Source: Joint Coal Board. (g) Includes attapulgitite. (h) Includes barite, diatomite, dolomite, feldspar, garnet concentrates, mica, peat, semi-precious stones, sillimanite, vermiculite and those minerals for which values are not available separately for publication. (i) Not comparable with values for earlier years as production of some non-metallic minerals was not collected in 1988-89 and no other source of the data was available.

### PRIVATE MINERAL EXPLORATION (Other than for petroleum)

Mineral exploration (other than for petroleum) is carried out over a large portion of the State. In recent years the search has largely concentrated on gold, as indicated in the accompanying table and diagram.

Expenditure in 1989-90 continued the downward trend commenced in 1988-89, decreasing by nineteen per cent to \$315 million. This was principally due to a further fall in gold exploration as gold prices remained at the relatively low level of the previous year and the imminent removal of gold's exemption from tax in January 1991.

Despite the fall, Western Australia continued to be the dominant state for exploration, both in total and for most individual minerals.

**TABLE 14.4 - PRIVATE MINERAL EXPLORATION  
(OTHER THAN FOR PETROLEUM)  
EXPENDITURE BY TYPE OF MINERAL SOUGHT  
(\$million)**

Reference : Catalogue No. 8412.0

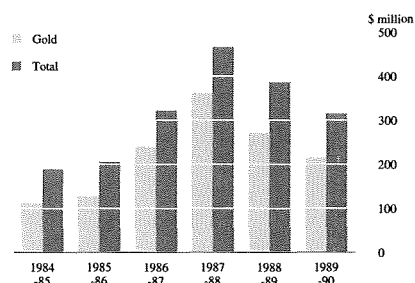
Type of mineral sought	Total private exploration		
	1987-88	1988-89	1989-90
Coal	1.4	5.4	2.4
Construction materials	0.5	0.5	1.6
Copper, lead, zinc, silver, cobalt and nickel	40.9	41.4	36.8
Diamonds	18.1	22.4	25.0
Gold	360.9	271.3	214.4
Iron ore	10.9	6.2	10.7
Mineral sands	3.8	8.3	7.1
Tin/tungsten	2.0	0.2	0.1
Uranium	12.7	13.3	7.0
Other	14.8	18.0	10.3
<b>Total</b>	<b>466.3</b>	<b>387.2</b>	<b>315.4</b>

**TABLE 14.5 - PRIVATE MINERAL EXPLORATION  
WESTERN AUSTRALIA IN RELATION  
TO AUSTRALIA : 1989-90  
(\$m)**

Reference: Catalogue No. 8412.0

Mineral	Western Australia		Western Australia as a percentage of Australia
	Australia	Australia	
Gold	214.4	341.3	63
Base metals	36.8	118.0	31
Diamonds	25.0	37.2	67
Other minerals	39.2	111.2	35
<b>Total</b>	<b>315.4</b>	<b>607.5</b>	<b>52</b>

**DIAGRAM 14.3  
PRIVATE MINERAL EXPLORATION  
GOLD AND TOTAL**



### PETROLEUM EXPLORATION

Petroleum exploration in Western Australia is centred on the onshore Canning and offshore Carnarvon Basins, and to a lesser extent in the Perth and Bonaparte Basins.

Exploration activity declined in 1988-89 partly due to falling oil prices in the preceding year. Only twenty-one exploration wells were completed compared with thirty-five in 1987-88. However, the depth drilled increased by eleven per cent to sixty thousand metres.

Successful wells were drilled in the Bonaparte and Carnarvon Basins, and a new drilling program has recently begun on Barrow Island. All fourteen exploration wells drilled in the Canning and Perth Basins proved fruitless, and were plugged and abandoned.

**TABLE 14.6 - PRIVATE PETROLEUM  
EXPLORATION - WELLS AND DEPTH DRILLED**  
Reference: Catalogue No. 8404.5

	Unit	1986-87	1987-88	1988-89
Wells drilled (i.e. those which reached final depth)—				
As oil producers	No.	3	4	3
As gas producers	"	1	—	1
As oil and gas producers	"	—	1	3
As gas and condensate producers	"	—	—	1
Plugged and abandoned	"	8	30	21
<b>Total</b>	"	<b>12</b>	<b>35</b>	<b>29</b>
Drilling still in progress at 30 June (uncompleted holes)				
Wells drilled or drilling over 3,000 metres	"	4	3	2
Depth drilled—				
Completed wells	metres	24,734	51,570	55,521
Uncompleted holes	"	5,286	2,384	4,412
<b>Total</b>	..	<b>28,175</b>	<b>53,954</b>	<b>59,933</b>

**REFERENCES****ABS Publications**

*Actual and Expected Private Mineral Exploration, Australia* (8412.0)

*Census of Mining Establishments: Details of Operations by Industry Class, Australia* (8402.0)

*Mineral Production, Australia* (8405.0)

*Mining, Western Australia* (8404.5)

*Principal Mining Statistics, Western Australia* (8405.5)

**Other Publications**

*Statistical Digest of Mineral Production 1988-89*,  
Department of Mines, Western Australia

## Chapter 15

### ENERGY

The availability of energy is an important factor in the economic and social development of any country, and this is no less so in Australia, which ranks among the highest per capita energy users in the world. In Western Australia, the per capita energy consumption is some 10 per cent higher than that for the rest of Australia, primarily because of two factors:

the vast area of the State in relation to its population and the resultant high demand for transport energy;

the development and expansion of large scale mining and mineral processing industries since the mid 1960s which has added considerably to energy demand.

For many years, Western Australia's only major indigenous source of primary energy (other than firewood and wind power) was black coal, which has been mined in the Collie region since the 1890s. Production of crude oil at Barrow Island (1967) and natural gas at Dongara (1971) further broadened the State's energy resource base. More recently, large deposits of natural gas in the North West Shelf area off Western Australia have been developed. Production from this source commenced in 1984.

Several deposits of energy minerals are at various stages of exploration, evaluation or development. In addition, research and development work continues on the various alternative sources of energy including solar and wind energy.

While Western Australia is still dependent on imports of some petroleum products, it is considerably more energy self-sufficient than it was in the early 1960s. One of the factors influencing previous economic development of this State has been the limited availability of local energy supplies. With the development of the North West Shelf natural gas project, a substantial energy surplus was created for the first time in the history of the State.

#### ENERGY RESOURCES

Western Australia's resources of energy minerals are shown in Table 15.1. To put these resources data into perspective, recent State production data have also been shown.

TABLE 15.1 — FUEL MINERALS  
RESOURCES AND PRODUCTION, 1989-90  
(Sources: Joint Coal Board;  
Western Australian Department of Mines)

Type	Unit	Resources (a)	Pro- duction
Hydrocarbon liquids—			
Crude oil	million cu m	(b)18.1	4.0
Condensate	million cu m	(b)87.4	1.6
Natural Gas	million cu m	(b)847,220	3,847
Black coal	million tonnes	(c)4,220	4.2

(a) At 30 June 1990. (b) Probability greater than 90 per cent that resources shown are recoverable. (c) Represents open cut and underground resources, both demonstrated and inferred.

The resources data, except for black coal, represent amounts which are expected to be profitably extractable, given existing knowledge of mineral deposits, current prices and technology.

Resources data are therefore subject to considerable revision if any of these factors change.

While it is not possible to quantify such resources, Western Australia's geographical and climatic characteristics are such that it has considerable potential to take advantage of advances in the use of solar, wind and biomass energy, as well as tidal and wave power.

### ENERGY PRODUCTION, CONVERSION AND UTILISATION

#### Electricity

Most of the electricity production in the State is generated by the State Energy Commission of Western Australia (SECWA) whose responsibilities include ensuring the effective and efficient use of the State's energy resources and the provision of economical and reliable supplies of electricity and gas. Significant amounts of electricity are also generated by private enterprise, particularly large-scale mining companies in the Pilbara region.

TABLE 15.2 - PRODUCTION OF ELECTRICITY (million kWh)

Generated by	1987-88	1988-89	1989-90
Government	8,179	9,123	9,990
Private	2,935	2,827	3,548
<b>Total</b>	<b>11,114</b>	<b>11,950</b>	<b>13,538</b>

SECWA operates two power grid systems which supply the electricity needs of 98 per cent of the State's population. The two systems are:

The *South-West interconnected system* servicing an area from Kalbarri in the north to Bremer Bay in the south and from Perth east to Kalgoorlie. Three major thermal power stations provide the bulk of electricity for the system. They are located at Muja (1,040MW capacity) and Bunbury (120MW), both coal fired and generating around 64 per cent of electricity supplied through the system during 1989-90; and at Kwinana (880MW), fuelled

by coal and North West Shelf natural gas. Gas turbines are located at Pinjar (north of Wanneroo), Mungarra (south east of Geraldton), Kwinana, Geraldton and Kalgoorlie to provide peak and emergency power. At 30 June 1990, the installed capacity of generating plant within this system was 2,280MW. Additional gas turbines are being installed at Pinjar, Mungarra and Kalgoorlie.

The *Pilbara interconnected system* interconnecting Karratha, Dampier, Cape Lambert, Wickham, Roebourne, Port Hedland and Goldsworthy. Electricity is supplied from Cliffs Robe River Iron Associates' gas-fired power station at Cape Lambert. Additional power can be drawn from the SECWA stand-by diesel generating facility at Port Hedland, from Hamersley Iron Proprietary Limited's power station at Dampier and from a SECWA gas turbine generating unit also located in Dampier.

Outside the electricity grid systems, SECWA operates another twenty-eight smaller diesel power stations with a total capacity at 30 June 1990 of 184MW. It also provides support services for the Aboriginal and Torres Strait Islanders Commission to help run thirty-four Aboriginal village power stations in remote areas of the State.

At 30 June 1990, SECWA had 623,000 customer accounts for electricity throughout Western Australia.

SECWA will install 300MW of combined cycle gas turbine plant at Pinjar by 1993. A decision will be made in early 1991 whether to proceed with a second 300MW of combined cycle gas turbines or a privately owned and operated 300MW coal-fired power station at Collie, but late in 1990 SECWA decided that the Hill River Project would not form part of their immediate plans for the State's power operation requirements.

TABLE 15.3 - FUELS USED FOR ELECTRICITY GENERATION

(Source : State Energy Commission Of Western Australia)

Fuel	Unit	1987-88	1988-89	1989-90
Coal	'000 tonnes	2,363	3,233	3,633
Fuel oil	'000 tonnes	15	16	19
Distillate	'000 tonnes	56	70	68
Natural gas	Terajoules	42,128	33,973	35,056

### Petroleum fuels

Until 1954, Western Australia was wholly dependent on imports for its supplies of petroleum fuels. The opening of an oil refinery at Kwinana in that year brought some local input into petroleum fuel production although, initially, all the feedstock for the refinery was imported.

The first commercial deposits of oil were found on Barrow Island, off the north-west coast of the State, in 1964 and shipments commenced in 1967. This oil is refined at several Australian refineries, including Kwinana.

The North West Shelf provides most of the natural gas to SECWA with a small amount of gas being received by SECWA from the onshore Woodada gas field (near Dongara).

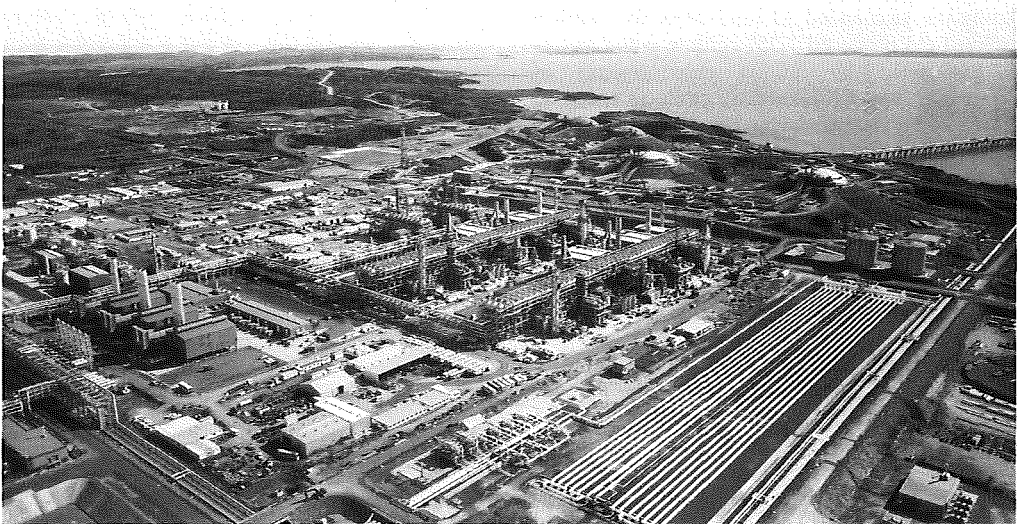
In addition to reticulating (principally) North West Shelf natural gas to customers linked to the Dampier to Bunbury pipeline, SECWA also reticulates tempered liquefied petroleum (TLP) gas to customers in Albany on the south coast, and Simulated Natural Gas (SNG) to customers in Mandurah, south of Perth.

At 30 June 1990, there were 243,731 customer accounts for natural gas and 2,537 customer accounts for TLP gas.

The North West shelf project is based on the use of the North Rankin and Goodwyn gasfields which contain expected recoverable hydrocarbons currently estimated at 297,500 million cubic metres of gas and 52 million cubic metres of condensate (with a 90 per cent probability that these volumes are recoverable). In North Rankin, the first field to be developed, the natural gas reservoir is trapped in layers of porous sandstone, more than three kilometres below the sea floor. The gas-saturated sandstone beds have a cumulative thickness of approximately 300 metres and extend over an area of more than 50 square kilometres.

Construction of the offshore and onshore facilities for the project involved two phases; the first (the Domestic Gas Phase) to supply gas to Western Australia, while the second (the Liquefied Natural Gas (LNG) phase) is to supply LNG to Japan.

The Domestic Gas Phase is complete. The LNG phase began in 1985. It involved the construction



On-shore plant for LNG processing at Karratha

Photograph: Woodside Petroleum



of three LNG processing 'trains', four 65,000 cubic metre capacity LNG storage tanks to store the refrigerated LNG ready for export, and seven 125,000 cubic metre capacity LNG tankers to ship the LNG to Japan.

By October 1990, two of the three processing trains, all storage tanks and four of the seven tankers were in service with the total plant and fleet due to be fully operational by 1993. LNG exports to Japan commenced at the end of July 1989, nearly two months ahead of the contract schedule. From commencement to beginning of November 1990, 54 export shipments have been made, totalling 3,105,635 tonnes of LNG.

When both phases are fully operational at planned plateau production levels, output from the project will include:

10.5 million cubic metres (414 Terajoules) of gas per day for the domestic market in Western Australia;

6 million tonnes of LNG per year to eight Japanese electricity and gas utilities which service areas embracing 90 million people;

1.9 megalitres of condensate per year (33,000 barrels per day). Production could treble once the Goodwyn Platform is in operation

During the year ended 30 June 1990, the North 3 Rankin field produced 7,357 million cubic metres of gas and 1.63 million cubic metres of condensate. The field currently produces about 33 million cubic metres of gas per day of which 10 million cubic metres is re-injected into the reservoir, resulting in increased condensate production. The peak daily flow rate of gas supplied to SECWA during 1989-90 was 443 terajoules (11.6 million cubic metres), but averaged 370 terajoules during 1990 due to the Kwinana Power Station firing on coal.

Development of the condensate rich Goodwyn field is now underway. Contracts have been let for construction of the \$1.7 billion Goodwyn A platform due for completion in 1993. It will be connected to the North Rankin A platform 23 kilometres to the south-east by undersea pipeline. The Goodwyn development will have the capacity to process 25.5 million cubic metres of gas per day and up to 12,700 kilolitres per day of condensate.

In 1984 SECWA constructed a 660 millimetre capacity pipeline, 1,500 kilometres long, from

Dampier to Wagerup, at a cost of approximately \$1,000 million, to carry gas to its Perth distribution network, and to major industrial customers in the south-west of the State. The pipeline has been extended to serve major industrial customers in the Pilbara and smaller gas supply systems at Carnarvon, Geraldton, Pinjarra, Bunbury and Harvey.

Petroleum exploration has continued at a high level in recent years. Statistics relating to this activity and to the production of crude oil and natural gas are contained in tables in Chapter 14.

An LPG extraction plant based at Kwinana and using North West Shelf gas to produce propane and butane became fully operational in October 1988. About 100,000 of the 150,000 tonnes produced each year is being exported to Japan.

Table 15.4 shows sales of petroleum products in Western Australia. The data relate only to sales of refinery products (whether produced in this State or imported), and hence exclude products such as natural gas, which do not go through a refining process; or crude oil, which is a refinery input.

**TABLE 15.4 - SALES (a) OF PETROLEUM PRODUCTS**  
(Source: Australian Bureau of Agricultural and Resource Economics)  
(megalitres)

	1987-88	1988-89	1989-90
LPG	67	67	92
Automotive gasoline—			
Premium Leaded	1,399	1,323	1,227
Unleaded	221	337	447
<i>Total</i>	<i>1,621</i>	<i>1,661</i>	<i>1,674</i>
Aviation gasoline	16	16	19
Aviation turbine fuel	285	283	280
Automotive diesel	1,609	1,840	2,030
Industrial and marine diesel fuel	64	44	40
Fuel oil	320	r330	286
Lubricating oils and greases	60	66	69
Bitumen	54	67	65
Other products (b)	37	36	32
<b>Total products</b>	<b>4,134</b>	<b>r4,409</b>	<b>4,587</b>

(a) Includes reporting companies' own use, but excludes refinery fuel. (b) Includes lighting kerosene and heating oil.

## Coal

Commercial production of coal commenced in the 1890s at Collie. For many years coal was the major source of energy in the State, being used to generate electricity, to manufacture 'town' gas and to provide fuel for steam locomotives and industry generally. Today, the major user of coal mined in

the Collie basin is SECWA. Coal is the main fuel for electricity generation for SECWA's South-West interconnected system.

Substantial deposits of black steaming coal suitable for power generation have recently been demonstrated at Hill River, 250 kilometres north of Perth near the coastal town of Jurien. The deposit, at 600 megatonnes (demonstrated and inferred), has the potential to be a major long term supplier of energy to the state.

Apart from the Collie and Hill River deposits, several other deposits of both black and brown coal have been identified and are at present being evaluated. Chapter 14 contains statistics relating to exploration and production of coal.

Data showing trends in coal production since 1900 are contained in the Statistical Summary, Chapter 26.

### Solar energy

The use of solar radiation for the production of domestic hot water is well established in Western Australia, and is the most common application of solar energy. Such systems are accepted as being competitive with other forms of domestic water heating.

Photovoltaic cells, which convert light directly into electrical energy are used for the refrigeration of food, and basic lighting and radio communications equipment in remote and outback localities. Solar energy is also used for water and space heating in commercial applications and in agriculture, where solar power can be used to pump water from reservoirs and to electrify fencing.

At present, economical application of solar energy is largely restricted to relatively small scale heating purposes, with some more sophisticated applications in remote localities where factors such as the transport costs of conventional fuels are significant.

### Biomass

Biomass refers to living matter which can be used as a source of energy and it includes matter which can be used directly as a fuel (e.g. firewood) or after conversion (e.g. sugar cane converted to sugar, sugar converted to ethanol). The concept of biomass includes organic waste materials such as sawdust and crop refuse, but excludes fossil fuels such as coal and petroleum. The most significant

form of biomass to have been used as an energy source in Western Australia is firewood, and this is still an important source of household energy.

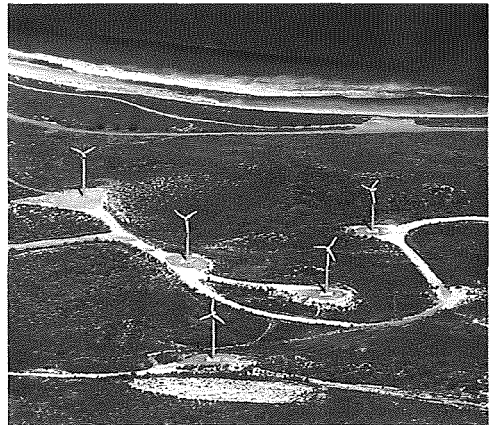
### Uranium

No uranium has been mined on a commercial basis in Western Australia to date, though small amounts of ore have been extracted and processed for test purposes. A number of uranium ore bodies have been identified in the State, and exploration for this mineral is continuing. Further details of uranium exploration are contained in Chapter 14.

### Wind energy

Wind power was of some significance as an energy source in the early days of settlement and is still used extensively in agricultural and pastoral areas for pumping water for stock.

Development of the use of wind power to generate electricity has intensified in recent years. In 1986, wind turbines were installed at a test site near South Fremantle. In March 1987, SECWA commissioned six 60 kilowatt wind turbines at Salmon Beach, a few kilometres west of the south coastal town of Esperance, to augment the local electricity supply. A wind power generator is also being used to augment the electricity supply on Rottnest Island.



Wind farm at Esperance.

Photograph: State Energy Commission

Wind energy is now considered close to becoming cost effective for power production in areas with reliable wind and there are prospects for extending the use of wind beyond its present major application in the pumping of water. SECWA is

currently studying the use of wind energy generators on the interconnected grid and have identified sites near Geraldton and Albany as being suitable for a wind farm of up to 20MW capacity.

### Other energy sources

There are several other energy sources which have potential use in Western Australia. Sites have been identified in the Kimberley region in the north of the State which would be suitable for hydro-electricity generation, including the existing dam on the Ord River. Parts of the Kimberley coastline, where very large tidal ranges occur, have been identified as suitable sites for tidal electricity generation, while wave power is proposed to be harnessed in waters near Esperance. Some small deposits of oil shale have been identified in the south-east of the State.

### Research

The Renewable Energy Advisory Council was recently established to advise the Western Australian Government on all aspects of research, development, demonstration and general promotion of renewable energy technologies.

The principal energy research organisations in Western Australia are SECWA, the Minerals and Energy Research Institute of Western Australia (MERIWA) and Murdoch University's Energy Research Institute (MUERI).

SECWA is primarily responsible for the efficient and effective use of energy resources available to the State of Western Australia. Consistent with this responsibility it is engaged in an active program of investigation and evaluation of renewable energy sources and applications of energy which may become significant in the future.

SECWA has undertaken studies into the use of alternative fuels for power generation and for use in motor vehicles. Vegetable oils have been tested with some success as alternative liquid fuels for generating electricity and tests are continuing into the use of LPG and compressed natural gas (CNG) in light vehicles. The Metropolitan (Perth) Passenger Transport Trust is involved in a project to convert thirty buses to operate exclusively on CNG.

SECWA are currently looking at a number of opportunities to achieve energy savings. One area is the establishment of co-generation facilities, i.e.

facilities enabling the combined generation of electricity and useful heat (usually as steam or hot air). Industry and commercial organisations requiring heat can arrange to install plant that will generate electricity at the same time, either for their own use or for on-selling. Where economic, SECWA will purchase power from such facilities.

SECWA and MERIWA are jointly funding a research program to assess the Landfill Gas (LFG) resource in the Perth metropolitan area. This information will be useful to organisations responsible for managing waste, the environment and energy utilisation.

MUERI is principally involved in research and development of renewable energy sources, especially solar energy (solar radiation) systems. In addition, MUERI carries out a range of tests for manufacturers and research workers on a confidential basis.

Since 1984, staff at MUERI have undertaken field trials in remote areas on photovoltaic systems for producing electricity. Staff are now developing systems suitable for remote Aboriginal communities, under funding from the Federal Departments of Aboriginal Affairs and Primary Industries and Energy.

There are also a number of other testing facilities in the State, some operating under contract. These facilities, and the institutions responsible for operating them include:

#### Corrosion Testing Facility

— Curtin University of Technology;

#### Materials Performance Testing Facility

— Curtin University of Technology;

#### Materials Standards Laboratory

— University of Western Australia.

At the national level, CSIRO and the Commonwealth Department of Primary Industries and Energy, and the Energy Research and Development Corporation (ERDC) are involved in a number of energy research programs. ERDC is a grant scheme established to encourage energy research.

### ENERGY AND THE ENVIRONMENT

There is an increasing awareness in the community about the possible impact on the environment of energy generation emissions particularly from the combustion of fossil fuels.

In response to community environment awareness, the Western Australian Government has outlined policies on energy conservation and emission controls.

For its part, SECWA is seeking to enhance the management of energy demand by improving the efficiency of energy utilisation. It has also established a Renewable Energy Branch to investigate alternatives to the use of traditional non-renewable energy sources. Other environment related SECWA activities include the preparation of an environmental policy, revision of its tree maintenance procedures and seeking to ensure that underground water reserves in the vicinity of power stations are protected.

### NATIONAL ENERGY SURVEY OF HOUSEHOLDS

National Energy Surveys were conducted by the ABS in November 1980, June 1983 and over the twelve months commencing 17 June 1985.

The 1985-86 Survey sought information about the types of domestic appliances and water heating facilities, room heating, air-conditioning, insulation and swimming pools installed. Additional data obtained were: the number of adults and children and gross income of the household; consumption of electricity and reticulated gas by households over a twelve-month period; and the number of rooms in the dwelling.

**TABLE 15.5 — HOUSEHOLDS BY MAJOR APPLIANCES AND FACILITIES: JUNE 1983 AND 1985-86**  
WESTERN AUSTRALIA AND AUSTRALIA  
Reference: Catalogue No. 8212.0

	Western Australia			Australia		
	June 1983 Per cent (a)	1985-86		June 1983 Per cent (a)	1985-86	
		'000	Per cent (a)		'000	Per cent (a)
Refrigerator	99.7	460.7	99.6	99.6	5,023.5	99.6
Freezer	46.4	210.3	45.5	46.0	2,342.4	46.4
Hot plates	97.5	455.7	98.5	97.7	4,953.1	98.2
Oven	99.1	456.0	98.6	99.0	4,980.4	98.7
Microwave oven (b)	12.9	154.8	33.5	10.0	1,509.5	29.9
Electric frypan/skillet (b)	35.9	301.1	65.1	38.0	3,521.2	69.8
Vertical grill (b)	5.7	53.7	11.6	6.9	777.7	15.4
Dishwasher	13.1	68.5	14.8	17.1	995.2	19.7
Washing machine	92.1	425.8	92.0	91.8	4,684.6	92.9
Clothes dryer	30.1	159.1	34.4	45.2	2,428.3	48.1
Ceiling fan (c)	(d)	113.0	24.4	(d)	852.7	16.9
Air conditioning	37.1	186.4	40.3	32.3	1,783.0	35.3
Main heating, non-shared—						
Electric	30.4	130.3	28.2	44.2	2,103.1	41.7
Gas	15.3	82.8	17.9	21.9	1,232.1	24.4
Oil	12.9	42.3	9.2	7.6	281.3	*5.6
Wood/solid fuel	21.3	120.1	26.0	12.4	794.6	15.8
<b>Total</b>	<b>92.5</b>	<b>421.9</b>	<b>91.2</b>	<b>92.5</b>	<b>4,646.8</b>	<b>92.1</b>
Hot water system (e)	99.0	459.6	99.2	98.7	5,001.8	98.9
Wall insulation (f)	4.6	21.3	4.9	*12.1	672.8	*15.0
Roof insulation (f)	39.2	201.5	46.2	43.7	2,239.4	49.8
Swimming pool (f)	12.7	56.6	13.0	10.1	518.3	11.5
Bore/well pump (f)	(d)	96.4	22.1	(d)	279.5	6.2
<b>Total households</b>	<b>100.0</b>	<b>462.6</b>	<b>100.0</b>	<b>100.0</b>	<b>5,044.1</b>	<b>100.0</b>

(a) Percentage of total households. (b) For June 1983, included only if used more than once a week. For 1985-86, included if the household had any of the appliances as distinct from actually using them. (c) Permanently fixed large bladed fans only. (d) Not asked. (e) Includes shared systems. (f) Not asked at flats, mobile, and improvised dwellings. \* Care should be exercised when using this figure — subject to sampling variability too high for most practical purposes.

**REFERENCES****ABS Publications**

*National Energy Survey: Household Appliances, Facilities and Insulation, Australia, 1985-86* (8212.0).

*National Energy Survey: Household Energy Consumption, Australia, 1985-86* (8213.0).

**Other Publications**

State Energy Commission of Western Australia, *Annual Report 1989*.

Australian Bureau of Agricultural and Resource Economics, *Quarterly Mineral Statistics*.

Western Australian Department of Mines, *Petroleum in Western Australia, July 1989*.

Western Australian Department of Mines, *Annual Report 1988-89*.

Joint Coal Board, *Black Coal in Australia 1988-89*.

Western Australian Government, Energy Policy and Planning Bureau, *Energy in Western Australia*.

## Chapter 16

### MANUFACTURING

**The manufacturing industry in Western Australia is heavily concentrated in the south-west of the State. The production of food and beverages and the processing of mineral products are the most valuable industries.**

#### MANUFACTURING IN WESTERN AUSTRALIA

Historically, manufacturing in Western Australia was centred around processing of local raw materials to produce meat, milk, seafood, wood, clay and cement products for both local consumption and export.

While these industries still remain important, the development in recent decades of the State's enormous mineral wealth and the availability of cheap, plentiful energy in the form of natural gas have seen the emphasis switch to value-added processing of minerals such as alumina and nickel for export. More recent mineral-related developments include expansion of gold and alumina refining capacities, the establishment of a silicon smelter and several projects related to downstream processing of mineral sands.

Concurrent with these developments and the strong growth in the mining industry (particularly in the gold and oil and gas sectors) has been the growth of manufacturing industries involved in the construction and servicing of new resources projects, especially in the fabrication and machinery and equipment sectors. Industrial chemicals for the resource industry, such as sodium cyanide, caustic soda, chlorine and ammonium nitrate are also now being produced locally.

Manufacturing activity is largely centred in the Perth metropolitan area. Heavy industry is chiefly located at Kwinana, with other important industrial areas in Canning Vale, Osborne Park-Balcatta,

Kewdale-Welshpool and O'Connor. Increased decentralisation of industry to areas like Kemerton, near Bunbury, is being encouraged.

A more comprehensive picture of the history of manufacturing in Western Australia can be found in the *Western Australian Year Book*, No. 24 — 1986.

The Western Australian Government body now responsible for encouraging the establishment of new industries is the Department of State Development.

#### DEPARTMENT FOR STATE DEVELOPMENT

The Department of State Development was established early in 1991. As a single agency it is the responsibility of the Minister for State Development. It brings together the work of five former departments which covered the areas of economic, trade, resource, regional and small business development.

The Department aims to foster an environment for sustainable development within the State by providing policy advice to Government and by strategic planning of economic progress.

The Department for State Development assists Western Australian industry to improve its competitiveness and productivity at enterprise level and at the broader sector level.

A major objective of the Department is to secure development projects of economic significance to

the State through negotiations with developers. It coordinates the public decision-making processes and prepares and monitors agreements.

The Department also coordinates the provision of government services to regions.

### MANUFACTURING STATISTICS

The 1988-89 Census of Manufacturing Establishments shows that the Perth Statistical Division had about eighty-two per cent of all manufacturing establishments, eighty-five per cent of manufacturing employment and eighty-two per cent of turnover. The South-West Statistical Division, where several of the State's larger mineral and timber processing establishments are located, was the only other region with a significant proportion of manufacturing activity.

Factories employing fewer than twenty persons accounted for over seventy-eight per cent of establishments. However, the large establishments employing more than 100 persons, which comprised only three per cent of establishments, contributed forty-two per cent of employment, forty-nine per cent of wages and salaries and fifty-one per cent of turnover.

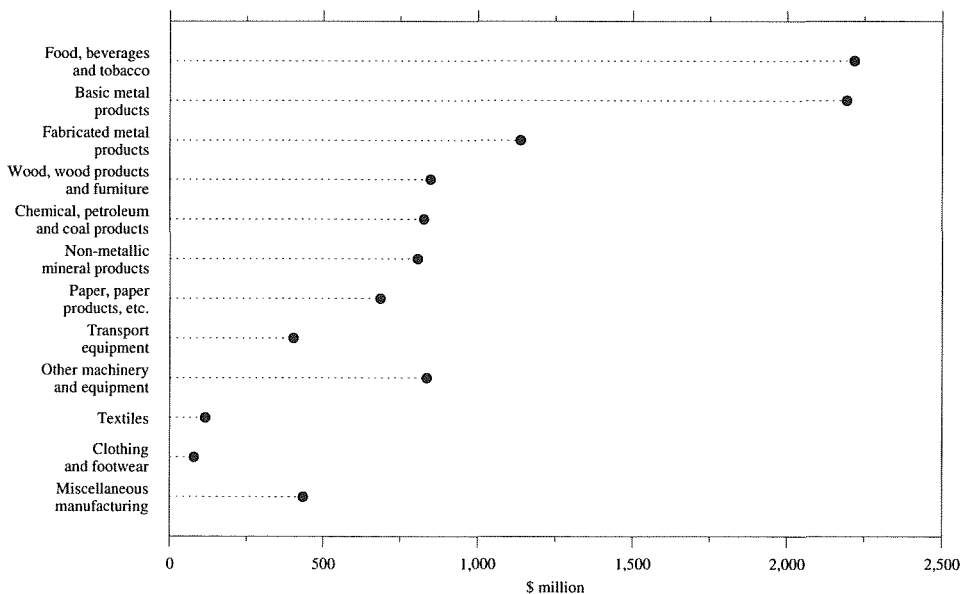
**TABLE 16.1 – MANUFACTURING ESTABLISHMENTS  
SUMMARY OF OPERATIONS BY  
STATISTICAL DIVISION: 1988-89**  
Reference: Catalogue No. 8202.5

Statistical division	Estab- lishments operating (a)	Persons employed (a)(b)	Wages and salaries (c)	Turnover
	No.	No.	\$m	\$m
Perth Statistical Division	2,172	62,357	1,459.6	8,681.2
Other divisions—				
South-West	184	5,464	136.4	971.7
Lower Great Southern	66	1,103	25.4	144.7
Upper Great Southern	24	245	3.6	19.9
Midlands	49	727	14.0	83.0
South-Eastern	48	983	27.0	382.2
Central	64	948	20.0	211.2
Pilbara	27	559	17.6	52.3
Kimberley	17	336	7.0	33.0
<i>Total other divisions</i>	<i>479</i>	<i>10,365</i>	<i>251.0</i>	<i>1,898.0</i>
<b>Western Australia</b>	<b>2,651</b>	<b>72,722</b>	<b>1,710.5</b>	<b>10,579.0</b>

(a) At 30 June. (b) Includes working proprietors. (c) Excludes amounts drawn by working proprietors.

(Note: Data in this table exclude operations by single establishment manufacturing enterprises employing fewer than four persons.)

**DIAGRAM 16.1  
MANUFACTURING ESTABLISHMENTS  
TURNOVER BY INDUSTRY AND SUB-DIVISION  
1988-89**



Despite the recent growth in Western Australia's manufacturing sector, the State's contribution to Australian manufacturing statistics was relatively small. The Non-metallic mineral products industry and the Fabricated metal products industry achieved the highest growth in turnover,

increasing by 18.7 per cent and 16.5 per cent respectively, compared with the previous year. The Western Australian industries that made the smallest contribution at the national level were the Clothing and Footwear, Textiles and Transport equipment industries.

**TABLE 16.2 - MANUFACTURING ESTABLISHMENTS OPERATING AT 30 JUNE 1989 (a) : SELECTED VARIABLES BY EMPLOYMENT SIZE - WESTERN AUSTRALIA AND AUSTRALIA**

Reference: Catalogue Nos. 8203.5, 8204.0

	<i>Fewer than 4 persons</i>	<i>4-19 persons</i>	<i>20-49 persons</i>	<i>50-99 persons</i>	<i>100 or more persons</i>	<i>Total</i>
<b>WESTERN AUSTRALIA</b>						
No. of establishments	788	1,892	489	152	118	3,439
Employment ('000)	1.8	15.8	14.9	10.6	31.4	74.5
Wages and salaries (\$m)	21.0	281.2	315.3	260.3	837.6	1,715.4
Turnover (\$m)	106.0	1,516.3	1,650.4	1,826.6	5,508.3	10,607.6
<b>AUSTRALIA</b>						
No. of establishments	11,024	22,227	5,031	1,872	2,119	42,273
Employment ('000)	24.2	182.6	151.9	129.9	608.2	1,096.8
Wages and salaries (\$m)	257.4	3,227.3	3,244.4	3,042.0	15,968.7	25,739.8
Turnover (\$m)	1,290.5	16,386.6	17,941.5	19,112.7	97,843.5	152,574.8
<b>WESTERN AUSTRALIA AS A PERCENTAGE OF AUSTRALIA</b>						
No. of establishments	7.1	8.5	9.7	8.1	5.5	8.1
Employment	7.4	8.7	9.8	8.1	5.2	6.8
Wages and salaries	8.2	8.7	9.7	8.6	5.2	6.7
Turnover	8.2	9.2	9.1	9.6	5.6	7.0

(a) Excludes manufacturing establishments with no employees.

**TABLE 16.3 - MANUFACTURING ESTABLISHMENTS SUMMARY OF OPERATIONS BY INDUSTRY SUB-DIVISION (a)**

Reference: Catalogue No. 8202.5

<i>Industry sub-division</i>		<i>Establishments operating (c)</i>	<i>Persons employed (c)</i>	<i>Wages and salaries (d)</i>	<i>Turnover</i>
<i>ASIC code (b)</i>	<i>Description</i>	<i>No.</i>	<i>No.</i>	<i>\$m</i>	<i>\$m</i>
1988-89					
21	Food, beverages and tobacco	364	12,135	273.9	2,216.9
23	Textiles	41	1,277	23.4	116.7
24	Clothing and footwear	69	1,850	29.5	80.6
25	Wood, wood products and furniture	451	8,998	182.2	847.0
26	Paper, paper products, printing and publishing	255	7,932	161.2	684.1
27	Chemical, petroleum and coal products	75	3,168	94.0	826.4
28	Non-metallic mineral products	144	5,070	130.1	804.3
29	Basic metal products	43	5,688	193.1	2,193.6
31	Fabricated metal products	466	9,888	230.41	1,138.4
32	Transport equipment	179	5,001	116.0	402.1
33	Other machinery and equipment	378	8,473	206.2	834.9
34	Miscellaneous manufacturing	186	3,242	70.4	434.2
	<b>Total Manufacturing</b>	<b>1988-89</b>	<b>72,722</b>	<b>1,710.5</b>	<b>10,579.0</b>
		<b>1987-88</b>	<b>72,069</b>	<b>1,604.8</b>	<b>9,416.9</b>
		<b>1986-87(e)</b>	<b>69,452</b>	<b>1,407.0</b>	<b>8,215.1</b>

(a) Includes establishments operating part year and ancillary locations. (b) Australian Standard Industrial Classification. (c) At 30 June. Includes working proprietors. (d) Excludes amounts drawn by working proprietors. (e) A census was not conducted for the year 1985-86

(Note: Data in this table exclude operations by single establishment manufacturing enterprises employing fewer than four persons.)



DIAGRAM 16.2  
MANUFACTURING ESTABLISHMENTS  
EMPLOYMENT AT 30 JUNE

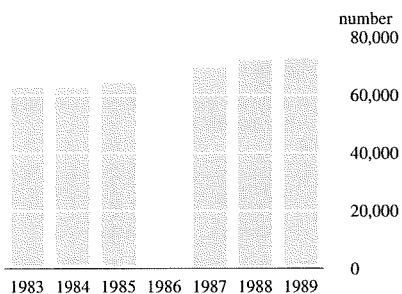
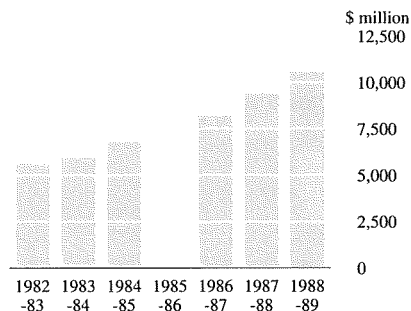


DIAGRAM 16.3  
MANUFACTURING ESTABLISHMENTS  
TURNOVER



(Note: A census was not conducted for the year 1985-86. Data in these diagrams exclude operations by single establishment manufacturing enterprises employing fewer than four persons.)

TABLE 16.5 - PRODUCTION OF SELECTED COMMODITIES (a)  
(Includes quantities produced and used in own establishment)  
Reference: Catalogue No. 1305.5

Commodity	Unit	1986-87	1987-88	1988-89	1989-90
Aerated and carbonated waters	'000 L	107,010	n.p.	n.p.	140,679
Alumina (b)	'000 t	5,727	6,063	6,172	6,651
Bacon and ham	tonnes	8,502	8,377	9,384	9,937
Butter (c)	"	1,400	1,505	1,139	1,339
Cheese (c)	"	3,727	3,772	r3,586	4,129
Footwear	pairs	287,816	288,843	304,384	363,089
Ice cream	'000 L	19,045	17,136	n.p.	n.p.
Inedible tallow	tonnes	31,251	34,464	r30,647	38,400
Paints	'000 L	5,875	5,942	r7,425	8,773
Ready-mixed concrete	'000 cu m	1,261	r1,342	r1,642	1,400
Rock lobster tails	tonnes	2,642	4,259	3,545	1,626
Scoured wool from greasy shorn wool	"	29,109	25,820	22,921	19,475
Stock and poultry foods—					
Meat and bone meal	"	37,844	39,471	35,621	45,673
Prepared stock and poultry food	"	351,388	r333,617	r439,763	341,583
Solar collectors	sq m	92,627	104,566	91,787	86,244
Terracotta and concrete tiles	'000 sq m	2,967	3,369	4,541	4,127
Timber (d)—					
Local logs sawn	cu m	941,794	919,848	r990,346	955,193
Sawn timber produced	"	316,658	318,652	r342,905	324,083

(a) Data from ABS sources exclude production by single establishment manufacturing enterprises employing fewer than four persons and establishments predominantly engaged in non-manufacturing activities. (b) Source: Department of Mines. (c) Source: Australian Dairy Corporation. (d) Derived from data supplied by the Department of Conservation and Land Management.

At the ASIC sub-division level, Food, beverages and tobacco and Basic metal products made the largest contributions to turnover in 1988-89. Industries with the largest turnover per person employed in 1988-89 were recorded in the Basic metal products and Chemical, petroleum and coal products divisions.

A wide range of manufactured commodities is produced in Western Australia, as indicated in Table 16.5. It should be noted that details of quantities produced for many other significant commodities are confidential or not collected, and therefore are not available for release. However, they are included in total Australian production.

In 1988-89, persons employed in Western Australia's manufacturing industry accounted for twelve per cent of the employed labour force.

**REFERENCE****ABS Publications**

*Census of Manufacturing Establishments: Industry and Area Data, Western Australia (8202.5)*

*Census of Manufacturing Establishments: Selected Items of Data Classified by Industry and Employment Size, Western Australia (8203.5)*

*Manufacturing Industry, Details of Operations by Industry Class, Australia (8203.0)*

*Manufacturing Industry, Selected Items of Data Classified by Industry and Employment Size, Australia (8204.0)*

*Manufacturing Commodities: Principal Articles Produced, Australia (8303.0)*

## Chapter 17

### INTERNAL TRADE AND SERVICES

#### WHOLESALE TRADE

Wholesale trade is described as the resale of new or used goods to retailers and other business users (including farmers, builders, government and professional bodies).

A sample survey of wholesale establishments was conducted for the year ended 30 June 1982 and provides the latest information available about the wholesale sector. Estimates were produced at the national level and are contained in *Wholesale Establishments, Details of Operations by Industry Class, Australia* (Catalogue No. 8638.0).

#### RETAIL TRADE

Retail trade is described as the resale of new or used goods to final consumers for personal or household consumption. Detailed information about the retail sector has been collected using Censuses of Retail Establishments, the first of which was taken for the year 1947-48. Eight censuses have been taken since then as part of the ABS's program of rotating economic censuses. Results from each census are published for each State and Territory and for Australia as a whole. Surveys of retail trade, which were introduced from 1956, have enabled the production of estimates of retail trade on a less detailed but more frequent basis.

#### Census of Retail Establishments

The most recent census was taken for the year ended 30 June 1986 and included all establishments classified to the Retail Trade subdivision of the Australian Standard Industrial Classification (ASIC), excluding bread and milk vendors, shoe repairers and electrical appliance

repairers n.e.c. Builders' hardware dealers were included for the first time. The next retail census will be conducted in 1992-93 and will relate to the year ending 30 June 1992.

#### Survey of Retail Establishments

**TABLE 17.1 - RETAIL TURNOVER - ANNUAL ESTIMATES AT CURRENT PRICES, BY INDUSTRY GROUPS(a) : 1987-88 TO 1989-90**  
(\$ million)

Reference : Catalogue No. 8501.0

Industry group	1987-88	1988-89	1989-90
Grocers, confectioners, tobacconists	2,113.3	2,191.0	2,371.9
Butchers	91.1	75.0	87.5
Other food stores	353.5	372.1	465.2
Hotels, liquor stores, licensed clubs	729.6	816.1	910.3
Cafes and restaurants	n.a.	225.6	349.6
Clothing and fabric stores	448.2	446.5	455.2
Department and general stores	771.9	858.6	903.1
Footwear stores	82.7	92.7	87.9
Domestic hardware stores, jewellers	161.5	147.1	188.5
Electrical goods stores	448.2	480.9	508.1
Furniture stores	136.4	147.9	108.3
Floor coverings stores	83.8	90.6	92.7
Pharmacies	247.4	270.6	305.0
Newsagents	205.1	194.6	221.9
Other	n.a.	339.5	345.3
<b>Total</b>	<b>(b)6,325.0</b>	<b>6,749.1</b>	<b>7,399.7</b>

(a) Excludes motor vehicle dealers, petrol and tyre retailers. (b) Includes figures for the industry groups which are unavailable separately.

Since 1956 intercensal estimates of the value of retail sales have been produced by means of sample surveys. Surveys were initially conducted quarterly but are now conducted on a monthly basis. The surveys are reviewed periodically, generally to account for changes reflected in the

DIAGRAM 1.1  
MONTHLY CHANGE IN RETAIL TURNOVER  
Trend Estimates Data

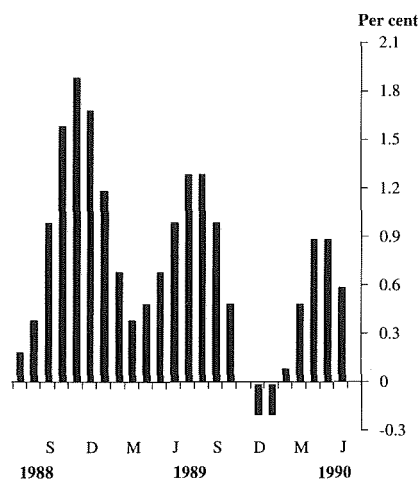
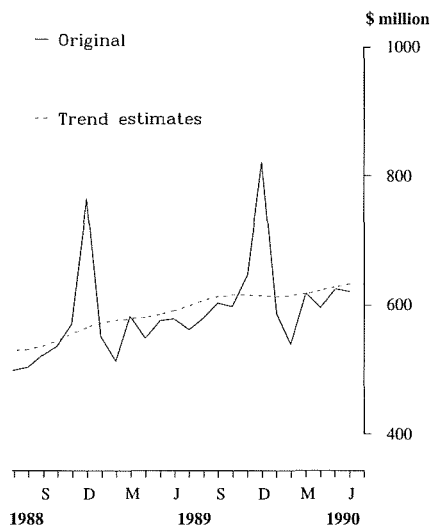


DIAGRAM 1.2  
MONTHLY ESTIMATES OF RETAIL TURNOVER



results of each retail census. The survey conducted since June 1988 is based on the results of the 1985-86 Retail Census and produces estimates of 'turnover' by retail establishments rather than the narrower estimates of 'retail sales'. The surveys are conducted monthly (quarterly prior to April 1982) and estimates are published in *Retail Trade, Australia* (Catalogue No. 8501.0).

Estimates of turnover (in original current price terms) by industry group for 1987-88 to 1989-90 are provided in Table 17.1. Data for 1987-88 were derived by linking the old survey (of retail sales) to the new survey (of turnover).

Diagrams 17.1 and 17.2, which relate to the 24 month period July 1988 to June 1990, illustrate the seasonal nature of retail turnover, the long term upward trend in retail turnover and the monthly variations that can occur. Data are presented as trend estimates in current price terms.

### SERVICE INDUSTRIES

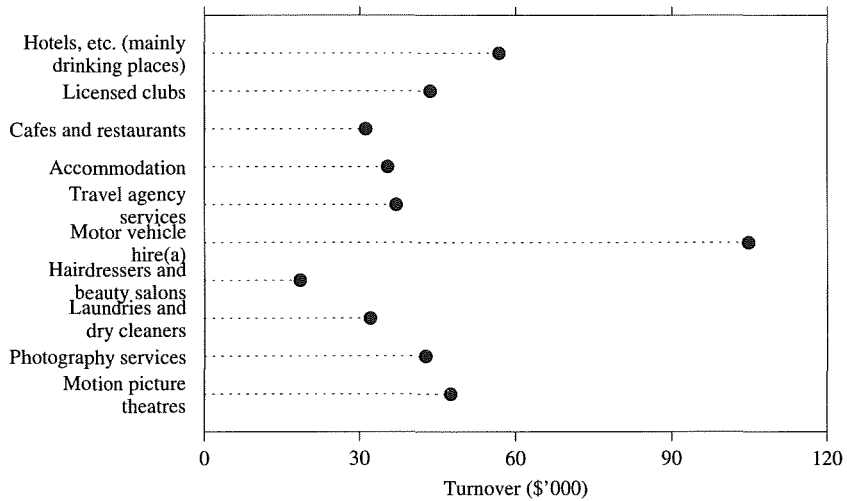
Statistics on selected service industries have previously been collected in conjunction with censuses of retail establishments conducted prior to 1985-86. The 1986-87 Service Industries Survey covered ten personal and travel related industries. Seven of these were also part of the 1979-80 Census of Retail and Selected Services Industries allowing for some comparisons between

the two periods. These industries were motion picture theatres, cafes and restaurants, hotels (mainly drinking places), accommodation, licensed laundries and dry cleaners, and hairdressers and beauty salons. Data for motor vehicle hire, travel agency services, and photography services were selected for the first time.

Also collected as part of the 1986-87 Service Industries Survey were data on selected tourist attractions. A brief summary of details of this survey is available in the next section, Tourism. Further details by type of attraction are shown in *Tourist Attractions, 1986-87* (Catalogue No. 8661.0).

The 1987-88 Service Industries Survey covered twelve professional and business related industries. These industries were Legal services, Accounting services, Real estate agents, Architectural services, Surveying services, Engineering and technical services, Computing services, Advertising services, Pest control services, Cleaning services, Debt collection and credit reporting services, and Security/Protection and other business services. The industries included in the 1986-87 and 1987-88 Surveys have not previously been studied in this detail by the ABS so comparisons with earlier statistics are not possible. Detailed statistics for each of the industries covered, plus a number of 'sub-industries', are available from the publications listed at the end of this chapter.

DIAGRAM 1.3  
SELECTED SERVICE INDUSTRIES - TURNOVER PER PERSON EMPLOYED: 1986-87



(a) State turnover figures not available for this industry. Takings from rental cars, which account for the major portion of total turnover was used as an approximation.

TABLE 17.2 - SELECTED SERVICES INDUSTRIES  
PERSONAL AND TRAVEL RELATED INDUSTRIES  
SUMMARY OF OPERATIONS : 1986-87  
Reference : Catalogue Nos. 8652.0 to 8660.0

Industry	Enterprises operating (a)	Persons employed (a)	Turnover	Net operating surplus (b)
	No.	No.		
Hotels, etc (mainly drinking places)	418	8,210	469.3	40.0
Licensed clubs	346	2,516	109.6	7.8
Cafes and restaurants	636	7,267	226.4	18.7
Accommodation	351	4,829	171.6	19.2
Travel agency services	209	1,057	34.7	n.a.
Motor vehicle hire	41	324	(c)34.0	n.a.
Hairdressers and beauty salons	839	3,756	70.0	10.7
Laundries and dry cleaners	128	1,151	36.8	4.7
Photography services	126	321	13.7	2.3
Motion picture theatres	17	542	25.8	2.6

(a) At 30 June 1987. (b) This item is a measure of turnover less business expenses except for non-operating expenses (e.g. interest) and can be considered a basic measure of profit for an industry. (c) State turnover figures are not available for this industry; \$34 million relates to takings from rental cars which accounts for the major portion of total turnover.

## TOURISM

Responsibility for the development of the tourism industry in Australia is exercised by government bodies at Commonwealth, State and regional levels. At the State level the Western Australian Tourism Commission (WATC) is responsible for marketing Western Australia as a tourist destination for international, interstate and intrastate visitors.

Information provided by the WATC shows that, during 1989-90, interstate and intrastate visitors (persons aged 14 years and over) made 5.2 million trips to or within Western Australia. This represents 10.5 per cent of total domestic trips made within Australia. The main purpose of trips to or within the State was 'pleasure or holiday' (40 per cent) followed by 'visiting friends and relatives' (24 per cent). The main destination regions for domestic travel were Perth and the South-West.

**TABLE 17.3 - TOURIST ACCOMMODATION (a)**  
31 December 1989  
Reference : Catalogue No. 8635.5

	<i>Perth Statistical Division</i>	<i>Rest of State</i>	<i>Western Australia</i>
<b>HOTELS AND MOTELS, WITH FACILITIES (b)</b>			
Establishments	93	225	318
Guest rooms	6,767	7,395	14,162
Bed spaces	16,841	19,198	36,039
<b>HOTELS AND GUEST HOUSES, WITHOUT FACILITIES (b)</b>			
Establishments	12	128	140
Guest rooms	421	2,497	2,918
Bed spaces	647	4,141	4,788
<b>CARAVAN PARKS (c)</b>			
Establishments	33	261	294
Sites	3,735	22,580	26,315
<b>HOLIDAY FLATS, UNITS AND HOUSES (b)</b>			
Letting entities	27	62	89
Units	878	776	1,654
Bed spaces	3,325	4,098	7,423

(a) Hotels, motels and guest houses must have breakfast available for guests. Caravan parks must provide powered sites and toilet, shower and laundry facilities. Holiday flats etc. are mainly self-contained and do not have breakfast available. (b) Establishments providing predominantly short term accommodation (i.e. periods less than two months). (c) Establishments providing short term or long term accommodation.

Tourism is one of the largest growing industries in Western Australia. Response to that growth has seen a significant increase in the development and refurbishment of luxury hotels and in the development of tourist attractions. As the State

capital, Perth receives the majority of interstate and international visitors and, therefore, has experienced a major share of the development in tourist accommodation. As at 30 June 1990 there were seven four star and seven five star hotels and motels in the Perth metropolitan area providing 2,961 guest rooms.

Development of tourism has not been restricted to Perth. Towns to the north and south of the State are also experiencing significant growth in tourist numbers.

The popularity of statistical local areas as tourist destinations can be indicated by the number of guests arriving to stay in commercial accommodation. A comparison of guest arrivals during 1988-89 and 1989-90 for areas attracting the most visitors is shown in the following table.

**TABLE 17.4 - HOTELS, MOTELS, GUEST HOUSES  
AND CARAVAN PARKS**

<i>Guest arrivals</i>	<i>Statistical Local Area (a)</i>	
	<i>1988-89</i>	<i>1989-90</i>
Over 200,000	1. Perth(C)	1. Perth(C)
150,001-200,000	2. Busselton	2. Geraldton (C) and Greenough
		3. Busselton
100,001-150,000	3. Geraldton	4. Albany(T & S)
	4. Albany(T & S)	5. Augusta-Margaret River
	5. Bunbury(C)	6. Bunbury(C)
	6. Augusta-Margaret River	7. Dundas
	7. Kalgoorlie-Boulder(C)	8. Belmont(C)
	8. Belmont(C)	9. Manjimup
	9. Dundas	10. Kalgoorlie-Boulder(C)
		11. Carnarvon
80,001-100,000	10. Manjimup	12. Mandurah(C)
	11. Carnarvon	13. Broome
	12. Broome	
	13. Mandurah(C)	
60,001-80,000	14. Esperance	14. Wyndham-East Kimberley
	15. Wyndham-East Kimberley	15. Stirling(C)
	16. Northampton	16. Gingin and Dandaragan
	17. Gingin and Dandaragan	17. Esperance
	18. Stirling(C)	18. Northampton
	19. Shark bay	19. Shark Bay

(a) Cities, Towns and Shires are marked (C), (T) and (S) respectively

During 1989, there were 182,800 short term overseas visitor arrivals to Western Australia. Travellers are considered as short term arrivals if their intended or actual period of stay is less than twelve months.

**TABLE 17.5 - HOTELS, MOTELS AND GUEST HOUSES**

Reference : Catalogue No. 8635.5

Year	Room Guest occupancy		Guest arrivals	Takings (b)
	rooms (a)	rate		
	No.	Per cent	'000	\$'000
1987	16,161	46	1,809	134,300
1988	16,344	47	1,880	147,038
1989	17,080	48	1,980	169,802

(a) At 31 December. (b) Takings only from accommodation.

**TABLE 17.6 - CARAVAN PARKS**

Reference : Catalogue No. 8635.5

Year	Site occupancy		Guest arrivals	Takings (b)
	Sites (a)	rate		
	No.	Per cent	'000	\$'000
1987	23,749	37	1,145	25,530
1988	25,449	37	1,117	29,307
1989	26,315	37	1,193	34,565

(a) At 31 December. (b) Takings only from accommodation.

**TABLE 17.7 - HOLIDAY FLATS, UNITS AND HOUSES**

Reference : Catalogue No. 8635.5

Year	Unit occupancy		Unit lettings	Takings (b)
	Units (a)	rate		
	No.	Per cent	'000	\$'000
1987 (c)	1,495		n.a.	
1988	1,667	58	65	12,258
1989	1,654	60	70	14,429

(a) At 31 December. (b) Takings only from accommodation. (c) Collection of data commenced from July 1987.

### Short Term Overseas Visitors

The majority of short term overseas visitors came to the State to holiday (50 per cent) while 31 per cent visited relatives and 8 per cent visited for business and convention reasons.

Most visitors to Western Australia came from the United Kingdom and Ireland (28 per cent) and New Zealand (16 per cent) mainly with the

intention of visiting relatives. Travellers from Asia represented the next largest group and visited mainly for holiday purposes.

**TABLE 17.8 - SHORT TERM VISITOR ARRIVALS  
COUNTRY OF RESIDENCE BY  
MAIN PURPOSE OF JOURNEY: 1989**

('000)

Reference : Catalogue No. 3404.0

Country of residence	Visiting relatives	Holiday (a)	Business (b)	Total (c)
<i>Africa</i>	1.3	1.1	0.3	2.8
<i>America</i>	2.7	4.3	2.5	11.1
Canada	0.9	1.4	0.3	2.1
USA	1.7	2.8	2.2	8.0
Other	0.1	0.1	0.1	0.3
<i>Asia</i>	10.1	44.8	5.6	68.9
Hong Kong	1.0	1.2	0.4	3.1
Indonesia	0.7	3.2	0.6	5.6
Japan	0.4	10.6	1.2	13.5
Malaysia	3.0	6.6	1.0	12.2
Singapore	3.2	20.0	1.2	25.8
Other	2.0	3.3	1.2	8.6
<i>Europe</i>	31.0	29.3	5.0	69.8
Germany	1.2	3.3	0.6	5.3
Netherlands	1.3	0.7	0.2	2.3
Switzerland	0.5	1.9	0.1	2.7
U.K. and Ireland	25.2	19.8	2.7	50.7
Other	2.8	3.6	1.5	8.7
<i>Oceania</i>	12.1	11.8	1.7	30.0
New Zealand	11.9	11.4	1.5	29.0
Other	0.2	0.4	0.2	1.0
<i>Not stated</i>	0.1	0.1	-	0.2
<b>Total</b>	<b>57.3</b>	<b>91.4</b>	<b>15.2</b>	<b>182.8</b>

(a) Includes accompanying a business traveller. (b) Includes attending conventions. (c) Includes employment, education, other and not stated.

### Tourist Attractions

A survey of Tourist Attractions in Western Australia was undertaken by the ABS in respect of the twelve months ended 30 June 1987. During that period, the attractions surveyed generated 4.4 million visits (excluding natural attractions). The majority of visits (39 per cent) were to museums and art galleries.

Income earned by surveyed attractions totalled \$41.8 million. Of this amount, \$17.2 million (or 41 per cent) came from government sources including amounts required for funding of government operated attractions.

**TABLE 17.9 – TOURIST ATTRACTIONS: 1986-87**  
Reference : Catalogue No. 8661.0

Type of attraction	Number of attractions surveyed	Total visitors	Total income
	No.	'000	\$'000
Museum, Art Gallery	102	1,702	13,593
Amusement, Theme Park	9	543	6,560
Zoo, Wildlife Sanctuary, Oceanarium	22	884	5,985
Primary, Secondary Producers - Winery	31	318	3,031
Mine, Factory, Other	22	271	645
Natural Attraction	34	n.a.	9,173
Historic Attraction	26	332	1,087
Other	16	321	1,726
<b>Total</b>	<b>262</b>	<b>4,371(a)</b>	<b>41,800</b>

(a) Excludes visitors to Natural Attractions.

## CONSUMER AFFAIRS

The Ministry of Consumer Affairs is the successor to the Bureau of Consumer Affairs which was established under the *Consumer Affairs Act 1981* and became the Department of Consumer Affairs in 1983.

The Ministry has as its corporate mission the promotion and maintenance of fair trading. The earlier emphasis on consumer protection has developed into a concern for the trading environment as a whole, with services provided for both traders and consumers.

The Ministry has recently reviewed its structure to reflect its changing role and as a response to legislative initiatives. In addition to Executive and Legal Services, the Ministry now comprises three Divisions:

Policy and Corporate Services,  
Education and Consumer Services, and  
Industry Standards

The Policy and Corporate Services Division provides the internal support functions essential for program delivery. It also provides administrative support to the Commercial and Small Claims Tribunals.

A Register of Encumbered Vehicles (REVS) maintains details of financial interests in motor vehicles and unlicensed farm machinery to assist prospective purchasers and financiers.

A new policy section has been established within this Division which assesses the need for legislative review and other policy measures such as the development of Codes of Practices designed to promote fair trading.

The Education and Consumer Services Division is responsible for informing and educating both traders and consumers about their respective rights and responsibilities. Emphasis is placed on providing consumers with skills to negotiate satisfactory resolutions to problems encountered in the marketplace. Advice and conciliation assistance is offered to individuals unable to resolve particular issues.

The Prices Monitoring Unit located in this Division researches and publishes information about the prices of various goods and services.

The Division also investigates product safety complaints and imposes sales bans on potentially unsafe goods.

The Industry Standards Division provides support to the Occupational Licensing Boards and the Commercial Tribunal in occupational licensing matters.

**TABLE 17.10 – MINISTRY OF CONSUMER AFFAIRS**  
**SUMMARY OF PRODUCT COMPLAINTS RECEIVED**  
**1987-88 TO 1988-90**

(Source: Ministry of Consumer Affairs)

Product classification	Number of product complaints		
	1987-88r	1988-89	1989-90
Food, beverages, tobacco	124	128	151
Clothing, footwear, drapery	188	212	221
Appliances and furnishings	877	932	1,018
Motor vehicles and transport equipment	1,773	1,627	1,976
Building and construction	937	1,327	1,064
Miscellaneous products	491	434	498
Transport and energy services	643	416	405
Insurance and finance	698	724	954
Real estate and accommodation	689	628	916
Miscellaneous services	1,403	992	981
Not specified	35	88	75
<b>Total</b>	<b>7,858</b>	<b>7,508</b>	<b>8,259</b>

The Retail Trading Branch within this Division monitors compliance with trading hours legislation while the Trade Measurement Unit enforces the use of uniform standards of measurement for goods sold by measure and provides assurance that measuring instruments can be verified to international standards. An Industry Compliance Team within this Division investigates complaints



and offences and, where necessary, initiates prosecutions on matters related to legislation administered within the Consumers Affairs portfolio.

**TABLE 17.11 – MINISTRY OF CONSUMER AFFAIRS:  
COMPLAINTS FINALISED: 1987-88 TO 1989-90**  
(Source: Ministry of Consumer Affairs)

	1987-88r	1988-89	1989-90
Full redress obtained for consumer	2,190	2,089	1,954
Partial redress obtained for consumer	443	442	375
Situation clarified between consumer and trader	19	149	1,003
Complaint justified – trader warned	322	267	173
Proceedings initiated under State or Federal law	40	70	36
Insufficient evidence to resolve complaint	207	197	312
Incapable of resolution owing to conflict of evidence	176	200	257
Trader bankrupt or in liquidation	662	122	166
Trader unable to be located	93	69	58
Complaint referred to Small Claims Tribunal	760	913	972
Complaint referred to Commercial Tribunal	167	80	33
Complaint outside Ministry's jurisdiction (includes referrals to other organisations)	504	470	550
Complaint withdrawn or lapsed	264	551	676
Complaint not justified	676	767	714
Complaint lodged for information purposes only	88	338	305
Result code not specified	4	—	—
Other reason	1,100	881	613
<b>Total</b>	<b>7,715</b>	<b>7,605</b>	<b>8,197</b>

## REFERENCES

### ABS Publications

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*Advertising Services Industry, Australia, 1987-88* (8670.0)

*Architectural Services Industry, Australia, 1987-88* (8664.0)

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*Cleaning Services Industry, Australia, 1987-88* (8672.0)

*Computing Services Industry, Australia, 1987-88* (8669.0)

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*Legal Services Industry, Australia, 1987-88* (8667.0)

*Licensed Clubs Industry, Australia, 1986-87* (8657.0)

*Motion Picture Theatre Industry, Australia, 1986-87* (8654.0)

*Motor Vehicle Hire Industry, Australia, (8652.0)*

*Pest Control Services Industry, Australia, 1987-88* (8671.0)

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*Travel Agency Services Industry, Australia, (8653.0)*

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Western Australian Tourism Commission, *Domestic Travel in Western Australia, July 1986–June 1987*

Western Australian Tourism Commission, *Western Australian Regional Tourism Research Monitor, July 1986–June 1987*

Ministry of Consumer Affairs, *Annual Report*

## Chapter 18

### HOUSING AND CONSTRUCTION

The typical dwelling in Western Australia is single, detached, of double brick construction, on its own block of land. It has three bedrooms and is owned or being purchased by the occupier. Information from the 1986 Census of Population and Housing indicates that throughout the State 80.1 per cent of the 456,515 private households lived in single detached houses. Only 7,016 (1.5 per cent) private households occupied multi-storey high rise flats (3 or more storeys). The remainder were accommodated in duplexes, row or terrace houses or similar medium density housing.

#### HOUSING AND THE CENSUS

The definitions below relate to data derived from the Census of Population and Housing.

**Occupied dwellings.** For the purpose of the census an occupied dwelling is any habitation occupied on census night by a household group living together as a domestic unit, and may comprise the whole of a building or only part of it. This means the total number of occupied dwellings, as measured by the census, may be greater than the known number of structures.

**Unoccupied private dwellings.** An unoccupied private dwelling is defined as a structure built specifically for private living purposes and capable of being lived in, though unoccupied at the time of the census.

**Private dwellings** comprise houses, including self-contained flats, and other dwellings such as sheds, tents, garages, caravans, houseboats, etc., occupied on a permanent or semi-permanent basis.

**Non-private dwellings** are dwellings which provide communal eating facilities, and include hospitals, homes for the aged, motels, hotels, boarding houses, gaols, religious and charitable institutions, defence establishments etc.

Between the censuses of 1981 and 1986, the number of private occupied dwellings in the State increased by 13.1 per cent. The number of persons enumerated in private dwellings showed an increase of 9.7 per cent.

**TABLE 18.1 – DWELLINGS AND PERSONS  
ENUMERATED: CENSUSES, 1981 AND 1986  
(‘000)**

Reference: Catalogue No. 2465.0

	1981	1986
DWELLINGS (‘000)		
Occupied dwellings—		
Private (a)	403.6	456.5
Non-private	2.4	2.2
Caravans, etc in parks (b)	n.a.	10.7
<b>Total occupied dwellings (b)</b>	<b>406.0</b>	<b>469.5</b>
Unoccupied private dwellings	42.1	53.9
PERSONS (‘000)		
Persons enumerated in—		
Private dwellings	1,205.8	1,322.6
Caravans, etc in parks (b)	n.a.	26.4
Other structures	67.8	58.0
<b>Total persons</b>	<b>1,273.6</b>	<b>1,406.9</b>

(a) Excludes caravans in caravan parks. (b) In 1981, caravan parks were treated as non-private dwellings. The number of caravans in caravan parks was not recorded and the figures for total occupied dwellings in 1981 and 1986 are not comparable.

## CONTROL OF BUILDING

Each of the local government authorities as constituted under the provisions of the *Local Government Act 1960* has the power to exercise general control over the erection of buildings in its own district. The powers of local government authorities to control building derive from the Town Planning and Development Act and the Local Government Act.

A more detailed description of these Acts appears on page 374 of the *Western Australian Year Book No.24 — 1986*.

## BUILDING STATISTICS

### Scope

The statistics in this section relate to the construction of new buildings and the alterations and additions to existing buildings.

Non-building construction of railways, roads, bridges, earthworks, etc. is excluded. Also excluded are particulars of repairs and maintenance to buildings.

### Sources of data

Data relating to the building approvals, dwelling unit commencements and building activity series are based on permits issued by local government authorities together with contracts let or day labour work authorised by Commonwealth, State, semi-government and local government authorities. Major building activity which takes place in areas not subject to the normal administrative approval processes (e.g. buildings on remote mine sites) is also included.

### Definitions

**Ownership.** The ownership of a building is classified as either 'public sector' or 'private sector' according to the sector of the intended owner of the completed building as evident at the time of approval.

**Residential buildings.** A residential building is defined as a building predominantly consisting of one or more dwelling units. Residential buildings can be either 'houses' (a detached building predominately used for long term residential purposes and consisting of only one dwelling unit), or 'other residential buildings'.

**Non-residential building.** Relates to construction work on buildings other than residential buildings. Additions and alterations to 'non-residential building' are also included.

**Commenced.** A building job is regarded as commenced when the first physical building activity has been performed on site.

**Completed.** A building job is regarded as completed when building activity has progressed to the stage where the building can fulfil its intended function.

**Value of building completed.** Represents the actual completion value based on the market or contract price of building jobs.

**Value of building work done.** Represents the estimated value of building work actually carried out during the period on building jobs which have commenced.

### Building Approvals

The number of houses and other residential buildings approved during 1989-90 decreased by 40.9 and 29.5 per cent respectively compared with the previous year. This resulted in a decrease of 37.8 per cent in total dwelling units approved.

TABLE 18.2 — NEW RESIDENTIAL BUILDING APPROVED BY SECTOR  
(Number of dwelling units)  
Reference : Catalogue No. 8731.5

<i>Class of building</i>	1987-88	1988-89	1989-90
PRIVATE SECTOR			
Houses	16,296	19,229	11,300
Other residential buildings	3,976	6,769	4,464
<b>Total</b>	<b>20,272</b>	<b>25,998</b>	<b>15,764</b>
PUBLIC SECTOR			
Houses	666	738	495
Other residential buildings	634	861	914
<b>Total</b>	<b>1,300</b>	<b>1,599</b>	<b>1,409</b>
TOTAL			
Houses	16,962	19,967	11,795
Other residential buildings	4,610	7,630	5,378
<b>Total</b>	<b>21,572</b>	<b>27,597</b>	<b>17,173</b>

The value of new residential building approved during 1989-90, at current prices, decreased by 30.6 per cent over the previous year. The value of

non-residential building approved during 1989-90 increased marginally (3.9 per cent) over 1988-89.

The total value of building approved during 1989-90 decreased by 16.9 per cent compared with the previous year.

**TABLE 18.3 – VALUE OF BUILDING APPROVED BY SECTOR**  
(\$ million)  
Reference: Catalogue No. 8731.5

<i>Class of building</i>	1987-88	1988-89	1989-90
<b>PRIVATE SECTOR</b>			
New residential building (a)—			
Houses	931.9	1,307.2	862.7
Other	151.2	313.1	242.7
<b>Total</b>	<b>1,083.0</b>	<b>1,620.3</b>	<b>1,105.4</b>
Alterations and additions to residential buildings (b)	92.9	132.5	140.0
Non-residential building (c)	881.5	766.8	766.7
<b>Total building</b>	<b>2,057.4</b>	<b>2,519.7</b>	<b>2,012.1</b>
<b>PUBLIC SECTOR</b>			
New residential building (a)—			
Houses	40.5	53.9	33.7
Other	24.0	41.2	51.2
<b>Total</b>	<b>64.4</b>	<b>95.1</b>	<b>84.8</b>
Alterations and additions to residential buildings (b)	1.4	1.8	2.3
Non-residential building (c)	200.1	218.3	257.3
<b>Total building</b>	<b>266.0</b>	<b>315.2</b>	<b>344.4</b>
<b>TOTAL</b>			
New residential building (a)—			
Houses	972.3	1,361.1	896.4
Other	175.1	354.4	293.9
<b>Total</b>	<b>1,147.5</b>	<b>1,715.5</b>	<b>1,190.2</b>
Alterations and additions to residential buildings (b)	94.3	134.3	142.3
Non-residential building (c)	1,081.6	985.1	1,024.0
<b>Total building</b>	<b>2,323.4</b>	<b>2,834.8</b>	<b>2,356.5</b>

(a) From 1 July 1988 valued at \$5,000 and over. (b) Valued at \$10,000 and over. (c) From 1 July 1988 valued at \$30,000 and over.

### Building Activity Survey

The value of new residential building commenced during 1989-90 fell by 29.1 per cent compared with the previous year. This decrease comprised a fall of 36.1 per cent in the value of new houses commenced and a marginal increase of 1.5 per cent in the value of other residential building commenced.

The value of alterations and additions to residential building commenced during 1989-90 maintained the increases of previous years to be 14.2 per cent higher than for 1988-89.

**TABLE 18.4 – VALUE OF BUILDING COMMENCED BY CLASS OF BUILDING**  
(\$ million)

Reference: Catalogue No. 8752.5

<i>Class of building</i>	1987-88	1988-89	1989-90
New residential building—			
Houses	846.2	1,343.6	857.9
Other	163.6	311.6	316.4
<b>Total new residential building</b>	<b>1,009.7</b>	<b>1,655.2</b>	<b>1,174.3</b>
Alterations and additions to residential buildings (a)	87.8	121.4	138.6
Non-residential building (b)—			
Hotels, etc	45.3	34.3	16.4
Shops	144.7	137.0	141.2
Factories	106.3	74.9	96.4
Offices	233.0	739.2	381.4
Other business premises	143.8	199.7	112.6
Educational	94.5	133.9	112.0
Religious	6.7	4.3	7.3
Health	70.3	27.6	41.0
Entertainment and recreational	50.3	42.4	39.1
Miscellaneous	93.0	56.7	86.9
<b>Total non-residential building</b>	<b>987.9</b>	<b>1,450.0</b>	<b>1,034.0</b>
<b>Total building</b>	<b>2,085.5</b>	<b>3,226.6</b>	<b>2,346.9</b>

(a) Valued at \$10,000 and over. (b) Valued at \$30,000 and over.

**TABLE 18.5 – VALUE OF BUILDING COMPLETED BY CLASS OF BUILDING**  
(\$ million)

Reference: Catalogue No. 8752.5

<i>Class of building</i>	1987-88	1988-89	1989-90
New residential building—			
Houses	694.4	906.9	1,296.1
Other	140.6	193.6	367.9
<b>Total new residential building</b>	<b>835.0</b>	<b>1,100.5</b>	<b>1,664.0</b>
Alterations and additions to residential buildings (a)	80.2	99.5	142.0
Non-residential building (b)—			
Hotels, etc	86.4	20.1	51.3
Shops	143.0	186.3	163.1
Factories	63.4	81.3	97.4
Offices	208.1	263.6	343.5
Other business premises	101.7	123.9	174.0
Educational	120.9	65.1	161.9
Religious	6.4	4.8	8.0
Health	36.7	112.9	58.5
Entertainment and recreational	58.2	37.6	63.9
Miscellaneous	58.8	63.8	72.5
<b>Total non-residential building</b>	<b>884.5</b>	<b>959.5</b>	<b>1,194.0</b>
<b>Total building</b>	<b>1,799.7</b>	<b>2,159.5</b>	<b>3,000.0</b>

(a) Valued at \$10,000 and over. (b) Valued at \$30,000 and over.

**TABLE 18.6 - HOUSES AND OTHER RESIDENTIAL BUILDINGS COMMENCED CLASSIFIED BY OWNERSHIP**

Reference: Catalogue No.8752.5

<i>Class of building</i>	1987-88	1988-89	1989-90
Private sector—			
Houses (a)	13,920	18,980	10,780
Other residential buildings (b)	3,660	6,216	4,595
Public sector—			
Houses	653	698	524
Other residential buildings (b)	500	726	1,049
<b>Total—</b>			
<b>Houses (a)</b>	<b>14,570</b>	<b>19,680</b>	<b>11,300</b>
<b>Other residential buildings (b)</b>	<b>4,160</b>	<b>6,942</b>	<b>5,644</b>

(a) Figures are rounded to nearest ten units. (b) Number of dwelling units.

The value of non-residential building commenced during 1989-90 fell by 28.7 per cent compared with 1988-89.

The total value of building commenced, at current prices, during 1989-90 decreased by 27.3 per cent when compared with 1988-89.

The value of new residential building and non-residential building completed during 1989-90 increased by 51.2 and 24.4 per cent respectively when compared with the previous year.

The total value of building work completed during 1989-90, at current prices, increased by 38.9 per cent compared with 1988-89.

### Dwelling Unit Commencement Series

A consequence of the sampling techniques used for private sector house building in the Building Activity Survey is that estimates for this class of building cannot be produced at finer levels of geographic disaggregation than State/Territory levels without incurring unacceptably high sampling errors.

To compensate for this loss of detail, a monthly Dwelling Unit Commencement series was implemented in July 1980. The data are compiled from monthly returns supplied by local and other government authorities. However, because this methodology is different from that of the Building Activity Survey, total figures for Western Australia differ between the two series by a small margin.

**TABLE 18.7 - HOUSES COMMENCED, BY MATERIAL OF OUTER WALLS**

Reference: Catalogue No. 8741.5

<i>Type of material</i>	1987-88	1988-89	1989-90
Double brick (a)	12,470	16,639	8,906
Brick veneer	716	925	691
Fibre cement	644	896	820
Other	426	603	630
<b>Total new houses</b>	<b>14,256</b>	<b>19,063</b>	<b>11,047</b>

(a) Includes houses built with outer walls of stone or concrete.

**TABLE 18.8 - DWELLING UNITS COMMENCED IN STATISTICAL DIVISIONS BY OWNERSHIP : 1989-90**  
Reference : Catalogue No. 8741.5

<i>Statistical division</i>	<i>Private sector</i>			<i>Public sector</i>			<i>Total</i>		
	<i>Houses</i>	<i>Other residential buildings</i>	<i>Total</i>	<i>Houses</i>	<i>Other residential buildings</i>	<i>Total</i>	<i>Houses</i>	<i>Other residential buildings</i>	<i>Total</i>
Perth Statistical Division	6,952	3,583	10,535	273	911	1,184	7,225	4,494	11,719
Other divisions—									
South-West	1,904	408	2,312	62	47	109	1,966	455	2,421
Lower Great Southern	348	97	445	11	6	17	359	103	462
Upper Great Southern	77	8	85	8	-	8	85	8	93
Midlands	528	32	560	13	12	25	541	44	585
South-Eastern	223	173	396	45	38	83	268	211	479
Central	352	87	439	26	3	29	378	90	468
Pilbara	53	16	69	23	10	33	76	26	102
Kimberley	78	29	107	71	40	111	149	69	218
<b>Total</b>	<b>3,563</b>	<b>850</b>	<b>4,413</b>	<b>259</b>	<b>156</b>	<b>415</b>	<b>3,822</b>	<b>1,006</b>	<b>4,828</b>
<b>Total Western Australia</b>	<b>10,515</b>	<b>4,433</b>	<b>14,948</b>	<b>532</b>	<b>1,067</b>	<b>1,599</b>	<b>11,047</b>	<b>5,500</b>	<b>16,547</b>

**ENGINEERING CONSTRUCTION SURVEY**

This survey measures engineering construction activity in Australia by both public and private sector organisations. The data are compiled from the Engineering Construction Survey (ECS).

**TABLE 18.9 – ENGINEERING CONSTRUCTION  
ACTIVITY BY STAGE OF CONSTRUCTION**  
(\$ million)

Reference: Catalogue No. 8762.0

<i>Stage of construction</i>	<i>1987-88</i>	<i>1988-89</i>	<i>1989-90</i>
Commenced during period	1,196.7	1,441.1	1,309.7
Work done during period	1,556.8	1,599.3	1,432.0
Work yet to be done	404.1	429.0	313.9

The ECS measures the value of all engineering construction work undertaken in Australia. For the ECS, all enterprises recorded on the ABS central register of economic units and classified to the construction industry are included in the survey framework together with all other units known to be undertaking engineering work (from trade journals, newspapers, etc.). Table 18.14 provides

details of engineering construction work undertaken in Western Australia

The value of engineering construction work commenced during 1989-90 fell by 9.1 per cent when compared with the previous year.

**REFERENCES****ABS publications:**

*Estimated Stocks of Dwellings in Census Collection Districts and Statistical Local Areas, Western Australia* (8705.5).

*Building Approvals, Western Australia* (8731.5).

*Dwelling Unit Commencements Reported by Approving Authorities, Western Australia* (8741.5).

*Building Activity, Western Australia* (8752.5).

*Construction Industry Survey: Private Sector Construction Establishment, Details of Operations, Australia* (8772.0).

*Engineering Construction Survey, Australia* (8762.0).

## Chapter 19

# TRANSPORT AND COMMUNICATION

## Transport

Western Australia's main transport systems are centred generally on Perth, the capital, and on Fremantle, the principal port. Subsidiary systems are centred on a number of outports north and south of Fremantle and on some inland towns. International flights operate through the airports at Perth and the north-west town of Port Hedland.

### ROAD TRANSPORT

#### Roads

The Main Roads Department is the principal road authority in Western Australia. In conjunction with local government authorities it is responsible for the planning, design, construction and maintenance of the State road network.

The basis of the Western Australian road system is a series of declared highways and main roads which are the responsibility of the Department. These highways and roads carry traffic to major internal centres and interstate. Other connecting or local roads, declared as secondary or unclassified, are controlled by individual local councils.

Road statistics at 30 June 1990 were:

Highways	8,228 km
Main Roads	7,490 km
Secondary Roads	8,538 km
Unclassified Roads	117,676 km

State sealed road length totalled 41,848 kilometres.

Excluded from these statistics are forestry roads, which are the responsibility of the Department of Conservation and Land Management and total 27,330 kilometres.

A comprehensive route numbering system for roads was established in Western Australia during 1986. The system consists of 48 State routes in the metropolitan area and 25 in the country.

Perth now has 34.7 kilometres of freeway from South Street, Leeming to Ocean Reef Road, Edgewater. A reserved bus lane was opened on the Kwinana Freeway in December 1989 to improve access for public transport to Perth.

Upgrading of the Eyre, Great Northern and North-West Coastal Highways is continuing. Other road developments include the construction of bypass and arterial or perimeter routes in major metropolitan and country areas.

#### Motor vehicles

The responsibility for the registration and licensing of vehicles and the licensing of motor vehicle drivers has been delegated to the Commissioner of Police by the Traffic Board of Western Australia. The Traffic Board is also responsible for the collection and analysis of road traffic accident statistics, and research into the causes and prevention of road traffic accidents.

A survey of motor vehicle usage is undertaken by the ABS every three years, the latest survey results relating to the twelve months ended 30 September 1988. The survey is based on a sample of approximately 67,000 vehicles across Australia (7,000 vehicles in Western Australia), of which 75 per cent were trucks and other commercial vehicle types.

**TABLE 19.1 - MOTOR VEHICLE REGISTRATIONS**  
References: Catalogue Nos. 9304.5, 9305.5

	1988	1989	1990
<b>New motor vehicle registrations—</b>			
Year ended 30 June—			
Motor cars and station wagons	36,040	44,100	42,728
Utilities and panel vans	5,403	7,376	7,625
Trucks and buses	5,214	6,773	6,110
Motor cycles	2,215	2,522	2,875
<b>Total</b>	<b>48,872</b>	<b>60,771</b>	<b>59,338</b>
<b>Vehicles on register—</b>			
At 30 June—			
Motor cars and station wagons	670,158	708,253	746,194
Utilities and panel vans	135,850	140,893	146,677
Trucks and buses	94,311	100,805	107,332
Motor cycles	35,442	36,294	37,452
<b>Total</b>	<b>935,761</b>	<b>986,245</b>	<b>1,037,655</b>

**TABLE 19.2 - CURRENT DRIVERS LICENCES AT 30 JUNE 1990**

(Source: Western Australian Police Service)

Age group	Male	Female	Total
Under 17	422	66	488
17 - 20	42,458	37,098	79,556
21 - 24	47,717	44,317	92,034
25 - 29	65,273	61,354	126,627
30 - 39	127,205	123,110	250,315
40 - 49	105,720	93,194	198,914
50 - 59	67,168	53,371	120,539
60 and over	79,037	50,209	129,246
<b>Total</b>	<b>535,000</b>	<b>462,719</b>	<b>997,719</b>

**TABLE 19.3 - DRIVERS LICENCES DISQUALIFICATIONS AND CANCELLATIONS (a) 1989-90**

(Source: Western Australian Police Service)

Nature of offence	Number
<b>Alcohol related—</b>	
Driving under the influence	4,798
Driving with 0.08% or more	6,616
Refusing test	356
Other	460
Dangerous, reckless or careless driving	1,783
Speeding	991
Driving under disqualification	3,079
Driving without a licence	3,131
Demerit points suspension	4,823
Other	4,420
<b>Total</b>	<b>30,457</b>

(a) Includes some cases carried forward from the previous year.

**TABLE 19.4 - ANNUAL KILOMETRES TRAVELLED (a) YEAR ENDED 30 SEPTEMBER 1988**  
(Million kilometres)

Reference: Catalogue No. 9208.0

Vehicle type	Area of travel			Total
	Perth Statistical Division	Rest of State	Interstate	
Cars and station wagons	7,972.4	2,964.1	178.0	11,114.5
Utilities and panel vans	1,430.0	1,212.5	22.3	2,664.8
Rigid trucks	446.5	391.2	6.3	843.9
Articulated trucks	79.1	240.0	27.2	346.4
Other truck types	14.0	9.7	—	23.8
Buses	89.1	88.7	23.7	201.5
Motor cycles	146.0	57.3	2.7	206.0
<b>Total</b>	<b>10,177.1</b>	<b>4,963.6</b>	<b>260.2</b>	<b>15,400.9</b>

(a) Vehicles registered in Western Australia



**TABLE 19.5 – FUEL CONSUMPTION AND TONNES CARRIED (a)**  
**YEAR ENDED 30 SEPTEMBER 1988**  
 Reference: Catalogue No. 9208.0

Vehicle type	Fuel consumption (million litres)				Tonnes carried (million)
	Petrol	Diesel	Other (b)	Total	
Cars and station wagons	1,247.4	33.3	18.2	1,298.9	—
Utilities and panel vans	287.4	69.9	2.1	359.4	11.0
Rigid trucks	57.1	167.4	4.3	228.7	67.3
Articulated trucks	0.9	186.9	2.9	190.7	42.8
Other truck types	2.6	2.4	0.7	5.6	—
Buses	4.7	46.9	0.4	52.1	—
Motor cycles	12.6	—	—	12.6	—
<b>Total</b>	<b>1,612.7</b>	<b>506.8</b>	<b>28.5</b>	<b>2,148.0</b>	<b>121.0</b>

(a) Vehicles registered in Western Australia. (b) Including LPG and dual fuelled.

### Bicycle services

In the metropolitan area and regional centres of Western Australia a range of bicycle facilities have been developed to cater for the growing number of pedal cyclists. The responsibility for bicycle policy lies with the Minister for Local Government and his department. A State Bicycle Committee is responsible for coordinating the various inputs to bicycle policy. 'Bike West' (comprising the State Bicycle Committee and a Bicycle Management Team) was established within the Department of Local Government and is responsible for the development and implementation of the 'Bikeplans' with assistance from local groups. Community participation is a key objective of Bike West's aim to educate the community on the need for safer cycling.

An estimated 500,000 Western Australians (one-third of the population) currently use bicycles, the greatest growth being in adult cycling. In the Perth metropolitan region an estimated 6 per cent of all daily vehicle trips are made by bicycle with most of these trips replacing private car trips.

Outside the metropolitan area, 'Bikeplans' have been completed for the following areas: Albany; Augusta-Margaret River; Bunbury; Carnarvon; Esperance; Geraldton and Mandurah.

### Bus and ferry services

The Metropolitan (Perth) Passenger Transport Trust (Transperth) bears overall responsibility for all of Perth's metropolitan public transport (bus, ferry and train services). The metropolitan area is designated as being within a 50 kilometre radius of the Perth Town Hall as well as the area west of

the South-West Highway between Perth and Pinjarra. The ferry service operates on the Swan River between Perth and South Perth. Buses and ferries are also available for charter from Transperth.

A new bus station is being constructed in the City of Perth and is expected to be completed in August 1991. The Perth City Bus Junction will connect directly with the new bus lane on the Kwinana Freeway.

A growing number of privately owned ferry companies operate tours to the wine growing regions of the Swan River as well as river and harbour cruises around Perth and Fremantle, and trips to Rottnest Island.

Road transport of passengers outside the metropolitan area is provided by both the railway road services (see the section 'Rail Services') and privately operated bus services. The railway coach services operate in the southern part of the State (a private company competes with Westrail on the Perth-Augusta and Perth-Pemberton routes), and the privately operated bus services cater predominantly for those areas north of Geraldton. Privately operated express bus services operate a restricted service between Perth and Kalgoorlie.

Intratown bus services are provided in a number of the larger country towns by private operators, although in the Kalgoorlie-Kambalda-Boulder region services are undertaken by the Eastern Goldfields Transport Board.

In certain country areas private operators, under Government contract, run school bus services taking country children to and from school.

**TABLE 19.6 - TRANSPERTH BUS AND FERRY SERVICES (a)**  
(Source: Metropolitan (Perth) Passenger Transport Trust)

	1987-88	1988-89	1989-90
<b>Buses—</b>			
Number (b)	899	898	906
Route kilometres	1,784	1,836	1,867
Bus kilometres ('000)	46,172	46,850	47,256
Passenger boardings ('000)	52,108	54,804	55,239
<b>Ferries—</b>			
Number (b)	4	4	4
Route kilometres	r2.5	r2.5	1.3
Kilometres run ('000)	52	51	46
Passenger boardings ('000)	r570	r600	605
<b>Passenger Journeys ('000)—</b>			
Bus	39,778	41,799	42,165
Ferry	430	451	455

(a) Includes private charter and tourist services and, in the case of buses, clipper and school specials. (b) At 30 June.

**Taxi services**

The Taxi Control Board controls the operations of taxis in the Perth Metropolitan Traffic Area and any other designated areas. The Department of Transport is responsible for taxi operations in country areas.

In addition to unrestricted taxis, private taxi-cars (luxury type vehicles used mainly for VIP work and tours where a chauffeur driven limousine is required) are licensed to cater for a demand for this type of vehicle. To cater for peak demand and 'special event' situations Temporary and Restricted Hour taxi licences are issued. Restricted Areas licences have been issued for areas that would otherwise be poorly serviced. Multi-purpose taxis, for use primarily by disabled people, have also been licensed.

**TABLE 19.7 - LICENSED TAXI CARS: 30 JUNE 1990**  
(Source: Taxi Control Board, (State) Department of Transport)

<b>Metropolitan area—</b>		
<b>Metered taxis—</b>		
Unrestricted	855	
Premium restricted	40	
Temporary restricted	79	
Multi-purpose	6	
Area restricted	7	
Private	25	
<b>Total</b>	<b>1,012</b>	
<b>Country areas</b>	<b>280</b>	

**Road traffic accidents**

Statistics of road traffic accidents are prepared from information concerning accidents in public

thoroughfares, as supplied by the Western Australian Police Department. The statistics are confined to accidents which satisfied all of the following conditions:

the accident was reported to the police;

the accident occurred on a road, street etc. open to the public, including railway level crossing;

it involved a road vehicle or driven animal which at the time of the accident was in motion;

the accident resulted in the death of a person within 30 days after the accident or bodily injury to a person to an extent requiring surgical or medical treatment.

**TABLE 19.8 - ROAD TRAFFIC ACCIDENTS**  
Reference: Catalogue No. 9406.5

	Casualty accidents	Persons killed	Persons injured
<b>1988</b>			
<b>Nature of accident—</b>			
Multi-vehicle accident	6,380	77	8,304
<b>Single vehicle accident—</b>			
Struck object	928	74	1,215
Struck pedestrian	592	33	591
Overturning	708	35	1,062
Falling (a)	223	9	235
Other/Unknown	235	2	303
<b>Total</b>	<b>9,066</b>	<b>230</b>	<b>11,710</b>
<b>Feature of roadway—</b>			
Intersection	4,658	53	6,013
Straight road	3,314	106	4,187
Curve or bend	915	62	1,293
Other/Unknown	179	9	217
<b>Total</b>	<b>9,066</b>	<b>230</b>	<b>11,710</b>
<b>1989</b>			
<b>Nature of accident—</b>			
Multi-vehicle accident	6,551	99	8,593
<b>Single vehicle accident—</b>			
Struck object	923	46	1,212
Struck pedestrian	581	32	581
Overturning	789	57	1,179
Falling (a)	258	8	271
Other/Unknown	211	1	253
<b>Total</b>	<b>9,313</b>	<b>243</b>	<b>12,089</b>
<b>Feature of roadway—</b>			
Intersection	4,768	66	6,196
Straight road	3,321	120	4,208
Curve or bend	1,006	51	1,405
Other/Unknown	218	6	280
<b>Total</b>	<b>9,313</b>	<b>243</b>	<b>12,089</b>

(a) Includes all motor cycle and pedal cycle accidents where the driver or passenger fell from the vehicle regardless of whether the vehicle overturned.

**TABLE 19.9 – ROAD TRAFFIC ACCIDENTS  
CASUALTIES BY TYPE OF ROAD USER**  
Reference: Catalogue No. 9406.5

Type of road user	1987	1988	1989
<b>PERSONS KILLED</b>			
Drivers of motor vehicles	91	85	102
Motor cyclists (a)	22	23	24
Pedal cyclists	4	7	7
Passengers—			
Motor vehicle	56	76	73
Motor cycle	—	4	3
Pedestrians	38	33	33
Other (b)	2	2	1
<b>Total</b>	<b>213</b>	<b>230</b>	<b>243</b>
<b>PERSONS INJURED</b>			
Drivers of motor vehicles	5,351	6,050	6,327
Motor cyclists (a)	784	758	803
Pedal cyclists	505	660	507
Passengers—			
Motor vehicle	3,003	3,415	3,497
Motor cycle	120	106	107
Pedestrians	551	575	574
Other (b)	207	206	274
<b>Total</b>	<b>10,521</b>	<b>11,710</b>	<b>12,089</b>

(a) Includes riders of motor scooters. (b) Includes passengers on pedal cycles, bystanders, train crews, riders of horses, drivers of animal-drawn vehicles and road user type not stated.

**TABLE 19.10 – ROAD TRAFFIC ACCIDENTS  
CASUALTIES CLASSIFIED BY AGE**  
Reference: Catalogue No. 9406.5

Age group	1987	1988	1989
<b>Persons killed—</b>			
Under 5	6	9	5
5 – 9	6	4	7
10 – 16	7	16	11
17 – 20	40	48	54
21 – 24	39	37	38
25 – 29	20	30	30
30 – 39	27	27	30
40 – 49	15	17	21
50 – 59	15	15	13
60 and over	37	27	34
Not stated	1	—	—
<b>Total</b>	<b>213</b>	<b>230</b>	<b>243</b>
<b>Persons injured—</b>			
Under 5	211	198	205
5 – 9	272	313	297
10 – 16	790	844	806
17 – 20	2,042	2,219	2,356
21 – 24	1,496	1,508	1,593
25 – 29	1,229	1,395	1,357
30 – 39	1,600	1,822	1,921
40 – 49	964	1,160	1,186
50 – 59	625	697	697
60 and over	688	772	811
Not stated	604	782	860
<b>Total</b>	<b>10,521</b>	<b>11,710</b>	<b>12,089</b>

## RAIL SERVICES

Westrail is the trading name of the Western Australian Government Railway Commission, a statutory authority which competes in the freight, passenger and related transport markets in southern Western Australia. The system is linked with railways in other States at Kalgoorlie where it joins Australian National Railways. In addition to the Westrail services there are private railways, for the handling of iron ore, in the north of the State.

**TABLE 19.11 – WESTRAIL SERVICES**  
(Source: Westrail)

	1987-88	1988-88	1989-90
<b>Kilometres of railway (a)—</b>			
Route kilometres	5,553	5,553	5,554
Track kilometres	6,986	6,982	6,962
<b>Kilometres run ('000)—</b>			
Train	9,465	9,472	8,212
Road bus (c)	2,447	2,773	2,745
<b>Passenger journeys ('000)—</b>			
Rail	288	323	336
Road (c)	174	177	186
<b>Tonnes carried ('000) (d)</b>	<b>21,946</b>	<b>24,294</b>	<b>24,906</b>

(a) Excludes suburban rail, charter and tourist services. (b) In addition to its rail services, Westrail operates a system of road services for passengers and freight. (c) Paying goods only.

At 30 June 1990 there were 5,554 kilometres of railway owned and operated by Westrail, with a further 731 kilometres of rail owned by the Commonwealth Government and operated by Australian National Railways. Railway facilities at Albany and Geraldton are being relocated to facilitate foreshore redevelopment in these towns for tourism and commercial purposes.

Westrail's passenger services are operated with interstate and country trains and country road services. The Perth metropolitan rail service is owned by Westrail and operated under contract to Transperth.

**TABLE 19.12 – SUBURBAN RAIL SERVICES**  
(Source: Metropolitan (Perth) Passenger Transport Trust)

	1987-88	1988-89	1989-90
Rail cars and carriages (number)	106	102	97
Route kilometres	63	63	63
Train kilometres ('000)	2,314	2,377	2,661
Passenger boardings ('000)	9,564	9,396	8,451
Passenger journeys ('000)	6,635	6,517	5,865



Perth's new electrified rail cars are expected to be introduced into service in 1991.

Photograph: Transperth

Electrification of the suburban rail network is currently underway. The first electric service is planned to commence between the city and Armadale by mid 1991. A full electric service from the city to both Midland and Fremantle, planned for late 1991, will complete the project. A new line extending northward from Perth to Joondalup will be completed in early 1993 to cater for the rapidly expanding northern suburbs.

The exploitation of extensive inland deposits of iron ore in Western Australia has necessitated the construction of private railways for the transport of ore from the mines to the coast. Conditions applying to the construction and operation of these

railways are incorporated in agreements made between the State Government and mining companies. The private railways operate from Newman to Port Hedland (426 kilometres), Paraburdoo to Dampier (400 kilometres), Shay Gap to Port Hedland (185 kilometres) and Pannawonica to Cape Lambert (187 kilometres).

A number of private organisations operate tourist railways in the south-west of the State principally on lines owned and maintained by Westrail. The tourist railways own the steam locomotives used on the tourist services. A tourist tramway operates in the south-west of the state between Pemberton and Northcliffe.

### AIR SERVICES

An extensive system of regular air services operates in Western Australia for the transport of passengers, freight and mail. Perth has frequent and direct links with major Western Australian regional centres, other Australian capital cities and Alice Springs. It also has direct overseas links which include Europe, Asia, Africa and New Zealand. Pacific and American connections are made via the Eastern States. Port Hedland, the

TABLE 19.13 - IRON ORE RAILWAYS

	1986-87	1987-88r	1988-89
Kilometres	1,185	1,191	1,198
Locomotives in service	124	127	129
Ore wagons	5,514	5,458	5,462
Tonnes carried ('000)	88,037	90,128	84,655

second international airport in Western Australia, has direct international links with Indonesia.

The Civil Aviation Authority has responsibility for setting safety standards and day to day regulatory control of air services throughout Australia as well as operational responsibility for air traffic control, flight advisory services, communication, navigation and surveillance systems and rescue and fire fighting services at airports.

**TABLE 19.14 – PASSENGER TRAFFIC BETWEEN PERTH AND PRINCIPAL AIRPORTS (a)**  
(Source: Department of Transport and Communications)

	Passengers		
	1987	1988	1989
Domestic—			
Adelaide	235,637	249,470	180,676
Alice Springs	42,481	41,313	23,891
Brisbane	6,365	4,678	168
Cairns	9,232	10,954	7,979
Melbourne	392,526	395,514	328,228
Sydney	290,067	290,222	237,944
International—			
Auckland	67,917	72,730	75,498
Denpasar	70,211	79,982	91,685
Hong Kong	56,464	54,057	55,267
Kuala Lumpur	73,649	73,060	72,135
London	65,498	68,646	72,732
Singapore	220,697	251,296	282,337

(a) Total of embarkations and disembarkations.

**TABLE 19.15 – PASSENGER AND AIRCRAFT MOVEMENTS AT PRINCIPAL AIRPORTS**

Airport	Passengers (a)			Aircraft movements (b)		
	1987	1988	1989	1987	1988	1989
Broome	34,384	47,262	48,258	1,890	2,306	2,148
Carnarvon	17,643	18,680	13,077	982	967	683
Derby	38,707	32,845	23,890	2,330	2,323	1,621
Geraldton	31,522	38,591	30,031	1,523	1,521	1,102
Kalgoorlie	88,978	100,752	67,069	1,864	2,080	1,386
Karratha	145,893	140,492	100,450	5,283	4,386	3,089
Kununurra	34,972	39,769	35,390	1,716	1,981	1,681
Learmonth	10,461	13,357	12,654	749	702	544
Newman	30,968	30,809	18,900	1,427	1,650	1,138
Paraburdoo	25,469	26,954	26,803	1,413	1,516	1,111
Perth—						
Internal (c)	1,432,115	1,471,116	1,140,513	18,596	18,724	13,965
International	649,199	714,111	813,236	3,307	3,338	4,228
Port Hedland—						
Internal	82,901	87,397	68,330	4,607	3,774	2,761
International	5,115	5,899	4,766	102	106	102

(a) Total of embarkations and disembarkations. (b) Total of arrivals and departures. (c) Interstate and intrastate.

The Bureau of Air Safety Investigations investigates aircraft accidents and incidents involving civil aircraft in Australia.

The Federal Airports Corporation is responsible for the operations at Perth (and Jandakot) airports, including the Perth International Terminal which is located twelve kilometres from the domestic terminal.

The domestic and international airports at Perth are currently used by:

9 international operators

3 interstate operators

1 intrastate operator

4 commuter operators connecting Perth with 18 country centres.

Other commuter services connect townships and stations with ports on jet routes.

Excluding Jandakot and Perth, there were forty-four aerodromes used for civil aviation in Western Australia at 31 December 1990, including the Department of Defence aerodromes at Learmonth and Curtin (WA) and eighteen aerodromes operated under the Aerodrome Local Ownership Plan.

Derby airport in the far north-west of the State will be redeveloped to allow the operation of larger aircraft in the region.

At 31 December 1990, there were 990 aircraft undertaking general aviation work (charter, private, aerial agriculture and other) based in Western Australia.

The operation of regular passenger air services over the main domestic routes, has been deregulated since 31 October 1990 and is no longer restricted to the two major domestic carriers, Australian Airlines and Ansett.

On 1 December 1990, Compass Airlines, the first new Australian airline in 42 years began operations. The initial Compass schedule was limited to four cities — Brisbane, Sydney, Melbourne and Perth.

The introduction of a third airline in the market has created a more competitive fare structure resulting in generally cheaper air travel on major domestic routes.

### SHIPPING

Western Australia's sea-borne trade is conducted through the Port of Fremantle and a number of outports. Of these, Geraldton, Bunbury, Albany and Esperance are situated in the more highly developed south-western and southern parts of the State. The less closely settled areas of the north-west and the north are served by ports and other landing points at Useless Loop (Shark Bay), Carnarvon, Cape Cuvier, Exmouth, Barrow Island, Dampier, Port Walcott (Cape Lambert), Port Hedland, Broome, Derby, Yampi and Wyndham.

Table 19.16 shows the number of arrivals into and departures from various ports by vessels coming direct from or going direct to overseas ports during 1989-90. The figures exclude particulars of: ships in ballast; naval vessels; yachts and other craft used for pleasure; foreign fishing vessels that neither load nor discharge cargo; geophysical and oceanographic research vessels; oil-drilling rigs

**TABLE 19.16 - OVERSEAS SHIP ARRIVALS AND DEPARTURES AT MAJOR PORTS (a)**  
1989-90

Reference: Catalogue No. 9206.0

	Arrivals		Departures	
	Ship calls	Dead weight tonnage	Ship calls	Dead weight tonnage
	No.	'000	No.	'000
Fremantle	1,519	33,756	1,076	27,614
Port Hedland	33	392	332	28,321
Albany	14	508	29	825
Kwinana	104	5,621	2	70
Other	158	4,488	1,204	86,414
<b>Total</b>	<b>1,828</b>	<b>44,765</b>	<b>2,643</b>	<b>143,244</b>

(a) Excludes ships in ballast.

and vessels servicing them; and vessels of 200 registered net tonnes and under.

The importance of mineral developments in the north-west of the State is evident from the amount of cargo loaded at the ports of Dampier, Port

**TABLE 19.17 - OVERSEAS SEA CARGO LOADED AND DISCHARGED AT MAJOR PORTS**  
1989-90

	Loaded		Discharged	
	Gross weight	Value	Gross weight	Value
	tonnes	\$'000	tonnes	\$'000
Fremantle	18,196,657	4,306,416	1,762,001	2,290,507
Albany	612,251	126,554	167,796	14,013
Broome	1,305,845	74,661	30,737	14,702
Bunbury	3,784,896	1,057,986	1,150,948	127,602
Dampier	45,186,335	1,632,355	157,669	195,102
Geraldton	2,112,809	537,166	120,828	19,455
Kwinana	21,204	6,260	3,365,920	625,722
Port Hedland	27,599,967	663,978	35,340	23,950
Port Walcott	19,133,145	282,184	20,193	6,006
Other	6,531,836	273,998	180,283	30,841
<b>Total</b>	<b>124,484,945</b>	<b>8,961,558</b>	<b>6,991,715</b>	<b>3,347,900</b>

Hedland and Port Walcott. They are surpassed only by the Port of Fremantle, the principal port of Western Australia.

Cargo statistics are recorded according to value and gross weight tonnes. Gross weight is the total weight of cargo excluding the weight of containers, irrespective of the basis on which freight is charged.

Apart from general cargo, overseas consignments discharged were principally petroleum and petroleum products, rock phosphate, caustic soda, iron, steel and sulphur. Outward cargoes from Fremantle consisted largely of alumina, cereal grains, wool, refined petroleum and sheep. Cargo loaded at Esperance and Albany comprised mainly cereal grains. At Bunbury, the principal cargoes loaded were alumina, mineral sands and woodchips. Cereal grains and mineral sands were the main items loaded at Geraldton. Principal cargoes loaded in the northern part of the State were iron ore from Dampier, Port Hedland and Port Walcott. Salt was loaded at Carnarvon, Dampier and Port Hedland.

The Western Australian Coastal Shipping Commission was established in 1965 to carry on the services formerly maintained by the State Shipping Service. The Commission's ships operate along the north-west and northern coasts, calling regularly at ports between Fremantle and Darwin (Northern Territory). Besides general cargo, the freight discharged at north-west and northern ports consists mainly of refined petroleum products, bulk cement and other building and construction materials, refrigerated cargo, vehicles and drilling equipment. Cargoes carried south to Fremantle are mainly primary products (such as meat, grains and prawns) and vehicles.

The Commission also maintains a regular link between Fremantle and Bunbury and the Eastern States.

In 1986, the Commission extended its operations to include Papua New Guinea; and in 1988, after a break of fifty years, the shipping service with South East Asia recommenced.

#### **Administration of ports**

The State Government, through the Marine and Harbours Department, controls the ports at Broome, Carnarvon, Derby, Port Walcott (Cape Lambert) and Wyndham. The ports at Albany, Bunbury, Esperance, Fremantle, Geraldton and Port Hedland are controlled by separately

constituted authorities established by Act of Parliament. Private operators control the ports (or landing points) at Barrow Island, Cape Cuvier, Dampier, Exmouth, Useless Loop and Yampi.

#### **Description of principal ports**

A brief description of the principal ports, at 30 June 1989, is given below. Reference to previous articles on ports appears in the Appendix.

**Albany.** The port of Albany (35°S latitude) is the most southerly port in Western Australia and comprises the waters of Princess Royal Harbour and King George Sound. The effect of tidal movements is negligible and as there is little trouble from fog or storm it is an all-weather port. It embraces an area of 11,800 hectares having an abundance of natural deep water and affording excellent protection to shipping and shore works.

Access to Princess Royal Harbour from King George Sound is by means of a channel of 12.2 metres minimum depth and 145 metres wide.

**Bunbury.** The port of Bunbury (33°S latitude) is situated in Koombana Bay, 104 nautical miles south of Fremantle, and comprises an inner and outer harbour. It is an all-weather port with a tidal rise and fall of 0.8 metres influenced by weather conditions.

Access to the inner harbour is by means of a dredged channel approximately 24 kilometres in length, 12.2 metres in depth and 121 metres wide.

**Esperance.** The port of Esperance (33°S latitude) is situated in Esperance Bay on the south coast of Western Australia.

The port has two land-backed berths of concrete and steel construction. The approach channel to the berths is 244 metres wide and is dredged to a depth of 13.0 metres. The deepest permissible loading draft is 11.5 metres.

**Fremantle.** The port of Fremantle (32°S latitude) is the principal port of Western Australia. It is an all-weather port, virtually tideless and little troubled by storm or fog. The port provides modern facilities for the handling of ships, passengers and cargo and is connected to the road and rail systems of Western Australia and Australia generally. It has an area of 87,600 hectares and comprises an Inner Harbour and an Outer Harbour.

The Inner Harbour, which is constructed within the mouth of the Swan River, is approached through a short entrance channel dredged to a depth of 11 metres at low water. It encloses 81 hectares of water dredged throughout to 13 metres at low water and is the centre of the general cargo trade of the port.

The Outer Harbour is protected from the west by islands and reefs. It embraces three main anchorages of depths of up to 19 metres. Gage Roads, the most northerly of these anchorages, serves as an approach to the Inner Harbour. Owen Anchorage is centrally situated between Success and Parmelia Banks. The largest and most protected of the anchorages, Cockburn Sound, lies to the south and serves the Kwinana industrial area.

**Geraldton.** The port of Geraldton (28°S latitude) is situated in Champion Bay on the west coast, 215 nautical miles in a north-westerly direction from Fremantle. The outer harbour, which is 10 metres deep, provides a good holding anchorage.

The inner harbour, enclosed by a breakwater, affords ample protection for shipping and shore works. The depth of the inner harbour is 9.1 metres, but the rock base of the entrance channel restricts the loaded draught of vessels to 8.7 metres. With the use of tides, vessels may load to 9.1 metres at mean sea level (0.8 metre tide), or to 9.3 metres at mean higher high water (1.1 metre tide).

**Port Hedland.** Port Hedland (20°S latitude) is situated on the north-west coast of Western Australia, 957 nautical miles from Fremantle. Access to the harbour is by means of a dredged channel approximately 20 kilometres in length with a further 25 kilometres delineated by beacons. The channel has a minimum depth of 14.1 metres, and minimum width of 183 metres. Subject to the height of tide, the channel is navigable by vessels of up to 250,000 tonnes deadweight, and 325 metres in length with a maximum draft of 18.35 metres.

## Communications

### TELECOMMUNICATIONS

#### Internal services

The Australian Telecommunications Corporation was established on 1 January 1989 after amendments to the Telecommunications Act abolished the former Australian

Telecommunications Commission which had been created on 1 July 1975.

The Corporation operates under the trading name Telecom Australia and is responsible to the Minister for Transport and Communications.

Telecom spends about one quarter of its annual \$400 million Western Australian budget on locally supplied goods and services. This includes a contribution to State Government revenue of approximately \$21 million per year.

On 24 September 1990, the Australian Government decided to merge Telecom with OTC and introduce a private competitor. The Government also signalled the end of Telecom's 'first telephone' monopoly on 30 June 1991, together with the introduction of a third mobile telephone licence and unlimited competition in telecommunications from June 1997.

**Joint Ventures.** QPSX Communications is just one of 17 subsidiary and joint venture companies of Telecom Australia.

Queued Packet Synchronous Exchange (QPSX) was invented by Robert Newman, a student at the University of Western Australia. It is an

TABLE 19.18 - TELECOM OPERATIONS IN WESTERN AUSTRALIA  
(Source: Telecom)

	1986-87	1987-88	1988-89
Telephone services (a)—			
Metropolitan (b)	448,038	469,984	520,300
Country	157,172	165,802	156,500
<b>Total</b>	<b>605,210</b>	<b>635,786</b>	<b>676,800</b>
Telex services (a)	4,686	3,339	2,012
Telex internal calls ('000) (c)	3,979	2,946	138
Data services (a)—			
Datel services	7,415	6,892	6,426
Digital data services	4,291	5,786	6,345

(a) At 30 June. (b) Within a 32 kilometre radius of the General Post Office, Perth. (c) Includes Post Office official traffic.



information transfer system that facilitates the rapid transmission of large volumes of telecommunications traffic through the public telephone network.

QPSX has significant revenue earning potential for Australia. Using QPSX would enable banks to conduct their night-time information transfers within seconds rather than hours; it would enable the transmission of complex graphical data and diagnostic information such as x-rays virtually instantaneously.

**Optical Fibre Cable.** Work has begun on Western Australia's second West-East optical fibre cable, due for completion in 1992 at a cost of more than \$30 million. The Meekatharra-Newman optical fibre cable will be completed in May 1991 at an approximate cost of \$4.5 million.



A rock saw was used to cut through the limestone on the Nullabour Plain during the installation of Telecom's West-East Optical fibre cable from Adelaide to Perth.

Photograph: Telecom.

**Mobile telephones.** The cellular telephone system operates within a service area which is divided into a number of cells up to 30 kilometres in diameter. Each cell interconnects with the standard telephone network, enabling mobile telephone customers the same facilities as standard telephone subscribers.

Australia wide more than half a million calls are made on mobile telephones each day. The mobile network is capable of reaching 75 per cent of the Australian population in all eight capitals and more than 40 regional centres.

Mobile telephones were introduced in Perth in February 1987. There are now 13,500 mobile telephones in Western Australia, of which 50 per cent are car-mounted, 30 per cent hand-held and 20 per cent transportable or combination.

Mobile telephone customers in Western Australia place about 58,000 mobile calls each day. Coverage extends in the metropolitan area north to Quinns Rocks, south to Mandurah and Pinjarra, east to Sawyers Valley and west to Rottnest Island. Country areas are Bunbury to Dunsborough, the Pilbara, Kalgoorlie, Port Hedland, Collie, Northam and Geraldton. In 1991, coverage will be extended to include Albany.

Telephones in Service in Western Australia at 30 June 1990 were:

Fixed telephones	715,234
Mobile telephones	13,500
Total	728,734

#### External services

OTC Limited is responsible for telecommunication services between Australia and other countries.

Australia, represented by OTC, is a member of the management body of the International Telecommunications Satellite Consortium which, in 1964, established a global communications satellite system. The Commission operates five standard earth stations (Carnarvon and Perth in Western Australia, Ceduna in South Australia, Healesville in Victoria and Moree in New South Wales) which communicate via satellite with stations in other countries.

In addition to transmission via satellite, OTC also uses submarine cables and high frequency radio for its services.

The Commission operates a coastal radio service which provides essential maritime communications covering distress signals, air-sea rescue and naval traffic. OTC also provides communications with ships at sea. Coastal radio stations in Western Australia are located at Perth, Broome, Carnarvon, Esperance and Geraldton.

In association with Telecom, OTC provides telephone, electronic mail, television and many other telecommunications services to other countries.

Radio communication station operators in Australia are licensed by the Department of Transport and Communications. These stations can be run by either organisations or private individuals and can be licensed to operate from fixed or mobile points.

#### Internal satellite communications services

Australia's National Satellite System is owned and operated by AUSSAT Pty Ltd, a company established in 1981 to provide internal satellite communications for Australia and neighbouring regions.

The Australian Government has plans to introduce more competition into telecommunications and will, as part of those plans, sell AUSSAT to private interests during the course of 1991. Once privatised AUSSAT will become the second fully competitive national and international Australian telecommunications carrier.

AUSSAT's initial satellite communication program was based on two satellites launched from Cape Canaveral in the United States of America on the Space Shuttles *Discovery* and *Atlantis* in August and November 1985. They began commercial operations on 1 January 1986. A third satellite was launched in September 1987 from Kourou, French Guyana, on the European Space Agency's *Ariane* rocket.

The major access points to the satellite system are through the company's eight major City Earth Stations located in each capital city. In Western Australia, the station is located at Lockridge, eleven kilometres north-east of Perth. Two stations — Belrose in Sydney and Lockridge — are responsible for monitoring and controlling the status of the orbiting satellites (Tracking, Telemetry, Command and Monitoring Stations). The Lockridge facility is equipped with a tracking and telemetry dish, two communications antennas for sending and receiving telecommunications and broadcasting signals and a microwave tower for land-based signal sending and receiving.

Each satellite has two national beams in the 'uplink' direction (ground to satellite) that can receive signals from anywhere in Australia and from offshore regions. In the 'downlink' direction, each has two national beams and four spot beams covering:

Western Australia (the Western Australian beam)

Queensland (the North-East beam)

South Australia, Northern Territory (the Central Australian beam)

New South Wales, Victoria, Tasmania, Lord Howe and Norfolk Islands (the South-East beam).

In addition, the third satellite has a beam which covers the south-west Pacific region including New Zealand.

AUSSAT's domestic satellite communications system complements existing land-based communications systems by providing:

Telecom services to remote areas

improved communications for mining and exploration companies

emergency service organisations with more reliable communications than land-based systems

government departments, financial institutions and businesses generally access to AUSSAT for voice, video and data transmission

improved communications links between air traffic control centres and aircraft

television and radio services to more remote areas through the Australian Broadcasting Service Homestead and Community Broadcast Satellite Service (HACBSS), a Remote Commercial Television Service and a Remote Commercial Radio Service

a more cost-effective and flexible means for establishing interactive distance education.

#### Radio and television services

The Australian Broadcasting Tribunal (ABT) is responsible for the licensing of all commercial radio and television stations, with the national broadcasting and television services being under the control of the Australian Broadcasting Corporation (ABC). The ABT operates within a framework of complex provisions designed to ensure diversity of ownership and control of commercial broadcasting services, including cross media interests.

Radio broadcasting stations have operated in Western Australia since 1924 when station 6WF (Westralian Farmers) opened in Perth.

Perth is served by five ABC Radio Services — Metropolitan 6WF, Radio National, ABC-FM Stereo, Youth Network Triple J and Parliamentary 6PB.

In addition there are 7 public and 6 commercial radio stations serving the metropolitan area on both AM and FM wavebands.

In country areas of the State the ABC provides program material through six regional stations located at Broome, Karratha, Geraldton, Kalgoorlie, Bunbury and Albany. The Regional Program Unit in Perth broadcasts statewide to isolated areas of the state through the HACBSS receivers.

Country areas are also served by one public and 14 commercial radio stations ranging from Port Hedland in the north to Albany in the south and as far east as Kalgoorlie. More remote areas not serviced by commercial radio receive programs through the satellite-fed Remote Commercial Radio Service.

Full scale transmission from a television station in Western Australia began in 1959 with the commercial station TVW 7 (Channel 7).

Country areas are serviced via AUSSAT satellite by the national television service and five commercial stations based in Geraldton, Bunbury, Albany and Kalgoorlie. National television reaches remote areas through the HACBSS receivers. The satellite-fed Remote Commercial Television Service operates to ensure that remote area residents receive at least one commercial service.

The ABC simulcasts major orchestral concerts, ballets and operas using ABC TV and ABC-FM radio.

The Special Broadcasting Service was extended to Perth in March 1986. Programs originate in Sydney and are relayed to transmitters in each State via AUSSAT satellite.

## POSTAL SERVICES

Postal services throughout Australia are controlled by the Australian Postal Commission (Australia Post). Postal services made available by Australia Post include standard and special services, courier and electronic mail services.

Other services provided include money orders, bill payment, philatelic sales and banking.

TABLE 19.19 — AUSTRALIA POST OPERATIONS  
WESTERN AUSTRALIA  
(Source : Australia Post)

	1987-88	1988-89	1989-90
Post offices at 30 June (a)	400	397	400
Postal articles handled (b) ('000)—			
Posted in WA for delivery within Australia	266,774	281,757	290,969
Posted in WA for delivery overseas	14,626	15,274	16,680
Received from overseas for delivery in WA	13,402	14,117	14,791
<b>Total</b>	<b>294,802</b>	<b>311,148</b>	<b>322,440</b>

(a) Post Offices and Post Office Agencies. (b) Includes standard letters, large letters, security articles and parcels.

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Western Australian Police Department, *Annual Report*

Westrail, *Annual Report*

## Chapter 20

### FOREIGN AND INTERSTATE TRADE

Foreign trade statistics are compiled from information contained in documents prepared by importers and exporters or their agents in accordance with the Customs Act. Particulars of Western Australia's foreign trade, as presented in this Chapter, are derived from data supplied by the ABS, Canberra.

Statistics of Western Australia's trade with other Australian States are compiled by the Western Australian Office of the ABS from information contained in documents collected under authority of the *Census and Statistics Act 1905* from importers, exporters and other persons concerned with the distribution of goods.

#### The Customs Tariff

The first Commonwealth Customs Tariff was introduced on 8 October 1901, from which date uniform duties came into effect throughout Australia. The Australian Customs Tariff was developed in conformity with the policy of protecting economic and efficient Australian industries and of granting preferential treatment to imports from certain countries. Duties are imposed on some goods, generally of a luxury nature, for revenue purposes. Customs collections are a major source of revenue, but in its protective character the tariff has an important influence on the Australian economy.

The Australian Customs Tariff in use until December 1987 was introduced on 1 July 1965. The nomenclature used in the Tariff is that of the Convention on Nomenclature for the Classification of Goods in Customs Tariffs, an international agreement signed at Brussels on 15 December 1950. The system of naming established by the Convention is known as the 'Customs

Co-operation Council Nomenclature' (previously the Brussels Tariff Nomenclature).

For periods up to and including December 1987 import and export statistics were presented according to the codes and descriptions of the Australian Import Commodity Classification (A.I.C.C.) and the Australian Export Commodity Classification (A.E.C.C.) respectively. These classifications were based on the *United Nations Standard International Trade Classification, Revision 2*, (SITC Rev 2), with some modifications to take account of Australia's trade.

#### The Harmonised Commodity Description and Coding System

From 1 January 1988 import and export data have been reported solely according to the Harmonized Tariff and the Australian Harmonized Export Commodity Classification respectively.

These new classifications, which update those used formerly reflect technological development

and changes in international trade. They provide international uniformity in classifying and coding goods, and simplify the task of collecting, analysing and comparing foreign trade statistics. The Australian Harmonized Import Commodity Classification (A.H.I.C.C.) and Australian Harmonized Export Commodity Classification (A.H.E.C.C.) contain some 8,200 and 6,300 items respectively.

To coincide with the introduction of the Harmonized System, the third revision of SITC (i.e. SITC Rev 3) was introduced.

SITC Rev 3 incorporates significant changes to the numbering system and overall structure to align it more closely with the Harmonized System. The changes between the second and the third revisions of SITC, and the adoption by the ABS of the complete international version of the classification, have resulted in a break in the statistical series published by the ABS.

Interstate imports and exports are classified according to Interstate Trade Commodity Classifications which are based on the A.H.I.C.C. and the A.H.E.C.C. The basic items of the Australian classifications are compressed or expanded according to their significance in Western Australia's trade to form interstate trade commodity categories.

Lack of comparability between the A.I.C.C. and the A.H.I.C.C. and the A.E.C.C. and the A.H.E.C.C., has prevented the production of twelve months of data for 1987-88 on the basis of one commodity classification. Overseas trade statistics for 1987-88 were therefore not published in the *Western Australian Year Book*. Statistics on the new basis are available from the 1988-90 financial year.

### Valuation of Items of Trade

**Foreign Trade.** All values in foreign trade statistics are determined on a 'free on board (f.o.b.) port of shipment' basis. This means that all charges (in particular the cost of freight and insurance) incurred after the goods have been exported from the port of shipment are excluded. Only transport and service charges incurred, or usually incurred, prior to export are included in the determination of trade values.

*Re-exports* are defined as goods, materials or articles which are exported either in the same condition as they were in when imported, or after minor repair or operations which leave them

**TABLE 20.1 - VALUE OF IMPORTS INTO AND EXPORTS FROM WESTERN AUSTRALIA CLASSIFIED ACCORDING TO ORIGIN OR DESTINATION: 1989-1990 (\$'000)**

<i>Origin or destination</i>	<i>Imports</i>	<i>Exports</i>
Interstate (a)	6,515,966	2,282,389
Overseas—		
Argentina	32,570	137,355
Bahrain	—	123,944
Bangladesh	981	7,556
Belgium-Luxembourg	26,910	164,192
Brazil	20,712	125
Canada	173,020	83,129
China		
excluding Taiwan Province	45,926	510,439
Taiwan Province only	89,732	273,429
Christmas Island	—	2,381
Denmark	16,190	1,744
Egypt	81	132,475
Fiji	14	6,017
Finland	35,318	48,575
France	101,624	183,912
Germany, Democratic Republic of	1,485	5,924
Germany, Federal Republic of	218,791	272,465
Hong Kong	26,026	149,293
India	15,012	32,942
Indonesia	131,149	321,825
Iran	—	111,424
Italy	110,795	192,306
Japan	798,297	2,741,213
Jordan	1,989	2,370
Korea, Republic of	68,065	493,844
Kuwait	23	21,714
Malaysia	62,618	123,994
Nauru	21,733	18
Netherlands	36,451	218,843
New Zealand	50,267	45,873
Norway	58,491	162
Pakistan	6,823	64,942
Papua New Guinea	217	15,445
Philippines	3,990	52,059
Poland	2,277	11,536
Qatar	10,618	3,881
Saudi Arabia	134,175	60,013
Singapore	144,850	462,500
South Africa	17,805	33,188
Spain	20,219	46,587
Sri Lanka	3,421	10,284
Sweden	46,685	17,386
Switzerland	21,784	235,363
Thailand	29,994	29,812
Union of Soviet Socialist Republics	2,651	248,469
United Arab Emirates	369,675	111,826
United Kingdom	259,379	236,025
United States of America	638,644	1,712,058
Yemen Arab Republic	—	40,312
Yugoslavia	5,087	12,901
Zimbabwe	248	288
Other countries, country unknown and re-exports	122,006	323,407
Ships' stores	—	90,093
<i>Total overseas</i>	<i>3,984,818</i>	<i>10,227,858</i>
<b>Total</b>	<b>10,500,784</b>	<b>12,510,247</b>

(a) Excludes interstate value of horses. Also excludes value of interstate ships' stores.

TABLE 20.2 – VALUE OF FOREIGN EXPORTS OF SELECTED COMMODITIES  
 MAIN COUNTRIES OF DESTINATION: 1989-90  
 (\$'000)

<i>Commodity and destination</i>	<i>Value</i>	<i>Commodity and destination</i>	<i>Value</i>
Iron ore (a)—		Rock lobsters, whole and tails, fresh or frozen—	
<b>Total exports</b>	<b>2,142,511</b>	Japan	75,269
Wheat, (incl. spelt) and meslin, unmilled—		United States of America	64,244
Japan	167,795	Taiwan	34,782
Indonesia	141,858	<b>Total exports</b>	<b>181,047</b>
China	134,263	Salt—	
Egypt	128,103	Japan	88,055
Iran	74,785	Taiwan	12,668
Iraq	74,534	Korea, Republic of	8,773
Korea, Republic of	57,074	<b>Total exports</b>	<b>123,425</b>
Pakistan	43,501	Live sheep—	
Yemen Arab Republic	40,312	Saudi Arabia	18,570
Malaysia	39,275	Kuwait	18,199
Korea, Democratic People's Republic	14,047	United Arab Emirates	6,912
<b>Total exports</b>	<b>946,683</b>	Oman	6,287
Wool, greasy—(incl. fleece washed wool)		Bahrain	3,495
Union of Soviet Socialist Republics	150,175	<b>Total exports</b>	<b>62,046</b>
Japan	96,332	Meat of bovine animals, fresh, chilled or frozen—	
Germany, Federal Republic of	88,169	United States of America	59,290
Italy	66,463	Taiwan	14,392
France	63,196	<b>Total exports</b>	<b>104,210</b>
Netherlands	28,971	Feeding stuff for animals (b)—	
Spain	19,893	Korea, Republic of	41,870
Belgium-Luxembourg	14,291	Japan	30,948
Malaysia	12,380	Netherlands	13,338
Czechoslovakia	11,311	<b>Total exports</b>	<b>118,546</b>
Korea, Republic of	11,216	Pigments, paints, varnishes and related materials—	
United States of America	11,176	Japan	29,889
Poland	10,919	Netherlands	24,646
<b>Total exports</b>	<b>629,034</b>	Korea, Republic of	23,164
Gold bullion—		Taiwan	14,975
Singapore	178,684	Philippines	13,824
Hong Kong	66,492	<b>Total exports</b>	<b>176,863</b>
Korea, Republic of	19,182	Mutton and lamb, fesh, chilled or frozen—	
<b>Total exports</b>	<b>331,658</b>	Japan	9,493
Petroleum and petroleum products—		Saudi Arabia	5,362
United States of America	220,169	<b>Total exports</b>	<b>57,682</b>
Singapore	167,292	Hides and skins—	
Japan	48,301	Italy	14,210
Polynesia (French)	25,576	France	9,174
<b>Total exports</b>	<b>605,073</b>	<b>Total exports</b>	<b>39,078</b>
Barley, unmilled—			
Japan	25,378		
China	12,791		
Colombia	8,938		
Portugal	7,311		
<b>Total exports</b>	<b>74,683</b>		
Wool, degreased—			
Japan	59,524		
Italy	29,417		
United States of America	13,095		
Thailand	12,335		
<b>Total exports</b>	<b>150,350</b>		

(a) Source: Western Australian Department of Mines No country details available. (b) Excludes unmilled cereals.

TABLE 20.3 - VALUE OF FOREIGN TRADE WITH SELECTED COUNTRIES BY SELECTED DIVISIONS: 1989-90  
(\$'000)

Division Description	Imports				Exports			
	Japan	United States of America	United Kingdom	All countries	Japan	United States of America	United Kingdom	All countries
01 Meat and meat preparations—	—	—	—	271	14,442	61,858	6,043	178,266
03 Fish, (not marine mammals) crustaceans, molluscs and aquatic invertebrates, and preparations thereof	3,817	1,255	1,980	39,025	106,845	66,718	202	231,694
04 Cereals and cereal preparations	171	173	854	7,438	216,910	128	90	1,065,454
05 Vegetables and fruit	98	4,365	518	24,776	55	—	564	37,540
08 Feeding stuff for animals (excluding unmilled cereals)	2	991	2	5,582	30,948	—	—	118,546
11 Beverages	61	1,989	3,351	14,533	40	56	352	1,045
24 Cork and wood	—	3,278	1	23,388	246	636	5,937	7,566
26 Textile fibres and their wastes (not manufactured into yarn or fabric)	1,471	617	749	10,478	155,857	24,271	13,354	781,396
27 Crude fertilisers (excluding those of Divisions 56) and crude minerals (excluding coal, petroleum and precious stones)	450	5,193	272	60,519	100,115	1,477	387	150,367
28 Metalliferous ores and metal scrap (a)	262	946	644	3,139	1,194,859	39,387	64,153	2,054,749
29 Crude animal and vegetable materials, n.e.s.	844	525	77	7,007	7,640	2,124	635	29,742
33 Petroleum, petroleum products and related materials	18	9,253	149	672,409	48,301	220,169	—	605,073
51 Organic chemicals (a)	3,348	4,526	10,686	44,365	25	—	—	170
52 Inorganic chemicals (a)	1,892	14,846	12,950	69,515	14,926	2,350	462	80,759
56 Fertilisers (excl. crude)	89	36,252	45	72,205	—	—	—	189
58 Plastics in non-primary forms (a)	1,426	4,742	1,780	19,239	1	—	39	1,223
59 Chemical materials and products, n.e.c.	763	8,183	17,314	41,254	12	85	56	1,069
62 Rubber manufactures, n.e.s.	54,852	9,129	3,266	102,914	18	8	38	2,073
64 Paper, paperboard and articles of paper pulp, of paper or of paperboard (a)	7,059	3,138	3,224	75,205	—	6	16	6,714
65 Textile yarn, fabrics, made-up articles n.e.s. and related products (a)	3,474	2,553	3,361	58,137	8	9	7	2,113
66 Non-metallic mineral manufactures, n.e.s. (a)	5,077	8,080	8,666	98,548	14,700	7,951	8,857	92,674
67 Iron and steel	26,443	5,897	6,764	94,599	—	3	80	1,087
68 Non-ferrous metals (a)	1,079	1,319	1,626	56,012	893	1,759	773	13,693
69 Manufactures of metal, n.e.s. (a)	6,730	22,556	6,106	88,232	173	1,594	168	13,237
71 Power generating machinery and equipment	37,011	41,005	12,444	172,242	13	471	1,856	7,912
72 Machinery specialised for particular industries (a)	54,705	126,499	24,029	356,085	247	4,428	628	21,581
73 Metal working machinery	3,625	2,434	2,910	20,452	3	214	6	824
74 General industrial machinery and equipment, n.e.s. and machine parts, n.e.s. (a)	32,730	57,812	16,464	209,817	184	3,744	5,217	34,360
75 Office machines and automatic data processing equipment	3,884	16,001	1,637	50,985	6	281	734	4,178
76 Telecommunications and sound recording and reproducing apparatus and equipment	20,000	3,853	687	41,000	20	668	782	3,836
77 Electrical machinery, apparatus, appliances, parts (incl. non-elec. counterparts of electrical domestic equipment)	18,971	25,918	12,917	91,456	132	592	514	9,765
78 Road vehicles (incl. air cushion vehicles)	267,633	57,318	15,403	399,763	59	455	97	4,316
79 Transport equipment (excl. road vehicles)	201,993	31,520	15,108	303,881	12,191	322	19	63,316
87 Professional, scientific and controlling instruments and apparatus, n.e.s.	6,547	28,238	10,491	62,542	819	715	442	8,157
88 Photographic apparatus, equipment and supplies and optical goods, n.e.s., watches and clocks (a)	1,671	2,065	1,496	11,442	4	208	70	735
<b>Total (b)</b>	<b>798,297</b>	<b>638,644</b>	<b>259,379</b>	<b>3,984,818</b>	<b>2,741,213</b>	<b>1,712,058</b>	<b>236,025</b>	<b>10,227,858</b>

(a) Excludes commodities subject to a confidential restriction. These are included in totals. (b) Includes details not available for publication and divisions not shown separately.



TABLE 20.4 - VALUE OF INTERSTATE IMPORTS AND EXPORTS (a) — SELECTED DIVISIONS  
(\$'000)

Division	Description	Imports			Exports		
		1987-88	1988-89	1989-90	1987-88	1988-89	1989-90
00	Live animals,	6,294	6,158	2,589	7,588	11,590	4,316
01	Meat and meat preparations	46,472	53,450	62,316	15,404	14,489	18,668
02	Dairy products and birds' eggs	53,348	66,206	67,860	n.p.	n.p.	629
03	Fish, crustaceans and molluscs, and preparations thereof	12,793	16,023	14,809	32,796	35,745	38,661
04	Cereals and cereal preparations	84,041	87,798	94,191	5,056	7,118	7,530
05	Vegetables and fruit	123,378	164,495	137,223	9,507	15,667	14,003
06	Sugar, sugar preparations and honey	42,714	56,360	50,038	n.p.	n.p.	n.p.
07	Coffee, tea, cocoa, spices and manufactures thereof	82,889	93,941	109,119	n.p.	n.p.	131
08	Feeding stuff for animals (not including unmilled cereals)	35,192	42,602	n.p.	n.p.	n.p.	n.p.
11	Beverages	122,182	140,156	156,103	n.p.	n.p.	n.p.
12	Tobacco and tobacco manufactures	157,572	150,070	181,025	—	—	—
24	Cork and wood	8,973	n.p.	n.p.	n.p.	n.p.	n.p.
28	Metalliferous ores and metal scrap-	n.p.	n.p.	n.p.	258,013	292,153	n.p.
51	Organic chemicals	17,047	17,173	16,842	n.p.	143	n.p.
52	Inorganic chemicals	35,274	41,157	20,342	n.p.	n.p.	n.p.
53	Dyeing, tanning and colouring materials	35,699	43,255	40,740	n.p.	n.p.	n.p.
54	Medicinal and pharmaceutical products	128,177	153,674	166,246	n.p.	n.p.	n.p.
55	Essential oils and perfume materials; toilet, polishing and cleansing preparations	137,603	174,373	179,062	162	206	883
58	Artificial resins and plastic materials, and cellulose esters and ethers	98,535	72,237	66,300	10,016	9,661	9,691
62	Rubber manufactures, n.e.s.	55,445	80,016	71,806	5,601	4,142	n.p.
63	Cork and wood manufactures (excluding furniture)	19,382	19,036	23,093	n.p.	n.p.	n.p.
64	Paper, paperboard, and articles of paper pulp, of paper or of paperboard	185,459	210,398	220,596	26,506	30,500	23,092
65	Textile yarn, fabrics, made-up articles n.e.s. and related products	150,584	154,117	155,602	40,123	41,918	45,162
66	Non-metallic mineral manufactures, n.e.s.	63,913	77,334	73,261	19,150	21,837	28,255
67	Iron and steel	331,642	426,893	345,903	20,745	18,689	23,605
68	Non-ferrous metals	84,089	134,559	103,693	16,623	n.p.	12,072
71	Power generating machinery and equipment	58,968	62,901	67,634	10,602	11,477	12,825
72	Machinery specialised for particular industries	208,670	298,196	309,618	52,259	59,627	39,873
73	Metalworking machinery	12,181	16,809	14,234	5,037	8,240	5,126
74	General industrial machinery and equipment, n.e.s. and machine parts n.e.s.	226,874	284,171	271,218	49,013	72,395	85,229
75	Office machines and automatic data processing equipment	151,551	182,632	188,752	6,391	11,861	9,204
76	Telecommunications and sound recording and reproducing apparatus and equipment	150,275	152,802	155,720	8,532	7,021	5,539
77	Electrical machinery, apparatus and appliances, n.e.s. and electrical parts thereof	281,925	312,697	354,477	9,615	11,918	14,996
78	Road vehicles (including air cushion vehicles)	757,475	1,172,964	1,102,526	22,032	29,962	29,829
81	Sanitary, plumbing, heating and lighting fixtures and fittings, n.e.s.	22,310	24,300	25,915	n.p.	n.p.	n.p.
82	Furniture and parts thereof	27,143	34,411	34,649	50,478	46,398	42,575
84	Articles of apparel and clothing accessories	247,280	300,313	353,309	45,130	53,868	51,457
85	Footwear	69,980	82,704	85,381	3,811	4,074	6,059
87	Professional, scientific and controlling instruments and apparatus, n.e.s.	83,446	92,650	110,353	4,467	9,909	5,519
88	Photographic apparatus, equipment and supplies and optical goods, n.e.s., watches and clocks	55,187	64,363	68,458	2,766	3,319	2,894
<b>Total (a) (b)</b>		<b>5,404,518</b>	<b>6,517,667</b>	<b>6,515,966</b>	<b>1,808,478</b>	<b>1,777,058</b>	<b>2,282,389</b>

(a) Excludes the value of horses. Also excludes the value of interstate ships' stores. (b) Includes details not available for publication and divisions not shown separately.

unchanged. These minor operations include blending, packaging, bottling, cleaning, sorting, husking or shelling.

**Interstate Trade.** Statistics of goods imported from other Australian States are recorded in terms of landed cost. The basis of valuation for goods exported to other Australian States is f.o.b., or its equivalent, at the point of final shipment.

#### **Direction of Trade**

The term *Country of origin*, as used in recording the statistics of foreign trade, means the country of production; *Country of destination* means the country to which goods were consigned at the time of export. In compiling statistics of Western Australia's interstate imports and exports, goods are classified according to the State or Territory from which or to which they were consigned.

#### **REFERENCES**

*Exports, Australia, Annual Summary Tables* (5424.0)

*Exports, Australia, Monthly Summary Tables* (5432.0)

*Foreign Trade, Australia, Exports* (5436.0)

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## Chapter 21

### EMPLOYMENT AND INDUSTRIAL CONDITIONS

This chapter presents information on the labour force, including employment, unemployment, age and industry data, details of the cost of employing labour, industrial disputes and average weekly earnings for Western Australia.

#### THE LABOUR FORCE

The labour force is defined as those persons aged 15 years and over who, during a specified week were either employed or unemployed. This represents the total supply of labour available to the labour market for that particular week. Estimates of the labour force are obtained from the Monthly Population Survey, an Australia wide survey conducted monthly by means of personal interviews of a sample of non-private dwellings (hotels, motels, caravan parks etc) and approximately 31,000 private dwellings. This

sample consists of 0.6 per cent of the total population.

Two important labour force indicators are:

Participation rate, which is the number of persons in the labour force expressed as a percentage of the civilian population aged 15 years and over.

Unemployment rate, which is the number of unemployed persons expressed as a percentage of the labour force.

TABLE 21.1 – LABOUR FORCE STATUS, NOVEMBER  
(‘000 persons)  
Reference: Catalogue No. 6203.0

<i>Labour force status</i>	1985	1986	1987	1988	1989	1990
MALES						
Civilian population	541.2	561.0	579.8	600.1	619.3	635.0
Labour force—	424.9	427.3	446.1	465.5	473.6	485.1
Employed—						
full-time	367.1	369.2	387.3	407.3	414.0	406.7
part-time	27.4	26.0	28.8	31.1	35.5	38.0
Unemployed	30.4	32.1	30.0	27.2	24.0	40.3
Unemployment rate (original)	7.2	7.5	6.7	5.8	5.1	8.3
Participation rate	78.5	76.2	77.0	77.6	76.5	76.4
FEMALES						
Civilian population	540.8	560.1	578.0	597.6	616.9	632.9
Labour force—	274.4	289.3	293.5	313.5	325.1	336.9
Employed—						
full-time	144.0	155.6	153.3	165.8	175.4	171.7
part-time	110.3	112.5	119.1	124.8	133.1	139.5
Unemployed	20.1	21.2	21.1	22.8	16.7	25.7
Unemployment rate (original)	7.3	7.3	7.2	7.3	5.1	7.6
Participation rate	50.8	51.6	50.8	52.5	52.7	53.2

Table 21.1 shows a trend of increasing female participation in the labour force. The number of females in both full-time and part-time employment has risen from a total of 254,300 in 1985 to 311,200 in 1990. The participation rate of males in the labour force has declined slightly, however the number of males in both full-time and part-time employment has increased from a total of 394,500 in 1985 to 444,700 in 1990.

The number of unemployed males and females was relatively consistent between 1985 and 1988. However, in 1989 there was a significant decrease in the number of unemployed followed by a rise in 1990.

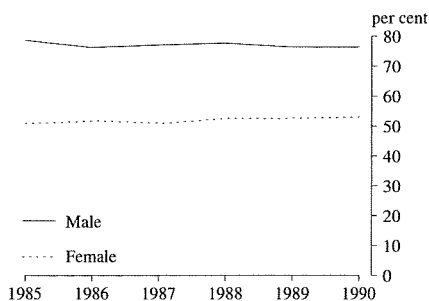
Similarly, teenage unemployment rates fell to 9.5 per cent in November 1989, down from a February 1985 peak of 22.9 per cent.

**TABLE 21.2 – LABOUR FORCE UNEMPLOYMENT RATES BY SEX, NOVEMBER**  
(Per cent)  
Reference: Catalogue No. 6203.0

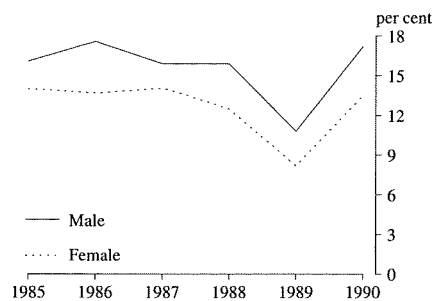
Age group	1985	1986	1987	1988	1989	1990
MALES						
15 – 19	16.1	17.6	15.9	15.9	10.8	17.2
20 – 24	12.4	15.3	10.5	9.6	6.8	13.6
25 – 34	6.1	6.4	6.4	4.5	5.7	8.1
35 – 44	3.9	4.8	4.1	2.9	2.9	5.1
45 – 54	3.8	3.8	4.4	*3.0	*2.1	6.1
55 – 59	8.3	*3.4	*4.0	*7.7	*5.7	*7.1
60 – 64	*8.7	*6.9	*5.5	*7.4	*9.2	*5.0
65 and over	*2.3	*0.0	*2.4	*7.1	*3.1	*4.5
FEMALES						
15 – 19	14.0	13.7	14.1	12.5	8.2	13.5
20 – 24	11.3	11.3	10.0	9.6	7.1	11.4
25 – 34	7.6	6.6	5.4	8.5	5.3	7.2
35 – 44	3.4	4.7	5.6	5.2	3.2	6.4
45 – 54	*3.8	*4.3	*5.5	*2.8	*4.5	*4.3
55 – 59	*3.7	*3.6	*2.6	*5.5	*2.2	*3.8
60 and over	*0.0	*2.1	*0.0	*0.0	*5.4	*0.0

\* subject to sampling variability too high for most practical uses.

**DIAGRAM 21.1**  
LABOUR FORCE PARTICIPATION RATE



**DIAGRAM 21.2**  
UNEMPLOYMENT RATE: WESTERN AUSTRALIA  
AGE GROUP 15-19



By November 1990, teenage unemployment had risen to a rate of 15.4 per cent.

The composition of the employed labour force (Table 21.3) has remained relatively stable

between 1985 and 1990. However, small decreases were recorded for both male and female employers. A steady increase in the number of persons not in the labour force is also shown in the table.

**TABLE 21.3 – CIVILIAN POPULATION (AGE 15+) – EMPLOYMENT STATUS, NOVEMBER**  
(’000 persons)

Reference: Catalogue No. 6203.0

<i>Employment status</i>	1985	1986	1987	1988	1989	1990
MALES						
Employer	30.1	26.3	24.6	25.6	25.5	28.7
Self-employed	49.8	52.6	54.7	59.1	60.5	58.3
Wage or salary earner	313.1	313.2	333.0	350.8	362.0	355.1
Helper, unpaid	*1.5	3.2	3.8	2.9	1.6	2.7
Unemployed	30.4	32.1	30.0	27.2	24.0	40.3
Not in labour force	116.3	133.7	133.6	134.5	145.7	149.9
<b>Total</b>	<b>541.2</b>	<b>561.0</b>	<b>579.8</b>	<b>600.1</b>	<b>619.3</b>	<b>635.0</b>
FEMALES						
Employer	12.7	12.2	11.1	12.6	13.4	12.1
Self-employed	25.0	24.6	20.0	26.7	25.2	26.9
Wage or salary earner	215.7	225.8	235.9	246.2	267.1	267.3
Helper, unpaid	*0.9	5.5	5.3	5.1	2.8	4.9
Unemployed	20.1	21.2	21.1	22.8	16.7	25.7
Not in labour force	266.3	270.9	284.6	284.1	291.7	296.0
<b>Total</b>	<b>540.8</b>	<b>560.1</b>	<b>578.0</b>	<b>597.6</b>	<b>616.9</b>	<b>632.9</b>

\* Subject to sampling variability too high for most practical uses.

Over the period 1985 to 1990 the percentage distribution of employment between industries varied only slightly. In this period at least 50 per cent of employed persons worked in one of the

four major industries — Retail trade, Manufacturing, Community services or Finance, property and business services.

**TABLE 21.4 – EMPLOYED PERSONS BY INDUSTRY**  
NOVEMBER  
(’000 persons)

Reference: Catalogue No. 6203.0

<i>Industry division</i>	1985	1986	1987	1988	1989	1990
Agriculture, forestry, fishing and hunting	50.7	54.0	47.3	54.6	47.4	49.9
Mining	28.0	25.7	24.9	26.3	28.9	27.3
Manufacturing	78.3	77.3	90.6	91.8	88.3	92.4
Electricity, gas and water	9.6	12.0	10.3	10.8	9.4	9.5
Construction	46.9	47.0	57.4	60.8	62.4	54.0
Wholesale trade	35.3	37.7	38.8	47.8	49.9	40.4
Retail trade	98.8	102.2	105.9	109.7	118.5	120.2
Transport and storage	35.5	36.2	34.9	35.8	34.6	37.5
Communication	11.0	10.9	10.2	9.7	10.7	11.4
Finance, property and business services	60.9	67.4	73.2	79.4	83.1	85.8
Public administration and defence	24.9	21.0	24.5	24.6	28.9	31.9
Community services	122.8	126.2	123.8	121.1	132.8	137.0
Recreation, personal and other services	46.1	45.6	46.8	56.7	63.1	58.6
<b>Total all industries</b>	<b>648.8</b>	<b>663.3</b>	<b>688.5</b>	<b>729.1</b>	<b>758.0</b>	<b>755.9</b>

## WAGES AND EARNINGS

## Average Weekly Earnings

Statistics of average weekly earnings of employees are produced quarterly and are based on employment and earnings information obtained from a sample survey of employers. They relate to earnings for a single weekly pay period ending near the middle of each quarter.

Earnings are gross earnings for the pay period, before taxation and any other deductions such as superannuation. Statistics are produced for average weekly ordinary earnings, including all allowances, payments, commissions etc, for full-time adults; average weekly total earnings, i.e. ordinary earnings plus overtime, for full-time adults; and average weekly total earnings for all employees. All average weekly earnings data is available by gender.

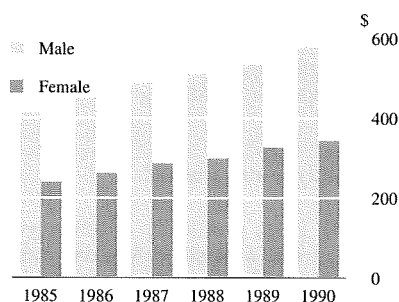
Diagram 21.3 shows that while female earnings have been increasing at about the same rate as male earnings since 1985, between 1989 and 1990, male earnings have increased at a slightly higher rate. Males have gained an additional \$162.60 compared with \$103.20 for females.

TABLE 21.5 – AVERAGE WEEKLY EARNINGS OF EMPLOYEES: AUGUST (\$)

Reference: Catalogue No. 6302.0

	<i>Full-time adult employees</i>		<i>All employees</i>
	<i>Ordinary earnings</i>	<i>Total earnings</i>	<i>Total earnings</i>
MALES			
1985	413.50	450.70	414.30
1986	446.40	482.70	449.10
1987	485.60	526.80	487.30
1988	506.00	552.30	510.30
1989	536.30	580.30	531.70
1990	585.60	630.70	576.90
FEMALES			
1985	342.40	347.90	241.20
1986	357.90	364.70	262.70
1987	388.20	399.00	286.80
1988	408.60	417.00	299.90
1989	438.50	448.40	327.20
1990	465.30	476.20	344.40

DIAGRAM 21.3  
AVERAGE WEEKLY EARNINGS BY SEX



## Weekly Award Rates of Pay

The weekly award rates of pay indexes reflect movements in rates of pay which are normally varied in accordance with awards, determinations or registered and unregistered agreements, for full time adult wage and salary earners.

Award rates of pay used in this index include the base rate, any allowance or loading applicable under the award to all employees and any other supplementary payments specified in the award. Remunerative allowances in the form of reimbursements, superannuation and severance, termination and redundancy payments are excluded.

TABLE 21.6 – INDEXES OF WEEKLY AWARD RATES OF PAY: NOVEMBER (Base: Weighted average minimum weekly award rate, June 1985 = 100.0)

Reference: Catalogue No.6312.0

<i>Industry</i>	<i>Full-time adult employees</i>		
	<i>1988</i>	<i>1989</i>	<i>1990</i>
Mining	112.6	122.0	122.7
Manufacturing	117.6	126.7	133.1
Construction	116.3	125.5	131.2
Wholesale trade	117.3	126.7	133.3
Retail trade	119.1	125.0	133.4
Finance, property and business services	115.3	123.5	127.0
Community services	114.1	122.7	124.0
<b>All industries (a)</b>	<b>115.8</b>	<b>124.1</b>	<b>128.2</b>

(a) Excludes employees in the Defence forces, Agriculture, Services to agriculture and employees in private households employing staff.

Over the period November 1988 to November 1990, the index over all industries rose by 10.7 per cent. The largest movement occurred in the Wholesale trade industry (13.6 per cent), while the smallest occurred in Community services (8.7 per cent). Generally increases in award rates slowed in 1990 compared with 1989, in line with wage restraint operating in most industries. This was particularly apparent in Mining and Community services.

### Average weekly hours worked

Since January 1948, practically all employees in Australia have had a standard working week of forty hours or less. However, the number of hours constituting a full week's work (excluding overtime) differs between industries.

The average weekly hours worked by employees over all industries in November 1990 was 35.4 hours per week, which is a decrease from the November 1989 average of 36.4. In Table 21.7, the lower average weekly hours worked for females is because of the much greater proportion of females, than males, working part-time. For particular industries the average per employee ranged from a minimum of 31.2 hours per week in

**TABLE 21.7 – EMPLOYED PERSONS AVERAGE WEEKLY HOURS WORKED (a) BY INDUSTRY NOVEMBER 1990**

Industry	Males	Females	Total
Agriculture, forestry, fishing and hunting	51.3	28.4	44.7
Mining	45.7	38.3	44.5
Manufacturing	40.9	29.1	38.3
Electricity, gas and water	37.9	29.4	37.5
Construction	40.3	16.9	37.7
Wholesale trade	40.8	32.5	38.1
Retail trade	39.9	24.2	31.9
Transport and storage	40.9	27.4	38.3
Communication	34.8	30.9	33.5
Finance, property and business services	39.4	28.5	34.4
Public administration and defence	38.3	31.8	35.4
Community services	38.1	28.0	31.5
Recreation, personal and other services	40.2	25.6	31.2
<b>All industries</b>	<b>41.0</b>	<b>27.5</b>	<b>35.4</b>

(a) The estimates refer to actual hours worked, not hours paid for.

the Recreation, personal and other services industry to a maximum of 44.7 hours per week in Agriculture, forestry, fishing and hunting.

**TABLE 21.8 – MAJOR LABOUR COSTS**

Reference: Catalogue No. 6348.0

Type of cost	1986-87		1987-88		1988-89	
	\$m	%	\$m	%	\$m	%
<b>PRIVATE SECTOR</b>						
Earnings—						
Gross wages and salaries	6,606	90.7	7,238	90.4	7,464	90.2
Other—						
Payroll tax	238	3.3	258	3.2	294	3.6
Workers' compensation	190	2.6	203	2.5	218	2.6
Superannuation	201	2.8	235	2.9	231	2.8
Fringe benefits tax (a)	49	0.7	70	0.9	65	0.8
<i>Total other</i>	<i>678</i>	<i>9.3</i>	<i>765</i>	<i>9.6</i>	<i>808</i>	<i>9.8</i>
<b>Total</b>	<b>7,284</b>	<b>100.0</b>	<b>8,003</b>	<b>100.0</b>	<b>8,271</b>	<b>100.0</b>
<b>PUBLIC SECTOR</b>						
Earnings—						
Gross wages and salaries	3,370	91.0	3,692	89.8	3,891	89.7
Other—						
Payroll tax	56	1.5	61	1.5	81	1.9
Workers' compensation	74	2.0	80	1.9	93	2.1
Superannuation	199	5.4	266	6.5	259	6.0
Fringe benefits tax (a)	7	0.2	11	0.3	13	0.3
<i>Total other</i>	<i>335</i>	<i>9.0</i>	<i>418</i>	<i>10.2</i>	<i>445</i>	<i>10.3</i>
<b>Total labour costs</b>	<b>3,705</b>	<b>100.0</b>	<b>4,110</b>	<b>100.0</b>	<b>4,336</b>	<b>100.0</b>

(a) Fringe benefits tax was introduced on 1 July 1986.

## MAJOR LABOUR COSTS

Labour costs are those costs, paid by the employer, associated with the employment of labour.

Details of major labour costs, i.e. earnings, payroll tax, superannuation, workers' compensation and fringe benefits tax, are collected through an annual survey of approximately 500 employers in the public and private sectors.

The composition of major labour costs remained relatively constant in both the public and private sectors between 1986-87 and 1988-89. The major labour cost in both sectors is employee earnings,

accounting for approximately 90 per cent of total labour costs. For the public sector, superannuation is the next greatest cost (6 per cent in 1988-89), while in the private sector payroll tax accounted for 3.6 per cent of total labour costs.

Overall there has been a greater increase in major labour costs per employee in the public sector (16.3 per cent) than in the private sector (15.8 per cent).

It is important to note that owing to differences in the compilation of superannuation statistics, no direct comparisons can be made between public and private sector superannuation costs.

TABLE 21.9 - MAJOR LABOUR COSTS PER EMPLOYEE  
Reference: Catalogue No. 6348.0

Type of cost	1986-87		1987-88		1988-89	
	\$	%	\$	%	\$	%
<b>PRIVATE SECTOR</b>						
Gross wages and salaries	19,096	90.7	20,468	90.4	21,998	90.2
Other—						
Payroll tax	687	3.3	728	3.2	865	3.6
Workers' compensation	549	2.6	573	2.5	643	2.6
Superannuation	582	2.8	665	2.9	681	2.8
Fringe benefits tax	142	0.7	199	0.9	191	0.8
<i>Total other</i>	<i>1,959</i>	<i>9.3</i>	<i>2,165</i>	<i>9.6</i>	<i>2,380</i>	<i>9.8</i>
<b>Total</b>	<b>21,056</b>	<b>100.0</b>	<b>22,633</b>	<b>100.0</b>	<b>24,378</b>	<b>100.0</b>
<b>PUBLIC SECTOR</b>						
Gross wages and salaries	21,847	91.0	23,499	89.8	25,069	89.7
Other—						
Payroll tax	360	1.5	387	1.5	519	1.9
Workers' compensation	477	2.0	509	1.9	602	2.2
Superannuation	1,289	5.4	1,695	6.5	1,667	6.0
Fringe benefits tax	43	0.2	71	0.3	81	0.3
<i>Total other</i>	<i>2,169</i>	<i>9.0</i>	<i>2,661</i>	<i>10.2</i>	<i>2,869</i>	<i>10.3</i>
<b>Total</b>	<b>24,017</b>	<b>100.0</b>	<b>26,160</b>	<b>100.0</b>	<b>27,938</b>	<b>100.0</b>

## INDUSTRIAL DISPUTES

Industrial disputes statistics relate only to disputes which involve stoppages of ten working days or more at the establishment where the stoppage occurred. Effects of these disputes on other establishments such as stand downs because of lack of materials, disruption of transport services, power cuts etc., are not included.

Details of stoppages are obtained primarily from the Department of Industrial Relations, trade journals, publications, newspapers and the employers and trade unions involved in the dispute.

DIAGRAM 21.4  
INDUSTRIAL DISPUTES  
NUMBER AND WORKING DAYS LOST

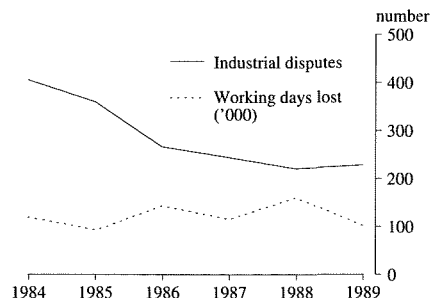




TABLE 21.10 – INDUSTRIAL DISPUTES BY INDUSTRY

Industry	1984	1985	1986	1987	1988	1989
NUMBER OF DISPUTES						
Mining	318	279	171	131	108	112
Manufacturing	17	06	23	14	12	7
Construction	23	34	31	56	32	49
Transport and storage	35	34	23	23	33	24
Other industries	13	08	19	21	36	36
<b>Total</b>	<b>406</b>	<b>361</b>	<b>267</b>	<b>245</b>	<b>221</b>	<b>228</b>
WORKING DAYS LOST ('000)						
Mining	49.9	52.0	109.8	30.3	83.5	17.8
Manufacturing	25.9	21.7	7.3	7.9	22.5	2.3
Construction	27.2	11.7	13.3	65.8	43.7	26.5
Transport and storage	11.7	5.8	5.6	4.6	3.4	2.5
Other industries	4.6	1.6	7.1	6.8	7.5	53.0
<b>Total</b>	<b>119.2</b>	<b>92.9</b>	<b>143.1</b>	<b>115.3</b>	<b>160.6</b>	<b>102.1</b>

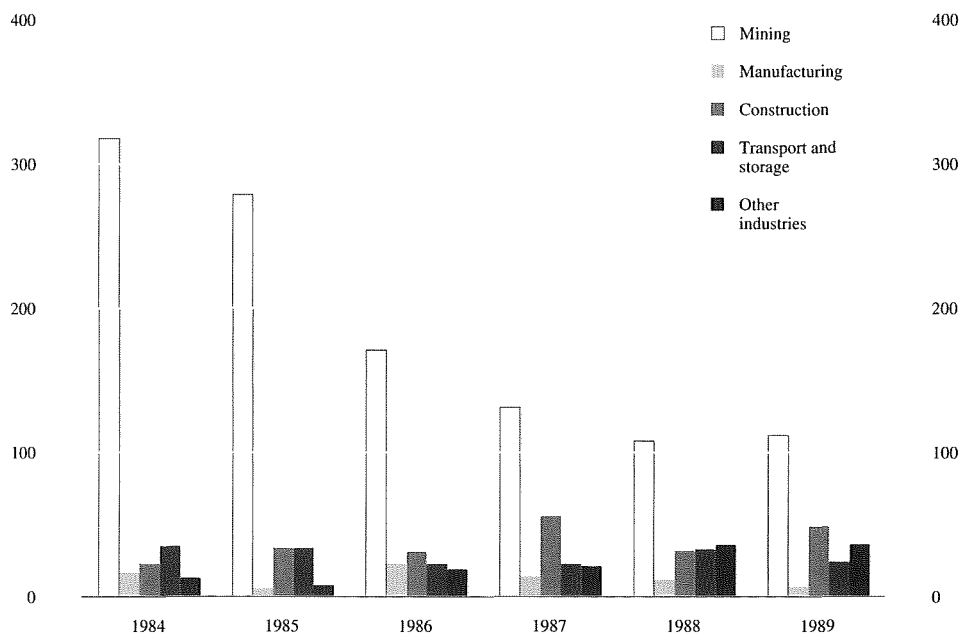
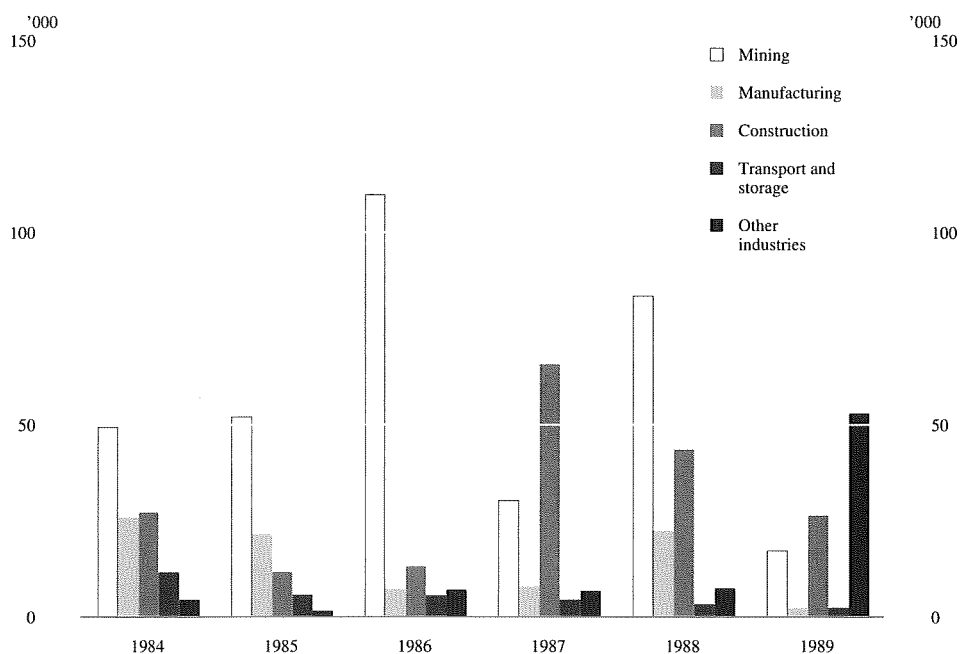
DIAGRAM 21.5  
INDUSTRIAL DISPUTES BY INDUSTRY

DIAGRAM 21.6  
WORKING DAYS LOST BY INDUSTRY



## INDUSTRIAL AUTHORITIES

### Federal Authorities

**Federal Court of Australia.** The Federal Court of Australia comprises an Industrial Division and a General Division. The Industrial Division deals with all proceedings under the *Conciliation and Arbitration Act 1904* and related legislation. A single Judge and the Industrial Relations Commission may refer a question of law for the opinion of the Court. Appeal from a judgement of a Full Court may, in certain circumstances, be made to the High Court of Australia.

**Industrial Relations Commission.** The Commission has jurisdiction to prevent and to settle industrial disputes extending beyond the limits of any one State. The work of the Commission is normally done by individual members; however, certain matters must be determined by a Full Bench of the Commission consisting of at least three members, of which two must be presidential members. A Full Bench of the Commission also deals with appeals and references from single members of the Commission.

### Western Australian authorities

The Western Australian Industrial Relations Commission may inquire into any industrial matter and make an award, order or declaration relating to such a matter. The Commission may also make inquiries where industrial action has occurred or is likely to occur.

The Commission in Court Session may make General Orders, hear matters referred by the Commission, and hear appeals from decision of Boards of Reference.

### REFERENCES

ABS publications

*Average Weekly Earnings, States and Australia* (6302.0)

*Award Rates of Pay Indexes, Australia* (6312.0)

*Labour Statistics* (6101.0)

*The Labour Force, Australia* (6203.0)

*Major Labour Costs, Australia* (6348.0)

*Industrial Disputes, Australia* (6322.0)

## Chapter 22

# PRICE INDEXES, PRICES AND HOUSEHOLD EXPENDITURE

### PRICE INDEXES

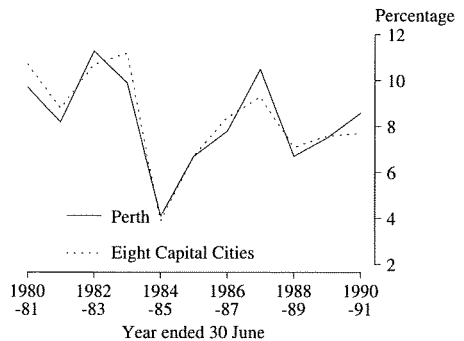
Information concerning the development of price indexes in Australia is given in *Year Book Australia* (Catalogue No. 1301.0) and *Labour Report* No. 58, 1973 (Reference. No. 6.7).

#### The Consumer Price Index

The Consumer Price Index (CPI) measures quarterly price changes of a 'basket' of goods and services which account for a high proportion of expenditure by metropolitan employee households. This 'basket' covers a wide range of goods and services, arranged in eight groups: Food; Clothing; Housing; Household equipment and operation; Transportation; Tobacco and alcohol; Health and personal care; and Recreation and education. The eight groups in turn are divided into thirty-five sub-groups and 107 expenditure classes. Indexes at the sub-group level and for individual expenditure classes are available on request. The CPI was published for the first time in August 1960 and was compiled retrospectively to the September quarter 1948.

**CPI population group.** Because the spending patterns of various groups in the population differ somewhat, the pattern of one group, fairly homogeneous in its spending habits, is chosen for calculating the CPI. This population group is, in concept, *metropolitan employee households*. For this purpose, *employee households* are those households which obtain at least three-quarters of their total income from wages and salaries excluding the top ten per cent (in terms of income) of such households. *Metropolitan* means the six State capital cities, Canberra and Darwin.

DIAGRAM 22.1  
CONSUMER PRICE INDEX  
Percentage change



**Weighting pattern.** Each of the 107 expenditure classes in the current CPI has a fixed weight (i.e. the measure of its relative importance) which reflects the expenditure pattern of the CPI population group as derived from Household Expenditure Surveys and other data collected by the ABS. More detailed information on weighting is published in *The Australian Consumer Price Index: Concepts, Sources and Methods* (Catalogue No. 6461.0)

**Periodic reviews.** The CPI is reviewed at approximately five-yearly intervals to take account of changes in household spending patterns. Following each review, the new series with its changed composition and weighting pattern is linked to the previous series to form one continuous series.

The eleventh (current) series of the CPI began with the release of the March quarter 1987 CPI and incorporates the following changes: expenditure on the purchase of dwellings was replaced by expenditure on mortgage interest charges; interest charges for consumer credit used for household purposes other than dwelling purchase were included; expenditure on optical services, veterinary services and watches and clocks was included; and the range of fresh fruit and vegetables included in the index was expanded.

A further change to the CPI was introduced in the March quarter 1989 when the ABS replaced the simple revaluation method of calculating mortgage interest charges with the conceptually superior and more sophisticated debt profile method.

**Price collection.** Since the CPI is designed to measure the impact of changing prices on metropolitan employee households, information about prices is collected in the kinds of retail outlets or other establishments where households normally purchase goods or services. This involves collecting prices from many sources, including supermarkets, electrical appliance

retailers, doctors, dentists, car dealers and repairers, service stations, hotels, real estate agents and financial institutions. For Perth, about 13,000 separate quotations are collected each quarter.

Prices are generally collected quarterly. However, for some important items prices are collected more frequently (e.g. petrol, alcohol, bread, fresh fish, fresh meat, fruit and vegetables) and a small number annually (e.g. seasonal clothing, local government rates and charges).

The prices used in the CPI are those that any member of the public would have to pay on the pricing day to purchase the specified good or service. Any sales tax or excise which the consumer must pay when purchasing specific items is included in the CPI price. Sale prices, discount prices and 'specials' are accepted for the CPI so long as the items concerned are of normal quality (e.g. not damaged or shop soiled) and are offered for sale in reasonable quantities. To ensure that the price movements reflect the experience of the bulk of the metropolitan population, the brands and varieties of the items which are priced are generally those which sell in the greatest volume.

TABLE 22.1 - CONSUMER PRICE INDEX : PERTH  
(Base year 1980-81 = 100 unless otherwise noted)  
Reference: Catalogue No 6401.0

	Food	Clothing	Housing (a)	Household equipment and operation	Trans- portation	Tobacco and alcohol	Health and personal care	Recreation and education (b)	All groups
1987-88	166.3	165.8	163.6	170.3	184.5	203.0	175.1	146.4	173.3
1988-89	181.2	177.4	(a)184.7	181.4	191.4	212.9	190.8	155.4	186.1
1989-90	192.8	185.6	217.5	192.1	205.2	232.2	207.8	164.1	201.6
1987-88									
December	163.6	165.3	163.5	169.3	183.7	201.3	171.0	144.1	171.8
March	168.3	165.4	163.5	171.2	185.7	204.5	179.2	148.6	174.6
June	172.0	171.9	166.0	174.6	187.9	208.0	181.8	150.0	177.7
1988-89									
September	176.6	172.2	175.2	177.1	188.1	210.8	186.3	152.3	181.3
December	178.7	177.6	188.2	180.3	188.4	210.5	187.1	155.2	185.1
March	183.8	177.0	(a)182.1	182.9	192.0	213.0	193.9	157.4	187.0
June	185.7	182.7	(a)193.4	185.2	196.9	217.3	195.7	156.6	191.0
1989-90									
September	188.4	181.5	(a)206.6	188.6	200.4	222.2	199.2	158.8	195.5
December	190.6	186.4	215.1	189.5	203.1	229.1	204.1	162.8	199.5
March	194.0	185.8	222.6	192.6	207.7	236.4	212.2	167.0	204.1
June	198.2	188.6	225.8	197.6	209.6	240.9	215.8	167.8	207.5
1990-91									
September	198.9	189.2	226.7	199.8	212.7	245.8	218.9	167.4	209.1
December	201.1	194.1	227.7	202.3	228.6	247.2	223.4	174.7	214.3

(a) These series have been affected by the adoption of a new approach to the treatment of mortgage interest charges. For more detail refer to Information paper *The Australian Consumer Price Index: Treatment of Mortgage Interest Charges* (Catalogue No 6442.0). (b) New group index replacing former 'Recreation' group. Base: March quarter 1982 = 100.

**Analysis of CPI changes.** Movements in the CPI from one period to another can be expressed either as changes in index points or as percentage changes. The following example illustrates the method of calculating index points changes and percentage changes between any two periods:

*All Groups CPI: Perth*

Index numbers:	
September quarter 1989:	195.5
less: June quarter 1989:	<u>191.0</u>
Change in index points:	+4.5
Percentage change =	$+4.5 \times \frac{100}{191.0} = 2.4\%$

**House price indexes**

House price indexes are compiled for use in calculating the mortgage interest charges component of the CPI. Separate indexes are constructed for established houses and project homes and these are published quarterly for each of the capital cities in *House Price Indexes: Eight Capital Cities* (Catalogue No. 6416.0).

**INDEX OF RELATIVE RETAIL PRICES**

An annual survey of retail prices for food in selected cities and towns in Western Australia is carried out during May each year. The information from the survey is then used to compile index numbers of the relative levels of food prices in those cities and towns using a common set of weights derived from the weighting pattern of the CPI Food Group. The resulting index numbers are expressed on the base Perth = 100 and are available from the ABS on request.

**AVERAGE RETAIL PRICES FOR SELECTED COMMODITIES**

'Average prices' of a limited range of commodities are recorded in the Blue Books of Western Australia from the early colonial years and in the Western Australian Year Book (Old Series) from 1886. Retail prices of food and groceries and average rentals of houses for years extending back to 1901 have been collected by the Australian Statistician but it was not until 1911 that a systematic collection of retail price statistics for compiling retail price indexes was begun. Since 1962 average retail prices for a range of selected (mainly food) items have been published quarterly in *Average Retail Prices of Selected Items* (Catalogue No. 6403.0).

**TABLE 22.2 – AVERAGE RETAIL PRICES OF SELECTED ITEMS: PERTH (cents)**

Reference: Catalogue No.6403.0

Item	Unit	December quarter		
		1987	1988	1989
<b>Dairy produce—</b>				
Milk, carton, supermarket sales	1 litre	83	87	90
Milk, powdered, full cream	1 kg can	522	529	631
Cheese, processed, sliced, wrapped	500g	252	279	330
Butter	500g	154	167	182
<b>Cereal products—</b>				
Bread, white loaf, sliced, supermarket sales	680g	115	120	136
Biscuits, dry	250g	101	110	117
Breakfast cereal, corn based	500g	210	219	250
Flour, self-raising	2 kg	162	176	199
Rice, medium grain	1 kg	97	102	107
<b>Meat and seafoods—</b>				
<b>Beef</b>				
Rib, without bone	1 kg	510	575	552
Rump steak	1 kg	818	906	1,014
T-bone steak, with fillet	1 kg	764	857	928
Chuck steak	1 kg	533	592	624
Silverside, corned	1 kg	532	595	637
Sausages	1 kg	270	336	366
<b>Lamb</b>				
Leg	1 kg	494	551	554
Loin chops	1 kg	570	661	686
Forequarter chops	1 kg	453	512	499
<b>Pork</b>				
Leg	1 kg	514	560	630
Loin chops	1 kg	597	649	744
Chicken, frozen	1 kg	311	323	346
Bacon, middle rashers	250g pkt	216	252	294
Beef, corned	340g can	210	228	241
Salmon, pink	210g can	243	316	284
<b>Fresh fruit and vegetables—</b>				
Oranges	1 kg	134	150	143
Bananas	1 kg	129	184	193
Potatoes	1 kg	84	124	122
Tomatoes	1 kg	273	234	298
Carrots	1 kg	76	109	108
Onions	1 kg	100	159	109
<b>Processed fruit and vegetables—</b>				
Peaches	825g can	154	170	177
Pineapple, sliced	450g can	80	80	85
Peas, frozen	500g pkt	92	110	136
<b>Confectionery—</b>				
Chocolate, milk, block (a)	250 g	166	187	205
<b>Other food—</b>				
Eggs(b)	53g 1 dozen	168	181	193
Sugar, white	2 kg	163	178	234
Jam, strawberry	500g jar	171	182	193
Tea	250g	141	144	152
Coffee, instant	150g jar	464	475	465
Tomato sauce	600 ml	133	147	160
Margarine, poly-unsaturated	500 g	128	130	151
Baked beans, in tomato sauce	440 g	73	80	83
Baby food	125g can	36	37	40
<b>Household supplies and services—</b>				
Laundry detergent	1 kg	359	371	415
Dishwashing detergent	1 litre	354	380	392
Facial tissues	pkt of 224	165	183	195
Toilet paper (c)	4 x 300 sheet rolls	283	304	330

**TABLE 22.2 – AVERAGE RETAIL PRICES OF  
SELECTED ITEMS: PERTH — continued**  
(cents)

Reference: Catalogue No.6403.0

Item	Unit	December quarter		
		1987	1988	1989
Pet food	415g	80	88	90
Private motoring— Petrol, super grade	1 litre	57.8	53.6	62.0
Alcoholic beverages— Beer, full strength, unchilled	12 x 750 ml bottles	1,869	1,866	1,928
Draught beer, full strength, public bar	285 ml glass	140	139	158
Scotch, nip, public bar	30 ml	192	197	232
Personal care products— Toilet soap	2 x 125g	129	139	146
Toothpaste	140g	189	214	212

(a) Prior to 1989 prices relate to 200 gram blocks. (b) Prior to 1988 prices relate to 55 gram egg standard. (c) Prior to 1988 prices relate to 6 x 500 sheet rolls.

### WHOLESALE PRICES OF MATERIALS USED IN BUILDING

There are two separate price index series for materials used in building.

**The Price Index of Materials used in House Building** measures changes in prices of selected materials used in the construction of houses. For this index the weights reflect the usage of materials in detached single dwelling units constructed in the Perth Statistical Division.

**TABLE 22.3 – PRICE INDEX OF  
MATERIALS USED IN HOUSE  
BUILDING – ALL GROUPS : PERTH**  
(Base year 1985-86 = 100)

Reference: Catalogue No. 6408.0

Year	Index number
1987-88	114.2
1988-89	128.1
1989-90	140.8

**The Price Index of Materials used in Building Other than House Building.** This index measures monthly changes in prices of selected materials used in the construction of buildings other than houses. The weights used in this index are based on the usage of materials in the construction of

buildings commenced in the six State capital cities in the three years ended June 1977. The same weighting pattern is used for each of the six capital cities.

For both of these indexes, prices are collected at the mid-point of each month from representative suppliers. In general the point of pricing is delivered on site, but in some cases it may be necessary to accept other pricing points, e.g. supplied and fixed.

**TABLE 22.4 – PRICE INDEX OF MATERIALS USED IN  
BUILDING OTHER  
THAN HOUSE BUILDING : PERTH**  
(Base year 1979-80 = 100)  
Reference: Catalogue No. 6407.0

Materials	Index number		
	1987-88	1988-89	1989-90
Selected major building materials—			
Structural timber	189.8	220.2	239.2
Clay bricks	188.5	205.6	217.4
Ready mixed concrete	182.5	200.4	220.5
Precast concrete products	182.6	199.9	218.6
Galvanised steel decking, cladding, etc.	185.2	207.9	232.1
Structural steel	221.0	255.8	273.3
Reinforcing steel bar, fabric and mesh	183.8	199.4	219.5
Aluminium windows	216.8	231.7	244.3
Steel windows, doors, louvres, etc.	202.2	214.1	236.3
Builders' hardware	208.7	222.6	240.6
Sand, aggregate and filling	200.0	223.4	248.1
Carpet	213.3	223.9	227.2
Paint	190.9	214.6	241.8
Non-ferrous pipes	189.1	213.4	228.6
Special combinations of building materials—			
All electrical materials	238.1	270.0	288.8
All mechanical services	214.3	230.9	247.9
All plumbing materials	191.0	211.6	234.9
<b>All groups</b>	<b>201.5</b>	<b>221.8</b>	<b>240.0</b>

### OTHER PRICE INDEXES

In addition to the indexes already described, the ABS compiles price indexes related to the prices of selected import and export commodities, copper materials, materials used in manufacturing industries and articles produced by manufacturing industries. The Import Price Index is released on a quarterly basis whereas the other indexes are released monthly. These indexes are published on a national basis only. For further reference to these indexes see *Year Book Australia* (Catalogue No. 1301.0) and other references listed at the end of this Chapter.

### HOUSEHOLD EXPENDITURE SURVEYS

During 1974-75 and 1975-76, the ABS conducted two surveys in order to obtain information about the expenditure patterns of private households. The 1974-75 survey was confined to a sample of households in the six State capital cities and Canberra, while the coverage of the 1975-76 survey was extended to include other urban and rural regions. Apart from limited attempts in 1910-11 and 1913 to assess the spending patterns of Australian households, these surveys were the first official collections of household expenditure statistics conducted in this country.

Further household expenditure surveys were conducted by the ABS in 1984 and for the financial year 1988-89. Coverage of these surveys, as in 1975-76, included households in urban and rural areas, except remote and sparsely settled areas.

The principal aim of the surveys was to measure levels and patterns of expenditure on commodities and services by private households and to identify key factors which influence these levels and patterns. Other uses for the data obtained include the provision of information for updating the weighting pattern of the CPI and development of government policy and planning for specific components of expenditure (e.g. housing, health, transport).

Table 22.5 shows household expenditure for Western Australia based on the 1988-89 Household Expenditure Survey compared with data from the 1984 survey. Since the 1984 Survey both average weekly household income and expenditure on commodities and services have increased in similar proportions. The most significant household outlays on commodities and services were on food and non-alcoholic beverages, transport and current housing costs.

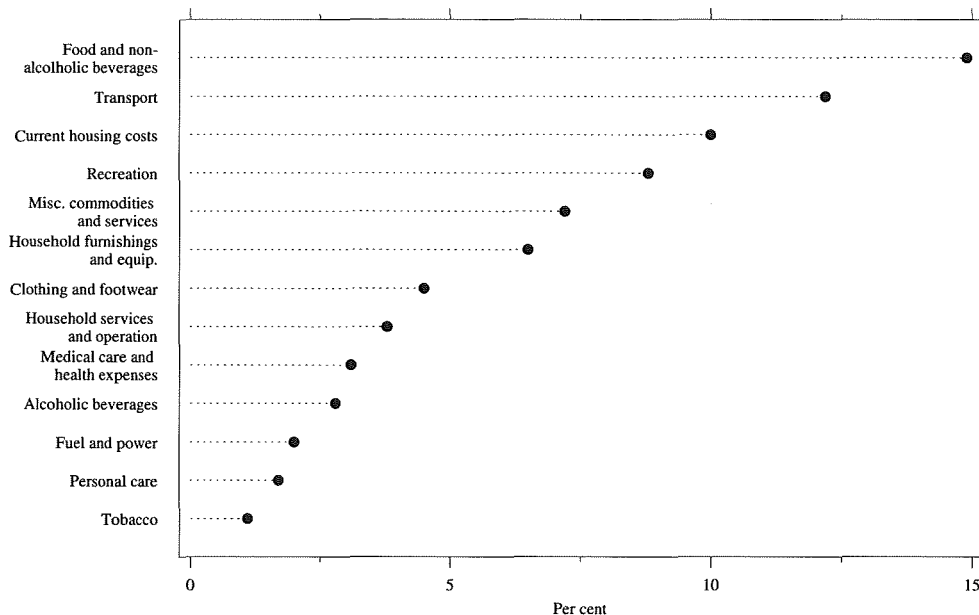
**TABLE 22.5 – AVERAGE WEEKLY HOUSEHOLD EXPENDITURE AND INCOME (a)(b) : 1984 AND 1988-89**

Reference : Catalogue No. 6533.0

	1984		1988-89 (a)	
	\$	Per cent of total income	\$	Per cent of total income
Average weekly household expenditure (b)—				
Commodity or service—				
Current housing costs (selected dwelling)	41.50	9.2	65.26	10.0
Fuel and power	10.37	2.3	13.18	2.0
Food and non-alcoholic beverages	69.18	15.3	97.04	14.9
Alcoholic beverages	13.24	2.9	18.56	2.8
Tobacco	6.27	1.4	7.18	1.1
Clothing and footwear	20.72	4.6	29.31	4.5
Household furnishings and equipment	28.54	6.3	42.53	6.5
Household services and operation	15.74	3.5	24.48	3.8
Medical care and health expenses	12.72	2.8	20.10	3.1
Transport	62.47	13.8	79.56	12.2
Recreation	46.50	10.3	57.07	8.8
Personal care	6.24	1.4	10.97	1.7
Miscellaneous commodities and services	26.52	5.8	46.81	7.2
<b>Total commodity or service expenditure (c)</b>	<b>360.01</b>	<b>79.5</b>	<b>512.05</b>	<b>78.6</b>
Average weekly household income	452.87	..	651.80	..

(a) To enable a direct comparison of household income from the 1984 and 1988-89 surveys, the 1984 concept of income has been applied to the 1988-89 data. This entailed setting negative components of household income to zero. For more detailed information refer to the reference publication. (b) The average obtained when the total estimated expenditure for a particular broad expenditure group is divided by the estimated number of households within the scope of the survey. (c) Excludes payments such as income tax, superannuation and insurance and capital housing costs.

DIAGRAM 22.2  
 AVERAGE WEEKLY HOUSEHOLD EXPENDITURE  
 PROPORTION OF INCOME EXPENDED BY EXPENDITURE CATEGORY  
 1988-89



## REFERENCES

### ABS Publications

*Labour Report No. 58, 1973*

*Australian Consumer Price Index (6401.0)*

*The Australian Consumer Price Index: Concepts Sources and Methods (6461.0)*

*A Guide to the Consumer Price Index: Eleventh Series (6440.0)*

*Information Paper: The Australian Consumer Price Index Treatment of Mortgage Interest Charges (6442.0)*

*Information Paper: Review of the Consumer Price Index: (6450.0)*

*Export Price Index (6405.0)*

*Import Price Index (6414.0)*

*Price Index of Materials Used in House Building (6408.0)*

*Price Index of Materials Used in Building Other than House Building (6407.0)*

*Price Indexes of Articles Produced by Manufacturing Industry (6412.0)*

*Price Indexes of Copper Materials (6410.0)*

*Price Indexes of Materials Used in Coal Mining (6415.0)*

*Price Indexes of Materials Used in Manufacturing Industries (6412.0)*

*Information Paper: 1988-89 Household Expenditure Survey, Australia (6527.0)*

*Household Expenditure by States and Territories (6533.0)*



## Chapter 23

### PUBLIC FINANCE

This chapter deals mainly with the financial activities of State and local government authorities in Western Australia. Particular emphasis has been given to Commonwealth-State financial relations, including details of Commonwealth cash benefits to persons in Western Australia.

In 1988-89 total current and capital outlays of State authorities was \$6,410m — 15 per cent above that of the previous year — with grants of \$2,570m received from the Commonwealth, a decrease of 0.5 per cent over the previous year.

Total current and capital outlays of local authorities were \$491.0m in 1988-89. Revenue and grants received totalled \$520.6m.

#### COMMONWEALTH-STATE FINANCIAL RELATIONS

For a historical description of Commonwealth-State financial relations, refer to Chapter 24 of the *Western Australian Year Book*, No. 24 — 1986.

#### Management of Commonwealth-State funding

The major institutions assisting in the management of Commonwealth funding to States and Northern Territory governments are: the Premiers' Conference; the Commonwealth Grants Commission; and the Australian Loan Council.

**Premiers' Conference.** The annual Premiers' Conference determines the total amount of general revenue assistance and the shares of each State and the Northern Territory. Although these payments are at the Commonwealth's discretion, they are subject to negotiation between the Commonwealth and States at the Conference.

**Commonwealth Grants Commission.** The Commonwealth Grants Commission was established in 1933 to recommend on applications made by States, under section 96 of the Constitution, for special financial assistance grants. Since 1982, as a result of arrangements

agreed at Premiers' Conferences, no State has sought such a grant.

Since 1978, under the *States (Personal Income Tax Sharing) Act 1976*, a special division of the Commission has also been responsible for recommending the per capita relativities to be used for the allocation of general revenue grants among the States.

**Australian Loan Council.** The Loan Council was established under the *Financial Agreement Act of 1928* with responsibility for determining the annual borrowing programs of the Commonwealth and State Governments, and the terms and conditions of loans to finance these programs. In 1936, the Gentlemen's Agreement extended the Loan Council's authority to include approval of semi-government and local authorities' borrowings.

By the early 1980s the Loan Council had begun to exercise increasingly less influence under the Gentlemen's Agreement over total authority borrowings. Greater use of non-conventional financing techniques, such as finance leasing and similar forms of borrowing, were being employed, which were outside the scope of the Agreement. These developments culminated in the

Gentlemen's Agreement being suspended at the June 1984 Loan Council meeting, and the Global Approach was adopted on a trial basis in 1984-85. The objective of the Global Approach was to broaden the scope of Loan Council oversight of authority borrowings by bringing within voluntarily agreed limits all forms of borrowings by Commonwealth, State and Local Authorities.

### Commonwealth financial assistance

Commonwealth Government payments to the States and Northern Territory Governments may be classified under two major headings: general purpose payments and specific purpose payments, which may be further classified into those provided for recurrent outlays and those provided for capital outlays. Payments are made in the form of grants (non-repayable) or loans (repayable).

General purpose payments provide general budgetary assistance and the States and Northern Territory are free to determine the spending of these monies according to their own budgetary priorities. Specific purpose payments, however, are generally a means of meeting the objectives and priorities of Commonwealth Budget programs. They are, therefore, provided subject to certain conditions, for example, the Commonwealth specifying the purpose for which the funds may be spent; the States being required to contribute some specified amount of their own funds to the program to qualify for the assistance.

**TABLE 23.1 - COMMONWEALTH GENERAL AND SPECIFIC PURPOSE PAYMENTS FOR WESTERN AUSTRALIA AND AUSTRALIA: 1989-90(a)**  
(\$ million)

(Source: Commonwealth Budget Paper No. 4.)

Payments	Western Australia	Australia
General purpose payments—		
Revenue	1,494.5	12,905.1
Capital	22.9	310.5
<b>Total</b>	<b>1,517.3</b>	<b>13,215.6</b>
Specific purpose payments—		
Revenue	873.7	9,271.9
Capital	350.7	3,113.1
<b>Total</b>	<b>1,224.3</b>	<b>12,384.9</b>
<b>Total payments</b>	<b>2,741.7</b>	<b>25,600.5</b>
General and specific purpose payments classified according to—		
Grants	2,741.7	25,594.0
Advances (loans)	—	6.5

(a) Excludes direct Commonwealth payments to local authorities.

**General purpose revenue payments.** General purpose revenue is paid in the form of grants. The arrangements for determining the level and distribution of these grants among the States and Northern Territory, are set at the Premiers' Conference each year.

**TABLE 23.2 - GENERAL PURPOSE REVENUE ASSISTANCE (a)**  
(\$ million)

(Source: Commonwealth Budget Paper No. 4)

Year	Western Australia	Australia
FINANCIAL ASSISTANCE GRANTS		
1987-88	1,393.3	11,756.1
1988-89	1,452.0	12,405.0
1989-90	1,494.5	12,859.6
IDENTIFIED HEALTH GRANTS (b)		
1987-88	219.5	1,782.7
1988-89	—	—
1989-90	—	—
SPECIAL REVENUE ASSISTANCE		
1987-88	6.5	33.8
1988-89	8.3	137.9
1989-90	—	45.5
TOTAL GENERAL REVENUE ASSISTANCE		
1987-88	1,619.3	14,248.2
1988-89	1,460.3	12,542.9
1989-90	1,494.5	12,905.1

(a) Excludes direct Commonwealth payments to local authorities. (b) Identified health grants were absorbed into the specific purpose payment in 'Hospital Funding Grants' in 1988-89.

**General purpose capital payments.** For 1989-90, the Loan Council approved a borrowing program of General Purpose Capital Funds for the States and Northern Territory of \$621m, of which \$310.5m comprised borrowings and \$310.5m capital grants. Western Australia's share amounted to \$22.9m in capital grants.

**Specific purpose payments.** Specific purpose recurrent payments to Western Australia for 1989-90 amounted to \$873.7m. The major payments were for: schools \$168.4m; higher education \$223.5m; and hospital funding grants \$302.2m. Specific purpose capital payments to Western Australia in 1989-90 amounted to \$350.7m with the largest amounts allocated to the Australian Centennial Road Development (\$160.1m) and public housing (\$66.3m).

**Grants and advances.** General and specific purpose payments are made in the form of grants or advances (loans).

TABLE 23.3 – COMMONWEALTH GOVERNMENT GRANTS TO WESTERN AUSTRALIA BY GOVERNMENT PURPOSE CLASSIFICATION  
(\$ million)

<i>Item</i>	<i>1985-86</i>	<i>1986-87</i>	<i>1987-88p</i>
<b>CURRENT GRANTS</b>			
General public services, defence, public order and safety	8.6	7.6	10.7
Education—			
Primary and secondary	113.9	122.4	130.8
Tertiary education	205.1	213.6	217.1
Other education	5.4	2.9	2.6
Health—			
Hospitals and other institutional services and benefits	89.1	93.0	101.0
Clinic and other non-institutional services and benefits	1.5	4.1	7.3
Public health	9.8	9.0	9.7
Social security and welfare—			
Welfare services	12.9	21.3	26.0
Housing and community amenities—			
Housing	0.6	0.6	0.6
Community development	1.2	1.3	0.7
Community amenities	—	0.2	0.3
Recreation and culture	1.8	6.0	—
Fuel and energy	0.7	0.7	0.6
Agriculture, forestry, fishing and hunting	10.7	18.7	12.3
Transport and communications	—	0.1	0.2
Other economic affairs	23.2	19.1	10.6
Other purposes—			
General purpose inter-government transactions	1,354.1	1,521.3	1,682.0
Natural disaster relief	0.1	—	—
<b>Total current grants</b>	<b>1,838.6</b>	<b>2,041.8</b>	<b>2,212.6</b>
<b>CAPITAL GRANTS</b>			
General public service, defence, public order and safety	—	—	60.0
Education—			
Primary and secondary	22.2	17.5	20.9
Tertiary education	28.2	39.3	37.2
Other education	0.1	0.1	0.1
Health—			
Hospitals and other institutional services and benefits	4.3	4.3	4.3
Clinic and other non-institutional services and benefits	0.3	0.5	0.3
Social security and welfare—			
Welfare services	2.4	3.8	4.9
Housing and community amenities—			
Housing	60.2	63.4	64.0
Community development	4.0	7.0	5.5
Community amenities	0.4	0.6	0.8
Recreation and culture	18.8	3.2	3.4
Agriculture, forestry, fishing and hunting	2.5	1.2	1.3
Transport and communications	167.9	154.3	154.1
Other Economic Affairs	—	—	0.1
Other purposes—			
General purpose inter-government transactions	51.6	39.7	13.0
Natural disaster relief	0.3	—	—
<b>Total capital grants</b>	<b>363.2</b>	<b>334.9</b>	<b>369.9</b>

**TABLE 23.4 – COMMONWEALTH GOVERNMENT ADVANCES TO WESTERN AUSTRALIA CLASSIFIED BY GOVERNMENT PURPOSE CLASSIFICATION**  
(\$ million)

<i>Item</i>	<i>1985-86</i>	<i>1986-87</i>	<i>1987-88p</i>
Net advances (a)—			
Defence	—	—	-0.1
Housing and community amenities—			
Housing	88.5	66.4	33.1
Community development	-7.0	-4.0	-1.5
Water supply	-0.1	-0.8	—
Sanitation and protection of the environment	-0.2	-0.2	—
Recreation and culture	-0.2	-0.2	-0.2
Agriculture, forestry, fishing and hunting	-1.2	-2.5	-2.9
Transport and communications	-3.3	-3.4	-3.6
Other purposes—			
General purpose inter-government transactions	-18.3	-18.3	-23.7
Natural disaster relief	-6.5	-7.0	-5.1
<b>Total net advances</b>	<b>51.8</b>	<b>30.1</b>	<b>-4.1</b>

(a) Gross advances less repayments.

### COMMONWEALTH CASH BENEFITS TO PERSONS IN WESTERN AUSTRALIA

Commonwealth cash benefits to persons are paid from the National Welfare Fund which was established in 1943 by the *National Welfare Fund Act*. The main components of cash benefits are hospital, medical, pharmaceutical, sickness and unemployment benefits; family allowance; and sole parent, widows, age, invalid and repatriation

pensions. Other cash benefits include scholarships and payments to trainee teachers.

Table 23.5 shows cash benefits to or for persons in Western Australia for the period 1986-87 to 1988-89 increased from \$2,060.7m to \$2,371.6m. In 1988-89, social security and welfare amounted to \$1,839.0m or 77.5 per cent of the total cash benefits, followed by health with \$447.8m or 18.9 per cent.

**TABLE 23.5 – COMMONWEALTH GOVERNMENT CASH BENEFITS TO OR FOR PERSONS IN WESTERN AUSTRALIA CLASSIFIED BY GOVERNMENT PURPOSE CLASSIFICATION (a)**  
(\$ million)

<i>Item</i>	<i>1986-87</i>	<i>1987-88</i>	<i>1988-89</i>
Education—			
Primary and secondary education	22.2	27.9	29.1
Tertiary education	41.4	47.6	48.6
Other education (including pre-school)	0.4	0.5	0.6
<b>Total education</b>	<b>64.0</b>	<b>76.0</b>	<b>78.3</b>
Health—			
Hospital and institutional services and benefits—			
Nursing home benefits	63.5	90.5	96.6
Hospital benefits re-insurance	0.7	0.9	1.0
Clinical and non-institutional services and benefits—			
Medical benefits	228.9	249.9	271.4
Other	3.0	3.6	2.0
Public health benefits	3.2	—	—
Pharmaceutical benefits	55.9	71.1	76.8
<b>Total health</b>	<b>355.2</b>	<b>416.0</b>	<b>447.8</b>

**TABLE 23.5 – COMMONWEALTH GOVERNMENT CASH BENEFITS TO OR FOR PERSONS IN WESTERN AUSTRALIA CLASSIFIED BY GOVERNMENT PURPOSE CLASSIFICATION (a) — *continued***  
(\$ million)

<i>Item</i>	<i>1986-87</i>	<i>1987-88</i>	<i>1988-89</i>
Social security and welfare—			
Benefits to ex-servicemen and their dependents	228.0	260.8	271.4
Invalid and other permanent disabled benefits—			
Invalid pensions	177.0	205.5	230.6
Other	11.7	11.1	13.4
Old age pensions	478.3	537.7	584.5
Widows, deserted wives, divorcees and orphans benefits	76.1	81.3	142.4
Unemployed benefits	328.3	295.9	257.8
Sickness benefits	28.8	36.6	38.2
Sole parent benefits	146.9	162.0	167.2
Family and child benefits n.e.c.	135.8	152.1	110.7
Other social security and welfare benefits	16.1	19.2	22.8
<i>Total social security and welfare</i>	<i>1,627.0</i>	<i>1,762.2</i>	<i>1,839.0</i>
Other purposes	14.5	9.9	6.5
<b>Total cash benefits</b>	<b>2,060.7</b>	<b>2,264.1</b>	<b>2,371.6</b>

(a) For conditions and rates applying see Chapter 7. Western Australia's allocation of some benefits have been estimated.

## STATE GOVERNMENT FINANCE

The data in Tables 23.6 and 23.7 relate to the financial activities of the Government of Western Australia, statutory authorities, boards, commissions and corporations, and incorporated bodies (other than financial enterprises) in which the State Government or its agencies have a controlling interest.

The revised series is designed to provide, for the public sector, statistics which complement the accounts for individual sectors provided in the Australian National Accounts. These statistics are intended to consolidate the transactions of the various public authorities and present them so that their economic impact may be assessed; to show the purposes that are being served by government expenditures; and to show the roles of the various levels of government in the undertaking and financing of these expenditures.

Basic principles which have been followed in developing the data for the economic accounts for the public sector are that all public authorities should be included; all funds under the control of those authorities should be analysed; and transfers between funds, accounts and authorities should be eliminated to present tables on a consolidated basis.

In this section of the Year Book the public sector has been taken to comprise general government bodies (excluding local government authorities)

and public trading enterprises. Public financial enterprises have been omitted from the consolidated accounts presented here, largely on the ground that combining the income and outlay and capital financing transactions of publicly-owned trading and savings banks, government insurance offices and other public financial institutions with the equivalent transactions of public trading enterprises and general government seems to provide a less meaningful account of public sector activity.

**General government bodies** are government departments, offices, agencies and authorities engaged in providing services free of charge or at prices significantly below their cost of production.

**Public trading enterprises** are government undertakings which aim at covering the bulk of their expenses by revenue from sales of goods and services.

Over recent years a range of new and revised classifications has been developed for use in the compilation and presentation of government finance statistics. For details of the new classifications refer to the *Classification Manual of Government Finance Statistics* (Catalogue No. 1217.0). Two of the main classifications shown in that publication are the Economic Transactions Framework and the Government Purpose Classification.

The Economic Transactions Framework, in broad terms, is designed to categorise transactions between public authorities and the private sector, and between public authorities where sub-sectors of the public sector have been identified, in a way which facilitates a study of the impact of government transactions on the economy.

The Government Purpose Classification scheme is the medium by which outlays with similar objectives are brought together to reveal more fully the broad purposes of public sector spending, and to provide a framework for developing means of assessment of the effectiveness of outlays in achieving government policies. With the classification of outlays by economic type, the purpose classification also facilitates the assessment of the economic impact of identified programs of expenditure.

Table 23.6 shows that the main components of the receipts of Western Australian State authorities are

taxation, grants and financing transactions. Further details of taxation collections by State authorities and local government authorities are given later in this Chapter.

Figures for some items published in the public authority finance series may differ from issue to issue as a consequence of reclassification of items and other improvements made in the course of developing the most appropriate presentation of the financial transactions of public authorities.

**Financing transactions** are the means by which governments finance their deficits or invest their surpluses, which include transactions in securities of all types, borrowing, trade credit of public trading enterprises, and changes in bank balances. Financing transactions represent the difference between total revenue and grants received and total outlays.

**TABLE 23.6 – STATE AUTHORITIES – RECEIPTS AND FINANCING TRANSACTIONS  
CLASSIFIED BY ECONOMIC TRANSACTIONS FRAMEWORK  
(\$ million)**

<i>Item</i>	<i>1986-87</i>	<i>1987-88</i>	<i>1988-89p</i>
Revenue—			
Taxes, fees, fines	1,170	1,432	1,684
Net operating surpluses of public trading enterprises	518	564	582
Income from public financial enterprises	25	30	65
Interest received	189	219	291
Other property income and other revenue	271	311	388
Grants received	2,383	2,582	2,570
<i>Total revenue</i>	<i>4,556</i>	<i>5,139</i>	<i>5,580</i>
Financing transactions—			
Net Advances received	25	-9	-17
Net domestic borrowing	665	784	-152
Net borrowing from abroad	11	119	535
Increase in provisions	184	196	219
Other financing transactions	-209	-658	246
<i>Total financing transactions</i>	<i>675</i>	<i>432</i>	<i>830</i>
<b>Total funds available</b>	<b>5,231</b>	<b>5,571</b>	<b>6,410</b>

Table 23.7 shows current and capital outlays by Western Australian State authorities classified by Economic Transaction Framework. The principal components, for current outlays, are general government final consumption expenditure and current transfer payments; and for capital outlays, capital expenditure on goods, capital transfer payments, and net advances.

*General government final consumption expenditure* refers to expenditure by general government bodies which does not result in the

creation of fixed tangible assets or in the acquisition of land, buildings or secondhand goods. It comprises expenditure on wages, salaries and supplements, and on goods and services other than fixed assets or stock. Fees, etc. charged by general government bodies for goods sold and services rendered are offset against purchases. Net expenditure overseas by general government bodies and purchases from public enterprises are included. All expenditure on defence is classified as general government final consumption expenditure.

*Current transfer payments* include such items as interest payments on public loans, personal benefit payments (e.g. age pensions), subsidies paid by general government to public and private enterprises, and grants for non-capital purposes, to local authorities and private non-profit organisations (e.g. charitable organisations).

*Capital expenditure* refers to expenditure on new fixed assets whether for additions or replacements, including wages and salaries paid in connection with capital works. The acquisition and disposal of secondhand fixed assets, land and intangible assets and changes in the balance of stock accounts are included. Expenditure on new fixed assets for defence purposes is excluded.

*Capital transfer payments* consist mainly of grants to local governments, to public and private enterprises and persons for the purpose of acquiring capital assets.

*Net advances.* Advances are the creation of financial assets with the aim of funding particular enterprises, households or government activities. Repayments are offset against gross advances to give net advances. These advances are included in outlays, rather than financing transactions (refer to the definition on page 255) in order to bring together all the methods governments use to achieve expenditure policies. For example, advances are made to fund State housing projects.

**TABLE 23.7 – STATE AUTHORITIES – OUTLAYS  
CLASSIFIED BY ECONOMIC TRANSACTIONS FRAMEWORK  
(\$ million)**

<i>Item</i>	<i>1986-87</i>	<i>1987-88</i>	<i>1988-89p</i>
<b>Current outlays—</b>			
General government final consumption expenditure	2,608	2,895	3,291
Transfers payments—			
Interest paid	803	901	1000
Subsidies paid to enterprises	212	268	388
Personal benefit payments	47	43	43
Grants—			
To non-profit institutions	173	211	251
To local government authorities	76	76	73
Other current transfer payments	2	—	—
<i>Total current transfer payments</i>	<i>1,313</i>	<i>1,499</i>	<i>1,755</i>
<b>Total current outlays</b>	<b>3,922</b>	<b>4,395</b>	<b>5,047</b>
<b>Capital outlays—</b>			
Gross fixed capital expenditure—			
On new fixed assets	1,100	1,072	1,366
On secondhand fixed assets (net)	36	-41	-94
Increase in stocks	44	40	-10
Expenditure on land and intangible assets (net)	-31	-41	-45
<i>Total capital expenditure</i>	<i>1,149</i>	<i>1,030</i>	<i>1,217</i>
Transfer payments—			
Grants—			
To private sector and public financial enterprises	13	18	27
To local government authorities	62	69	63
<i>Total capital transfer payments</i>	<i>75</i>	<i>87</i>	<i>91</i>
Net advances paid—			
To private sector and public financial enterprises	82	57	52
To local government authorities	5	3	3
<i>Total net advances paid</i>	<i>87</i>	<i>60</i>	<i>55</i>
<b>Total capital outlays</b>	<b>1,310</b>	<b>1,177</b>	<b>1,363</b>
<b>TOTAL OUTLAYS</b>	<b>5,232</b>	<b>5,572</b>	<b>6,410</b>

## LOCAL GOVERNMENT FINANCE

The financial powers of local government authorities in Western Australia are derived principally from the *Local Government Act 1960*, the main provisions of which are outlined in Chapter 5 — Government.

### Outlays, Revenue and Financing Transactions

Table 23.8 summarises the outlays, revenue and financing transactions of local government authorities for 1988-89. Outlays are detailed by purpose while revenue and financing transactions are detailed by type.

**TABLE 23.8 – LOCAL GOVERNMENT AUTHORITIES  
– OUTLAYS, REVENUE AND FINANCING  
TRANSACTIONS: 1988-89**

<i>Item</i>	<i>\$'000</i>
Current outlays by purpose—	
General public services	63,091
Public order and safety	12,327
Education	312
Health	12,064
Social security and welfare	11,813
Housing and community development	8,436
Sanitation and protection of the environment	3,515
Other community services	12,223
Recreation and culture	73,523
Road maintenance	46,851
Other purposes	47,745
<i>Total current outlays</i>	<i>291,903</i>
Capital outlays by purpose—	
General public services	9,290
Public order and safety	952
Education	189
Health	1,118
Social security and welfare	2,697
Housing and other community services	11,134
Sanitation and protection of the environment	13,515
Recreation and culture	39,542
Road transport	114,952
Other purposes	5,732
<i>Total capital outlays</i>	<i>199,131</i>
<b>Total outlays</b>	<b>491,034</b>

**TABLE 23.8 – LOCAL GOVERNMENT AUTHORITIES  
– OUTLAYS, REVENUE AND FINANCING  
TRANSACTIONS: 1988-89 — continued**

<i>Item</i>	<i>\$'000</i>
Revenue—	
Rates	288,226
Other taxes, fees and fines	14,408
Interest received	45,839
Government grants	151,314
Other revenue	20,818
<i>Total revenue</i>	<i>520,608</i>
Financing transactions—	
Net borrowings	-3,222
Decrease in cash and investments	-33,525
Other financing transactions	7,187
<i>Total financing transactions</i>	<i>-29,573</i>
<b>Total revenue and financing transactions</b>	<b>491,034</b>

### Loan Transactions

Under the provisions of local government legislation, local government authorities are constituted as corporate bodies and are authorised to raise loans for works and undertakings and for the liquidation of existing loan debts. The conditions imposed by the *Local Government Act 1960* in relation to loan raising, the levying of loan rates, the expenditure of loan monies and the repayment of loans are summarised in the section *The Local Government System* in Chapter 5 under the heading *Financial Provisions*.

Loans are raised mainly from banks, insurance companies and superannuation funds. A number of local authorities also raise loans through the WA Treasury Corporation. The State Government exercises a measure of supervision over the loan transactions of local government authorities and, where a loan is repayable in full at maturity, maintains the necessary sinking fund at the Treasury.



**STATE GOVERNMENT AND LOCAL  
AUTHORITY TAXATION**

The principal sources of State Government and local authority taxes, fees and fines in 1988-89 were: employers' payroll taxes 21.6 per cent,

municipal rates 14.4 per cent, stamp duties 21.0 per cent and vehicle registration fees and taxes 5.3 per cent. The following table shows, for the three years 1986-87 to 1988-89, taxes, fees and fines collected by State Government and local authorities.

**TABLE 23.9 - STATE AND LOCAL AUTHORITIES:  
TAXES, FEES AND FINES BY TYPE  
(\$ million)**

<i>Item</i>	<i>1986-87</i>	<i>1987-88</i>	<i>1988-89</i>
Employers' payroll taxes	310.5	360.3	428.9
Taxes on property—			
Taxes on immovable property—			
Land taxes	58.6	63.0	73.7
Municipal rates	228.3	251.0	285.9
Metropolitan improvement rates	8.8	10.2	11.0
Taxes on immovable property n.e.c.	0.4	0.4	0.5
Taxes on financial and capital transactions—			
Stamp duties	192.8	338.2	416.2
Financial institutions' taxes	26.4	31.6	36.8
Taxes on provision of goods and services—			
Excises (levies on statutory corporations)	31.0	42.7	44.7
Taxes on gambling—			
Taxes on government lotteries	25.9	36.7	47.2
Casino taxes	10.8	11.4	21.6
Race betting taxes	28.1	32.2	31.3
Taxes on gambling n.e.c.	0.9	0.5	0.8
Taxes on insurance—			
Insurance companies' contributions to fire brigades	25.8	26.8	28.8
Third party insurance taxes	4.6	4.6	0.1
Taxes on insurance n.e.c.	29.6	32.6	43.6
Taxes on use of goods and performance of activities—			
Motor vehicle taxes—			
Vehicle registration fees and taxes	93.2	100.8	106.1
Stamp duty on vehicle registration	50.1	60.1	82.0
Drivers' licences	14.7	18.0	20.2
Road transport and maintenance taxes	2.6	3.1	3.5
Franchise taxes—			
Petroleum products franchise taxes	98.2	91.0	88.2
Tobacco franchise taxes	61.9	65.1	70.6
Liquor franchise taxes	43.1	51.9	57.0
Fees and fines—			
Fees from regulatory services	35.3	37.1	54.7
Fines	24.9	27.2	30.5
<b>Total taxes, fees and fines</b>	<b>1,406.5</b>	<b>1,696.5</b>	<b>1,984.0</b>

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*Taxation Revenue, Australia* (5506.0)

*Expenditure on Education, Australia* (5510.0)

## Chapter 24

### PRIVATE FINANCE

**The operations of the financial sector in Western Australia are controlled by both Commonwealth and Western Australian legislation.**

The principal Australian legislation comprises the *Banking Act 1959*, *Reserve Bank Act 1959*, *Commonwealth Banks Act 1959*, *Life Insurance Act 1945* and the *Insurance Act 1973*. More detailed descriptions of the background and purpose of these Acts may be found in the *Year Book Australia*, No.71 — 1988 from page 812 (Catalogue No. 1300.0).

In addition, the *Financial Corporations Act of 1974* was introduced as a result of the increasing significance of the non-bank financial institutions in the early 1970s. The Government's aim in introducing this legislation was to regulate the activities of these non-bank institutions in order to achieve economic stability, maintenance of full employment, the efficient allocation of productive resources and to ensure adequate levels of finance for housing.

In the 1980s, Australian Governments sought to decrease the degree of regulation previously imposed on the financial sector and on banking activity in particular. As a result, controls on most bank interest and foreign exchange were relaxed and new private banks (including overseas banks) were permitted to commence operations.

In late 1989, the Banking Act was amended to give explicit powers to the Reserve Bank for prudential supervision of banks and enable regulations to be made for this purpose. It also provided the Bank with greater power to seek information from banks for prudential purposes and to investigate, either directly or through an agent, the affairs of banks.

State legislation exists to regulate the activities and monitor the solvency of particular types of financial institutions, which operate on a cooperative basis and lend predominantly to members or consumers. In general, these institutions are permanent building societies, cooperative housing societies and credit unions. In some States, including Western Australia, there is also legislation for State Government bodies to operate as banks or insurance offices.

#### CURRENCY

Australia has a decimal system of currency, the unit being the dollar which is divided into 100 cents. Australian notes are issued in the denominations of 5, 10, 20, 50 and 100 dollars and coins in the denominations of 5, 10, 20, 50 cents, and 1 and 2 dollars. The 2 dollar note was replaced by a 2 dollar coin in 1988. In 1991, the issue of 1 and 2 cent coins was discontinued.

#### BANKING

The banking system in Western Australia includes the Commonwealth banking institutions, The Rural and Industries Bank of Western Australia and, until late 1989, private trading and savings banks.

At 30 June 1989, thirty banks in Western Australia had deposits repayable in Australia and/or other lending. Table 24.1 provides individual bank details.

**TABLE 24.1 – DEPOSITS AND LOANS ON  
AUSTRALIAN BOOKS OF INDIVIDUAL BANKS:  
AT 30 JUNE 1990  
(\$ million)**

Name	Deposits repayable in Australia	Other lending
Advance Bank Australia	—	22
ANZ Banking Group	1,137	843
ANZ Savings Bank	400	526
Australian Resources Development Bank	5	—
Bank of Melbourne	—	434
Bank of New Zealand	161	103
BNZ Savings Bank	1	1
Bank of Singapore (Australia)	—	70
Bankers Trust Australia	37	—
Banque Nationale de Paris	49	88
Barclays Bank Australia	—	2
Challenge Bank	1,461	1,278
Chase AMP Bank	28	88
Citibank	1	5
Citibank Savings	48	321
Commonwealth Bank	950	1,304
Commonwealth Development Bank	16	349
Commonwealth Savings Bank	1,334	993
Hong Kong Bank of Australia	60	129
IBJ Australia Bank	42	100
National Australia Bank	1,099	1,303
National Australia Savings Bank	513	741
National Mutual Royal Bank	56	23
NMR Savings Bank	6	21
NatWest Australia Bank	67	224
Primary Industry Bank	1	142
Rural & Industries Bank of WA	4,021	3,426
Standard Chartered Bank Australia	11	60
Westpac Banking Corporation	1,394	1,406
Westpac Savings Bank	1,122	1,146
<b>Total</b>	<b>14,017</b>	<b>15,148</b>

### Trading and Savings Banks

The amended Banking Act has now largely removed the distinction between Trading and Savings banks.

### State Bank

The Rural and Industries Bank of Western Australia is owned by the Western Australian government. The bank has an office in Sydney, which handles wholesale business, branches in London and the Cayman Islands, and a representative office in Tokyo. It is also authorised to deal in foreign exchange under the Banking (foreign exchange) Regulations and to operate a full foreign exchange dealing room in Perth.

### Other Banks (excluding merchant banks)

Other banks operating in Western Australia comprise the Commonwealth Development Bank of Australia, which provides finance for the purpose of primary production, and for the purpose of establishment or development of small business undertakings where finance is not otherwise available on reasonable and suitable terms and conditions; the Australian Resources Development Bank Limited, which assists Australian enterprises to participate in the development of Australia's natural resources; and the Primary Industry Bank of Australia Limited, which provides loans to primary producers for longer terms than are otherwise generally available but which is restricted to refinancing loans made by banks and other financial institutions.

### BUILDING SOCIETIES

Building societies in Western Australia are registered under the provisions of the *Building Societies Act 1976*, primarily for the purpose of raising funds to assist members by granting loans, secured on mortgage, to build or acquire homes.

**TABLE 24.2 – BUILDING SOCIETIES  
(\$'000)**

	1986-87	1987-88	1988-89
PERMANENT SOCIETIES			
Liabilities—			
Withdrawable shares	1,685,300	1,097,445	1,469,005
Borrowings	1,104,696	518,082	396,992
Other	123,563	91,783	144,823
<b>Total liabilities</b>	<b>2,913,559</b>	<b>1,707,310</b>	<b>2,010,820</b>
Assets—			
Amount owing on loans	2,056,374	1,222,144	1,480,756
Placements and deposits	115,467	65,784	95,147
Other	741,718	419,382	434,917
<b>Total assets</b>	<b>2,913,559</b>	<b>1,707,310</b>	<b>2,010,820</b>
Expenditure	430,701	330,796	265,418
Income	444,956	350,288	301,175
TERMINATING SOCIETIES			
Liabilities—			
Loans—			
Banks	42,423	49,202	58,642
Government	158,819	157,950	152,433
Other	29,541	31,772	31,858
Other	4,588	5,526	5,638
<b>Total liabilities</b>	<b>235,370</b>	<b>244,450</b>	<b>248,571</b>
Assets—			
Amount owing on loans	200,183	208,420	203,365
Other	35,188	36,029	45,207
<b>Total assets</b>	<b>235,370</b>	<b>244,450</b>	<b>248,572</b>
Expenditure	22,800	22,529	27,121
Income	23,446	23,707	27,713

As shown by Table 24.2 permanent building societies obtain the majority of their funds from the public, while terminating societies derive funds primarily from government and banks. The Commonwealth Government contributes to these funds under the *Housing Assistance Act 1984*.

### CREDIT UNIONS

Credit unions are registered in Western Australia under the *Credit Union Act 1979*. They operate on a cooperative basis by predominantly borrowing from and providing finance to their own members.

TABLE 24.3 – CREDIT UNIONS

	1986-87	1987-88	1988-89
Credit unions on register (a)	25	24	23
Number of members	217,873	186,262	184,370
	\$'000	\$'000	\$'000
Income—			
Interest on loans	166,427	98,644	98,083
Income from placements and other deposits (b)	8,033	4,158	5,891
Income from securities	6,918	6,850	5,922
Other income	10,346	9,157	8,256
<b>Total income</b>	<b>191,724</b>	<b>118,808</b>	<b>118,151</b>
Expenditure—			
Interest on borrowings	145,573	73,091	68,135
Wages, salaries, etc	15,231	12,127	13,031
Other administrative expenses (c)	32,717	18,547	18,091
Other expenditure	9,559	10,786	10,378
<b>Total expenditure</b>	<b>203,079</b>	<b>114,549</b>	<b>109,635</b>
Liabilities—			
Members' funds—			
Share capital	1,763	5,768	6,087
Deposits	1,155,663	614,960	571,379
Other	53,304	60,848	82,318
<b>Total liabilities</b>	<b>1,210,731</b>	<b>681,576</b>	<b>659,785</b>
Assets—			
Loans to members	1,038,247	539,166	550,232
Other	172,483	142,411	109,553
<b>Total assets</b>	<b>1,210,731</b>	<b>681,576</b>	<b>659,785</b>

(a) At 30 June. (b) Includes interest on deposits with banks. (c) Includes bad debts written off and allowances for doubtful debts.

### OTHER FINANCIAL INSTITUTIONS

Financial institutions registered under the Financial Corporations Act and not contained in the tables above comprise authorised money market dealers, money market corporations, general financiers, pastoral finance companies, intra-group financiers and other financial corporations. These institutions together with public unit trusts, cash management trusts, insurance companies and private and public

superannuation funds also contribute to financial dealings in Western Australia. Statistical data for these institutions are generally available only on an Australian basis.

### LENDING BY FINANCIAL INSTITUTIONS

New monthly statistical series were introduced in January 1985 to show a measure of the lending activity of significant lenders in fields of personal, commercial and lease finance. These were in addition to statistics already published on secured housing finance commitments to individuals for owner occupation.

#### Personal Finance Commitments

Personal finance commitments comprise those commitments made by significant lenders to individuals for their own personal (non-business) use. A lender is considered to be significant if it is a bank, a life insurance company or a corporation registered under the Financial Corporations Act and, during 1982-83, it committed funds exceeding \$4 million to individuals for their own use.

TABLE 24.4 – PERSONAL FINANCE COMMITMENTS (\$ million)

	1987-88	1988-89	1989-90
Total fixed loan commitments during period (including Personal investment loans)	1,218.6	1,501.2	1,353.3
Commitments under revolving credit facilities (including credit card facilities)—			
New and increased credit limits	612.1	684.5	832.6
Cancellations and reduction of credit limits during period	303.0	444.7	524.8
Credit limits at end of period—			
<b>Total</b>	<b>1,552.1</b>	<b>1,796.1</b>	<b>2,045.9</b>
Commitments used	558.3	690.1	817.7

#### Commercial Finance

Commercial finance commitments comprise those made by significant lenders to government, private and public enterprises, non-profit organisations, or individuals (for investment and business purposes). A lender is considered to be significant if it is a bank, a corporation registered under the Financial Corporation Act, or an insurance company and if it committed funds exceeding \$40.1 million for business purposes (excluding leasing of goods) during 1982-83.

**TABLE 24.5 – COMMERCIAL FINANCE COMMITMENTS**  
(\$ million)

	1987-88	1988-89	1989-90
Fixed loan facilities (excluding some personal investment loans) by purpose of commitment—			
Construction finance for—			
Erection of—			
Dwellings for rental/resale	115.4	213.0	174.7
Non-residential buildings	232.7	487.4	270.7
Non-building structures	5.3	18.7	12.2
Alterations and additions	17.1	26.8	15.3
Purchase of real property—			
Dwellings for rental/resale	165.9	468.1	517.8
Non-residential buildings	280.0	481.1	380.6
Rural property	138.8	199.5	124.4
Residential block development	92.4	203.0	115.2
Other land	88.8	162.4	94.3
Wholesale finance	93.3	106.2	123.2
Purchase of plant and equipment—			
Motor vehicles	114.8	174.7	162.4
Other transport equipment	78.9	84.8	31.6
Other	131.3	199.7	134.3
Re-financing	396.4	828.6	403.7
Other (including factoring)	938.1	1,159.0	950.0
<b>Total fixed loan commitments</b>	<b>2,889.2</b>	<b>4,813.2</b>	<b>3,510.5</b>
Commitments not drawn at end of year	445.7	582.8	460.5
Revolving credit facilities—			
Total credit limits at end of year	6,381.9	6,224.7	6,694.8
Used credit at end of year	4,710.9	4,387.6	4,755.4

### Lease Finance Commitments

Lease finance commitments comprise those made by significant lenders to trading and financial enterprises, non-profit organisations, governments, public authorities and individuals.

A lender is considered to be significant if it is a trading bank or a corporation registered under the Financial Corporations Act and categorised as a money market corporation or a finance company or a general financier and it committed funds exceeding \$13 million during 1982-83.

**TABLE 24.6 – LEASE FINANCE COMMITMENTS**  
(\$ million)

	1987-88	1988-89	1989-90
Value of goods under new finance lease commitments (a)—			
Motor vehicles	202.5	296.3	223.7
Other transport equipment	19.3	20.8	9.3
Construction and earthmoving equipment	50.6	45.7	30.2
Agricultural machinery and equipment	22.4	37.5	42.9
Automatic data processing equipment and office machines	54.7	75.2	67.3
Shop and office furniture, fittings and equipment	49.1	39.3	39.8
Other revenue	87.7	140.3	68.6
<b>Total lease finance commitments</b>	<b>486.3</b>	<b>655.8</b>	<b>481.8</b>

(a) Excludes leveraged leases.

### Housing Finance for Owner Occupation

Housing finance commitments comprise secured commitments to individuals for construction or purchase of dwellings for owner occupation.

**TABLE 24.7 – HOUSING FINANCE FOR OWNER OCCUPATION**  
(\$ million)

	1987-88	1988-89	1989-90
Secured housing finance commitments to individuals—			
Construction of dwellings—			
Houses	450.9	636.0	430.0
Other dwellings	10.9	20.0	13.7
Purchase of newly erected dwellings—			
Houses	74.7	69.2	55.7
Other dwellings	21.3	20.1	13.5
Purchase of established dwellings—			
Houses	1,306.0	1,522.5	1,124.7
Other dwellings	114.9	115.3	79.6
Alterations and additions	57.1	84.7	88.0
<b>Total commitments</b>	<b>2,035.7</b>	<b>2,468.1</b>	<b>1,804.8</b>

## NEW CAPITAL EXPENDITURE

New capital expenditure is expenditure on new fixed tangible assets including major improvements, and alterations and additions. In general this is expenditure charged to fixed tangible assets accounts excluding expenditure on second hand assets unless these are imported from overseas for the first time.

Data is collected by quarterly sample survey of all private sector enterprises except those enterprises primarily engaged in the agriculture, construction and community services industries. State dissections of data have been produced since December 1978. Prior to that date, data was only available at the national level. Quarterly estimates of private new capital expenditure are available in *Private New Capital Expenditure, Australia* (Catalogue No. 5626.0 and *State Estimates of Private New Capital Expenditure* (Catalogue No. 5646.0).

In original current price terms expenditure has remained relatively stable increasing by 7 per cent over the three years from 1987-88 to 1989-90. Increases have been registered in the Finance, property and business services, and Other selected industries sectors with decreases occurring in the Manufacturing and Mining sectors.

TABLE 24.8 - PRIVATE NEW CAPITAL EXPENDITURE AT CURRENT PRICES BY SELECTED INDUSTRIES AND TYPE OF ASSET (\$ million)

<i>Selected industry and type of asset</i>	1987-88	1988-89	1989-90
Finance, property and business services	432	482	640
Mining	2,211	2,042	2,071
Manufacturing	658	694	559
Other selected industries	618	876	928
New capital expenditure—			
New buildings and structures	1,418	1,325	1,435
Equipment, plant and machinery	2,501	2,769	2,763
<b>Total new capital expenditure</b>	<b>3,919</b>	<b>4,094</b>	<b>4,198</b>

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## CHAPTER 25

### KIMBERLEY STATISTICAL DIVISION PROFILE

The Kimberley Statistical Division covers an area of 421,451 square kilometres in the far north of Western Australia. The Division is fringed by the Timor Sea to the north, the Indian Ocean to the west, the Great Sandy Desert to the south and the Northern Territory border to the east.

The Kimberley's land area is one sixth of the State's total area which is twice as large as Victoria and three times the size of England. A population of 24,078 (estimated resident population at 30 June 1989) live in the Division's four local government areas, which includes six established towns. These towns service the pastoral industry, mining, tourism, agriculture and horticulture, fishing and surrounding Aboriginal communities and out-stations. Broome, Derby and Kununurra are the most significant centres.

The Division is experiencing strong population growth fostered by the improved viability of a diverse range of industries. Agriculture and horticulture associated with the Ord Irrigation District has grown rapidly, capitalising on out of season southern domestic markets and newly acquired international markets.

Diamond and lead/zinc mining have provided valuable income and employment for people living in and out of the region. Exploration activity is increasing, especially associated with the search for oil in the Timor Sea to the North.

Kimberley towns rely heavily on tourism for employment and income. The medium to long term forecast for the tourism industry in the Kimberley is very good, although the industry has had some short term set-backs resulting in economic instability in some of its towns. The diverse range of local industries, expected tourism growth and the needs of the surrounding Aboriginal communities will continue to provide opportunities for further sustainable growth.

#### HISTORY AND HERITAGE

The Kimberley Division was named after the Earl of Kimberley in 1880, the then Secretary of State

for the Colonies. Pre-dating European settlement, Aborigines are believed to have lived in the region for at least 40,000 years. There is evidence that by about 1700, Indonesian and Macassan fishermen had crossed the Timor Sea in small prahas and spent time ashore in Australia.

The first Europeans are believed to have been the Portuguese who sailed down the west coast as far as Shark Bay. With the discovery of Dutch East Indies 'Spice Islands', the Dutch charted some of the Western Australian coast. Many Dutch ships were lost on the dangerous reefs lying off the Western Australian coast.

Earliest British interest in the Kimberley came with William Dampier anchoring the *Cygnat* in King Sound in 1688. Dampier later returned in *HMS Roebuck* in 1699. There was no further interest until 1801 and 1803 when French expeditions in the *Geographe* and the *Naturaliste* explored much of the Western Australian coast.

The first exploration by land occurred with George Grey's 1837-38 expedition to the Kimberley. In 1879 Alexander Forrest visited the region and gave an enthusiastic report about the region's stock carrying capacity. This report encouraged pastoralists from the south-West, Queensland and New South Wales to attempt to settle the area.

By 1883, 20 million hectares of the Kimberley were leased, although this had stabilised to 6 million hectares by 1887. The East Kimberley was colonised by pastoralists driving cattle overland from the Eastern States through the Northern Territory. The West Kimberley pastoralists had their origins mainly in the south-west of Western Australia. These two settlements did not merge immediately and for a long time the region was known as the 'Kimberleys' owing to the separatism of the settlements.

In the early 1880s a significant resource of pearl oysters was discovered near to what is now Broome. By 1883 Broome and Derby were declared town sites with ports. By 1910 Broome was renowned as the biggest pearling centre in the world, operating 350-400 luggers.

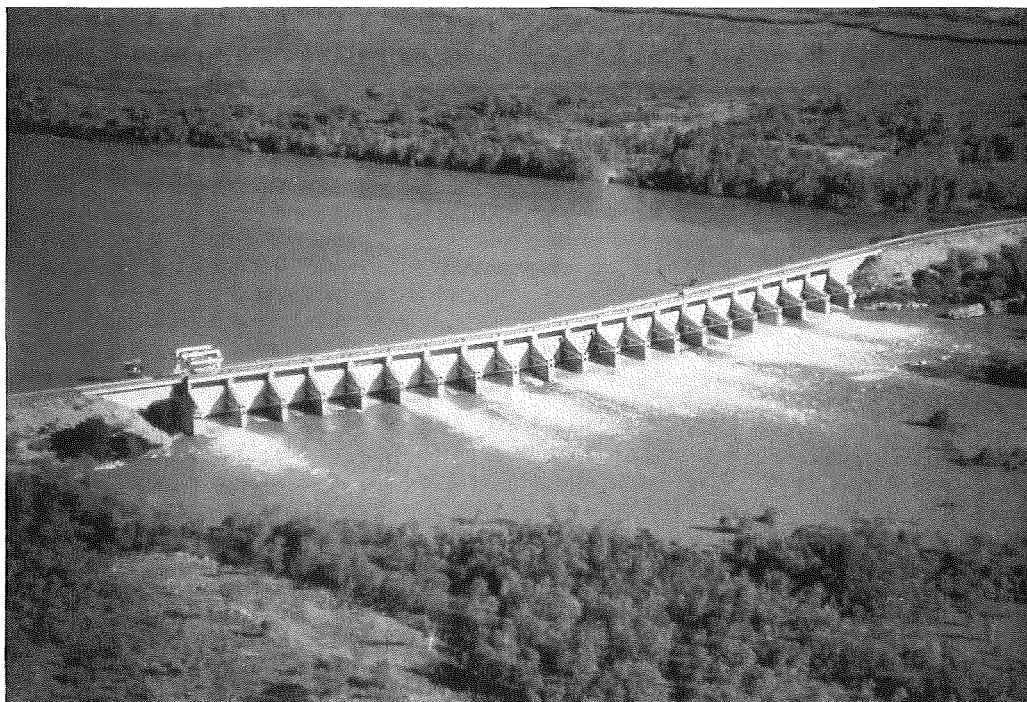
The discovery of gold at Halls Creek in 1883 by Hall and Slattery was the first gold strike in Western Australia. An estimated 10,000 prospectors came to the area seeking their fortunes. The Port of Derby was originally used to service the Halls Creek goldfields, however a port was soon developed at Wyndham in 1884 to service the goldfields and the pastoral industry. Wyndham was declared a town site in 1886. In

1918 the Wyndham meatworks was opened to service the pastoral industry. This meatworks closed in 1985.

In the late 1930s the irrigation potential of the Ord and Fitzroy rivers was recognised. In 1941 the State Government established a small research farm on the Ord River. By the late 1950s the State Government in conjunction with the Commonwealth Government commenced a major irrigation project on the Ord River. The project was the first of its kind in damming a major river in the tropics.

Stage I, completed in 1963, involved the construction of a diversion dam and associated irrigation infrastructure. By 1966, 31 farms had been allocated. Stage II, completed in 1972 involved the construction of the main dam 70 kilometres upstream, creating Lake Argyle.

In the mid 1970s a reduction in farm profitability halted planned further development of the Ord Irrigation Project. Currently there are approximately 14,000 hectares available to irrigation, with potential for a further 60,000 hectares. In recent years the Ord Irrigation Area has returned to profitability with a diversity of crops.



The Ord River Dam

Photograph: Department for State Development



Another major irrigation project was attempted at Camballin, located in the Fitzroy River Basin. A number of unprecedented floods culminated in failure of the project. The project was sold to an international consortium, but is still experiencing difficulties.

The more recent discovery and mining of diamonds in the Kimberley and recent tourism exposure has greatly increased the population and stability of the region.

### PHYSICAL FEATURES

The Kimberley landscape consists of the vast Kimberley Plateau in the north, the Fitzroy River Basin in the west and the south and the Ord River basin in the east. The geology of the Kimberley dates back to Precambrian origins and consists of some unique geological formations such as the Bungle Bungle Range.

The Kimberley Plateau is the dominant geographic feature in the Division, covering 130,000 square kilometres. The plateau is composed of flat sedimentary sandstone benches many kilometres wide, bounded by scarps up to 890 metres high, with extensive outcrops of basalt rocks throughout. Deep gorges have been cut into the sedimentary sandstone and basalt benches by major rivers. The Drysdale, King Edward, Isdell, and Gibb Rivers all drain this plateau region.

On the northern and western coastlines many small rivers have formed deep narrow gorges. The western half of the plateau is deeply eroded, especially between the Roe and Charnely Rivers and eastwards to Mt Agnes. The majority of the exposed basalt occurs in this western half of the plateau. The characteristic vegetation on the plateau is savanna woodland with moderately thick scrub (*Acacia*) and a ground storey characterised by curly spinifex. Eucalypt woodlands occur only in the high rainfall areas that have deep soils and along major rivers.

The Fitzroy River Basin in a large watershed that runs transverse from the Ord River Basin, along the southern edge of the Kimberley Plateau, to the tidal lowlands of King Sound. The Fitzroy River has a catchment area of 116,550 square kilometres and an annual flow of 1,969,000 megalitres. Typically for 5 to 6 months of the year the Fitzroy does not flow and is reduced to a series of water holes.

To the north of the Fitzroy lies the rugged landscape of the King Leopold, Napier, Geikie and the Oscar Ranges. These ranges are characterised by gorges and gaps formed from rivers cutting through the rock formations. The dominant vegetation in the Fitzroy basin is an open and stunted Eucalyptus woodland with greater dominance of the lower storey grasses. Progressing to the south, the vegetation becomes sparser giving way to tall, grassland savanna. Common genera include Cane grasses (*Sorghum*), Spinifex (*Triodia* and *Plectrachne*), Spear Grasses (*Aristida* and *Heteropogon*) and Kangaroo grasses (*Themeda*).

The Ord River Basin drains the 650 kilometre long Ord River, which flows into the head of the Cambridge Gulf. The Ord River has a watershed of 64,700 square kilometres extending into the Northern Territory to Victoria River. The middle reaches of the Ord flow through the Carr Boyd Ranges. Topographically the region is composed of vast areas of flat or slightly undulating plains surrounded by rugged plateaux and mesas. The vegetation is mainly tall grassland savanna with Eucalyptus woodland near water courses.

The fauna of the Kimberley is extremely diverse. The most well known fauna in the Division are the two species of Crocodylian, the Salt-water Crocodile (*Crocodylus porosus*) and the Freshwater Johnston Crocodile (*Crocodylus johnstoni*). Both these species inhabit rivers, estuaries and watercourses in varying numbers in the more coastal extremities of the Division.

Mammals are well represented throughout the Kimberley through the larger macropods such as the Agile Wallaby and the Antilopine Wallaroo. Rarely seen, small, nocturnal and carnivorous marsupials are represented by the Red-cheeked, Striped faced and Carpentarian Dunnart. Many other species of marsupials occur throughout the Division.

Avifauna is extremely diverse. It is usual to see large flocks of parrots, Magpie geese, Whistling ducks and other riverine birds at most times of the year. Reptilian fauna is well represented with sixteen species of snakes, both venomous and non venomous. Other reptiles that may be seen include monitors, lizards and skinks. Aquatic fauna such as dugongs, turtles, whales and dolphins may also be seen along the coast.

## CLIMATE

The Kimberley is a semi arid to arid monsoonal region within the dry tropics. The Division is characterised by two distinct seasons. During the 'wet' between October and April, rainfall varies from 350mm per annum in the south to over 1,400mm in the Mitchell Plateau area to the north.

During the 'dry', which are the winter months from May to September, rain is a rare event and temperatures range from 16 to 32 degrees Celsius daily. Temperatures increase during the 'wet', regularly reaching 38-40 degrees Celsius.

The extremes of temperature, humidity and rainfall experienced in the Kimberley can greatly impact on local communities. Weather associated with tropical cyclones and tropical depressions can make roads impassable during the 'wet'.

## POPULATION

The estimated resident population of the Kimberley was 24,078 at 30 June 1989. Between the last two census years 1981 and 1986 the Division experienced a 22.7 per cent increase in population. The greatest rate of growth has occurred in the Shire of Broome which now has the largest population of the four shires.

Consistent with this continued growth, population projections based on medium fertility and medium to high migration, indicate that by 2001, the Kimberley population may increase to 34,900. The major increase is expected in the Shire of Broome, which could more than double its 1986 population.

At the 1986 Census 63 per cent of the resident population lived within the six main urban centres. In the Shire of Broome 73 per cent, of the

TABLE 25.1 - TEMPERATURE AND RAINFALL

Source: Bureau of Meteorology

Reporting station and characteristics		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Broome—														
Temperature—	Mean max. °C	33.4	32.9	34.0	34.2	31.4	29.0	28.6	30.2	31.9	32.8	33.6	34.0	32.1
	Mean min. °C	26.2	25.9	25.3	22.6	18.3	15.0	13.6	15.0	18.4	22.1	24.9	26.4	21.2
Rainfall—	Average (mm)	175	162	92	25	30	19	5	2	2	2	9	41	564
Wet days—	Average number	11	11	7	3	3	2	1	1	1	1	1	5	47
Derby—														
Temperature—	Mean max. °C	35.0	34.7	35.2	35.1	32.3	29.9	29.4	31.6	34.1	35.7	36.4	36.2	..
	Mean min. °C	25.8	25.6	25.2	22.7	19.2	16.1	14.6	16.2	19.4	23.0	25.4	26.4	..
Rainfall—	Average (mm)	182	154	113	32	22	10	6	1	*	—	2	17	84
Wet days—	Average number	12	10	8	2	1	1	1	—	—	—	2	6	43
Fitzroy Crossing—														
Temperature—	Mean max. °C	37.7	36.4	36.8	36.1	32.1	29.9	29.6	32.5	36.2	39.4	40.5	40.0	..
	Mean min. °C	24.7	24.1	23.1	19.6	15.7	12.4	10.7	12.7	17.0	21.4	24.2	25.1	..
Rainfall—	Average (mm)	151	134	82	19	11	8	7	1	2	5	26	85	531
Wet days—	Average number	12	11	7	2	2	1	1	—	—	1	4	8	49
Halls Creek—														
Temperature—	Mean max. °C	36.8	35.8	35.6	33.8	29.8	27.3	27.0	29.9	33.6	36.9	38.4	38.2	33.8
	Mean min. °C	24.1	23.6	22.6	20.2	16.6	13.5	12.2	14.7	18.5	22.6	24.3	24.7	19.9
Rainfall—	Average (mm)	149	124	71	22	14	5	7	3	5	16	32	69	517
Wet days—	Average number	13	12	8	3	2	1	1	1	1	3	6	10	61
Kalumburu—														
Temperature—	Mean max. °C	34.1	33.5	34.1	34.4	33.2	31.7	31.9	33.5	35.4	36.7	37.1	35.9	..
	Mean min. °C	24.6	24.4	23.8	21.3	17.8	14.8	13.7	15.4	18.7	22.4	24.5	24.9	..
Rainfall—	Average (mm)	309	297	215	51	20	7	9	1	5	26	84	172	1,196
Wet days—	Average number	18	17	15	6	2	1	—	—	1	3	8	13	84
Kununurra (Airport)—														
Temperature—	Mean max. °C	36.8	36.5	37.7	35.9	34.4	31.1	30.4	32.0	36.9	39.8	39.4	37.9	..
	Mean min. °C	25.5	25.0	25.0	22.9	20.5	16.9	16.0	16.6	20.2	25.0	25.5	26.0	..
Rainfall—	Average (mm)	193	179	149	18	7	1	4	—	5	16	63	110	745
Wet days—	Average number	14	14	11	3	1	—	—	—	1	3	6	11	64
Wyndham—														
Temperature—	Mean max. °C	37.1	36.0	36.0	35.9	33.6	31.0	30.8	33.9	36.3	38.8	39.3	38.7	35.5
	Mean min. °C	26.3	25.8	25.3	23.5	20.9	17.8	16.8	19.4	22.8	25.6	26.9	27.1	23.1
Rainfall—	Average (mm)	161	193	153	23	10	2	7	—	8	18	57	109	740
Wet days—	Average number	15	14	11	3	1	—	—	—	1	3	6	9	63

population lived in the Broome town site, whereas in the Shire of Halls Creek only 38 per cent of the population lived within the Halls Creek town site.

**TABLE 25.2 - POPULATION  
KIMBERLEY STATISTICAL DIVISION  
AT 30 JUNE**

Statistical local area (b)	Census		E.R.P.(a)
	1981	1986	1989
Broome (S)	4,869	7,932	7,434
Derby-West Kimberley (S)	6,627	7,289	7,352
Halls Creek (S)	2,541	2,886	2,946
Wyndham-East Kimberley (S)	5,259	6,963	6,346

(a) Estimated resident population. (b) Shires are marked (S).

At the 1986 Census approximately 45 per cent of the Division's total population were of Aboriginal or Torres Strait Islander descent. About 35 per cent

of Western Australia's total Aboriginal population reside in the Kimberley. The proportion of Aboriginal people in Shire populations range from 33 per cent in the Shire of Wyndham-East Kimberley to 76 per cent in the Shire of Halls Creek.

**TABLE 25.3 - POPULATION  
KIMBERLEY STATISTICAL DIVISION  
AT 30 JUNE**

Urban centre	Census	
	1981	1986
Broome	3,666	5,778
Derby	2,933	3,258
Fitzroy Crossing	428	1,028
Halls Creek	966	1,182
Kununurra	2,081	3,137
Wyndham	1,509	1,329

**TABLE 25.4 - CENSUS COUNT OF ABORIGINAL POPULATION  
INCLUDING TORRES STRAIT ISLANDERS  
KIMBERLEY STATISTICAL DIVISION  
AT 30 JUNE**

Statistical division and Statistical local area (a)	1981			1986		
	Males	Females	Persons	Males	Females	Persons
Broome (S)	1,013	952	1,968	1,195	1,278	2,473
Derby-West Kimberley (S)	1,423	1,348	2,772	1,517	1,442	2,959
Halls Creek (S)	867	837	1,705	1,056	1,013	2,078
Wyndham-East Kimberley(S)	784	704	1,488	1,033	967	2,000
<b>Total division</b>	<b>4,087</b>	<b>3,841</b>	<b>7,933</b>	<b>4,810</b>	<b>4,700</b>	<b>9,510</b>

(a) Shires are marked (S).

## EMPLOYMENT

A significant number of employees are appointed from outside of the Kimberley. Many of these work in the public administration, community service and mining sectors. The majority of mining sector employees work on a fly-in fly-out basis from Perth and major Kimberley centres.

Overall employment numbers increased by 55 per cent in the ten years to 1986. The Mining, Construction, Wholesale and Retail, Finance,

Property, Business services, Community services and Recreational and Personal services industry sectors increased their proportion of the workforce. Wyndham and to some extent Derby have experienced a contraction in employment opportunities.

Despite the overall increase in employment opportunities a high level of unemployment and underemployment exists within the region, particularly amongst Aboriginal people.

TABLE 25.5 – EMPLOYED PERSONS BY INDUSTRY  
KIMBERLEY STATISTICAL DIVISION (a)  
AT 30 JUNE

<i>Industry</i>	<i>Broome (S)</i>	<i>Derby- West Kimberley (S)</i>	<i>Halls Creek (S)</i>	<i>Wyndham- East Kimberley (S)</i>	<i>Kimberley Statistical Division</i>
CENSUS 1981					
Agriculture, forestry, fishing and hunting	226	368	221	356	1,172
Mining	37	566	31	185	819
Manufacturing	150	35	9	243	429
Electricity, gas and water	30	51	6	129	217
Construction	100	200	17	144	460
Wholesale and retail trade	62	189	40	182	625
Transport and storage	98	106	26	163	391
Communications	33	41	19	36	129
Finance, property and business services	62	117	15	63	256
Public administration, defence	90	63	20	113	286
Community services	323	626	285	509	1,743
Recreation, personal and other services	137	127	25	136	425
Other and not stated	314	391	143	282	1,130
<b>Total (Incl. not stated)</b>	<b>1,811</b>	<b>2,880</b>	<b>857</b>	<b>2,541</b>	<b>8,082</b>
CENSUS 1986					
Agriculture, forestry, fishing and hunting	342	268	241	385	1,236
Mining	95	443	19	392	947
Manufacturing	190	40	11	92	335
Electricity, gas and water	53	48	45	126	274
Construction	186	352	98	280	916
Wholesale and retail trade	353	278	50	350	1,032
Transport and storage	174	121	8	178	483
Communications	45	23	8	38	112
Finance, property and business services	132	82	17	147	379
Public administration, defence	119	109	24	151	401
Community services	651	691	155	586	2,083
Recreation, personal and other services	223	130	40	230	623
Other and not stated	26	24	11	31	89
<b>Total (Incl. not stated)</b>	<b>2,703</b>	<b>2,710</b>	<b>797</b>	<b>3,072</b>	<b>9,281</b>

(a) Shires are marked (S).

### AGRICULTURE

Historically, pastoralism has been the Kimberley's major enterprise. Over 50 per cent of the Division is held under pastoral lease. Since the early 1980s cattle numbers have decreased and meatworks in Derby and Wyndham have closed. Also in recent years cattle numbers have been further reduced in response to successive years of low rainfall. A positive development has been the live export of cattle to South East Asia through Wyndham and Broome.

Agriculture and horticulture have been mainly associated with the Ord Irrigation Area. Other agricultural areas in use, or with potential, including the Dunham River Irrigation Area, the Fitzroy River Valley and smaller areas in the north Kimberley.

In 1990 about sixty different crops were grown on some 7,500 hectares of land in the Ord Irrigation

District. All but 2,000 hectares of available land is currently farmed under the system of crop/fallow rotations or reserved for proposed future development. Increases in cropped area in the past two years have been dramatic and the value of production has more than doubled since 1988. The estimated value of production for 1990 is between \$25 and \$30 million.

The rapid increase in the cropped area in the late 1980s has created renewed interest in pursuing further development in adjacent irrigable land. The current agricultural industries provide a stable basis from which future expansion can be achieved. However, there are many factors that need to be addressed before more land will become freely available. Most of the crops find high priced southern domestic markets although a few crops are now being exported. For major new areas of land to be developed it will be important that exportable crops be grown.

TABLE 25.6 – NUMBER OF AGRICULTURAL ESTABLISHMENTS AND TOTAL AREA BY STATISTICAL LOCAL AREA – KIMBERLEY STATISTICAL DIVISION

Statistical local area (a)	1987-88		1988-89		1989-90	
	Number of establishments	Total area	Number of establishments	Total area	Number of establishments	Total area
		'000 ha		'000 ha		'000 ha
Ord—						
Halls Creek (S)	24	8,169.5	21	7,746.3	21	7,395.4
Wyndham-East Kimberley (S)	71	5,487.5	71	5,488.2	65	4,696.1
<i>Total Ord Subdivision</i>	95	13,657.0	92	13,234.5	86	12,091.4
Fitzroy—						
Broome (S)	17	2,418.0	13	2,120.3	10	1,800.6
Derby-West Kimberley (S)	30	8,528.0	31	8,720.9	33	8,863.8
<i>Total Fitzroy Subdivision</i>	47	946.0	44	10,841.2	43	10,664.4
<b>Total division</b>	<b>142</b>	<b>24,603.0</b>	<b>136</b>	<b>24,075.7</b>	<b>129</b>	<b>22,755.8</b>

(a) Shires are marked (S).

TABLE 25.7 – GROSS VALUE OF AGRICULTURAL COMMODITIES PRODUCED (a)  
KIMBERLEY STATISTICAL DIVISION 1988-89  
\$'000

Source: Department of Mines, Western Australia

Statistical local area (b)	Crops and pastures	Livestock slaughterings and other disposals	Livestock products			Total agriculture
			Wool	Other	Total	
Kimberley—						
Broome (S)	181	2,796	—	131	131	3,108
Halls Creek (S)	—	10,741	—	—	—	10,741
Derby-West Kimberley (S)	19	14,185	—	—	—	14,203
Wyndham-East Kimberley (S)	7,879	4,640	1	66	67	12,586
<b>Total Division</b>	<b>8,078</b>	<b>32,363</b>	<b>1</b>	<b>197</b>	<b>198</b>	<b>40,638</b>

(a) Includes beekeeping. (b) Shires are marked (S).

## FISHING

Pearling and inshore fishing together make a large contribution to the economy of the region, being valued at \$90–\$100 million per annum.

Excluding pearling, the barramundi fishery is the most significant for commercial and recreational pursuits. The major commercial fishing grounds are the Cambridge Gulf, King Sound, Roebuck Bay, the north Kimberley coast, Mitchell River, Drysdale River and, to a lesser extent, the coastal flats east to the Northern Territory border. Mud crabs as well as other species of fish including threadfin salmon, mulloway, grunter and saw fish are caught in these areas.

The barramundi fishery and the tourist fishing adventure tours which operate out of Broome, Derby, Kununurra and Wyndham are important

attractions for tourists to the region and therefore of considerable economic importance.

TABLE 25.8 – FISH AND PRAWN CATCH BY FISHING LOCALITY  
KIMBERLEY STATISTICAL DIVISION  
(Tonnes)

Fishing locality	1987-88		1988-89	
	Fish	Prawns	Fish	Prawns
Broome	69	292	99	11
Derby	60	39	69	7
Wyndham	180	116	242	66
<b>Western Australia</b>	<b>18,989</b>	<b>3,314</b>	<b>18,128</b>	<b>3,160</b>
Kimberley as percentage of Western Australia (tonnage)	1.6	13.5	2.3	2.6

In late 1989, a number of conservation measures were introduced to protect the barramundi fishery. A limited entry fishery was created with restrictions on the number of boats, net size and quantity of fish caught. A ban on recreational netting for barramundi was also introduced.

The Bardi Aboriginal community is developing an industry based on the trochus shell. However, this industry which is providing employment opportunities is being hampered by illegal fishing activities in the Kimberley waters.

## MINING

The major minerals mined in the Kimberley are, in order of economic importance, diamonds, lead and zinc, iron ore, oil and gold.

Diamonds are produced from deposits located in the vicinity of Lake Argyle. The annual value of production is in excess of \$350 million dollars.

An iron ore mine is operated at Koolan Island in Yampie Sound, approximately 130 kilometres north of Derby. About 530 personnel are employed at the mine which has an annual production of approximately 4 million tonnes.

Lead and zinc are mined near Fitzroy Crossing and in 1989 some 500,000 tonnes was produced.

The only onshore oil producing wells in the Division are located to the east of Derby. Production from this area is relatively minor and represents only 1 per cent of the total Western Australian oil and condensate production.

TABLE 25.9 - VALUE (F.O.B.) OF MINERALS BY STATISTICAL LOCAL AREA  
KIMBERLEY STATISTICAL DIVISION 1988-89  
\$'000

Source: Department of Mines, Western Australia

Statistical local area (a)	Diamonds	Gold	Iron ore	Lead	Zinc	Petroleum
Broome (S)	—	—	—	—	—	—
Derby-West Kimberley (S)	—	—	56,505	920	26,787	1,485
Halls Creek (S)	—	(b)572	—	—	—	—
Wyndham-East Kimberley (S)	354,746	—	—	—	—	—

(a) Shires are marked (S). (b) Based on average gold price of month as supplied by Gold Producers' Association.

## MANUFACTURING AND PROCESSING

Manufacturing industries are not significant within the Kimberley. Most of those located in the region are small scale establishments such as steel fabrication enterprises, camping equipment production, shop fitting and furniture making.

Larger scale operations include a number of abattoirs and a brickworks in Broome. A crocodile skin and meat processing plant associated with the newly opened Wyndham Crocodile Farm is planned for the future.

## BUILDING AND CONSTRUCTION

In the last decade there was a significant increase in building and construction activity, particularly in Broome. The increased activity was associated with a rise in the number of tourists visiting the Kimberley.

A number of tourist resorts were constructed to service the needs of tourists, which over a period of time have created employment opportunities.

As a consequence residential development progressed rapidly to cater for the increased resident population.

The level of building and construction activity declined significantly following the Australian domestic pilots dispute in 1989 which adversely affected the tourist industry. Since that time activity has further declined because of general economic conditions.

## COMMERCE

A significant proportion of the Division's work force are employed in the Retail and Wholesale trades. The majority of small businesses in the Kimberley are also in the Retail and Wholesale trades sector. Many of these small businesses cater for the needs of local residents, although in the 1980s many businesses were established that relied on trade associated with the tourism industry.

With the national recession and a decline in tourism numbers there has been some

rationalisation in retail businesses. As Broome is heavily reliant on the tourism industry, rationalisation has been greater than in other Kimberley towns.

**TABLE 25.10 – RETAIL ESTABLISHMENTS  
KIMBERLEY STATISTICAL DIVISION: 1985-86**

<i>Description</i>	<i>Establishments at 30 June</i>
<b>ORD STATISTICAL SUB-DIVISION</b>	
Department and general stores	1
Clothing, fabrics and furniture stores	7
Household appliance and hardware stores	4
Motor vehicle dealers, petrol and tyre retailers	20
Food stores	16
Other retailers	9
<b>Total Ord Statistical sub-division</b>	<b>57</b>
<b>FITZROY STATISTICAL SUB-DIVISION</b>	
Department and general stores	1
Clothing, fabrics and furniture stores	18
Household appliance and hardware stores	10
Motor vehicle dealers, petrol and tyre retailers	26
Food stores	41
Other retailers	15
<b>Total Fitzroy Statistical sub-division</b>	<b>111</b>
<b>KIMBERLEY STATISTICAL DIVISION</b>	
Department and general stores	2
Clothing, fabrics and furniture stores	25
Household appliance and hardware stores	14
Motor vehicle dealers, petrol and tyre retailers	46
Food stores	57
Other retailers	24
<b>TOTAL KIMBERLEY STATISTICAL DIVISION</b>	<b>168</b>

(a) Includes working proprietors and partners.

**TABLE 25.11 – WHOLESALE AND RETAIL TRADE  
ESTABLISHMENTS IN THE KIMBERLEY  
STATISTICAL DIVISION  
JULY 1989**

<b>Wholesale trade—</b>	
Builders and hardware dealers	23
Machinery and equipment	101
Mineral, metal and chemical wholesalers	42
Farm property and produce dealers	58
Food, drink and tobacco wholesalers	10
<b>Total wholesale trade</b>	<b>234</b>
<b>Retail trade—</b>	
Department and general stores	6
Clothing, fabric and furniture stores	52
Household appliances and hardware stores	44
Motor vehicle dealers, petrol and tyres	183
Food stores	199
Other retailers	89
<b>Total retail trade</b>	<b>573</b>
<b>Total wholesale and retail trade</b>	<b>807</b>

## SERVICES AND INFRASTRUCTURE

The Kimberley is an isolated region of Australia and only has a small resident population. As a result, public and private infrastructure is not at the same level of some other rural areas of Australia. As the population increases, Government is making a greater commitment to public infrastructure in the towns and communities.

Transport is very important to Kimberley residents and businesses because of their isolation from southern markets and major centres. Historically, sea transport was the major mode of transport. Broome and Wyndham continue to operate as the ports for the Kimberley. Derby port closed in the early 1980s because of navigational problems in King Sound.

Broome, Derby (RAAF Curtin) and Kununurra have all-weather sealed aerodromes that are serviced regularly. RAAF Curtin, near Derby does not have any permanently based aircraft or operational personnel. The base was heavily utilised during the military exercise 'Kangaroo 1989', and the base is partly used as a domestic airport facility for Broome. The original aerodrome at Derby is used for light aircraft and is the Kimberley base of the Royal Flying Doctor Service.

There is no rail infrastructure in the Kimberley and consequently the area relies on road transport for essential and consumer goods from the southern centres and for transporting produce to southern and international markets. Road trains up to 50 metres long are the principal means of freighting goods.

The major urban centres are provided with electricity by the State Energy Commission (SECWA). Electricity is generated by independent diesel oil generators in each of the centres. A proposal is currently being pursued to place a hydro-electric generation station on the Ord River at Lake Argyle. It may be possible to supply Kununurra, Wyndham and Argyle Diamond Mine with electricity from the proposed station.

The six major population centres have access to the national telecommunications network, ABC national television and one commercial television station. In addition people in or near these major centres can receive ABC national radio and one Perth based commercial station via satellite.

A regional ABC radio station located in Broome broadcasts local programs which can be received in Broome, Derby and Kununurra.

Health services include a regional hospital at Derby and district hospitals in Broome, Halls Creek, Wyndham, Fitzroy Crossing and Kununurra. There are also a number of Aboriginal health organisations which operate within the Division.

The Government provides education facilities up to Year 10 in the major towns. Non-government education services are available in some centres. For students wishing to complete Years 11 and 12 there are a number of options. The majority choose to travel to Perth with assistance from the Student Assisted Travel Scheme operated by the Western Australian Government. Others may choose to remain in the Kimberley and enrol in Distance Education.

There are no regional Technical and Further Education (TAFE) colleges or institutions offering tertiary level courses. Access to TAFE facilities and courses is limited.

Local community services such as fire brigades, welfare services and ambulance services rely in part on local voluntary efforts.

A number of community organisations are working towards greater levels of public and private infrastructure provision for the Kimberley.

### TOURISM

The Kimberley's unique and spectacular natural environment is attracting increasing numbers of tourists to the Division.

Currently the majority of tourists visiting the Kimberley travel by road and originate in Western Australia. However, tourism authorities have been promoting the Kimberley throughout the other states and territories of Australia and in key centres in Asia and the United States of America and as a result it is expected that growth in tourist numbers will come from these areas.

From 1988 to 1990 there was a 61 per cent increase in the number of guest rooms available in

the Kimberley. Over the same period guest arrivals increased by 14.8 per cent. The number of sites in caravan parks increased by 32.8 per cent, and the number of tourists increased by 10.7 per cent.

Tourism is expected to continue to be one of the most important industries for the Kimberley as it provides significant employment opportunities.

TABLE 25.12 - TOURISM  
KIMBERLEY STATISTICAL DIVISION

	1987-88	1988-89	1989-90
<b>HOTELS, MOTELS AND GUEST HOUSES</b>			
At 30 June—			
Establishments	21	22	21
Guest rooms	653	962	1,052
Year ended 30 June—			
Guest arrivals ('000)	89.3	97.4	102.5
<b>CARAVAN PARKS</b>			
At 30 June—			
Establishments	16	19	19
Sites (a)	1,719	2,262	2,284
Year ended 30 June—			
Guest arrivals ('000)	132.1	136.7	146.3

(a) Includes sites occupied by permanents.

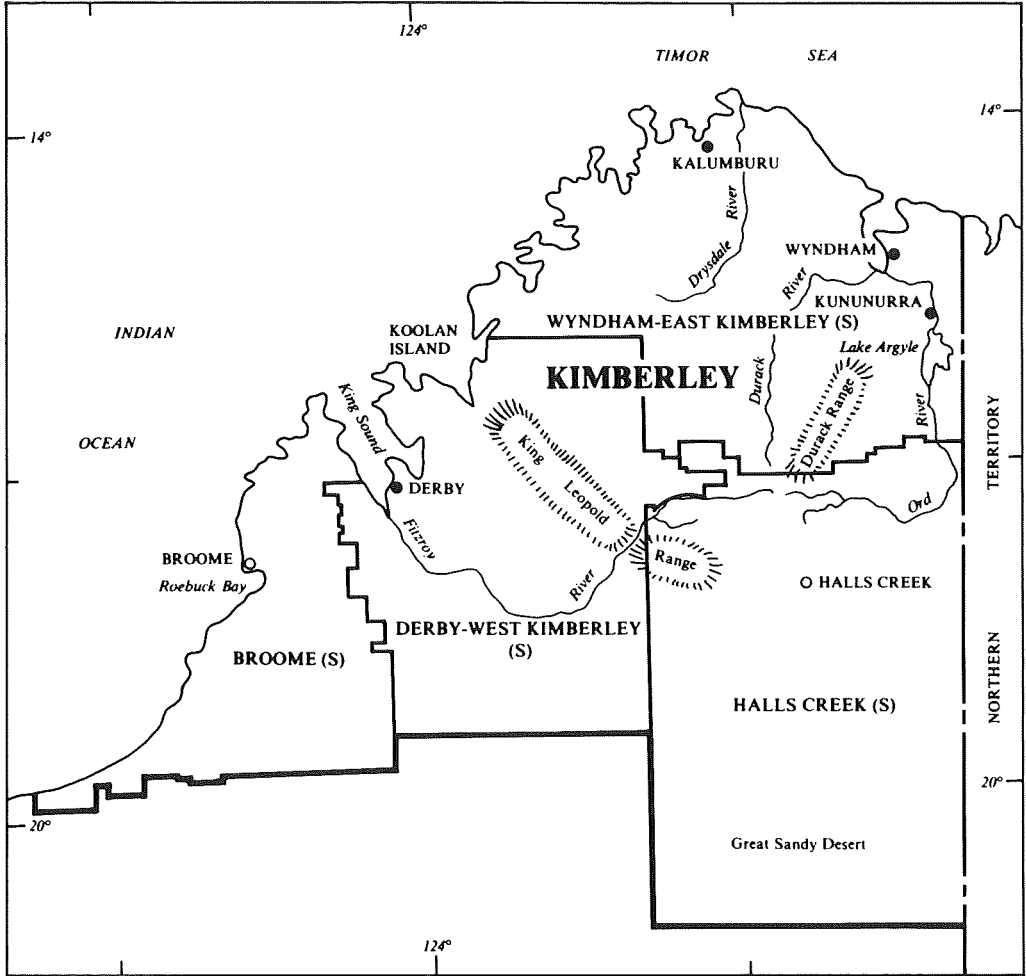
### THE FUTURE OUTLOOK

Population growth in the Division is higher than the State's average. A large proportion of this growth is associated with the high fertility rate among the Aboriginal population. The increase in population and the development of new communities brings new challenges for the economic and social development of the Division.

It will be necessary to improve access to social infrastructure as the Kimberley's population increases and places greater demands on the Divisions health, education and social welfare services.

Perhaps the most significant challenge facing the Kimberley will be to manage and protect its unique environment whilst encouraging the development of new industries and the expansion of existing ones to provide employment and income for its residents.





## Chapter 26

### STATISTICAL SUMMARY

In the following pages, a historical summary of some of the more important statistics relating to Western Australia is shown. This is intended to present a general picture of the development of the State. Naturally the range of statistics available in the early years of the colony is limited. Also it is not always possible to achieve perfect comparability over long periods of time because of changes in definitions, scope of statistical collections etc. While major breaks in series are shown minor changes are not shown and the statistics should be interpreted with this in mind. Generally, the first year shown on each page is the earliest for which any series on that page is available. Because of space constraints, data for earlier years are shown at ten year intervals only. The pages have been arranged in chapter order.

## ESTIMATED POPULATION, NATURAL INCREASE AND MIGRATION (a)

NOTE: Figures above the double lines exclude full-blood Aborigines; those below the double lines refer to total population, i.e. including Aborigines.

Year	Population at 31 December (b)			Population increase (c)				Mean population (b)		Population of Perth Statistical Division (b) (d)
				Recorded natural increase (e)	Estimated net migration (f)	Total increase (g)		Year ended		
	Males	Females	Persons			Number	Per cent (h)	30 June	December	
				31						
1829	769	234	1,003	n.a.	n.a.	n.a.	n.a.			
1830	877	295	1,172	n.a.	n.a.	169	16.85		n.a.	
1840	1,434	877	2,311	34	123	157	7.29			
1850	3,576	2,310	5,886	132	1,109	1,241	26.72			n.a.
1860	5,997	5,749	15,346	379	130	509	3.43	n.a.	15,092	
1870	15,511	9,624	25,135	475	7	482	1.96		24,894	
1880	16,985	12,576	29,561	551	-129	422	1.45		29,350	
1890	28,854	19,648	48,502	1,021	1,821	2,842	6.22		47,081	20
1900	110,088	69,879	179,967	3,214	6,495	9,709	5.70		175,113	73
1910	157,971	118,861	276,832	4,845	6,312	11,157	4.20	266,686	271,019	115.7
1920	176,895	154,428	331,323	4,761	-1,298	3,463	1.06	327,152	330,023	167.0
1930	232,868	198,742	431,610	5,426	-453	4,973	1.17	425,785	429,079	235.1
1940	248,734	225,342	474,076	4,598	-2,902	1,696	0.36	472,060	473,397	255.5
1950	294,758	277,891	572,649	9,170	19,295	28,465	5.23	545,134	557,878	351.7
1951	304,454	285,885	590,339	9,506	8,184	17,690	3.09	570,346	580,317	362.8
1952	316,700	296,235	612,935	10,204	12,392	22,596	3.83	589,887	600,615	378.1
1953	326,372	305,371	631,743	10,790	8,018	18,808	3.07	611,191	621,034	390.1
1954	334,342	314,365	648,707	10,564	6,400	16,964	2.69	630,705	639,963	402.2
1955	343,838	324,771	668,609	11,244	8,658	19,902	3.07	648,222	657,323	416.8
1956	350,333	330,935	681,268	11,344	1,315	12,659	1.89	666,898	674,459	427.4
1957	356,195	339,039	695,234	11,627	2,339	13,966	2.05	680,949	687,448	438.9
1958	361,441	345,755	707,196	11,177	785	11,962	1.72	693,568	699,915	449.3
1959	366,253	352,438	718,691	11,614	-119	11,495	1.63	705,869	711,737	459.5
1960	<u>372,665</u>	<u>358,368</u>	<u>731,033</u>	11,229	1,113	12,342	1.72	717,316	722,900	470.3
1961	<u>384,773</u>	<u>370,440</u>	<u>755,213</u>	11,349	2,571	13,920	1.90	729,770	737,596	482.7
1962	395,891	381,357	777,248	11,254	10,499	22,035	2.92	755,770	766,205	500.3
1963	407,024	391,871	798,895	11,314	10,068	21,647	2.79	777,413	788,457	517.8
1964	417,023	401,098	818,121	10,256	8,705	19,226	2.41	798,824	808,300	534.0
1965	427,330	410,918	838,248	<u>9,912</u>	<u>9,963</u>	20,127	2.46	817,157	826,481	550.9
1966	440,913	423,180	864,093	10,292	15,553	25,845	3.08	837,290	849,189	571.8
1967	458,438	438,550	896,988	11,244	21,651	32,895	3.81	863,539	879,815	597.7
1968	479,938	457,862	937,800	12,073	28,739	40,812	4.55	896,761	915,757	629.2
1969	500,378	476,242	976,620	13,404	25,416	38,820	4.14	935,985	955,660	659.7
1970	<u>520,174</u>	<u>493,878</u>	<u>1,014,052</u>	14,075	23,357	37,432	3.83	975,063	994,201	689.6
1971	547,563	522,784	1,070,347	<u>16,433</u>	<u>16,352</u>	<u>33,033</u>	3.26	1,013,455	1,052,785	733.0
1972	558,030	534,574	1,092,604	14,780	7,875	22,257	2.08	1,068,972	1,081,634	753.5
1973	568,500	545,482	1,113,982	12,700	8,910	21,378	1.96	1,091,845	1,101,921	773.6
1974	584,552	561,439	1,145,991	12,506	19,700	32,009	2.87	1,113,723	1,127,887	801.4
1975	594,518	572,885	1,167,403	12,411	9,410	21,412	1.87	1,142,777	1,155,499	822.1
1976	605,932	585,748	1,191,680	12,972	10,921	24,277	2.08	1,166,902	1,178,928	842.5
1977	618,210	599,006	1,217,216	12,815	11,392	25,536	2.14	1,191,588	1,204,454	861.1
1978	627,238	609,163	1,236,401	12,880	4,980	19,185	1.58	1,217,062	1,227,903	875.3
1979	636,442	620,650	1,257,092	12,499	6,847	20,691	1.67	1,237,090	1,246,800	890.6
1980	648,922	634,583	1,283,505	12,505	12,627	26,413	2.10	1,257,214	1,269,270	910.0
1981	667,381	652,840	1,320,221	13,905	20,858	36,716	2.86	1,284,014	1,301,528	937.7
1982	684,771	670,200	1,354,971	14,060	17,640	34,750	2.63	1,320,278	1,338,681	965.3
1983	697,570	683,441	1,381,011	14,718	8,126	26,040	1.92	1,354,814	1,368,546	986.8
1984	708,066	694,966	1,403,032	13,123	5,586	22,021	1.59	1,380,566	1,391,775	1,005.5
1985	724,952	711,948	1,436,900	14,272	16,304	33,868	2.41	1,404,053	1,419,004	1,032.9
1986	746,560	732,919	1,479,479	14,929	25,569	42,579	2.96	1,437,490	1,458,526	1,066.7
1987 r	767,648	752,659	1,520,307	14,452	26,376	40,828	2.76	1,479,779	1,500,249	1,099.4
1988 r	793,614	777,774	1,571,388	15,611	35,470	51,081	3.36	1,522,066	1,546,259	n.a.
1989 p	815,360	799,450	1,614,810	15,510	27,912	43,422	2.76	1,571,276	1,594,538	n.a.

(a) Estimates for years prior to 1987 are based on final census results. (b) Figures for 1971 and later refer to the estimated resident population. (c) Figures prior to 1972 are on a State of registration basis; those for 1972 and later are on the basis of State of usual residence. (d) At 31 December. (e) Excess of births registered over deaths registered, including deaths of defence personnel, whether in Australia or overseas, between September 1939 and June 1947. (f) Interstate and overseas. (g) For the years 1972 to 1986 differences between the sum of natural increase and net migration, and total increase, are owing to distribution of intercensal discrepancy. (h) The rates represent total increase in population during the year expressed as a proportion per cent of the population at the end of the previous year.

VITAL STATISTICS

NOTE: Figures for 1965 and earlier (i.e. those above the double lines) exclude persons of predominantly Aboriginal descent.

Year	Marriages registered	Divorces (b)	Live births registered (c)	Deaths registered (c)(d)	Natural increase (c)(e)	Rate per 1,000 of mean population (a)				Infant mortality	
						Marriages	Births	Deaths (c)(d)	Natural increase (c)(d)	Number (c)(f)	Rate (c)(g)
1840	25		54	20	34	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1850	37		186	54	132	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1860	151		588	209	379	10.01	38.96	13.18	25.11	n.a.	n.a.
1870	153		853	378	475	6.15	34.27	15.18	19.08	100	117.23
1880	214		933	382	551	7.29	31.79	13.02	18.77	72	77.17
1890	278		1,561	540	1,021	5.90	33.16	11.47	21.69	140	89.69
1900	1,781		5,454	2,240	3,214	10.17	31.15	12.79	18.35	688	126.15
1910	2,107		7,585	2,740	4,845	7.77	27.99	10.11	17.88	593	78.18
1920	2,932	n.a.	8,149	3,388	4,761	8.88	24.69	10.27	14.42	538	66.02
1930	3,205		9,200	3,774	5,426	7.47	21.44	8.80	12.64	430	46.74
1940	5,234		9,121	4,486	4,635	11.06	19.27	9.48	9.79	403	44.18
1941	5,077		10,118	4,769	5,349	10.71	21.35	10.06	11.29	357	35.28
1942	5,441		9,901	5,076	4,825	11.42	20.77	10.65	10.12	365	36.86
1943	4,528		10,481	4,587	5,894	9.50	21.98	9.62	12.36	342	32.63
1944	4,506		10,870	4,478	6,392	9.36	22.58	9.30	13.28	354	32.57
1945	3,788		10,672	4,712	5,960	7.77	21.89	9.67	12.23	315	29.52
1946	5,171	725	12,105	4,753	7,352	10.49	24.57	9.65	14.92	376	31.06
1947	5,282	807	12,874	4,723	8,151	10.50	25.60	9.39	16.21	398	30.92
1948	5,186	696	12,931	4,685	8,246	10.08	25.13	9.10	16.02	331	25.60
1949	4,951	566	13,511	4,790	8,721	9.30	25.37	8.99	16.37	357	26.42
1950	5,434	720	14,228	5,058	9,170	9.74	25.50	9.07	16.44	386	27.13
1951	5,390	682	14,794	5,288	9,506	9.29	25.49	9.11	16.38	425	28.73
1952	5,389	585	15,413	5,209	10,204	8.97	25.66	8.67	16.99	384	24.98
1953	5,032	535	15,862	5,072	10,790	8.10	25.54	8.17	17.37	378	23.83
1954	5,204	530	15,928	5,364	10,564	8.13	24.89	8.38	16.51	359	22.54
1955	5,145	479	16,623	5,379	11,244	7.83	25.29	8.18	17.11	373	22.44
1956	5,080	544	16,916	5,572	11,344	7.53	25.08	8.26	16.82	384	22.70
1957	4,897	541	16,924	5,297	11,627	7.12	24.62	7.71	16.91	357	21.09
1958	5,038	536	16,731	5,554	11,177	7.20	23.90	7.94	15.97	360	21.52
1959	5,387	584	17,111	5,497	11,614	7.57	24.04	7.72	16.32	345	20.16
1960	5,323	540	16,926	5,697	11,229	7.36	23.41	7.88	15.53	366	21.62
1961	5,150	466	17,078	5,729	11,349	6.98	23.15	7.77	15.39	336	19.67
1962	5,466	582	17,064	5,810	11,254	7.23	22.58	7.69	14.89	380	22.27
1963	5,755	553	17,290	5,976	11,314	7.40	22.23	7.68	14.55	353	20.42
1964	6,023	542	16,685	6,429	10,256	7.55	20.93	8.06	12.86	328	19.66
1965	6,448	604	16,186	6,274	9,912	7.91	19.85	7.70	12.16	351	21.68
1966	7,002	637	17,194	6,902	10,292	8.25	20.25	8.13	12.12	343	19.95
1967	7,430	726	18,023	6,779	11,244	8.44	20.48	7.71	12.78	314	17.42
1968	8,086	812	19,541	7,468	12,073	8.83	21.34	8.16	13.18	398	20.37
1969	8,993	872	20,754	7,350	13,404	9.41	21.72	7.69	14.03	453	21.83
1970	9,227	889	21,618	7,543	14,075	9.28	21.74	7.59	14.16	459	21.23
1971	9,382	1,064	24,239	7,806	16,433	8.91	23.02	7.41	15.61	464	19.14
1972	9,120	1,243	22,177	7,441	14,736	8.43	20.50	6.88	13.62	348	15.69
1973	9,102	1,424	20,510	7,845	12,665	8.26	18.61	7.12	11.49	394	19.21
1974	9,295	1,761	20,207	7,778	12,429	8.24	17.92	6.90	11.02	327	16.18
1975	9,026	2,240	20,338	7,972	12,366	7.81	17.60	6.90	10.70	271	13.32
1976	9,517	4,818	20,670	7,740	12,930	8.07	17.53	6.57	10.97	273	13.21
1977	10,063	3,975	20,651	7,899	12,752	8.35	17.15	6.56	10.59	251	12.15
1978	9,404	3,387	20,611	7,794	12,817	7.66	16.79	6.35	10.44	230	11.16
1979	9,239	3,397	20,469	8,020	12,449	7.41	16.42	6.43	9.98	247	12.07
1980	9,594	3,073	20,607	8,166	12,441	7.56	16.24	6.43	9.80	239	11.60
1981	10,111	3,481	21,877	7,993	13,884	7.77	16.81	6.14	10.67	193	8.82
1982	10,455	3,842	22,236	8,187	14,049	7.81	16.61	6.15	10.49	204	9.17
1983	10,519	3,822	23,087	8,369	14,718	7.69	16.87	6.12	10.75	179	7.75
1984	9,920	4,069	21,625	8,503	r13,122	7.13	15.54	6.11	9.43	232	10.72
1985	10,398	4,039	23,109	8,836	r14,273	7.33	16.29	6.23	10.06	209	9.04
1986	10,379	4,001	24,236	9,307	14,929	7.12	16.62	6.38	10.24	214	8.83
1987	10,150	4,044	23,332	8,880	14,452	6.77	15.55	5.92	9.63	196	8.40
1988	10,578	3,964	25,143	9,532	r15,611	6.85	16.27	6.17	10.18	214	8.51
1989	10,739	4,089	25,051	9,543	15,508	6.73	15.71	5.98	9.72	195	7.78

(a) Rates for 1971 and later are based on the estimated resident population. Rates for years prior to 1987 are based on final census results. (b) Final orders - dissolution of marriages. (c) Births, deaths and natural increase figures for 1982 and earlier years are on a State of registration basis. Figures for 1983 and later are based on State of usual residence. (d) Excludes fetal deaths (stillbirths) and between September 1939 and June 1947, deaths of defence personnel, whether in Australia or overseas. (e) Excess of live births registered over deaths registered. (f) Deaths under 1 year of age included in deaths registered. (g) Per 1,000 live births.

## SOCIAL SERVICE BENEFICIARIES AND REPATRIATION PENSIONS: WESTERN AUSTRALIA

Year ended 30 June	Social service benefits							Repatriation pensions				
	Pensioners (a)			Family Allowance (a) (b)				Un-employment benefit (h)	Disability		Service	
	Age (c)(d)	Invalid (c)(d)	Total Age and Invalid	Widow	Under 16 years of age (e)(f)		Students (g)		Total	Number (a)(i)	Amount paid \$'000	Number (a)(j)
1910	2,361	..	2,361						n.a.	n.a.	n.a.	n.a.
1920	4,791	1,788	6,579						22,311	1,087	n.a.	n.a.
1930	8,913	3,284	12,197				n.a.		28,407	1,586	n.a.	n.a.
1940	19,024	3,454	22,478	n.a.	n.a.				21,449	1,370	1,489	103
1941	19,423	3,425	22,848					n.a.	20,388	1,343	1,545	112
1942	19,156	3,557	22,713				68,533		19,757	1,337	1,561	129
1943	18,575	3,580	22,155	2,596	65,777		65,777		20,245	1,506	1,454	147
1944	18,109	3,443	21,552	2,796	66,938		66,938		22,511	1,884	1,369	144
1945	17,713	3,414	21,127	2,894	68,316		68,316		27,686	2,105	1,343	144
1946	18,797	3,538	22,335	2,870	69,325		69,325	422	37,921	2,530	1,403	173
1947	21,162	4,002	25,164	2,570	71,968		71,968	1,095	42,127	2,856	1,580	192
1948	22,210	4,387	26,597	2,719	75,186		75,186	409	44,818	3,000	1,715	290
1949	23,739	4,340	28,079	2,876	79,693		79,693	126	46,785	3,516	1,832	301
1950	24,316	4,294	28,610	2,883	133,557	n.a.	133,557	267	48,878	3,776	1,953	331
1951	24,317	4,184	28,501	2,789	172,186		172,186	60	51,027	4,545	2,022	369
1952	24,782	3,964	28,746	2,676	183,257		183,257	57	52,071	5,429	2,136	449
1953	25,679	3,996	29,675	2,686	192,991		192,991	844	52,607	5,843	2,343	556
1954	27,248	4,101	31,349	2,753	202,098		202,098	427	53,352	6,174	2,468	605
1955	28,833	4,191	33,024	2,848	212,025		212,025	157	54,117	6,877	2,692	723
1956	30,244	4,425	34,669	3,015	220,792		220,792	473	54,427	6,902	3,648	964
1957	32,192	5,039	37,231	3,243	230,922		230,922	1,940	54,987	7,169	4,306	1,095
1958	33,124	5,519	38,643	3,542	237,732		237,732	2,330	55,251	8,017	4,672	1,395
1959	34,629	5,941	40,570	3,833	245,090		245,090	2,852	56,008	7,893	5,009	1,552
1960	36,575	6,152	42,727	4,039	250,449		250,449	2,512	56,644	8,471	5,344	1,751
1961	37,656	6,945	44,601	4,348	257,037		257,037	2,154	57,123	9,310	6,101	2,102
1962	39,104	7,826	46,930	4,570	266,067		266,067	2,932	57,947	10,177	7,115	2,687
1963	40,661	8,170	48,831	4,486	270,736		270,736	2,674	57,580	10,527	7,526	2,927
1964	41,819	8,306	50,125	4,734	275,910	7,865	283,775	2,677	57,047	11,564	7,754	3,177
1965	42,706	8,615	51,321	4,926	279,642	8,844	288,486	1,679	55,920	11,447	7,780	3,320
1966	43,876	8,575	52,451	5,071	286,534	8,769	295,303	785	54,560	12,637	7,757	3,571
1967	45,741	8,307	54,048	5,228	295,628	10,697	306,325	718	52,967	11,889	7,674	3,612
1968	48,850	8,310	57,160	5,482	306,492	10,999	317,491	608	51,193	11,934	7,586	3,777
1969	50,432	8,413	58,845	5,559	318,147	11,446	329,593	524	49,526	13,061	7,298	4,071
1970	56,017	7,933	63,950	6,086	322,058	11,539	333,597	474	47,993	12,811	7,783	4,491
1971	58,224	8,155	66,379	6,392	333,848	13,737	347,585	872	46,514	13,140	7,767	4,769
1972	60,523	8,485	69,008	6,795	343,455	15,452	358,907	2,808	45,079	14,413	7,864	5,298
1973	68,701	9,518	78,219	7,948	346,769	17,821	364,590	4,960	44,093	15,462	9,599	7,394
1974	76,124	10,406	86,530	8,763	343,404	17,585	360,989	2,863	42,807	17,363	10,669	10,191
1975	79,831	10,961	90,792	9,442	349,702	18,924	368,626	9,317	41,747	21,845	11,814	15,149
1976	84,087	12,265	96,352	10,027	352,998	20,151	373,149	13,598	40,619	23,118	13,472	20,560
1977	86,470	13,263	99,733	10,691			376,346	15,706	39,459	25,587	15,338	26,933
1978	94,491	13,653	108,144	11,494			377,545	20,470	38,053	28,728	16,975	33,785
1979	96,558	15,045	111,603	12,232			371,315 (k)	29,000	36,883	28,183	18,794	38,896
1980	98,887	15,894	114,781	12,476			375,013 (k)	29,800	35,857	29,097	21,131	45,911
1981	101,042	16,352	117,394	12,526			377,113	28,638	34,920	33,411	23,704	59,328
1982	103,397	17,195	120,592	12,654	n.a.	n.a.	385,708	31,636	34,696	35,597	26,121	69,549
1983	105,784	18,598	124,382	12,830			391,885	50,992	34,726	44,394	29,346	90,417
1984	103,889	21,124	125,013	12,934			393,952 (k)	59,400	34,808	49,981	32,640	110,663
1985	102,943	23,889	126,832	12,977			396,851 (k)	57,900	34,952	58,502	34,815	127,841
1986	103,085	25,769	128,854	12,817			388,251 (k)	54,358	35,223	67,345	36,423	144,009
1987	103,339	27,886	131,225	12,647			388,360	56,441	31,760	72,596	36,532	155,389
1988	103,743	28,522	132,265	11,898			367,107	46,091	31,362	80,593	36,798	179,711
1989	104,816	29,706	134,522	6,901	352,405	14,085	366,490	35,621	30,761	84,091	36,246	184,171
1990	106,301	30,590	136,891	6,488	353,348	9,582	362,930	34,770	30,285	92,674	35,570	195,559

(a) Number at 30 June. (b) Previously child and student endowment. Name of benefit, rates and conditions changed from 15 June 1976. (c) Prior to June 1957 excludes pensioners in benevolent homes. (d) At 30 June 1940 invalid pensioners who qualified were reclassified as age pensioners. (e) Prior to 30 June 1957 excludes endowed children in institutions. (f) Child endowment commenced 1 July 1941 for second and subsequent children. From 20 June 1950 endowment extended to include first or only children. (g) From 14 January 1964 includes students aged 16 and under 21; extended to 25 years in 1976. (h) Average number of persons on benefit at end of each week. (i) Includes pensions paid to incapacitated veterans and to dependants of incapacitated or deceased veterans. (j) Comprises pensions paid to veterans and their dependants. (k) Estimated.

**NATIONAL WELFARE FUND: EXPENDITURE IN WESTERN AUSTRALIA**

NOTE: The National Welfare Fund was established, with effect from 1 July 1943, in terms of the National Welfare Fund Act 1943. During the first two years of operation, only maternity allowances and funeral benefits were paid from the Fund. Under the provisions of the National Welfare Fund Act 1945, effective from 1 July 1945, expenditure on age pensions (introduced in 1909), invalid pensions (1910), widows' pensions (1942), and child endowment (1941) became a charge on the Fund. Unemployment, sickness, and special benefits came into operation on 1 July 1945. Hospital benefit was first paid in 1945-46 (for public hospitals from 1 January 1946, and private hospitals from 18 February 1946).

(\$'000)

Year ended 30 June	Social services					Health services					Total expenditure from National Welfare Fund (c)	
	Pensions		Child endowment (a)	Unemployment, sickness, and special benefits	Total expenditure on social services	Hospital and nursing home benefits	Medical benefits	Pharmaceutical benefits	Tuberculosis campaign (a)	Milk for school children		Total expenditure on health services (b)
	Age and invalid	Widows'										
1960	19,833	1,827	9,720	1,504	33,652	3,351	2,241	3,178	1,163	458	10,427	44,079
1961	21,586	2,104	11,402	1,309	37,180	3,817	2,339	3,630	1,111	448	11,386	48,812
1962	24,344	2,371	10,205	1,887	39,575	3,996	2,455	4,809	873	526	12,695	52,270
1963	25,582	2,377	10,485	2,006	41,203	4,189	2,657	5,161	885	584	13,501	54,705
1964	27,373	3,115	12,994	1,978	46,223	4,705	2,808	5,242	839	615	14,238	60,460
1965	29,413	3,463	13,406	1,401	48,450	4,987	3,716	5,294	822	637	15,486	64,635
1966	30,760	3,602	13,624	872	49,648	5,286	4,345	5,870	758	619	16,906	67,316
1967	33,794	4,011	15,498	855	55,001	5,881	4,944	6,719	600	698	18,998	74,666
1968	36,418	4,346	14,845	758	57,295	6,598	5,265	7,117	862	850	20,860	78,894
1969	39,404	4,786	15,540	795	61,729	7,401	5,600	8,702	645	797	23,340	85,828
1970	44,637	5,600	17,894	1,039	70,725	9,153	6,373	9,836	828	797	27,262	98,577
1971	48,979	6,172	16,423	1,699	75,279	10,256	9,782	11,215	800	835	33,246	109,216
1972	57,374	7,180	18,188	4,298	89,623	14,492	13,800	12,418	907	997	43,032	133,770
1973	76,188	10,064	21,407	8,372	119,622	19,062	15,958	13,258	824	1,086	50,827	171,763
1974	98,011	13,409	19,009	8,314	147,040	21,222	16,478	16,153	803	596	56,535	205,778
1975	138,812	18,459	19,085	24,944	213,981	25,758	19,437	19,830	1,023	..	68,542	284,016

(a) Comprises amounts paid to individuals in the form of allowances and to the State Government as reimbursements for expenditure incurred in the provision and maintenance of facilities. (b) Excludes some relatively minor expenditure not allocatable among States. (c) See footnote (b).

NOTE: This series has been replaced by 'Commonwealth Government Cash Benefits to or for Persons in Western Australia'.

**COMMONWEALTH GOVERNMENT CASH BENEFITS TO OR FOR PERSONS IN WESTERN AUSTRALIA**

NOTE: This series replaced 'National Welfare Fund: Expenditure in Western Australia' (\$'000)

Year ended 30 June	Health services and benefits				Social security and welfare benefits						Total cash benefits	
	Hospital and institutional	Clinical and non-institutional and public health	Pharmaceutical	Total	Ex-service men and dependants	Age pensions	Unemployment and sickness benefits	Sole parent, family and child benefits n.e.c.	Other	Total		Other services
1979	24,290	37,342	18,287	79,919	67,067	238,241	90,042	111,464	94,177	600,991	28,770	709,680
1980	27,771	42,135	18,717	88,623	74,995	258,650	96,078	117,148	108,903	655,774	28,631	773,028
1981	37,095	48,754	22,138	107,987	92,714	290,394	98,604	128,446	126,817	736,975	32,231	877,193
1982	46,954	58,881	28,497	134,332	105,147	334,791	125,389	156,684	146,891	868,902	36,690	1,039,924
1983	54,954	71,699	33,122	159,775	134,811	364,234	224,646	199,396	169,662	1,092,749	42,512	1,295,036
1984	42,164	114,152	35,673	191,989	160,665	400,380	294,750	234,797	192,544	1,283,136	55,175	1,530,300
1985	51,700	176,200	49,200	277,100	186,200	428,500	310,500	256,600	227,600	1,409,400	53,800	1,740,300
1986	60,600	200,900	53,900	315,400	211,700	450,200	317,500	281,500	255,600	1,516,500	59,500	1,891,400
1987	64,200	235,100	55,900	355,200	228,000	478,300	357,100	282,700	280,900	1,627,000	78,500	2,060,700
1988	91,400	253,500	71,100	416,000	260,800	537,700	332,500	314,100	317,100	1,762,200	85,900	2,264,100
1989	97,600	273,400	76,800	447,800	268,300	584,500	257,800	277,900	450,500	1,839,000	84,800	2,371,600

## LIVESTOCK; WOOL PRODUCTION; AGRICULTURE

Year(a)	Livestock (c)			Wool production (d)		Area and production of principal grain crops (b)			
	Cattle	Sheep	Pigs	Quantity	Gross value (e)	Area	Yield per hectare	Wheat Production	
								Total	Gross value
	'000	'000	'000	tonnes	\$'000	'000 hectares	tonnes	'000 tonnes	'000 \$'000
1829	—	1	—	n.a.	—	n.a.	n.a.	n.a.	—
1830	1	8	—	n.a.	—	n.a.	n.a.	n.a.	—
1840	2	31	2	n.a.	—	1	1.11	1	—
1850	13	128	3	n.a.	—	2	n.a.	n.a.	n.a.
1860	32	260	11	298	n.a.	6	1.00	6	—
1870	45	609	13	811	—	11	0.79	9	—
1880	64	1,232	24	1,970	—	11	0.62	7	—
1890	131	2,525	29	3,161	—	14	0.92	13	—
1900	339	2,434	62	4,323	—	30	0.70	21	310
1910	825	5,159	58	13,210	2,141	236	0.68	161	2,162
1920	850	6,533	61	18,947	4,552	516	0.65	333	11,023
1930	813	9,883	101	32,451	4,829	1,601	0.91	1,456	12,201
1940	789	9,516	218	32,362	7,889	1,062	0.54	573	8,648
1950	865	10,923	79	42,071	47,237	1,171	0.89	1,048	51,339
1951	841	11,362	90	46,680	118,068	1,289	1.05	1,358	65,328
1952	852	12,188	86	52,681	64,027	1,253	0.87	1,089	58,984
1953	846	12,475	76	54,760	75,121	1,214	0.80	965	55,194
1954	830	13,087	101	58,497	82,567	1,168	0.93	1,030	55,423
1955	861	13,411	107	56,324	67,985	1,206	0.77	933	43,655
1956	897	14,128	99	67,932	69,642	1,170	1.24	1,449	68,840
1957	957	14,887	140	67,301	90,283	1,119	0.78	874	44,055
1958	997	15,724	151	68,504	75,228	1,197	0.75	901	45,912
1959	1,000	16,215	115	71,376	59,407	1,332	1.18	1,569	77,639
1960	1,030	16,412	131	72,979	75,302	1,505	1.06	1,597	82,361
1961	1,100	17,151	176	82,652	73,863	1,627	1.07	1,739	92,290
1962	1,218	18,314	174	83,159	79,283	1,773	1.01	1,788	100,023
1963	1,298	18,727	131	80,366	80,071	1,944	1.01	1,973	107,023
1964	1,299	20,165	128	95,053	116,331	1,878	0.76	1,424	74,389
1965	1,258	22,392	137	91,170	93,275	2,085	0.82	1,717	88,557
1966	1,271	24,427	144	108,116	115,183	2,489	1.12	2,780	153,050
1967	1,357	27,370	161	119,681	121,509	2,569	1.09	2,809	153,157
1968	1,427	30,161	183	131,379	116,653	2,690	1.08	2,911	170,102
1969	1,546	32,901	220	164,307	158,264	2,952	1.04	3,060	151,306
1970	1,681	33,634	250	144,527	120,819	2,747	0.66	1,815	90,961
1971	1,781	34,709	278	151,808	92,009	2,361	1.25	2,957	153,227
1972	1,975	34,405	427	170,219	135,137	2,042	1.06	2,165	115,934
1973	2,182	30,919	476	140,649	225,041	2,437	0.82	2,003	109,399
1974	2,330	32,451	344	143,147	251,712	2,978	1.41	4,211	461,049
1975	2,544	34,476	264	172,659	218,859	2,810	1.17	3,277	361,211
1976	2,654	34,771	260	174,807	242,027	3,171	1.30	4,122	427,507
1977	2,464	31,158	242	156,237	291,358	3,314	0.98	3,249	290,489
1978	2,271	29,823	237	143,127	258,034	3,609	0.82	2,945	292,901
1979	2,092	30,265	271	150,284	286,601	3,706	1.19	4,400	546,827
1980	2,065	30,431	293	147,840	348,214	4,121	0.91	3,739	571,158
1981	2,033	30,764	289	160,096	401,030	4,333	0.77	3,315	508,734
1982	1,942	30,268	263	145,126	378,540	4,593	1.05	4,803	762,706
1983	1,754	30,164	300	148,190	395,896	4,865	1.14	5,534	982,505
1984	1,730	29,518	300	141,359	407,451	4,746	0.91	4,316	702,330
1985	1,673	31,574	274	170,030	503,963	4,652	1.41	6,580	1,134,766
1986	1,690	33,213	278	175,859	577,273	4,148	1.05	4,362	736,334
1987	1,660	33,463	295	188,773	716,263	4,260	1.26	5,377	836,016
1988	1,705	33,951	307	188,527	1,252,674	3,312	1.17	3,882	649,969
1989	1,702	37,090	285	203,173	1,395,116	3,297	1.58	5,225	1,122,328
1990	1,673	38,422	272	236,079	1,253,637	3,476	1.38	4,800	954,292

(a) Figures relate to varying time periods (e.g. year ended 30 June, year ended 31 December, year ended 31 March), owing to changes in the method of data collection. (b) From 1944 figures relate to the season ended 31 March. (c) From 1943 figures relate to the season ended 31 March. (d) Comprises shorn, dead and fellmongered wool and wool exported on skins. For 1947 and earlier, year ended 31 December; for the years 1949 to 1964 figures are for the year ended 31 March. From 1965 figures relate to the year ended 30 June in the following year. (e) Figures for 1949 and 1951 to 1955 exclude distributions of profits under the 1939-1945 War-time Wool Disposals Plan aggregating \$13,869,934. Separate State figures are not available for distributions made from 1956 to 1958 when payments were virtually complete.

AGRICULTURE - continued

Year (a)	Area and production of principal grain crops (b)—continued						Area used for crops (d)	Gross value of primary commodities produced (c)	
	Oats		Barley		Hay (all kinds)			Agriculture	Fisheries (e)
	Area	Production	Area	Production	Area	Production			
	'000 hectares	'000 tonnes	'000 hectares	'000 tonnes	'000 hectares	'000 tonnes	'000 hectares	\$'000	\$'000
1840	n.a.	n.a.	n.a.	n.a.	—	n.a.	1		
1850	n.a.	n.a.	n.a.	n.a.	1	n.a.	3		
1860	—	—	1	1	2	8	10		
1870	1	1	2	2	7	21	22	n.a.	n.a.
1880	—	—	2	2	8	20	26		
1890	1	1	2	2	9	25	28		
1900	2	2	1	1	42	106	81		
1910	25	14	1	1	71	182	346		
1920	78	37	4	3	108	268	730	(f)29,364	
1930	111	60	7	4	161	500	1,939	(f)38,747	544
1940	174	59	27	16	169	381	1,614	39,520	r562
1950	237	132	28	22	87	276	1,737	141,348	r1,432
1951	237	144	24	21	72	231	1,834	233,827	r1,649
1952	266	140	23	16	70	215	1,824	189,153	r2,505
1953	337	189	43	40	92	295	1,877	201,380	r3,286
1954	297	174	85	62	89	299	1,812	210,428	3,808
1955	354	174	105	64	117	310	2,041	186,361	4,383
1956	442	300	136	106	109	390	2,118	221,435	4,915
1957	425	189	139	85	98	293	2,080	216,295	5,563
1958	467	250	124	81	137	392	2,230	204,911	6,530
1959	538	410	130	123	135	462	2,434	231,149	7,818
1960	502	356	170	161	129	440	2,583	256,002	8,621
1961	538	396	219	193	115	387	2,734	266,972	8,569
1962	498	366	199	165	119	402	2,823	280,475	10,689
1963	476	367	158	137	138	460	2,965	292,615	11,219
1964	455	324	121	92	117	395	2,714	300,766	10,187
1965	466	254	123	84	123	396	2,950	296,147	15,218
1966	502	422	167	147	118	421	3,419	406,097	15,733
1967	487	401	151	152	119	424	3,463	411,084	16,525
1968	469	359	168	159	129	428	3,595	428,258	21,954
1969	442	416	224	208	138	508	3,840	461,479	23,717
1970	461	281	364	273	202	576	3,916	370,557	19,660
1971	520	520	632	769	190	673	3,831	445,390	25,127
1972	454	414	911	1,000	177	653	3,751	461,581	30,817
1973	297	212	744	640	224	664	3,855	574,665	28,158
1974	325	383	510	626	220	734	4,133	1,034,191	30,494
1975	262	250	387	329	164	508	3,758	845,169	35,130
1976	320	386	419	505	163	536	4,207	996,633	51,079
1977	372	347	452	553	169	560	4,416	959,160	69,094
1978	415	416	614	751	191	597	4,910	993,889	88,340
1979	427	491	616	778	184	586	4,993	1,343,932	96,055
1980	370	399	523	632	208	636	5,280	1,572,744	85,652
1981	382	384	535	504	240	703	5,547	1,678,031	82,764
1982	432	442	580	576	255	711	5,963	1,874,267	99,254
1983	461	534	603	717	252	754	6,379	2,196,230	126,208
1984	448	456	771	797	238	676	6,526	1,940,863	142,658
1985	351	460	965	1,431	226	747	6,723	2,602,205	165,443
1986	288	338	826	1,024	201	633	5,970	2,213,118	143,034
1987	302	414	468	601	218	681	5,930	2,554,658	182,421
1988	373	502	461	617	243	778	5,334	2,991,232	254,399
1989	389	618	383	552	248	873	5,082	r3,719,597	242,412
1990	340	529	421	628	229	811	5,174	3,370,319	n.y.a.

(a) Figures relate to varying time periods (e.g. year ended 30 June, year ended 31 December, year ended 31 March), owing to changes in the method of data collection. (b) From 1944 figures relate to the season ended 31 March. (c) Estimated value of recorded production based on wholesale prices realised at principal market. (d) Excludes pasture hay and from 1967 also excludes lucerne. (e) From 1980 excludes pearling and whaling. (f) Includes hunting.



## PRIMARY PRODUCTION — MISCELLANEOUS

Year	Gold production (a) (b)		Coal production (b)		Average values f.o.b. (c)	
	Quantity	Value	Quantity	Value	Wool (greasy) per kg (d)	Wheat per tonne (e)
	'000 grams	\$'000	'000 tonnes	\$'000	cents	\$
1860	—	—	—	—	—	19.83
1870	—	—	—	—	—	..
1880	—	—	—	—	n.a.	18.37
1890	622	171	—	—	—	..
1900	43,980	12,015	120	110	—	5.51
1910	45,753	12,494	266	227	16.20	14.85
1920	19,222	6,951	469	701	28.26	26.33
1930	13,001	3,729	509	770	19.37	16.69
1940	37,044	25,393	548	729	25.68	11.19
1941	34,494	23,703	566	779	28.70	14.49
1942	26,376	17,731	590	923	28.64	15.12
1943	16,982	11,421	541	979	32.19	15.09
1944	14,494	9,800	567	1,166	34.81	17.71
1945	14,588	10,021	552	1,146	34.24	23.30
1946	19,191	13,280	652	1,460	34.92	31.81
1947	21,897	15,151	743	1,680	45.64	48.42
1948	20,684	14,314	745	1,760	76.41	64.33
1949	20,155	15,926	763	1,944	94.20	56.11
1950	18,973	18,933	827	2,575	105.91	57.03
1951	19,533	19,451	862	3,434	263.50	62.25
1952	22,706	23,696	843	4,915	138.10	62.64
1953	25,629	26,598	900	6,146	148.04	63.57
1954	26,469	26,627	1,034	7,178	156.20	60.90
1955	26,189	26,749	919	6,179	135.39	52.22
1956	25,256	26,405	843	5,448	112.66	46.57
1957	27,900	29,102	852	5,105	144.67	48.12
1958	26,967	28,357	885	4,561	130.80	56.35
1959	26,967	28,388	926	4,713	91.87	51.76
1960	26,625	28,140	937	4,878	115.37	49.48
1961	27,122	28,584	778	3,361	99.10	49.91
1962	26,717	28,115	934	3,962	109.80	51.90
1963	24,883	26,375	916	3,970	111.38	52.30
1964	22,177	23,383	1,003	4,679	134.47	52.01
1965	20,497	22,381	1,010	4,410	120.58	51.66
1966	19,564	23,316	1,078	4,562	116.00	51.12
1967	17,916	21,690	1,079	4,765	117.46	54.88
1968	15,925	19,407	1,104	4,817	105.69	51.31
1969	14,961	19,040	1,120	4,853	107.60	51.26
1970	12,310	15,811	1,178	5,407	98.11	47.72
1971	10,736	13,674	1,190	5,653	75.33	48.88
1972	10,848	14,835	1,188	5,855	74.94	49.52
1973	9,264	16,718	1,154	6,422	150.21	49.67
1974	7,173	19,183	1,197	7,237	215.36	98.75
1975	6,305	29,788	1,879	12,511	144.37	126.39
1976	7,644	27,141	2,157	17,613	147.62	116.89
1977	7,619	31,586	2,339	21,896	188.10	105.10
1978	13,653	64,741	2,435	24,846	195.76	92.52
1979	12,231	78,313	2,406	34,484	207.87	116.53
1980	11,598	158,253	3,039	54,464	253.81	146.45
1981	10,532	165,376	3,127	63,100	270.01	160.32
1982	16,135	178,566	3,435	75,132	288.61	155.48
1983	22,992	334,802	3,903	95,529	303.41	168.10
1984	26,183	365,453	3,942	106,325	317.08	173.81
1985	37,425	508,892	3,673	109,120	353.01	187.09
1986	46,072	707,114	3,765	126,841	376.50	185.14
1987	64,911	1,300,079	3,782	n.p.	430.31	144.86
1988	90,546	1,843,770	3,702	150,965	651.33	146.18
1989	r130,565	r2,072,692	3,800	161,241	721.94	202.00
1990	148,420	2,371,726	4,161	183,698	627.18	223.06

(a) Prior to 1971 comprises gold refined at the Mint and gold contained in gold-bearing materials exported. From 1971 covers gold production as notified by the Department of Mines. (b) From 1969 figures relate to year ended 30 June. (c) From 1978 figures relate to foreign exports only. (d) From 1920 figures relate to year ended 30 June. (e) Prior to 1940 averages generally are based on exports of the previous season's wheat; from 1940 they relate to exports during the year ended 30 June.

## SECONDARY PRODUCTION

Year (a)	Manu- facturing establish- ments (b)	Persons employed (c)	Wages and salaries (d)	Turn- over (e)	Value added (f)	Production of selected commodities						Timber from local logs (l)
						Bricks (g)	Scoured wool (h)	Bacon and ham (i)	Butter (j)	Flour (plain) (k)	Cheese (k)	
	No.	No.	\$'000	\$'000	\$'000	'000	tonnes	tonnes	tonnes	tonnes	tonnes	'000 cu m
1900	632	11,166	2,589	n.a.	n.a.	25,234		n.a.	132	11,375		266
1910	822	14,894	3,532	10,158	5,472	23,162	n.a.	n.a.	291	33,401	n.a.	412
1920	998	16,942	6,073	26,283	9,708	31,838		850	553	108,976		425
1930	1,466	19,643	8,310	33,783	14,976	47,720		1,180	2,143	109,402		377
1940	2,129	22,967	9,150	40,615	18,055	43,786	2,459	2,106	6,351	127,776	382	360
1950	3,023	40,733	30,586	172,956	522,088	58,943	7,110	3,599	6,878	144,691	712	363
1951	3,111	43,761	39,316	168,862	68,441	67,312	5,828	3,615	6,906	197,172	760	416
1952	3,267	45,097	50,769	213,143	85,491	76,884	5,884	3,739	6,813	201,255	634	471
1953	3,424	45,188	56,687	238,620	98,383	86,043	6,162	3,752	6,584	203,509	909	527
1954	3,523	47,459	63,181	269,174	110,294	101,240	6,914	3,503	6,241	170,513	1,224	569
1955	3,727	49,314	69,476	299,169	121,912	115,412	7,226	3,369	7,260	150,381	1,100	593
1956	3,871	50,108	74,413	350,293	139,466	102,359	9,483	3,283	7,523	162,715	775	578
1957	3,935	48,748	73,833	375,272	146,884	101,209	11,044	3,103	7,582	153,800	1,201	539
1958	3,941	48,462	75,870	392,525	150,624	111,082	11,708	2,999	6,916	134,398	1,033	550
1959	4,125	48,417	77,464	392,405	157,524	101,521	12,791	3,002	6,265	126,736	1,200	561
1960	4,279	49,651	83,285	431,165	172,747	110,359	15,271	3,228	7,494	136,780	1,466	532
1961	4,334	50,666	90,255	481,140	193,262	119,998	13,420	3,214	7,784	152,622	1,373	496
1962	4,418	51,033	92,840	486,988	196,083	119,868	14,459	3,556	7,603	128,007	1,386	505
1963	4,492	53,435	99,880	517,899	216,422	131,176	13,312	3,899	7,075	123,296	1,462	486
1964	4,609	55,705	108,515	555,058	230,511	155,792	12,464	3,841	7,026	129,996	1,530	517
1965	4,734	58,097	119,978	616,422	260,637	146,057	12,040	4,047	7,887	121,906	1,838	550
1966	4,906	60,282	134,171	678,751	288,803	140,611	12,107	4,357	8,225	103,115	1,230	552
1967	5,167	63,757	153,597	765,224	335,788	163,166	12,148	4,654	6,529	91,725	1,726	533
1968	5,404	67,335	175,100	887,372	388,257	207,575	12,662	5,173	6,009	100,418	1,983	557
1969	2,585	59,853	183,168	919,555	361,473	273,078	14,415	5,591	6,332	96,641	2,022	444
1970	2,705	62,597	208,410	1,028,778	414,999	288,949	14,940	5,399	5,915	92,635	1,718	450
1971			(m)			240,323	10,724	4,863	5,425	96,411	1,917	449
1972	2,727	64,217	255,879	1,240,106	472,013	227,581	17,009	5,116	5,988	84,227	1,979	407
1973	2,814	64,074	275,455	1,375,859	501,034	278,610	11,987	5,257	5,324	77,680	1,869	405
1974	2,818	67,884	346,942	1,741,029	658,412	304,178	10,791	5,530	5,223	79,114	1,922	408
1975	1,974	65,852	434,272	2,032,374	779,842	262,905	11,779	5,294	4,981	84,486	2,291	392
1976	2,054	65,953	508,931	2,432,654	944,459	328,356	13,969	5,439	4,531	78,447	2,673	388
1977	2,035	66,750	594,514	2,882,421	1,151,619	385,942	15,818	5,836	3,340		2,074	375
1978	2,037	65,740	629,095	3,031,505	1,208,749	357,391	13,308	5,666	2,212		1,812	386
1979	2,202	65,232	670,772	3,498,828	1,321,683	381,092	16,129	5,516	1,373		2,364	341
1980	2,301	65,987	734,204	4,259,065	1,643,325	404,954	20,128	5,930	995		2,866	349
1981	2,426	68,870	869,223	4,902,236	1,876,664	381,909	21,645	6,062	834		3,342	347
1982	2,603	70,799	1,013,397	5,490,999	2,052,683	391,743	19,574	6,074	799	n.a.	3,322	334
1983	2,499	64,980	1,038,300	5,596,500	2,040,900	279,164	13,747	6,405	914		3,417	257
1984	2,408	61,997	1,047,393	5,922,692	2,136,745	n.p.	17,053	6,807	1,269		3,665	265
1985	2,451	64,242	1,137,558	6,788,471	2,513,218	n.p.	21,938	7,862	1,582		3,736	305
1986			(m)			n.p.	22,992	8,174	1,595		3,400	329
1987	2,660	69,327	1,406,965	8,215,095	2,998,694	n.p.	29,109	8,502	1,400		3,727	317
1988	2,675	72,069	1,604,782	9,416,932	n.a.	n.p.	25,820	8,377	1,505		3,772	319
1989	2,651	72,722	1,710,547	10,578,958	n.a.	n.a.	19,475	9,937	1,339		4,129	324

(a) From 1930 year ended 30 June. (b) Excludes details of single establishment manufacturing enterprises employing fewer than four persons. For details of breaks in series refer to publications of Censuses of Manufacturing Establishments statistics. (c) Average over whole year including working proprietors. Prior to 1926-27 includes fellers and haulers employed by sawmills. From 1988, employment at 30 June. (d) Figures for 1929-30 and later exclude amounts drawn by working proprietors. (e) Selling value 'at the factory'. (f) Value added in course of manufacture, representing sum available for payment of wages, rent, depreciation, other sundry expenses and for interest and profit. (g) For years prior to 1964-65 figures represent clay bricks only (all sizes). (h) Excludes fellmongered, dead or waste wool. (i) From 1977-78 excludes canned bacon and ham. (j) For 1917 and earlier years, includes butter made on farms. Source: from 1977-78 to 1980-81, Western Australian Department of Agriculture; from 1981-82, the Australian Dairy Corporation. (k) Source: 1933-34 to 1967-68, annual manufacturing census; 1968-69 to 1970-71, Commonwealth Dairy Produce Equalisation Committee Limited; from 1971-72 to 1980-81, Western Australian Department of Agriculture; from 1981-82, the Australian Dairy Corporation. (l) Prior to 1968-69, figures also include hewn timber. (m) No census of manufacturing establishments was conducted for this year.

## BUILDING COMPLETED (a)

Year ended 30 June	Houses (b) (c)		Other Residential buildings (b)(c)		Alterations and additions (d) to residential buildings Value (g)	Non-residential building (e)				Total building (g)
	Number (f)	Value (g)	Number of of units	Value (g)		Factories	Offices	Edu- cational	Total	
		\$m		\$m	\$m	\$m	\$m	\$m	\$m	\$m
1947	1,792	3.5	—	—	—	0.1	—	—	0.7	4.2
1948	2,771	5.8	—	—	—	0.2	—	—	0.9	6.7
1949	3,244	7.6	—	—	—	0.4	—	—	1.8	9.4
1950	3,509	9.0	101	0.2	—	0.4	—	—	1.5	10.7
1951	5,160	15.0	305	0.6	—	0.4	n.a.	n.a.	2.3	17.9
1952	6,577	24.5	215	0.3	—	1.4	—	—	4.1	28.9
1953	7,965	38.0	100	0.3	—	1.7	—	—	7.5	45.8
1954	7,627	39.8	22	0.8	—	1.7	—	—	11.0	51.6
1955	8,792	48.4	316	1.2	—	6.2	—	—	18.6	68.2
1956	7,760	45.1	584	2.6	—	3.8	0.8	2.2	19.7	67.4
1957	5,030	29.1	365	1.5	(h)	2.2	2.0	1.2	16.3	46.8
1958	6,196	36.5	171	0.7	—	2.5	3.9	1.1	17.3	54.5
1959	5,846	34.4	212	0.8	—	2.8	2.4	4.6	25.3	60.5
1960	5,997	35.5	263	1.0	—	2.4	1.5	5.8	23.8	60.2
1961	5,973	38.1	440	1.6	—	4.7	4.1	8.0	32.4	72.0
1962	6,082	39.5	265	1.3	—	3.0	2.9	6.0	27.3	68.1
1963	6,593	45.8	642	3.0	—	4.9	1.6	7.7	37.7	86.4
1964	7,276	51.8	1,295	5.6	—	5.4	6.0	6.2	35.5	92.9
1965	7,445	57.2	1,841	9.0	—	6.8	2.8	8.0	40.8	107.1
1966	7,265	58.1	1,624	9.1	—	9.6	10.6	8.5	63.0	130.2
1967	8,272	78.1	1,742	9.3	—	9.8	7.1	10.5	74.7	162.1
1968	9,858	97.4	2,392	12.6	—	15.1	14.6	12.1	85.5	195.4
1969	12,840	133.3	3,491	22.4	—	15.8	10.9	14.1	99.2	254.8
1970	13,933	151.3	5,596	40.5	—	16.6	14.3	13.3	111.6	303.4
1971	11,900	149.3	5,013	40.0	0.4	18.0	39.7	20.6	175.4	365.0
1972	13,209	165.5	1,595	13.9	1.2	21.3	19.4	16.3	150.8	331.4
1973	13,660	163.4	920	7.3	1.8	15.6	21.2	24.8	151.5	324.0
1974	12,517	176.4	3,546	32.8	2.8	23.4	19.0	21.8	139.2	351.2
1975	10,994	198.6	3,300	38.9	4.4	18.2	18.4	40.0	170.1	412.0
1976	12,080	253.8	2,948	44.0	8.7	22.4	45.7	58.3	227.3	533.8
1977	15,155	395.0	6,152	113.9	15.4	26.6	43.5	29.5	226.4	750.7
1978	12,685	378.8	4,681	98.9	21.5	34.6	18.2	46.1	234.1	733.3
1979	11,148	349.1	3,507	74.9	30.5	44.0	33.2	56.3	339.3	793.8
1980	11,648	380.9	4,156	93.2	33.3	51.5	49.9	33.2	301.9	809.4
1981	10,120	375.5	4,531	108.0	37.5	37.0	75.0	29.6	308.8	829.7
1982	9,440	398.5	5,255	165.0	51.9	52.6	131.5	39.9	495.6	1,111.0
1983	9,070	372.5	4,020	143.4	47.4	45.2	152.1	37.7	464.3	1,027.5
1984	10,340	407.4	2,124	75.9	41.0	19.0	75.0	45.1	351.0	875.4
1985	14,000	583.9	3,735	115.3	51.9	27.9	55.6	30.7	357.5	1,108.6
1986	12,620	615.7	4,217	158.1	60.5	91.5	149.9	65.3	630.8	1,465.1
1987	12,330	651.5	3,619	144.3	70.4	39.0	155.8	99.2	795.0	1,661.2
1988	12,390	694.4	3,518	140.6	80.2	63.4	208.1	120.9	884.5	1,799.7
1989	14,660	906.9	4,631	193.6	99.5	81.3	263.6	65.1	959.5	2,159.5
1990	17,690	1,296.1	7,229	367.9	142.0	97.4	343.5	161.9	1,194.0	3,000.0

(a) From 1981 figures are not strictly comparable with those for earlier periods. (b) Prior to 1970-71 figures include alterations and additions to dwellings. Data for 1970-71 and later years relate to new dwellings only. (c) From July 1973 changes in the classification of residential buildings mean that figures for earlier years are not comparable. (d) Valued at \$10,000 and over. (e) From 30 June 1985 includes alterations and additions valued at \$30,000 and over. Prior to 30 June 1985 includes alterations and additions valued at \$10,000 and over. (f) From 1981 numbers of new houses are rounded to nearest ten units. (g) Excludes the value of land. (h) Not available separately; included with Houses and Other residential buildings as appropriate.

TRANSPORT; CUSTOMS AND EXCISE

Year	State Government railways (a)		Private railways	Air passenger movements Perth Airport		Customs and excise gross revenue (b)		
	Route kilometres at end of year (c)	Paying goods	Route kilometres at end of year	Internal	International	Customs	Excise	Total
		'000 t		'000	'000	\$'000	\$'000	\$'000
1870	—	—	—	..	..	81	—	81
1880	55	2	61	..	..	186	—	186
1890	303	62	620	..	..	356	—	356
1900	2,181	1,406	1,003	..	..	1,889	63	1,952
1910	3,452	2,278	1,452	..	..	1,543	213	1,756
1920	5,695	2,656	1,477	..	..	1,311	799	2,110
1930	6,616	3,587	1,363	..	..	3,882	1,527	5,409
1940	7,051	2,702	1,337	..	..	3,769	2,395	6,164
1950	6,843	2,889	1,246	..	..	10,166	10,943	21,109
1951	6,804	3,082	1,210	..	..	10,839	11,973	22,812
1952	6,619	3,112	1,210	..	..	14,045	16,312	30,357
1953	6,611	2,661	1,165	..	..	9,908	18,395	28,303
1954	6,616	3,257	1,220	..	..	12,241	19,447	31,688
1955	6,616	3,461	1,204	n.a.	n.a.	12,196	21,812	34,008
1956	6,629	3,854	1,168	n.a.	n.a.	8,473	24,092	32,565
1957	6,626	4,291	1,136	n.a.	n.a.	5,504	30,078	35,582
1958	6,626	3,647	925	n.a.	n.a.	5,476	32,547	38,023
1959	6,626	3,976	925	n.a.	n.a.	4,800	32,398	37,198
1960	6,630	4,605	832	n.a.	n.a.	5,614	33,634	39,248
1961	6,635	4,911	755	n.a.	n.a.	7,470	33,835	41,305
1962	6,198	5,428	898	n.a.	n.a.	7,156	35,705	42,861
1963	6,111	4,870	888	n.a.	n.a.	8,996	35,944	44,940
1964	5,918	5,271	665	n.a.	n.a.	10,369	37,839	48,208
1965	6,008	5,133	34	n.a.	n.a.	10,692	43,349	54,041
1966	6,030	6,486	460	270	26	15,251	53,536	68,787
1967	6,140	7,999	455	294	36	13,569	58,176	71,745
1968	6,140	9,053	455	340	49	19,468	62,903	82,371
1969	6,157	9,078	882	382	54	21,202	69,289	90,490
1970	6,161	10,837	884	467	69	24,649	76,637	101,286
1971	6,175	13,457	884	541	84	32,262	88,978	121,240
1972	6,116	13,867	884	524	105	30,072	101,883	131,955
1973	6,168	13,706	1,220	596	117	25,714	106,054	131,768
1974	6,192	15,059	1,222	668	139	30,612	138,197	168,809
1975	6,075	16,348	1,181	681	165	44,114	148,310	192,424
1976	6,163	17,812	1,179	658	197	46,767	183,838	230,605
1977	6,165	19,003	1,155	746	206	63,037	203,852	266,889
1978	5,764	18,625	1,150	815	225	68,118	216,929	285,047
1979	5,764	19,288	1,155	879	261	71,704	256,486	328,190
1980	5,773	21,388	1,159	928	325	83,620	260,299	343,919
1981	5,773	20,271	1,160	960	377	110,939	283,499	394,438
1982	5,609	19,776	1,181	1,027	434	128,866	198,397	327,263
1983	5,610	19,791	1,177	1,005	414	130,752	379,889	510,641
1984	5,623	19,870	1,177	1,075	455	133,088	492,117	625,205
1985	5,563	22,085	1,285	1,195	502	176,416	496,172	672,588
1986	5,553	20,877	1,185	1,264	569	196,027	444,311	640,338
1987	5,553	21,264	1,185	1,432	649	213,647	284,677	498,324
1988	5,553	21,946	1,191	1,471	714	232,397	330,699	563,096
1989	5,553	24,294	1,198	1,140	813	260,204	326,816	587,020
1990	5,554	24,906	n.y.a.	1,399	859	258,328	376,293	634,621

(a) From 1900, year ended 30 June. (b) From 1915, year ended 30 June. (c) Open for general and passenger traffic.

## MOTOR VEHICLE REGISTRATIONS; EXPORTS OF CATTLE AND SHEEP

Year	New motor vehicles registered (a)				Motor vehicles on register (b)				Exports of—	
	Motor cars (c)	Utilities, panel vans, trucks and buses	Motor cycles (d)	Total	Motor cars (e)	Utilities, panel vans, trucks and buses	Motor cycles (d)	Total	Cattle	Sheep (f)
									\$'000	\$'000
1860									—	4
1870									—	—
1880									—	—
1890	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1	2
1900									—	2
1910									16	9
1920					3,404			73		28
1930					31,130	11,358	7,707	50,195	1	46
1940	2,871	1,517	399	4,787	38,907	25,026	6,789	70,222	—	65
1941	1,015	632	200	1,847	36,995	24,788	6,704	68,487	2	112
1942	250	353	74	677	29,022	21,625	4,057	54,704	1	97
1943	218	151	57	426	29,750	21,189	3,935	54,874	1	—
1944	19	1,102	109	1,230	30,295	22,459	4,324	57,078	27	—
1945	40	597	192	829	30,635	23,943	4,501	59,079	2	1
1946	101	456	271	828	31,408	28,904	6,799	67,111	2	91
1947	1,354	1,126	678	3,158	32,879	32,097	8,199	73,175	27	362
1948	2,963	1,975	1,059	5,997	35,596	35,285	8,877	79,758	10	347
1949	4,684	3,122	1,769	9,575	40,199	38,901	10,974	89,994	11	374
1950	8,926	4,707	2,346	15,979	48,632	43,206	12,897	104,735	5	426
1951	8,201	6,610	2,802	17,613	56,235	47,908	14,535	118,678	9	616
1952	8,836	5,750	2,740	17,326	64,277	52,627	16,047	132,951	23	631
1953	6,879	4,881	1,416	13,176	69,917	56,445	15,565	141,927	23	501
1954	9,926	5,601	1,258	16,785	78,312	60,362	15,243	153,917	29	568
1955	12,394	5,993	1,202	19,589	90,255	63,870	14,662	168,787	68	612
1956	10,100	5,203	1,089	16,392	99,206	62,809	12,959	174,974	177	625
1957	9,321	4,418	1,192	14,931	104,506	63,315	12,731	180,552	243	923
1958	10,140	5,562	1,702	17,404	111,825	63,598	12,631	188,054	308	841
1959	10,389	5,140	2,071	17,600	119,957	65,588	12,814	198,359	396	764
1960	13,492	5,695	1,949	21,136	130,476	68,702	12,876	212,054	325	845
1961	15,161	5,542	1,080	21,783	141,612	70,974	12,589	225,175	318	881
1962	17,082	5,833	902	23,817	155,447	74,224	12,390	242,061	55	1,254
1963	23,175	6,367	754	30,296	169,800	75,500	11,500	256,800	160	1,495
1964	24,958	7,013	628	32,599	186,200	77,700	10,200	274,100	331	1,433
1965	23,304	6,897	553	30,754	197,800	78,500	8,900	285,200	427	1,376
1966	23,418	9,170	706	33,294	212,600	83,300	8,400	304,300	283	1,633
1967	27,922	9,404	1,158	38,484	231,200	86,300	8,400	325,900	381	1,771
1968	33,368	10,448	1,525	45,341	252,300	90,800	8,900	352,000	1,229	2,191
1969	35,379	11,018	1,539	47,936	275,300	94,500	9,600	379,400	972	2,943
1970	37,764	11,138	1,945	50,847	301,000	99,900	10,800	411,700	760	2,876
1971	37,769	10,872	2,718	51,359	328,500	104,900	12,200	445,600	1,159	2,710
1972	37,274	9,819	3,985	51,078	346,300	104,600	14,200	465,100	1,865	3,871
1973	36,904	11,425	4,914	53,243	364,400	107,400	16,800	488,600	1,661	7,959
1974	40,302	12,241	7,062	59,605	389,300	112,700	21,000	523,000	2,111	12,539
1975	41,474	13,693	6,613	61,780	414,800	125,000	24,600	564,400	1,498	12,862
1976	40,338	15,863	5,731	61,932	437,200	140,000	27,600	604,800	1,464	14,436
1977	44,363	17,362	3,887	65,612	473,731	153,174	28,022	654,927	2,533	34,905
1978	40,990	16,538	3,339	60,867	500,365	167,107	28,051	695,523	3,071	35,985
1979	40,882	14,025	2,713	57,620	518,705	174,064	26,916	719,685	3,182	45,915
1980	40,232	13,716	4,600	58,548	535,613	179,844	29,531	744,988	1,748	91,763
1981	41,660	15,223	6,088	62,971	552,552	187,599	33,009	773,160	2,899	100,340
1982	42,329	16,079	5,835	64,243	573,400	197,344	35,213	805,957	3,039	94,825
1983	38,812	15,043	5,147	59,002	576,893	196,539	35,852	809,284	5,476	94,630
1984	39,737	15,199	3,969	58,905	592,495	201,754	35,770	830,019	5,824	92,700
1985	46,070	17,956	4,310	68,336	615,442	214,649	36,229	866,320	3,432	82,430
1986	42,645	13,676	3,350	59,671	632,182	218,851	36,324	887,357	5,339	84,317
1987	33,642	10,198	2,305	46,145	647,734	223,030	35,287	906,050	4,969	105,015
1988	36,040	10,617	2,215	48,872	670,158	230,161	35,442	935,761	(g)	—
1989	44,100	14,149	2,522	60,771	708,253	241,698	36,294	986,245	3,371	62,256
1990	42,728	13,735	2,875	59,338	746,194	254,009	37,452	1,037,655	6,094	62,046

(a) Year ended 30 June. (b) From 1929, at 30 June; for earlier years, at various dates. For years before 1946, excludes Commonwealth Government-owned vehicles; from 1946, includes Commonwealth Government-owned vehicles other than those of defence services. From 1956 to 1976, series based on the results of the periodic census of motor vehicles. Improvements in the methodology used to produce statistics of motor vehicles on register have resulted in a break in the continuity of the series from 30 June 1983. (c) From 1959, includes station wagons previously included with commercial vehicles. (d) Including motor scooters. (e) From June 1956, includes station wagons previously included with commercial vehicles. (f) Excludes interstate exports. Details are not available for publication. (g) Details not available; see Chapter 20.

EXPORTS OF CERTAIN COMMODITIES (a)

Year (b)	Meats—Fresh, chilled or frozen									
	Beef and veal		Mutton and lamb		Pigmeat		Rock lobsters (c)		Wheat exports (d)	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
	tonnes	\$'000	tonnes	\$'000	tonnes	\$'000	tonnes	\$'000	tonnes	\$'000
1840	—	—	—	—	—	—	—	—	—	—
1850	—	—	—	—	—	—	—	—	1	—
1860	—	—	—	—	—	—	—	—	—	—
1870	—	—	—	—	—	—	—	—	408	8
1880	—	—	—	—	—	—	—	—	—	—
1890	—	—	—	—	—	—	—	—	27	—
1900	(e)				—	—	—	—	54,839	813
1910	—	—	—	—	—	—	—	—	249,049	5,083
1920	300	33	—	—	—	—	—	—	679,109	12,258
1930	5,162	272	—	—	—	—	—	—	—	—
1940	4,826	329	4,665	533	2,263	324	—	—	417,214	4,669
1941	5,583	407	4,396	496	6,015	851	—	—	404,314	5,858
1942	3,576	327	3,684	435	4,670	682	—	—	266,005	4,021
1943	—	—	3,985	458	1,053	155	—	—	139,833	2,111
1944	1,445	190	6,664	763	1,568	238	—	—	328,138	5,813
1945	1,202	168	4,002	410	1,697	254	—	—	642,015	14,955
1946	4,317	558	2,269	275	3,401	545	—	—	367,682	11,696
1947	6,358	691	4,081	409	1,306	248	—	—	185,102	8,964
1948	6,353	604	5,079	584	303	53	—	—	525,857	33,809
1949	8,056	840	4,607	608	624	179	n.a.	(f)500	500,793	28,100
1950	8,625	1,183	2,392	485	163	59	518	463	585,406	33,384
1951	7,699	1,221	939	217	279	113	1,436	1,517	830,346	51,688
1952	6,028	1,135	1,044	301	424	232	1,311	1,861	730,002	45,728
1953	5,016	1,437	6,589	1,463	463	303	1,329	2,085	634,639	40,347
1954	6,148	1,748	3,309	875	215	152	1,461	2,342	185,066	11,272
1955	6,776	2,038	3,225	1,328	1,049	532	1,532	2,490	526,212	27,478
1956	7,601	2,343	6,602	2,156	743	482	1,601	3,022	619,779	28,860
1957	4,127	1,221	5,788	1,741	733	588	1,618	3,514	1,273,578	61,291
1958	11,025	3,302	5,083	1,900	2,324	1,462	2,136	3,965	725,131	40,861
1959	10,535	4,342	9,944	3,177	1,983	1,178	2,715	5,281	639,647	33,113
1960	13,597	6,742	8,735	2,378	1,188	953	2,996	6,499	999,164	49,442
1961	12,413	6,141	11,367	3,901	1,894	1,501	2,316	5,881	1,428,272	71,280
1962	12,544	6,299	8,468	2,436	3,151	2,025	3,607	9,778	2,010,766	104,356
1963	17,268	9,382	7,428	2,401	2,061	1,404	3,490	8,910	1,380,372	72,197
1964	20,528	11,497	5,385	1,895	861	718	3,416	9,211	1,497,453	77,881
1965	19,360	11,730	5,040	1,981	571	516	2,672	10,592	1,102,420	56,955
1966	18,115	12,108	10,319	4,357	420	376	3,193	13,821	1,887,996	96,515
1967	16,912	11,987	9,652	3,723	565	470	3,643	13,873	2,312,777	126,918
1968	16,821	12,995	13,153	4,745	547	474	3,919	17,989	2,373,195	121,764
1969	20,210	16,939	21,523	7,218	642	564	3,038	17,133	1,521,376	77,987
1970	23,645	21,508	29,661	11,271	1,437	1,175	2,976	15,695	1,814,787	86,593
1971	20,257	17,626	24,244	9,396	1,126	895	3,155	19,413	2,670,890	130,564
1972	24,435	22,528	42,994	17,645	2,503	1,995	3,425	24,626	2,587,504	128,132
1973	33,325	36,614	39,853	26,103	7,630	6,382	3,171	20,919	2,249,934	111,744
1974	34,778	43,039	27,189	23,682	5,939	5,772	2,656	18,511	2,139,973	211,333
1975	31,083	25,993	33,240	22,107	2,283	3,037	3,328	25,258	3,241,895	409,758
1976	35,732	32,693	52,120	34,009	2,451	3,696	3,128	27,777	3,215,792	375,897
1977	53,051	53,291	60,373	48,913	1,292	1,968	4,071	47,061	3,009,101	316,258
1978	57,827	64,896	42,532	40,885	620	984	3,902	48,043	3,795,969	351,190
1979	51,932	90,216	26,250	31,059	382	693	4,170	51,064	2,208,985	257,414
1980	41,372	93,547	44,699	51,230	204	460	3,626	50,448	4,205,774	615,944
1981	40,672	87,669	44,142	57,515	144	334	2,858	42,480	2,634,951	422,433
1982	38,399	73,673	25,367	37,057	225	446	4,849	77,930	3,826,760	594,992
1983	41,659	88,972	29,073	43,133	99	344	5,424	88,175	5,031,977	845,855
1984	32,492	80,442	26,000	39,114	282	829	6,506	111,954	3,637,624	632,247
1985	30,327	77,403	21,329	33,808	150	567	4,778	126,644	4,543,782	850,090
1986	28,012	76,709	27,055	41,766	122	373	4,267	114,568	5,342,611	989,144
1987	29,928	88,348	31,010	50,305	481	1,542	4,884	143,665	4,872,265	697,557
1988	—	—	—	—	—	—	—	—	—	—
1989	24,980	74,722	19,844	38,006	36	133	7,750	172,779	4,995,551	1,009,103
1990	31,576	104,210	31,928	57,682	68	136	6,835	181,047	4,244,130	946,683

(a) From 1980 figures relate to foreign exports only. (b) From 1920, year ended 30 June. (c) For years 1950 to 1952, foreign exports only. Figures relate to rock lobster tails only until 1982. From 1982 figures include whole rock lobsters and tails. (d) From 1920, year ended 30 June; from 1978, excludes interstate exports. (e) Separate details not available. Total exports of fresh meats were 84 tonnes valued at \$9,164. (f) Estimated. (g) Details not available; see Chapter 20.

## EXPORTS OF CERTAIN COMMODITIES (a) - continued

Year (b)	Flour (c)		Potatoes		Fresh fruit (d)	Hides and skins	Timber (e)		Wool (f)	
	Quantity	Value	Quantity	Value	Value	Value	Quantity	Value	Quantity	Value
	tonnes	\$'000	tonnes	\$'000	\$'000	\$'000	'000 cu m	\$'000	tonnes	\$'000
1860	11	—	71	1	—	1	—	2	141	31
1870	—	—	26	—	—	—	2	10	298	99
1880	n.a.	—	—	—	—	—	6	35	811	179
1890	—	—	—	—	—	8	19	133	1,970	543
1900	47	1	113	1	1	49	33	164	3,161	523
1910	2,559	49	18	—	11	150	162	916	4,125	541
1920	117,254	5,045	1,637	54	300	482	342	1,945	11,883	1,934
1930	62,659	1,540	5,037	151	312	1,246	143	931	27,034	7,875
1940	83,159	1,301	11,953	214	740	745	143	1,251	28,487	5,558
1941	107,588	2,185	18,501	373	282	580	172	1,546	10,334	3,119
1942	77,087	1,681	10,452	213	114	772	148	1,369	36,590	10,866
1943	70,412	1,581	6,410	139	139	348	100	1,189	14,173	4,757
1944	96,941	2,344	772	22	96	680	103	1,216	33,240	11,759
1945	92,438	2,505	17,939	581	132	537	81	1,131	25,829	9,107
1946	106,088	4,667	13,219	446	488	1,274	96	1,429	54,398	19,914
1947	117,661	7,628	12,939	484	1,445	2,131	98	1,719	42,022	20,521
1948	127,002	11,326	18,623	681	1,688	2,048	102	2,230	43,671	33,244
1949	119,025	10,516	13,723	431	1,452	2,134	91	1,986	45,135	43,069
1950	105,065	8,335	10,090	384	1,780	2,329	81	1,949	45,766	50,923
1951	144,914	11,774	11,181	506	2,295	5,294	66	1,783	41,633	112,559
1952	146,584	13,669	13,514	733	2,853	3,194	68	2,075	46,633	67,680
1953	159,883	15,090	12,860	750	4,556	3,942	112	4,147	51,489	79,122
1954	134,126	11,704	16,026	1,300	3,300	3,295	109	4,480	51,083	82,260
1955	109,172	7,219	9,020	512	3,845	2,921	99	3,847	49,811	70,563
1956	117,409	7,766	2,275	171	3,393	3,274	129	5,598	58,982	70,313
1957	115,658	7,474	7,728	736	4,598	4,650	132	6,215	57,755	87,510
1958	101,448	6,907	13,998	832	3,725	3,898	158	7,496	52,167	72,686
1959	94,854	6,337	8,577	368	3,609	3,489	183	8,415	60,280	58,537
1960	79,697	5,100	9,612	436	2,437	4,767	174	7,760	62,838	77,957
1961	122,839	7,840	7,821	437	4,636	3,828	157	7,175	71,681	74,842
1962	88,889	5,891	10,328	632	2,818	4,580	161	7,528	73,584	83,865
1963	67,652	4,645	18,032	810	4,982	4,339	155	7,241	71,058	82,107
1964	62,677	4,396	9,925	353	4,016	4,966	149	6,813	82,628	114,239
1965	83,826	5,926	12,935	841	5,165	4,177	133	6,279	79,106	98,294
1966	49,130	3,378	21,362	1,393	4,838	5,447	69	3,687	97,698	115,128
1967	34,804	2,507	17,478	692	5,704	5,377	139	7,475	106,886	126,995
1968	41,918	2,944	13,142	622	4,068	4,699	85	4,947	124,708	126,417
1969	35,100	2,433	21,944	1,149	6,552	6,013	88	5,068	144,388	157,950
1970	31,173	2,257	19,888	831	6,054	7,968	96	5,666	132,778	134,796
1971	26,670	1,958	9,390	510	7,208	5,395	79	4,808	128,388	98,289
1972	18,882	1,345	8,600	371	5,245	5,356	101	6,440	159,284	120,460
1973	9,798	859	(g)4,911	(g)334	6,135	13,945	113	7,087	146,456	220,719
1974	11,232	1,380	(g)9,576	(g)1,113	5,835	13,536	100	7,407	121,113	263,330
1975	19,281	3,439	8,527	1,217	7,547	11,195	109	9,252	114,069	167,631
1976	11,658	2,022	12,196	1,636	6,047	13,728	94	9,823	153,248	231,301
1977	11,355	2,051	7,190	1,127	5,285	24,708	78	10,152	169,674	331,164
1978	8,291	1,481	5,853	390	5,976	21,147	59	8,885	123,071	251,321
1979	7,872	1,660	2,735	373	8,703	29,280	66	10,508	150,185	326,466
1980	(h)4,342	(h)1,055	(h)5,292	(h)616	(h)10,314	(h)34,716	72	12,226	141,262	378,557
1981	4,952	1,279	3,824	585	9,506	17,467	32	7,050	135,529	398,051
1982	1,578	594	5,466	947	10,783	16,736	25	5,830	127,308	394,367
1983	1,086	343	7,274	1,278	12,655	18,783	18	4,813	123,953	392,144
1984	3,127	833	2,806	756	10,013	23,998	20	5,251	121,511	406,207
1985	3,140	876	5,084	946	10,220	27,629	22	7,173	140,675	523,304
1986	1,750	550	2,338	511	12,573	13,979	22	7,330	153,987	614,202
1987	1,879	528	2,311	570	13,879	40,292	10	4,199	161,085	731,352
1988						(i)				
1989	1,957	642	2	4	8,338	32,009	13	5,497	153,548	1,167,056
1990	650	276	4,271	1,000	10,575	39,078	20	7,556	124,308	779,639

(a) From 1981 figures relate to foreign exports only. (b) From 1920, year ended 30 June. (c) From 1973, figures include meal and flour of wheat or meslin; from 1978, figures include meal and flour of all cereal grains. (d) Includes tomatoes for 1933 and earlier years. (e) Excludes plywood and veneers and small quantities of timber for which details are not recorded. (f) Includes greasy and degreased wool. (g) Some interstate details for 1973 included in 1974. (h) Figures represent foreign exports only. (i) Details not available; see Chapter 20.

EXPORTS OF CERTAIN COMMODITIES (a) - continued

Year (b)	Iron ore and concentrates		Lead and zinc ores (c) (d)	Tin ore and concentrates	Ilmenite concentrate (including leucoxene) (e)		Iron and steel (f)	Gold mint bullion (g)	
	Quantity	Value	Value	Value	Quantity	Value	Value	Quantity	Value (h)
	'000 tonnes	\$'000	\$'000	\$'000	'000 tonnes	\$'000	\$'000	kg	\$'000
1850	—	—	—	—	—	—	—	—	—
1860	—	—	2	—	—	—	—	—	—
1870	—	—	29	—	—	—	—	—	—
1880	—	—	31	—	—	—	—	—	—
1890	—	—	4	11	—	—	—	715	173
1900	—	—	—	76	—	—	7	31,103	7,589
1910	—	—	4	93	—	—	5	10,389	2,835
1920	—	—	102	129	—	—	16	1,275	452
1930	—	—	19	29	—	—	3	4	1
1940	—	—	2	14	—	—	31	36,329	24,056
1941	—	—	2	12	—	—	35	37,386	25,096
1942	—	—	2	6	—	—	19	30,326	20,590
1943	—	—	1	5	—	—	5	23,514	15,744
1944	—	—	1	6	—	—	23	10,855	7,250
1945	—	—	1	5	—	—	100	—	—
1946	—	—	—	8	—	—	9	—	—
1947	—	—	5	12	—	—	99	—	—
1948	—	—	146	17	—	—	89	11,073	7,656
1949	—	—	235	31	—	—	59	—	—
1950	—	—	272	49	—	—	95	2	2
1951	—	—	263	62	—	—	83	—	—
1952	53	102	1,369	107	—	—	58	12,286	13,143
1953	553	1,079	1,681	153	—	—	357	23,608	24,798
1954	592	1,157	270	97	—	—	279	13,001	13,280
1955	589	1,149	108	146	—	—	602	19,222	19,338
1956	480	936	888	322	—	—	530	12,752	12,842
1957	334	649	960	293	—	—	1,174	23,950	24,119
1958	446	870	410	166	89	1,011	2,470	6,470	6,511
1959	598	1,169	238	304	66	648	4,218	4,106	4,118
1960	809	1,601	229	415	90	713	11,198	18,662	18,738
1961	1,035	2,101	83	325	132	1,198	12,781	78,754	79,271
1962	1,069	2,209	45	563	159	1,441	13,826	14,090	12,195
1963	1,495	2,898	33	532	183	1,717	15,107	12,970	13,048
1964	1,381	2,743	18	1,080	263	2,571	15,029	11,975	12,045
1965	1,562	3,040	662	1,229	330	3,194	17,933	15,956	16,127
1966	2,657	6,967	124	1,521	430	4,181	14,458	25,909	26,147
1967	8,530	50,890	177	2,214	443	4,440	15,658	14,930	15,107
1968	14,563	104,506	58	2,330	462	4,645	11,442	11,602	11,816
1969	19,898	151,797	161	1,843	557	5,751	27,002	11,228	12,701
1970	31,542	233,580	41	1,386	573	6,068	34,306	12,037	13,874
1971	46,273	341,702	—	1,511	563	6,631	34,571	14,665	15,760
1972	48,658	347,500	—	2,043	580	7,416	36,415	17,646	21,950
1973	66,036	420,255	6	2,277	595	7,696	36,529	16,314	30,193
1974	79,286	488,239	15	2,732	728	9,774	60,811	10,093	27,393
1975	88,070	699,843	—	3,019	672	9,893	71,493	9,263	36,666
1976	83,090	772,199	—	2,538	647	9,995	60,765	13,659	50,527
1977	84,939	900,987	—	3,939	1,184	20,155	74,508	9,980	36,863
1978	80,128	935,018	—	4,947	986	17,653	50,285	10,344	50,906
1979	84,016	978,315	—	5,074	883	17,475	72,591	n.a.	(i)99,708
1980	76,725	1,025,660	220	5,841	1,119	25,433	83,447	n.a.	(i)56,317
1981	72,756	1,069,087	—	2,469	929	23,726	42,423	1,279	22,024
1982	72,532	1,195,486	11,285	1,057	890	25,003	6,645	5,054	72,060
1983	64,551	1,405,840	14,925	1,234	780	21,986	2,959	9,536	141,340
1984	80,942	1,551,299	18,420	127	1,068	35,176	2,473	21,312	308,580
1985	87,670	1,796,578	17,407	—	1,009	36,473	741	23,036	308,424
1986	80,309	1,861,779	6,040	—	999	45,149	747	28,483	458,728
1987	74,321	1,701,851	—	—	864	55,398	916	23,247	479,790
1988	—	—	—	—	(j)	—	—	—	—
1989	(k)94,949	(k)1,718,621	31,891	—	825	73,075	944	26,539	414,025
1990	(k)101,017	(k)2,142,511	52,171	—	752	73,146	1,087	19,844	331,658

(a) From 1980, figures relate to foreign exports only. (b) From 1920, year ended 30 June. (c) Includes silver-lead and silver-lead-zinc ores and concentrates. (d) Between 1971 and 1988, the value of foreign exports of lead was nil. From 1973, figures exclude interstate exports of lead ores and concentrates, and from 1978 interstate exports of zinc ores and concentrates. (e) From 1972, figures exclude foreign exports of beneficiated ilmenite; from 1978, figures also exclude interstate exports of all ilmenite and leucoxene. From April 1987 figures exclude ilmenite ores and concentrates in bags, drums and similar containers. (f) Principally pig-iron, cast iron and basic shapes and sections of iron and steel. (g) Gold sold abroad before consignment is not recorded as an export until actually shipped. (h) Includes additional premiums on sales of industrial gold. (i) Includes all processed gold, but excludes gold ores and concentrates. (j) Details not available; see Chapter 20. (k) Source: Western Australian Department of Mines.



**EXTERNAL TRADE**  
(\$'000)

Year (a)	Imports (b)			Exports (b) (c)			Excess of -		Ships' stores
	Foreign	Interstate	Total	Foreign	Interstate	Total	Imports	Exports	
1850	n.a.	n.a.	125	n.a.	n.a.	44	80	..	n.a.
1860	318	20	338	160	16	175	163	..	3
1870	260	167	427	348	46	394	33	..	8
1880	349	358	707	736	252	988	..	280	11
1890	1,025	724	1,749	961	369	1,330	419	..	14
1900	6,574	5,350	11,924	11,246	2,250	13,496	..	1,572	208
1910	8,750	7,067	15,817	11,679	4,627	16,306	..	489	294
1920	9,918	14,819	24,737	28,918	2,392	31,311	..	6,574	827
1930	17,758	19,805	37,563	32,009	2,213	34,223	3,341	..	1,316
1940	12,568	27,450	40,017	19,256	28,518	..	..	7,756	1,380
1941	9,710	27,519	37,229	16,900	30,808	47,708	..	10,479	1,971
1942	10,391	26,110	36,501	23,157	25,241	48,398	..	11,897	2,305
1943	7,383	24,803	32,186	10,625	20,117	30,741	1,445	..	1,983
1944	7,770	26,628	34,399	22,845	13,472	36,317	..	1,919	2,747
1945	9,215	26,863	36,079	24,765	11,533	36,298	..	219	2,508
1946	11,018	32,238	43,256	38,917	11,662	50,579	..	7,322	2,511
1947	18,929	42,253	61,182	46,015	11,459	57,474	3,708	..	1,966
1948	34,311	51,329	85,640	97,389	11,599	108,989	..	23,349	2,474
1949	44,075	61,182	105,258	96,982	9,495	106,477	..	1,220	4,710
1950	68,844	70,044	138,887	106,590	12,421	119,011	19,876	..	4,720
1951	80,517	95,828	176,345	197,686	18,780	216,466	..	40,122	7,249
1952	120,474	124,209	244,683	151,562	35,404	186,966	57,717	..	8,419
1953	59,748	137,213	196,961	166,286	49,659	215,945	..	18,984	10,321
1954	85,051	165,374	250,425	136,849	39,190	176,039	74,386	..	7,266
1955	101,295	182,110	283,405	137,013	47,310	184,323	99,082	..	7,865
1956	92,963	177,952	270,915	152,286	68,466	220,752	50,164	..	10,592
1957	80,423	188,680	269,103	216,599	81,545	298,144	..	29,041	12,902
1958	91,775	195,103	286,879	179,516	79,836	259,352	27,527	..	11,602
1959	89,972	202,430	292,402	174,585	68,919	243,504	48,898	..	9,482
1960	92,363	246,696	339,059	231,766	77,278	309,043	30,016	..	8,954
1961	110,531	245,474	356,005	309,332	89,922	399,254	..	43,249	10,285
1962	100,178	245,208	345,386	287,619	84,626	372,245	..	26,859	9,379
1963	112,640	313,712	426,351	246,823	91,636	338,459	87,892	..	7,904
1964	121,677	323,176	444,854	286,132	101,811	387,943	56,911	..	9,733
1965	153,540	343,899	497,439	243,078	119,954	363,033	134,407	..	9,009
1966	175,690	403,054	578,744	314,404	119,619	434,023	144,721	..	10,058
1967	159,390	474,852	634,242	421,325	116,030	537,355	96,887	..	10,936
1968	206,980	527,052	734,031	475,260	124,505	599,765	134,266	..	14,824
1969	203,533	562,312	765,846	546,366	149,892	696,258	69,588	..	14,327
1970	242,299	640,189	882,487	675,027	149,861	824,888	57,600	..	15,092
1971	278,344	726,778	1,005,122	862,421	163,812	1,026,233	..	21,111	20,561
1972	283,263	787,788	1,071,051	946,504	156,303	1,102,807	..	31,756	22,477
1973	227,305	786,177	1,013,483	1,154,359	173,839	1,328,198	..	314,715	17,542
1974	368,910	939,361	1,308,272	1,414,968	222,208	1,637,176	..	328,904	29,224
1975	577,416	1,134,510	1,711,926	1,880,082	253,424	2,133,506	..	421,580	50,157
1976	637,439	1,418,726	2,056,165	2,117,898	290,733	2,408,631	..	352,466	46,638
1977	829,411	1,641,545	2,470,955	2,596,107	305,836	2,901,943	..	430,987	64,141
1978	937,350	1,828,510	2,765,860	2,588,954	355,151	2,944,105	..	178,245	71,009
1979	1,161,164	2,044,447	3,205,611	2,820,134	446,208	3,266,343	..	60,732	72,611
1980	1,449,694	2,337,808	3,787,502	3,854,047	635,388	4,489,434	..	701,933	126,176
1981	1,663,378	2,841,110	4,504,488	3,595,048	812,996	4,408,044	96,444	..	144,285
1982	2,535,112	3,141,096	5,676,208	3,907,623	888,540	4,796,163	880,045	..	134,198
1983	2,523,046	3,160,789	5,683,835	4,797,766	1,155,698	5,953,464	..	269,129	129,484
1984	1,935,552	3,638,883	5,574,436	5,062,112	1,410,145	6,466,257	..	891,822	110,706
1985	2,155,270	4,291,229	6,446,499	6,028,430	1,507,370	7,535,850	..	1,089,351	123,237
1986	2,202,948	4,783,474	6,986,422	6,529,348	1,623,017	8,152,365	..	1,165,943	87,674
1987	2,768,663	5,071,476	7,840,139	6,911,427	1,805,667	8,717,094	..	876,955	84,476
1988	3,216,985	5,404,518	8,621,503	7,491,773	1,808,478	9,300,251	..	678,748	87,220
1989	3,581,772	6,430,737	10,012,509	8,856,643	1,777,058	10,633,701	..	621,291	72,455
1990	3,984,818	6,515,966	10,500,784	10,227,858	2,282,389	12,510,247	..	2,282,389	90,093

(a) From 1920, year ended 30 June. (b) From 1976, excludes interstate value of horses. Details are not available for publication. (c) Excludes ships' stores up to and including 1982. Ships' and aircraft stores for foreign owned vessels and aircraft are included in foreign and total exports from 1983 onwards. From 1982, excludes value of re-exports.

## INDUSTRIAL DISPUTES; WAGE RATES; UNEMPLOYMENT BENEFIT

Year	Industrial disputes (a)			Award rates of pay index numbers (b)		Persons on Unemployment benefit (f)	
	Number of disputes	Workers involved (e)	Working days lost		Adult male wage and salary earners (c)(d)		
Number			Average per worker involved	Weekly		Hourly	
		'000	'000	No.			
1920	45	12.0	166.6	13.87	n.a.	n.a.	..
1930	2	0.5	27.1	57.85	n.a.	n.a.	..
1940	4	3.0	7.4	2.44	36.8	33.1	..
1941	3	0.3	0.8	2.79	39.0	35.4	..
1942	8	1.8	8.9	4.89	41.5	37.6	..
1943	10	2.5	38.4	15.11	42.8	38.8	..
1944	30	11.0	90.0	8.16	42.6	38.6	..
1945	16	3.8	32.5	8.55	42.6	38.7	..
1946	11	6.4	69.6	10.94	43.6	39.5	422
1947	7	1.8	6.1	3.44	48.4	44.1	1,095
1948	9	2.4	7.8	3.33	53.9	53.9	409
1949	16	5.7	26.3	4.64	59.6	59.7	126
1950	15	2.0	5.7	2.93	71.0	71.7	267
1951	10	4.2	5.1	1.22	85.5	85.7	60
1952	21	19.2	127.8	6.67	97.5	97.7	57
1953	11	3.7	5.0	1.36	100.4	100.7	844
1954	15	5.5	21.7	3.94	101.7	101.9	427
1955	16	9.8	9.6	0.97	106.3	106.6	157
1956	14	11.1	31.9	2.87	110.8	111.0	473
1957	14	5.4	3.1	0.57	113.9	114.1	1,940
1958	20	11.0	3.0	0.27	114.7	114.9	2,330
1959	20	11.2	11.2	1.00	120.7	120.8	2,852
1960	43	25.7	27.3	1.06	126.8	127.1	2,512
1961	22	9.7	23.2	2.40	128.8	129.0	2,154
1962	28	8.4	6.3	0.75	129.5	129.7	2,932
1963	28	42.6	32.0	0.75	132.8	133.0	2,674
1964	26	6.2	7.1	1.16	137.5	137.6	2,677
1965	33	12.6	10.0	0.79	143.5	143.5	1,679
1966	25	2.9	6.2	2.17	153.6	153.8	785
1967	26	5.1	6.0	1.18	159.6	159.9	718
1968	70	18.7	21.8	1.16	169.0	168.7	608
1969	104	59.1	101.4	1.72	179.5	179.3	524
1970	125	46.5	141.1	3.03	198.2	198.0	474
1971	132	35.8	69.4	1.94	219.5	219.4	872
1972	105	28.3	94.6	3.34	234.2	232.5	2,808
1973	160	37.6	117.3	3.12	267.9	266.3	4,960
1974	257	188.1	256.9	1.37	357.7	356.5	2,863
1975	236	53.8	100.7	1.87	401.2	398.5	9,317
1976	250	100.7	252.1	2.50	104.8	104.8	13,598
1977	229	54.9	220.5	4.02	116.0	116.0	15,706
1978	306	76.1	197.9	2.60	125.3	125.3	20,470
1979	252	169.5	348.1	2.06	131.7	131.7	(g)29,000
1980	368	69.4	191.0	2.75	145.7	145.8	(g)29,800
1981	364	72.9	244.0	3.35	166.1	166.2	28,638
1982	436	63.6	158.9	2.50	187.6	190.3	31,636
1983	300	42.3	270.6	6.40	197.2	200.9	50,992
1984	406	69.2	119.2	1.72	205.9	210.7	(g)57,514
1985	361	48.7	92.9	1.91	103.8	103.8	(g)54,028
1986	267	50.6	143.1	2.83	106.3	106.5	55,089
1987	245	43.1	115.3	2.68	110.0	110.3	52,755
1988	221	60.9	160.6	2.64	118.5	119.1	46,091
1989	226	54.7	102.1	1.87	124.4	126.7	37,285
1990	190	73.2	108.4	1.48	129.1	132.3	36,240

(a) Excludes disputes involving cessation of work of less than 10 man-days. Details of the number of disputes and workers involved in disputes which commenced in any year and were still in progress during the following year are included in the figures for both years. (b) End of December. Prior to 1976 - Base: weighted average wage rate for Australia, 1954=100. From 1976 to June 1985 - Base: weighted average wage rate for Australia, June 1976=100. From June 1985 - Base: weighted average wage rate for Australia, June 1985=100. (c) Excludes workers in rural industry. (d) Prior to June 1985 index related to wage earners only. From June 1985 relates to wage and salary earners. (e) Includes workers indirectly involved, i.e. those put out of work at an establishment where a stoppage occurred but not themselves parties to the dispute. (f) Year ended 30 June; average number of persons on benefit at end of each week. As from 1st January 1988 includes persons receiving job search allowance. (g) Estimated.

## CONSUMER PRICE INDEX (a)

Year ended 30 June	Group index numbers—Perth							All groups	Weighted average of eight capital cities (b) All groups	
	Food	Clothing	Housing	Household equipment and operation	Transportation	Tobacco and alcohol	Health and personal care			Recreation and education (c)
1949	12.1	15.9	11.4						14.1	14.0
1950	13.4	18.3	12.1						15.4	15.2
1960	26.0	28.8	24.3						27.1	27.3
1961	27.3	29.5	25.8	n.a.	n.a.	n.a.	n.a.		28.1	28.4
1962	27.2	29.7	26.6						28.2	28.5
1963	27.3	29.8	27.5						28.4	28.6
1964	27.6	30.1	28.4						28.7	28.8
1965	28.7	30.4	29.1						29.6	29.9
1966	30.0	30.8	30.1						30.7	31.0
1967	31.5	31.4	31.6	35.5	32.5	31.5			32.0	31.8
1968	32.5	32.1	33.4	36.1	33.6	32.3			32.9	32.9
1969	33.0	32.8	35.6	36.8	34.2	33.0			33.7	33.7
1970	34.1	33.9	37.9	37.4	35.9	33.3		n.a.	35.0	34.8
1971	35.5	35.3	39.7	38.9	37.3	35.7	27.1		36.5	36.5
1972	36.7	37.3	42.2	41.3	39.1	38.7	30.1		38.6	39.0
1973	39.3	39.6	44.2	43.2	40.1	41.3	31.9		40.7	41.3
1974	44.7	45.0	47.1	46.4	43.1	43.8	36.6		45.0	46.6
1975	50.8	54.7	55.0	54.9	51.4	52.8	47.2		53.1	54.5
1976	56.8	63.5	66.2	65.4	60.1	65.0	39.2		60.6	61.5
1977	64.8	73.1	77.2	70.7	67.0	71.3	77.3		70.2	70.0
1978	74.4	81.2	85.1	77.4	73.1	74.8	91.7		77.8	76.7
1979	82.1	87.0	89.2	83.0	81.1	87.3	84.5		84.0	83.0
1980	91.7	92.9	92.5	89.4	90.6	94.4	96.6		91.9	91.4
1981	100.0	100.0	100.0	100.0	100.0	100.0	100.0		100.0	100.0
1982	110.2	107.2	109.0	109.5	111.9	109.1	130.9		111.2	110.4
1983	119.8	114.0	118.6	120.4	123.5	122.9	159.8	105.8	122.5	123.1
1984	128.9	120.9	124.1	129.1	133.9	141.0	156.9	111.8	131.0	131.6
1985	136.2	128.8	131.6	134.7	142.8	153.2	125.7	115.1	136.1	137.2
1986	146.3	140.2	141.7	145.7	153.7	168.7	135.9	123.9	147.1	148.7
1987	157.1	154.4	154.7	159.0	172.3	188.1	156.0	135.7	161.8	162.6
1988	166.3	165.8	163.6	170.3	184.5	203.0	175.1	146.5	173.3	174.5
1989	181.2	177.4	(d)184.7	181.4	191.4	212.9	190.8	155.4	186.1	187.3
1990	192.8	185.6	217.5	192.1	205.2	232.2	207.8	164.1	201.6	202.3

(a) The base of each index is Year 1980-81 = 100 unless otherwise noted. (b) Prior to 1980-81, weighted average of six State capital cities. (c) Base of index is March quarter 1982=100. (d) These series have been affected by the adoption of a new approach to the treatment of mortgage interest charges. For more detail refer to an information paper *The Australian Consumer Price Index: Treatment of Mortgage Interest Charges* (ABS Catalogue No. 6442.0).

## STATE AND LOCAL AUTHORITIES: RECEIPTS AND OUTLAY

NOTE: This series replaces 'Public Revenue and Expenditure: Consolidated Revenue Fund' and 'Net Expenditure from Loan Funds; Public Debt' on later pages.  
(\$ million)

Year ended 30 June	Receipts and financing transactions					Outlay					
	Taxes, fees, fines	Net operating surpluses public trading enterprises	Property and other income	Grants from the Commonwealth Government	Financing transactions	Total funds available	Final consumption expenditure	Capital expenditure on goods(a)	Transfer payments	Net advances paid	Total outlay
1976	322.1	66.2	98.9	772.5	52.8	1,312.5	728.5	435.1	131.2	17.8	1,312.5
1977	371.0	36.9	119.9	844.6	155.3	1,527.6	870.7	482.6	157.1	17.2	1,527.6
1978	423.2	80.3	167.9	974.5	258.8	1,904.6	1,004.7	550.6	330.3	18.8	1,904.6
1979	466.3	90.0	172.1	1,056.2	315.3	2,100.0	1,112.7	608.5	363.4	15.5	2,100.0
1980	518.6	97.7	184.7	1,168.1	352.0	2,321.0	1,267.0	645.6	408.8	-0.4	2,321.0
1981	589.9	130.2	212.4	1,307.0	280.8	2,520.4	1,425.1	627.4	465.5	2.4	2,520.4
1982	690.3	154.7	249.1	1,430.1	316.4	2,840.5	1,608.9	716.7	516.2	-1.3	2,840.6
1983	771.7	193.5	316.3	1,618.8	856.6	3,756.8	1,863.6	1,196.3	677.0	19.9	3,756.8
1984	923.5	274.0	355.2	1,874.4	834.7	4,261.8	2,096.1	1,252.3	850.3	63.1	4,261.8
1985	1,062.0	300.9	394.5	2,067.3	584.9	4,409.5	2,312.8	1,102.2	972.5	21.9	4,409.4
1986	1,145.0	400.7	510.1	2,214.5	644.3	4,914.6	2,581.0	1,147.2	1,110.0	76.4	4,914.6
1987	1,397.2	518.3	529.4	2,394.8	678.6	5,518.3	2,815.3	1,328.4	1,293.7	80.9	5,518.4
1988	1,698.7	563.4	599.9	2,594.3	432.0	5,888.3	3,133.8	1,222.4	1,482.1	49.8	5,888.2

(a) Includes gross fixed capital expenditure, increase in stocks and expenditure on land and intangible assets (net).

**PUBLIC REVENUE AND EXPENDITURE: CONSOLIDATED REVENUE FUND**  
(S'000)

Year (a)	Revenue					Expenditure						
	Common-wealth funds	Public utilities	Departmental (b)	Taxation	Territorial (c)	Total revenue	Public utilities	Interest and sinking fund	Departmental			Total expenditure
									Education	Health	Other	
1840					5	34			n.a.			30
1850					4	38			n.a.			33
1860					35	140		n.a.	3			123
1870	n.a.	n.a.	n.a.	n.a.	40	196	n.a.		7	n.a.	n.a.	226
1880					72	360		40	19			409
1890					217	829		144	23			803
1900		2,612	182	244	380	5,751	1,863	880	138	198	2,049	5,231
1910	1,407	3,916	551	673	649	7,315	2,440	2,006	367	328	1,533	6,895
1920	1,197	6,364	1,188	1,688	818	11,727	5,156	4,124	829	642	1,931	13,063
1930	1,547	10,596	3,134	2,906	950	19,501	8,073	6,891	1,385	649	2,872	20,537
1931	1,547	9,228	3,279	2,269	678	17,374	6,654	7,243	1,346	486	3,950	20,215
1932	1,547	8,818	2,766	2,014	585	16,071	5,724	7,015	1,098	328	4,543	19,186
1933	1,947	8,873	2,701	2,257	558	16,664	5,682	7,009	1,108	333	3,761	18,392
1934	2,147	8,867	2,240	2,737	626	16,963	5,870	7,095	1,153	309	3,560	18,541
1935	2,413	9,837	1,562	3,804	812	18,663	6,391	7,100	1,225	326	3,342	18,997
1936	2,617	10,366	1,677	4,372	767	20,067	6,756	7,135	1,331	341	3,595	19,891
1937	2,013	10,633	1,727	4,807	773	20,371	7,247	7,237	1,432	381	4,024	21,113
1938	2,097	11,148	1,980	5,190	749	21,638	7,249	7,579	1,474	380	4,158	21,659
1939	2,087	11,159	1,786	5,728	634	21,899	7,857	7,779	1,514	401	3,992	22,340
1940	2,137	11,102	1,942	5,992	632	22,240	7,662	8,021	1,545	416	4,070	22,534
1941	2,247	11,366	1,916	6,255	638	22,864	7,534	8,114	1,568	421	4,262	22,842
1942	2,207	12,133	2,204	6,222	620	23,880	8,282	8,204	1,662	436	4,293	23,877
1943	7,852	13,518	2,497	1,330	634	26,303	9,377	8,183	1,627	458	5,564	26,254
1944	7,935	13,626	2,868	1,553	700	27,178	9,870	8,185	1,747	506	5,780	27,102
1945	8,044	13,618	3,402	1,715	697	27,908	10,064	8,251	1,778	485	6,261	27,899
1946	9,960	13,303	2,519	1,936	709	28,815	10,825	8,168	2,005	1,010	5,621	28,815
1947	11,461	11,769	3,105	2,138	1,053	29,962	10,866	8,012	2,447	1,369	5,910	30,057
1948	14,515	13,242	3,575	2,354	1,202	35,421	13,996	8,089	3,298	1,841	7,280	36,125
1949	17,136	15,032	4,564	2,683	1,106	41,121	16,720	8,215	3,519	2,613	9,942	42,756
1950	22,975	17,792	5,733	3,240	1,225	51,622	20,237	8,508	4,160	3,633	13,096	51,574
1951	25,343	19,085	5,911	3,912	1,230	56,312	21,974	8,994	5,269	4,465	13,180	55,994
1952	29,923	24,335	6,863	4,633	1,300	67,910	27,490	9,741	7,262	6,269	15,696	69,094
1953	39,056	22,385	8,557	5,247	1,513	77,768	32,044	10,611	8,686	6,926	17,639	78,784
1954	38,342	29,860	8,378	6,468	1,929	86,292	35,234	12,147	9,503	7,675	18,797	86,497
1955	38,759	32,645	9,433	7,258	2,014	91,440	36,089	13,857	11,217	8,026	19,838	92,408
1956	43,373	33,969	9,779	8,036	2,498	99,225	39,184	15,451	12,482	9,344	21,501	102,886
1957	46,759	37,133	12,548	9,027	2,433	108,662	42,022	17,043	13,636	10,067	33,645	112,487
1958	51,808	34,525	13,640	10,729	2,516	114,108	40,103	19,303	15,172	11,026	25,572	116,355
1959	55,496	36,080	14,522	10,368	2,783	120,136	40,317	20,844	15,819	11,967	29,244	123,506
1960	58,871	38,575	15,696	11,834	2,878	128,776	42,418	23,053	17,282	13,565	29,861	131,587
1961	65,519	40,830	16,372	12,079	2,797	138,665	41,072	24,628	19,541	15,018	35,160	141,075
1962	73,430	42,456	16,549	12,926	3,283	149,852	42,097	27,250	21,417	14,935	40,131	151,780
1963	75,847	43,559	18,134	14,762	3,501	157,182	42,267	29,980	22,850	16,073	41,254	158,687
1964	78,988	45,376	20,948	17,604	3,751	167,888	44,247	31,771	25,880	18,705	43,430	170,681
1965	88,565	39,778	26,712	19,512	4,107	180,143	43,360	34,669	29,133	21,160	49,401	184,840
1966	103,459	45,683	28,753	22,574	4,598	206,655	47,106	37,926	34,016	23,086	56,869	206,665
1967	106,748	52,787	31,461	27,536	7,655	228,146	53,182	41,662	36,746	26,429	61,512	228,174
1968	112,617	56,226	33,135	34,916	11,845	250,738	60,728	43,864	41,224	29,294	65,362	249,909
1969	126,621	54,407	33,035	41,602	17,301	275,081	64,016	47,083	46,441	33,613	74,822	276,135
1970	141,326	62,921	36,905	50,865	23,633	318,189	71,166	51,427	55,839	41,343	87,660	318,901
1971	170,396	68,350	45,583	48,434	32,187	367,252	79,717	54,178	66,341	52,575	107,129	371,620
1972	180,132	73,446	54,131	78,490	34,992	423,999	82,410	62,029	82,472	59,862	125,260	424,890
1973	200,633	69,158	66,711	97,141	37,162	473,840	88,372	65,280	94,547	71,866	144,005	477,330
1974	232,111	85,291	76,306	126,929	43,346	567,683	104,178	69,200	115,982	100,841	168,122	573,414
1975	313,846	108,921	96,930	160,307	49,010	734,240	121,494	75,300	165,705	148,161	213,042	743,373

(a) From 1900, year ended 30 June. (b) Reimbursements, fees, etc. (c) Revenue from sales, leases, licences and royalties relating to land, mining and timber.

NOTE: This table has been replaced by a new series 'State and Local Authorities: Receipts and Outlays' on previous page.

**NET EXPENDITURE FROM LOAN FUNDS; PUBLIC DEBT**  
(£'000)

Year (a)	Net expenditure from loan funds on public works and services (b)							Public debt (at end of year)	
	Railways, tramways and buses	Electricity supply	Harbours, rivers, light- houses, etc.	Water supplies sewerage, drainage and irrigation	Public buildings	Other	Total	Gross amount out- standing	Sinking fund
1860	—	—	—	—	—	—	—	4	—
1870	—	—	—	—	—	—	—	—	—
1880	(c)549	—	(d)38	—	—	n.a.	(d)802	722	n.a.
1890	3	6	6	2	(e)76	n.a.	32	2,735	170
1900	302	—	395	949	—	110	1,757	23,349	754
1910	908	—	174	199	152	626	2,058	46,575	5,139
1920	242	—	204	94	21	4,765	5,327	93,644	13,656
1930	1,819	—	529	610	108	4,226	7,291	142,389	2,081
1931	878	—	257	420	—	1,457	3,012	153,130	2,621
1932	263	—	155	1,152	—	1,055	2,624	159,416	2,618
1933	374	—	485	1,355	69	1,838	4,121	167,029	2,693
1934	659	—	492	1,606	196	2,344	5,297	171,696	743
1935	997	—	610	2,155	213	1,103	5,076	177,180	1,048
1936	946	—	602	2,487	169	700	4,903	180,688	1,138
1937	491	—	352	2,303	178	741	4,064	184,666	1,292
1938	950	—	201	1,843	183	1,144	4,321	187,424	614
1939	441	—	184	1,777	230	640	3,272	190,945	719
1940	200	—	104	1,615	732	974	3,624	192,461	608
1941	214	18	152	1,649	306	480	2,819	195,583	1,147
1942	110	25	111	605	70	437	1,359	194,718	535
1943	157	92	133	100	55	217	754	193,976	347
1944	49	31	Cr. 143	75	166	34	212	192,957	140
1945	140	11	61	150	241	492	1,094	191,790	254
1946	142	208	75	473	451	276	1,625	193,852	1,008
1947	535	332	173	1,453	772	821	4,087	198,005	1,091
1948	676	1,471	316	1,388	1,097	125	5,074	200,549	309
1949	913	2,131	449	1,626	1,099	942	7,161	207,377	126
1950	4,496	4,691	804	2,002	1,357	2,859	16,209	219,100	142
1951	3,723	6,591	1,164	4,091	2,003	3,081	20,653	246,374	17
1952	15,198	6,684	2,694	4,803	2,729	3,409	35,517	276,577	647
1953	13,533	179	2,422	4,858	5,432	8,787	35,213	306,144	1,861
1954	11,295	1,406	2,328	3,939	3,144	6,276	28,388	331,565	822
1955	9,752	1,410	1,920	5,661	3,993	6,726	29,462	355,763	442
1956	6,139	2,049	1,638	5,516	4,187	7,098	26,629	377,465	245
1957	5,519	4,200	950	7,119	5,599	9,169	32,556	410,290	112
1958	4,209	2,480	1,398	7,694	5,891	6,599	28,272	436,857	147
1959	5,711	2,200	1,428	8,395	7,410	7,199	32,342	464,237	173
1960	4,953	1,553	1,373	9,547	8,723	6,355	32,504	493,575	171
1961	4,221	400	1,966	10,314	10,479	8,037	35,418	523,070	94
1962	5,432	300	2,587	10,952	12,032	6,449	37,751	555,130	222
1963	6,204	500	2,438	10,770	13,420	5,563	38,894	587,336	485
1964	7,496	—	3,028	10,537	15,630	6,409	43,100	626,045	442
1965	6,800	794	2,822	10,957	19,948	5,457	46,779	665,620	473
1966	7,628	1,434	2,583	12,667	19,908	3,580	47,800	705,514	267
1967	9,068	2,427	1,746	13,642	18,230	5,902	51,015	748,601	216
1968	7,750	4,542	2,402	14,552	18,816	5,115	53,177	792,969	408
1969	10,547	5,679	1,190	12,560	20,116	4,765	54,859	840,343	3,015
1970	6,331	4,566	2,055	13,330	24,627	8,594	59,504	886,778	182
1971	7,194	27	2,202	15,176	25,549	13,492	63,640	924,111	582
1972	5,919	3,666	1,902	18,369	23,994	32,606	86,456	975,958	1,216
1973	4,179	4,104	2,371	23,598	32,872	21,882	89,006	1,030,060	265
1974	5,569	3,467	2,505	26,708	34,324	3,291	75,863	1,074,111	4,899
1975	6,185	4,069	3,728	24,487	45,262	6,140	89,871	1,120,313	1,037

(a) From 1900, year ended 30 June. Sinking fund at 31 March from 1900 to 1928. (b) From 1928 includes expenditure from Loan Suspense Account. (c) Total amount for the years 1877 to 1881. (d) Total amount for the years 1872 to 1881. (e) Includes expenditure prior to 1890.

NOTE: This table has been replaced by a new series 'State and Local Authorities: Receipts and Outlay' on an earlier page.

BANKING AND PERMANENT BUILDING SOCIETIES

Year	Trading banks			Savings banks (a)		Permanent building societies (b)			
	Depositors' balances (c)	Loans advances and bills discounted (c)	Weekly debits to customers' accounts (d)	Operative accounts at end of year	Depositors' balances at end of year	Liabilities		Assets	
							With-drawable shares	Deposits	Amount due on loans
	\$'000	\$'000	\$m	No.	\$'000	\$'000	\$'000	\$'000	\$'000
1870	n.a.	n.a.		895	27				
1880	n.a.	n.a.		1,299	45				
1890	1,904	2,809		3,014	69				
1900	8,781	5,514	n.a.	33,646	2,598				
1910	12,627	12,228		84,262	6,955				
1920	24,742	21,594		211,415	14,516				
1930	25,524	41,773		367,665	23,457				
1940	42,219	47,529		233,649	23,720				
1950	116,458	55,301	27.4	378,670	79,225				
1951	149,244	66,680	38.6	392,790	89,345				
1952	170,923	83,353	43.6	403,678	94,342				
1953	170,234	87,353	44.2	414,288	99,589				
1954	181,863	106,429	50.8	422,480	105,229				
1955	180,895	137,830	52.4	426,637	107,258				
1956	174,070	142,156	53.9	446,419	115,868				
1957	185,576	135,074	57.1	473,548	125,386				
1958	186,478	141,198	60.4	497,690	131,896				
1959	180,300	147,106	61.5	527,079	142,998				
1960	192,076	142,064	69.7	550,966	157,246	n.a.	n.a.	n.a.	n.a.
1961	190,094	146,244	75.7	577,619	161,424				
1962	209,274	139,204	80.4	625,070	181,056				
1963	219,952	153,528	88.2	683,417	208,812				
1964	242,268	164,878	96.4	736,009	239,766				
1965	272,430	186,000	106.3	786,340	261,654				
1966	310,432	195,190	122.4	848,562	292,871				
1967	355,899	212,023	138.6	905,349	330,807				
1968	398,837	252,627	169.1	970,120	373,602				
1969	462,559	280,147	209.0	1,036,180	412,984				
1970	558,017	323,824	246.4	1,096,466	431,877				
1971	544,732	351,110	295.3	1,153,420	464,611				
1972	552,546	357,410	318.4	1,205,448	511,457				
1973	693,456	443,330	355.9	1,250,576	608,133				
1974	829,002	604,460	439.4	1,327,699	684,974				
1975	906,589	673,526	515.9	1,401,485	779,427				
1976	1,092,350	791,376	680.0	1,443,883	897,693	522,517	286,320	632,929	849,182
1977	1,376,813	927,709	814.4	1,466,200	960,548	646,176	383,451	851,896	1,078,720
1978	1,448,206	1,163,207	975.9	1,511,092	1,048,510	747,307	508,710	1,046,718	1,308,935
1979	1,621,852	1,368,657	1,173.7	1,539,416	1,133,627	858,380	681,851	1,270,625	1,601,527
1980	1,742,801	1,678,121	1,463.3	1,579,722	1,216,182	966,319	812,817	1,491,983	1,849,490
1981	2,026,507	1,943,299	1,826.3	1,647,837	1,360,315	1,020,465	994,100	1,650,304	2,100,204
1982	2,521,072	2,288,020	2,283.4	1,741,114	1,514,207	1,129,730	1,030,780	1,793,793	2,261,263
1983	2,877,685	2,571,177	2,651.2	1,835,917	1,910,538	1,265,212	948,426	1,743,068	2,312,162
1984	3,004,651	2,874,000	3,043.7	1,961,811	2,214,373	1,374,872	861,647	1,664,158	2,345,479
1985	3,622,307	3,342,663	3,857.6	2,051,681	2,402,828	1,463,808	908,036	1,807,865	2,468,670
1986	4,653,781	4,032,226	4,846.9	2,153,457	2,649,943	1,534,979	1,058,426	1,977,938	2,702,788
1987	5,143,047	4,652,428	5,133.2	2,618,596	3,975,333	1,685,760	1,104,696	2,056,374	2,913,559
1988	5,881,611	5,440,095	6,167.8	2,638,557	5,442,147	1,105,345	518,082	1,222,144	1,707,310
1989	(e)	(e)	5,382.4	(e)	(e)	1,469,005	396,992	1,480,756	2,010,820

(a) From 1900, year ended 30 June. (b) At 30 June. (c) Average based on amounts as at close of business each week. From 1927, year ended 30 June. (d) Weekly average for year ended 30 June. Excludes debits to Commonwealth Government accounts at city branches. From 1946-47 includes The Rural and Industries Bank of Western Australia (General Banking Department). (e) No longer available.

## WESTERN AUSTRALIA IN RELATION TO AUSTRALIA

	Unit	Date or period	Western Australia	Australia	Percentage
Area	sq km	..	2,525,500	7,682,300	32.9
Proportion of area having rainfall —					
Under 250 mm	per cent	..	58.0	39.0	..
250 mm and under 500 mm	per cent	..	29.2	31.8	..
500 mm and over	per cent	..	12.8	29.2	..
Population (a)	number	30 December 1989p	1,614,810	16,957,126	9.5
Population increase	number	1988-1989	46,109	280,287	16.5
Rate of population increase	per cent	1988-1989	2.9	1.7	..
Births registered (b)	number	1989	25,051	50,853	10.0
Deaths registered (b)	number	1989	9,543	124,232	7.7
Marriages registered	number	1989	10,739	117,176	9.2
Divorce - Dissolutions granted	number	1989	4,089	41,382	9.9
Employed labour force (c)	'000	November 1990	755.9	7,849.9	9.6
Average weekly earnings - all male employees (d)	\$	August 1990	576.9	562.7	..
Unemployed on benefit	number	30 June 1990	36,240	385,014	9.4
Industrial disputes - Working days lost	'000	1990	108.4	1,376.5	7.9
Area under crop	'000 hectares	1989-90	5,174	16,953	30.5
Area under sown pasture	'000 hectares	1989-90	7,724	30,861	25.0
Area of —					
Wheat for grain	'000 hectares	1989-90	3,476	9004	38.6
Oats for grain	'000 hectares	1989-90	340	1089	31.2
Barley for grain	'000 hectares	1989-90	421	2310	18.2
Hay	'000 hectares	1989-90	229	1319	17.4
Fruit and vineyards	'000 hectares	1989-90	8	177	4.4
Livestock —					
Sheep	'000	31 March 1990	38,422	170,297	22.3
Cattle	'000	31 March 1990	1,673	23,191	7.2
Pigs	'000	31 March 1990	272	2,648	10.3
Production —					
Wheat for grain	'000 tonnes	1989-90	4,800	14,214	33.8
Wool (e)	'000 tonnes	1989-90	236.1	1,102.0	21.4
Meat (f)	'000 tonnes	1989-90	264.1	3,001.7	8.8
Whole milk (g)	mil. litres	1989-90	266	6,263	4.2
Butter (g)	tonnes	1989-90	1,339	104,158	1.3
Value of agricultural commodities produced	\$m	1989-90	3,370	23,509	14.3
Mining establishments - Value added	\$m	1988-89	(h)4,084	12,567	32.5
Iron ore production	'000 tonnes	1988-89	92,977	97,618	95.1
Coal production	'000 tonnes	1988-89	(i)3,800	149,125	2.5
Crude oil production (j)	megalitres	1989-90	5,809	31,962	18.2
Manufacturing establishments (k) —					
Number	..	1988-89	2,651	31,249	8.5
Employment - At 30 June	'000	1988-89	72.7	1,072.6	6.8
Wages and salaries paid	\$m	1988-89	1,710.5	25,599.1	6.7
Turnover	\$m	1988-89	10,579.5	151,856.6	7.0
New dwelling units commenced (l)	number	1989-90	16,940	137,700	12.3
Value of all building commenced	\$m	1989-90	2,346.9	26,761.4	8.8
Foreign imports	\$m f.o.b.	1989-90	3,984.8	51,331.7	7.8
Foreign exports	\$m f.o.b.	1989-90	10,227.9	49,131.6	20.8
Motor vehicles on register	'000	30 June 1990	1,037.6	10,080.6	10.3
New motor vehicles registered	'000	1989-90	59.3	648.2	9.1
Road traffic accidents - Persons killed	number	1989	243	2,796	8.7
Retail turnover (excluding motor vehicles, etc.)	\$m	1989-90	7,399.7	83,269.6	8.9
Savings bank deposits per head	\$	31 December 1988	3,799	4,091	..
Household income per head	\$	1988-89	15,092	15,702	..
Age and invalid pensions (including wives and spouse/ carers pensions)	number	30 June 1990	148,692	1,780,811	8.3
Disability and service pensions (including dependants)	number	30 June 1990	65,855	740,430	8.9
Education Institutions—					
Government schools	number	1990	760	7,490	10.1
Non-government schools	number	1990	244	2,517	9.7
Higher education institutions (m)	number	31 March 1990	4	76	5.3
Student enrolment —					
Government schools	number	1990	215,311	2,193,347	9.8
Non-government schools	number	1990	69,575	848,310	8.2
Higher education institutions (m)	number	31 March 1990	48,474	485,075	10.0

(a) Based on Estimated Resident Population. (b) Based on State of usual residence. (c) In civilian employment. Excludes defence forces and employees in agriculture and private domestic service, and trainee teachers. (d) Not comparable with 'Average weekly earnings per employed male unit' previously published. (e) In terms of greasy wool. Comprises shorn wool, dead wool, fellmongered wool and wool exported on skins. (f) Comprises sheep, cattle, pig and poultry meat. Excluding Tasmanian poultry production. Dressed carcass weight. Excludes offal. (g) Source: Australian Dairy Corporation. (h) Excludes establishments predominantly engaged in quarrying sand and gravel. (i) Source: Department of Mines. (j) Source: Department of Primary Industries and Energy. (k) Excludes details for single establishments manufacturing enterprises employing fewer than four persons. Excludes electricity and gas establishments. (l) Number of new dwelling units has been rounded to nearest ten. (m) Commonwealth-funded only.

## APPENDIX

### Articles Published in Previous Issues (a)

In cases where an article has been published in more than one previous issue, the reference to its last appearance only is given.

<i>Article</i>	<i>Year Book</i>
Aboriginal population, history of	1984, pp. 1-8
Agriculture, Institute of, University of Western Australia	1975, pp. 217-18
Air pollution and the weather	1975, pp. 63-5
Albany, Port of	1971, pp. 449-51
ANZAAS Congress: Perth, 1973	1973, pp. 562-4
Australian Stock Exchange (Perth) Ltd.	1989 pp. 257-9
Basic wage, historical summary—	
Commonwealth	1968, pp. 396-401
State	1968, pp. 403-5
Captain Fremantle's Report of Arrival of First Settlers, text of	1976, pp. 541-2
Captain Stirling's 'Narrative of Operations', text of	1974, pp. 533-41
Census of Wholesale Establishments, 1968-69	1976, pp. 434-7
Censuses of population and housing, 1911 to 1966	1972, pp. 547-70
Centenary of the discovery of the Collie coalfields	1983, pp. 393-7
Community Welfare, Department for, history of	1981, pp. 135-9
Computer Service Centre, Perth	1969, p. 504
Conservation of the fauna	1976, pp. 93-5
Conservation of the flora	1975, pp. 78-80
Crown Law Department, history of	1983, pp. 129-31
Education Department, history of	1972, pp. 117-21
Electoral Divisions (Commonwealth)	1971, pp. 97-8
Electoral Divisions (Commonwealth), origin of name of	1970, p. 530
Electoral Provinces and Electoral Districts (State)	1976, pp. 116-17
Esperance, Port of	1973, pp. 444-6
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Export price index	1970, p. 507
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(a) Commencing with the present series: No. 1 — 1957

STATISTICAL DIVISIONS, SUB DIVISIONS AND COMPONENT LOCAL GOVERNMENT AREAS  
At June 1990

<i>PERTH</i>	<i>SOUTH-WEST (continued)</i>	<i>UPPER GREAT SOUTHERN (continued)</i>	<i>CENTRAL</i>
<i>CENTRAL METROPOLITAN</i>	<i>PRESTON</i>	<i>LAKES</i>	<i>GASCOYNE</i>
Claremont (T)	Bunbury (C)	Corrigin (S)	Carnarvon (S)
Cottesloe (T)	Capel (S)	Kondinin (S)	Exmouth (S)
Mosman Park (T)	Collie (S)	Kulin (S)	Shark Bay (S)
Nedlands (C)	Dardanup (S)	Lake Grace (S)	Upper Gascoyne (S)
Peppermint Grove (S)	Donnybrook-Balingup (S)	<i>MIDLANDS</i>	<i>CARNEGIE</i>
Perth (C) - Inner	Harvey (S)	<i>MOORE</i>	Cue (S)
Perth (C) - North	<i>VASSE</i>	Chittering (S)	Meekatharra (S)
Perth (C) - Outer	Augusta-Margaret River (S)	Dandaragan (S)	Mount Magnet (S)
Perth (C) - South	Busselton (S)	Gingin (S)	Murchison (S)
Perth (C) - Wembley-Coastal	<i>BLACKWOOD</i>	Moora (S)	Sandstone (S)
<i>EAST METROPOLITAN</i>	Boyup Brook (S)	Victoria Plains (S)	Wiluna (S)
Bassendean (T)	Bridgetown-Greenbushes (S)	<i>AVON</i>	Yalgoo (S)
Bayswater (C)	Manjimup (S)	Beverley (S)	<i>GREENOUGH RIVER</i>
Kalamunda (S)	Nannup (S)	Cunderdin (S)	Carnamah (S)
Mundaring (S)	<i>LOWER GREAT SOUTHERN</i>	Dalwallinu (S)	Chapman Valley (S)
Swan (S)	<i>PALLINUP</i>	Dowerin (S)	Coorow (S)
<i>NORTH METROPOLITAN</i>	Broomehill (S)	Goomalling (S)	Geraldton (C)
Stirling (C) - Central	Gnowangerup (S)	Koorda (S)	Greenough (S)
Stirling (C) - West	Jerramungup (S)	Northam (T)	Irwin (S)
Stirling (C) - South-Eastern	Katanning (S)	Northam (S)	Mingenew (S)
Wanneroo (C)	Kent (S)	Quairading (S)	Morawa (S)
<i>SOUTH-WEST METROPOLITAN</i>	Kojonup (S)	Tammin (S)	Mullewa (S)
Cockburn (C)	Tambellup (S)	Toodyay (S)	Northampton (S)
East Fremantle (T)	Woodanilling (S)	Wongan-Ballidu (S)	Perenjori (S)
Fremantle (C) - Inner	<i>KING</i>	Wyalkatchem (S)	Three Springs (S)
Fremantle (C) - Remainder	Albany (T)	York (S)	<i>PILBARA</i>
Kwinana (T)	Albany (S)	<i>CAMPION</i>	<i>DE GREY</i>
Melville (C)	Cranbrook (S)	Bruce Rock (S)	East Pilbara (S)
Rockingham (C)	Denmark (S)	Kellerberrin (S)	Port Hedland (T)
<i>SOUTH-EAST METROPOLITAN</i>	Plantagenet (S)	Merredin (S)	<i>FORTESCUE</i>
Armadale (C)	<i>UPPER GREAT SOUTHERN</i>	Mount Marshall (S)	Roebourne (S)
Belmont (C)	<i>HOTHAM</i>	Mukinbudin (S)	Ashburton (S)
Canning (C)	Boddington (S)	Narembeen (S)	<i>KIMBERLEY</i>
Gosnells (C)	Brookton (S)	Nungarin (S)	<i>ORD</i>
Serpentine-Jarrahdale (S)	Cuballing (S)	Trayning (S)	Halls Creek (S)
South Perth (C)	Dumbleyung (S)	Westonia (S)	Wyndham-East Kimberley (S)
<i>SOUTH-WEST</i>	Narrogin (T)	Yilgarn (S)	<i>FITZROY</i>
<i>DALE</i>	Narrogin (S)	<i>SOUTH-EASTERN</i>	
Mandurah (C)	Pingelly (S)	<i>LEFROY</i>	
Waroona (S)	Wagin (S)	Coolgardie (S)	Broome (S)
Murray (S)	Wandering (S)	Kalgoorlie-Boulder (C)	Derby-West Kimberley (S)
	West Arthur (S)	Laverton (S)	
	Wickepin (S)	Leonora (S)	
	Williams (S)	Menzies (S)	
		<i>JOHNSTON</i>	
		Dundas (S)	
		Esperance (S)	
		Ravensthorpe (S)	

Statistical divisions are indicated thus: *SOUTH-WEST*; sub-divisions thus: *BLACKWOOD*; statistical local areas thus: Manjimup (S). Cities are marked (C), Towns (T) and Shires (S).

## LOCAL GOVERNMENT AREAS AT 30 JUNE 1990

<i>Local government area (a)</i>	<i>Statistical division in which situated</i>	<i>Local government area (a)</i>	<i>Statistical division in which situated</i>
Albany (T)	Lower Great Southern	Leonora	South-Eastern
Albany	Lower Great Southern	Mandurah(C)	South-West
Armadale (C)	Perth	Manjimup	South-West
Ashburton	Pilbara	Meekatharra	Central
Augusta-Margaret River	South-West	Melville (C)	Perth
Bassendean (T)	Perth	Menzies	South-Eastern
Bayswater (C)	Perth	Merredin	Midlands
Belmont (C)	Perth	Mingenew	Central
Beverley	Midlands	Moora	Midlands
Boddington	Upper Great Southern	Morawa	Central
Boyup Brook	South-West	Mosman Park (T)	Perth
Bridgetown-Greenbushes	South-West	Mount Magnet	Central
Brookton	Upper Great Southern	Mount Marshall	Midlands
Broome	Kimberley	Mukinbudin	Midlands
Broomehill	Lower Great Southern	Mullewa	Central
Bruce Rock	Midlands	Mundaring	Perth
Bunbury (C)	South-West	Murchison	Central
Busseton	South-West	Murray	South-West
Canning (C)	Perth	Nannup	South-West
Capel	South-West	Narembeen	Midlands
Carnamah	Central	Narrogin (T)	Upper Great Southern
Carnarvon	Central	Narrogin	Upper Great Southern
Chapman Valley	Central	Nedlands (C)	Perth
Chittering	Midlands	Northam (T)	Midlands
Claremont (T)	Perth	Northam	Midlands
Cockburn (C)	Perth	Northampton	Central
Collie	South-West	Nungarin	Midlands
Coolgardie	South-Eastern	Peppermint Grove	Perth
Coorow	Central	Perenjori	Central
Corrigin	Upper Great Southern	Perth (C)	Perth
Cottesloe (T)	Perth	Pingelly	Upper Great Southern
Cranbrook	Lower Great Southern	Plantagenet	Lower Great Southern
Cuballing	Upper Great Southern	Port Hedland(T)	Pilbara
Cue	Central	Quairading	Midlands
Cunderdin	Midlands	Ravensthorpe	South-Eastern
Dalwallinu	Midlands	Rockingham(C)	Perth
Dandaragan	Midlands	Roebourne	Pilbara
Dardanup	South-West	Sandstone	Central
Denmark	Lower Great Southern	Serpentine-Jarrahdale	Perth
Derby-West Kimberley	Kimberley	Shark Bay	Central
Donnybrook-Balingup	South-West	South Perth (C)	Perth
Dowerin	Midlands	Stirling (C)	Perth
Dumbleyung	Upper Great Southern	Subiaco (C)	Perth
Dundas	South-Eastern	Swan	Perth
East Fremantle (T)	Perth	Tambellup	Lower Great Southern
East Pilbara	Pilbara	Tammin	Midlands
Esperance	South-Eastern	Three Springs	Central
Exmouth	Central	Toodyay	Midlands
Fremantle (C)	Perth	Trayning	Midlands
Geraldton (C)	Central	Upper Gascoyne	Central
Gingin	Midlands	Victoria Plains	Midlands
Gnowangerup	Lower Great Southern	Wagin	Upper Great Southern
Goomalling	Midlands	Wandering	Upper Great Southern
Gosnells (C)	Perth	Wanneroo (C)	Perth
Greenough	Central	Waroona	South-West
Halls Creek	Kimberley	West Arthur	Upper Great Southern
Harvey	South-West	Westonia	Midlands
Irwin	Central	Wickepin	Upper Great Southern
Jerramungup	Lower Great Southern	Williams	Upper Great Southern
Kalamunda	Perth	Wiluna	Central
Kalgoorlie-Boulder (C)	South-Eastern	Wongan-Ballidu	Midlands
Katanning	Lower Great Southern	Woodanilling	Lower Great Southern
Kellerberrin	Midlands	Wyalkatchem	Midlands
Kent	Lower Great Southern	Wyndham-East Kimberley	Kimberley
Kojonup	Lower Great Southern	Yalgoo	Central
Kondinin	Upper Great Southern	Yilgarn	Midlands
Koorda	Midlands	York	Midlands
Kulin	Upper Great Southern		
Kwinana (T)	Perth		
Lake Grace	Upper Great Southern		
Laverton	South-Eastern		

(a) Shire, unless marked (C) indicating city, or (T) indicating Town.

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9405.5	\$4.00	Road Traffic Accidents Involving Casualties q
9406.5	\$10.00	Road Traffic Accidents Involving Casualties

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[C]

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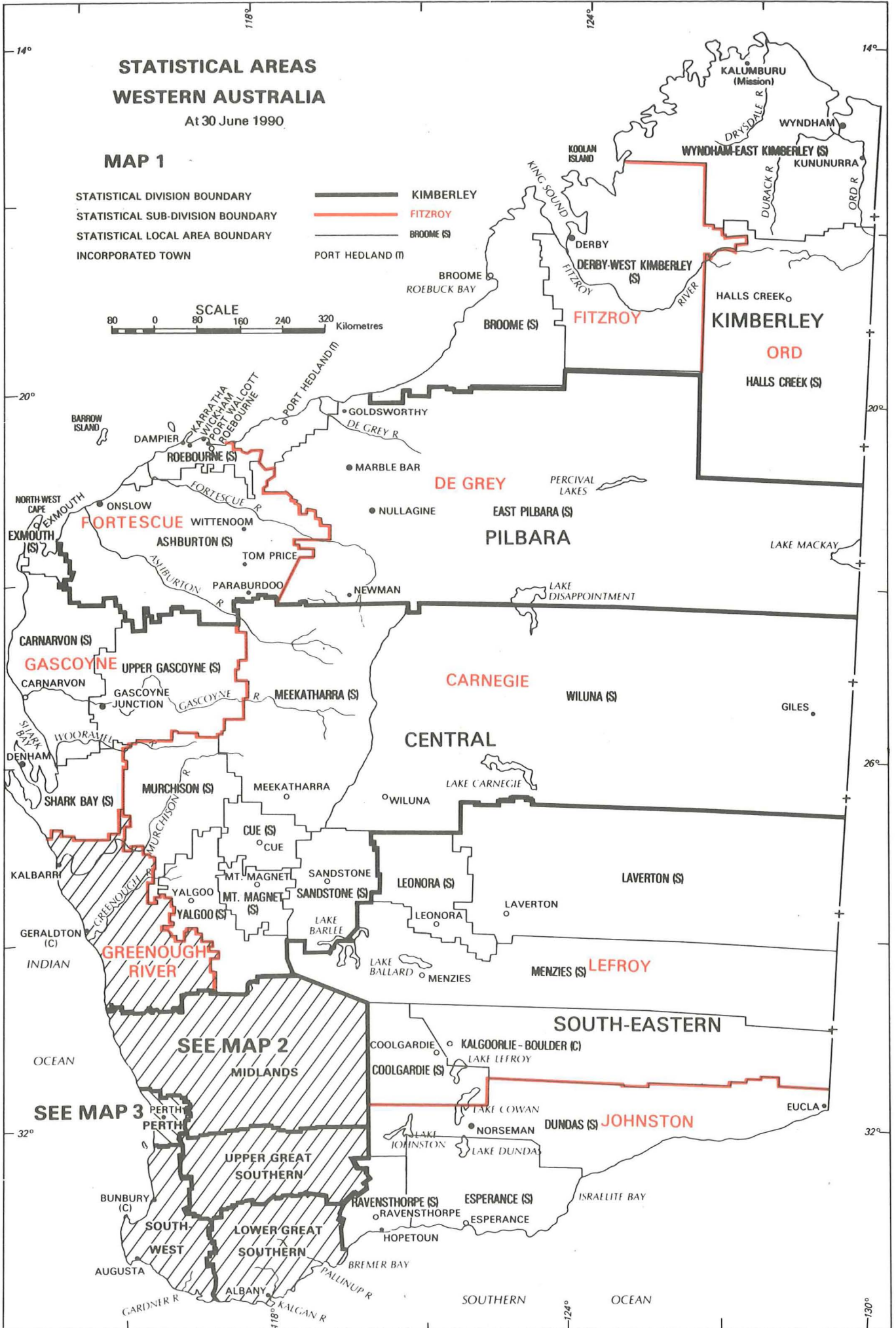
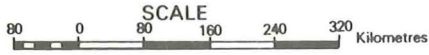
# STATISTICAL AREAS WESTERN AUSTRALIA

At 30 June 1990

## MAP 1

STATISTICAL DIVISION BOUNDARY  
 STATISTICAL SUB-DIVISION BOUNDARY  
 STATISTICAL LOCAL AREA BOUNDARY  
 INCORPORATED TOWN

**KIMBERLEY**  
**FITZROY**  
**BROOME (S)**  
 PORT HEDLAND (M)



SEE MAP 2  
 MIDLANDS  
 SEE MAP 3  
 PERTH  
 PERTH  
 UPPER GREAT SOUTHERN  
 SOUTH WEST  
 LOWER GREAT SOUTHERN

BUNBURY (C)  
 AUGUSTA  
 SOUTH WEST  
 LOWER GREAT SOUTHERN  
 ALBANY  
 BREMER BAY  
 HOPETOUN  
 RAVENSTHORPE (S)  
 RAVENSTHORPE  
 ESPERANCE (S)  
 ESPERANCE  
 ISRAELITE BAY  
 SOUTHERN OCEAN

COOLGARDIE  
 COOLGARDIE (S)  
 LAKE COWAN  
 NORSEMAN  
 DUNDAS (S)  
 JOHNSTON  
 EUCLA

LAKE JOHNSTON  
 LAKE DUNDA  
 LAKE BALLARD  
 MENZIES  
 LAKE BARLÉE  
 SANDSTONE  
 SANDSTONE (S)  
 LEONORA  
 LEONORA (S)  
 LAVERTON  
 LAVERTON (S)  
 WILUNA  
 WILUNA (S)  
 GILES

CARNEGIE  
 CENTRAL  
 EAST PILBARA (S)  
 PILBARA  
 LAKE CARNEGIE  
 LAKE DISAPPOINTMENT  
 LAKE MACKAY

DE GREY  
 MARBLE BAR  
 NULLAGINE  
 WITTENOOM  
 TOM PRICE  
 PARABURDOO  
 NEWMAN

BROOME (S)  
 BROOME  
 ROEBUCK BAY  
 DERBY  
 DERBY-WEST KIMBERLEY (S)  
 FITZROY  
 FITZROY RIVER  
 HALLS CREEK  
 HALLS CREEK (S)  
 KIMBERLEY  
 ORD  
 WYNDHAM-EAST KIMBERLEY (S)  
 WYNDHAM  
 KUNUNURRA  
 ORD R.  
 DURACK R.  
 DRYSDALE R.  
 KALUMBURU (Mission)  
 KOOLAN ISLAND

ROEBOURNE (S)  
 ROEBOURNE  
 WICKHAM  
 PORT WALKCOTT  
 ROEBOURNE  
 PORT HEDLAND (M)  
 GOLDSWORTHY  
 DE GREY R.  
 MARBLE BAR  
 NULLAGINE  
 WITTENOOM  
 TOM PRICE  
 PARABURDOO  
 NEWMAN

ASHBURTON (S)  
 ASHBURTON  
 MURCHISON (S)  
 MURCHISON  
 MEKATHARRA (S)  
 MEKATHARRA  
 CUE (S)  
 CUE  
 SANDSTONE  
 SANDSTONE (S)  
 LEONORA (S)  
 LEONORA  
 LAVERTON (S)  
 LAVERTON  
 WILUNA (S)  
 WILUNA

UPPER GASCOYNE (S)  
 GASCOYNE (S)  
 GASCOYNE  
 MURCHISON (S)  
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 MEKATHARRA (S)  
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 WILUNA

GREENOUGH RIVER  
 YALGOO (S)  
 YALGOO  
 MT. MAGNET (S)  
 MT. MAGNET  
 SANDSTONE (S)  
 SANDSTONE  
 LEONORA (S)  
 LEONORA  
 LAVERTON (S)  
 LAVERTON  
 WILUNA (S)  
 WILUNA

SHARK BAY (S)  
 SHARK BAY  
 MURCHISON (S)  
 MURCHISON  
 MEKATHARRA (S)  
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 CUE (S)  
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 WILUNA

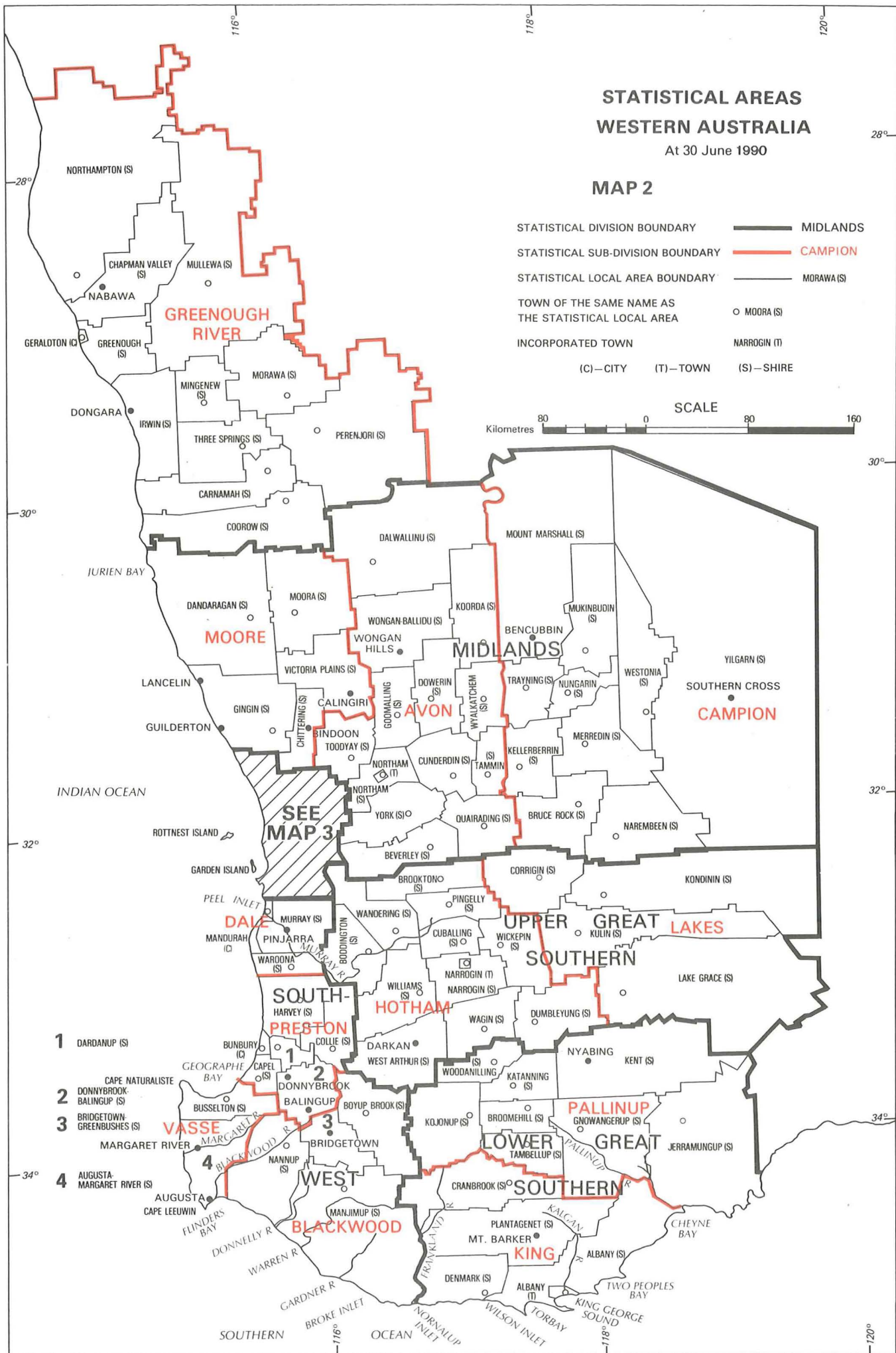
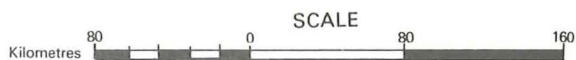
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 LEONORA  
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 LAVERTON  
 WILUNA (S)  
 WILUNA

# STATISTICAL AREAS WESTERN AUSTRALIA

At 30 June 1990

## MAP 2

- |   |          |              |
|---|----------|--------------|
| STATISTICAL DIVISION BOUNDARY                       |          | MIDLANDS     |
| STATISTICAL SUB-DIVISION BOUNDARY                   |          | CAMPION      |
| STATISTICAL LOCAL AREA BOUNDARY                     |          | MORAWA (S)   |
| TOWN OF THE SAME NAME AS THE STATISTICAL LOCAL AREA |          | MOORA (S)    |
| INCORPORATED TOWN                                   |          | NARROGIN (T) |
| (C)—CITY  | (T)—TOWN | (S)—SHIRE    |



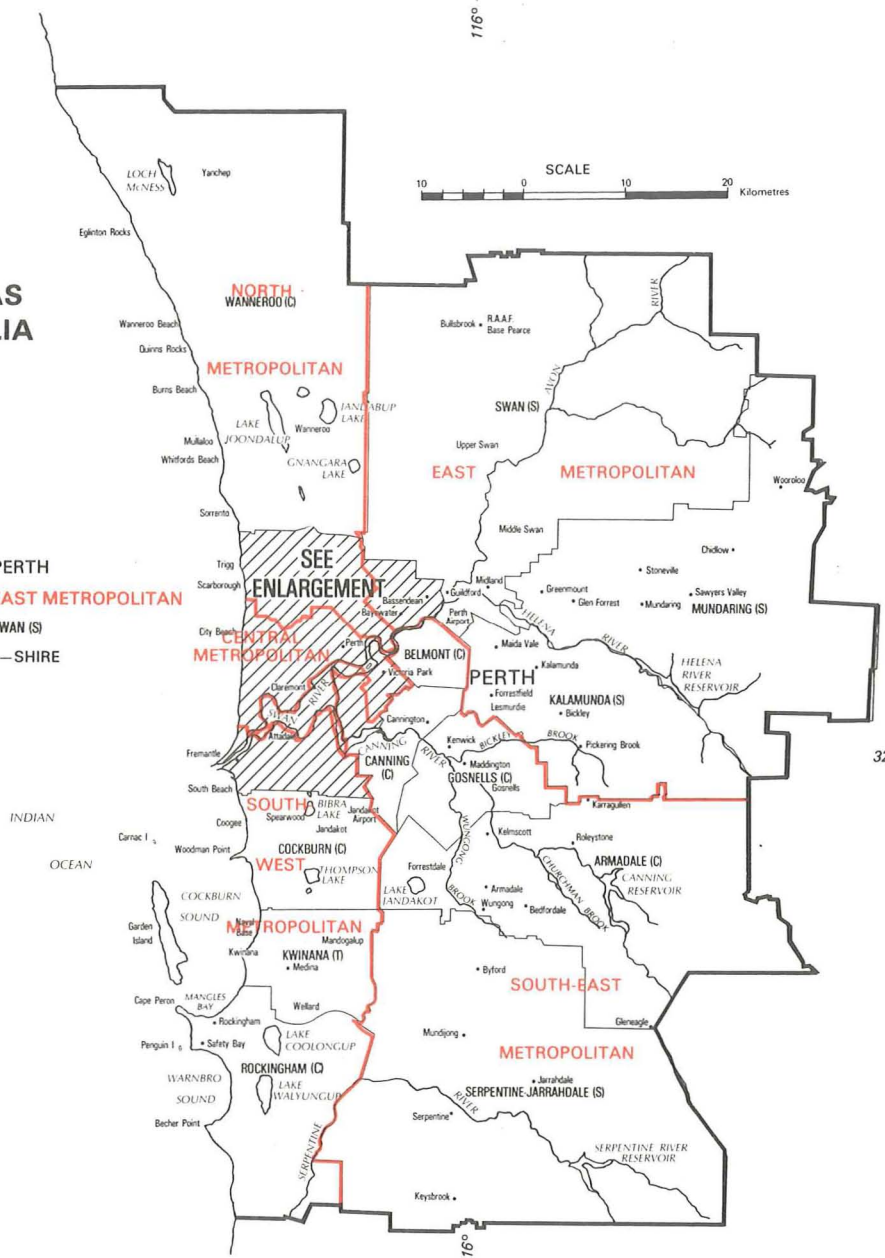


# STATISTICAL AREAS WESTERN AUSTRALIA

At 30 June 1990

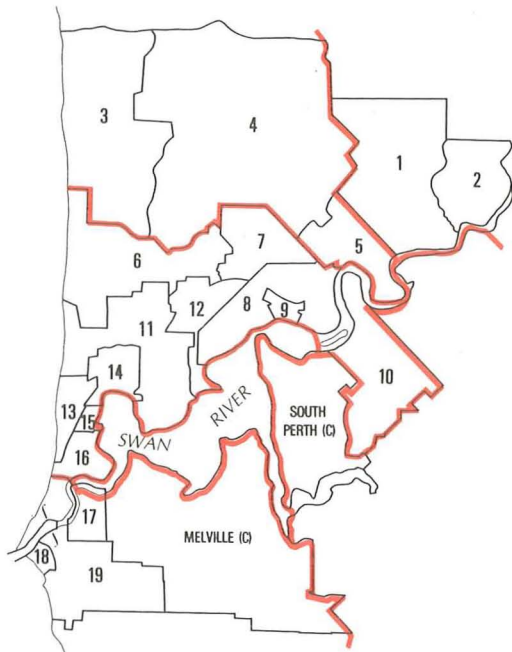
## MAP 3

- STATISTICAL DIVISION BOUNDARY ——— PERTH  
 STATISTICAL SUB-DIVISION BOUNDARY ——— EAST METROPOLITAN  
 STATISTICAL LOCAL AREA BOUNDARY ——— SWAN (S)  
 (C)—CITY (T)—TOWN (S)—SHIRE

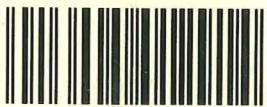
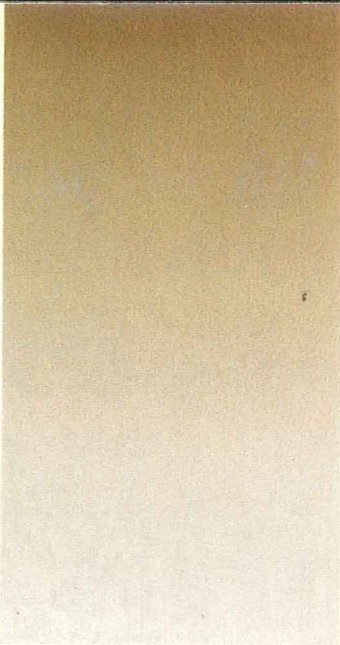


### ENLARGEMENT

1. BAYSWATER (C)
2. BASSENDEAN (T)
3. STIRLING (C)—WEST
4. STIRLING (C)—CENTRAL
5. STIRLING (C)—SOUTH-EASTERN
6. PERTH (C)—WEMBLEY—COASTAL
7. PERTH (C)—NORTH
8. PERTH (C)—OUTER
9. PERTH (C)—INNER
10. PERTH (C)—SOUTH
11. NEDLANDS (C)
12. SUBIACO (C)
13. COTTESLOE (T)
14. CLAREMONT (T)
15. PEPPERMINT GROVE (S)
16. MOSMAN PARK (T)
17. EAST FREMANTLE (T)
18. FREMANTLE (C)—INNER
19. FREMANTLE (C)—REMAINDER







2013005012914

ISSN 0083-8772

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**Recommended retail price: \$23.50**