
WATER RESOURCES

This chapter is divided into two major parts—existing water resources in Australia and the management of these resources. The former provides information on such topics as the geographic background to water resources, surface and ground water supplies and use, and the drainage divisions in Australia. The latter summarises Australian and State assessment and management of water resources.

The information in this chapter is largely derived from the *1985 Review of Australia's Water Resources and Water Use* (published by the Department of Primary Industries and Energy for the Australian Water Resources Council, November 1987, and available from AGPS bookshops).

For information concerning general, descriptive and historical matter see *Year Book* No. 37, pages 1,096–1,141 and *Year Book* No. 51, pages 228–31.

Introduction

Rainfall, or the lack of it, is the most important single factor determining land use and rural production in Australia. Chapter 5, Physical Geography and Climate of Australia contains details on geographical and climatic features that determine the Australian water pattern. The scarcity of both surface and ground water resources, together with the low rates of precipitation which restrict agriculture (quite apart from economic factors), has led to extensive programs to regulate supplies by construction of dams, reservoirs, large tanks and other storages.

Geographic Background

General

Water resources are determined by rainfall, evaporation and physical features including soil, vegetation and geology. Chapter 5, Physical Geography and Climate of Australia, contains a detailed description of the climatic features of the country. A brief description of the landforms appears in *Year Book* No. 61, pages 25–27. In assessing Australia's water resources, dependability and quality of supply must be considered, as well as quantity.

Topography

The major topographical feature affecting the rainfall and drainage patterns in Australia is the absence of high mountain barriers. Australia's topographical features range from sloping tablelands and uplands along the east coast Main Divide, through the low plain and marked depression in the interior to the Great Western Plateau.

Drainage

Only one-third of the Australian land mass drains directly to the ocean, mainly on the coastal side of the Main Divide and inland with the Murray–Darling system. With the exception of the latter, most rivers draining to the ocean are comparatively short but

account for the majority of the country's average annual discharge. Surface drainage is totally absent from some arid areas of low relief.

Climate

Australia's large area (7.7 million square kilometres) and latitudinal range (3,700 kilometres) have resulted in climatic conditions ranging from alpine to tropical. Two-thirds of the continent is arid or semi-arid, although good rainfalls (over 800 mm annually) occur in the northern monsoonal belt under the influence of the Australian-Asian monsoon, and along the eastern and southern highland regions under the influence of the great atmospheric depressions of the Southern Ocean. The effectiveness of the rainfall is greatly reduced by marked alternation of wet and dry seasons, unreliability from year to year, high temperatures and high potential evaporation.

Settlement

The availability of water resources controls, to a large degree, the possibility and density of settlement; this in turn, influences the quality of the water through production and disposal of waste. Most early settlements were established on the basis of reliable surface water supplies and, as a result, Australia's population is concentrated along the coast, mainly in the comparatively fertile, well-watered east, south-east and far south-west.

As settlement spread into the dry inland grazing country, the value of reliable supplies of underground water was realised. Observations of the disappearance of large quantities of the rainfall precipitated on the coastal ranges of eastern Australia eventually led to the discovery of the Great Artesian Basin which has become a major asset to the pastoral industry. Development, however, has not been without costs. Significant environmental degradation and deterioration in water quality are becoming evident.

For further information on the influence of water resources on the spread of settlement in Australia see *Year Book* No. 61, page 860.

In the text and tables below, water volume, usage and flow are shown in litres rather than in cubic metres as in earlier issues. Equivalence and terms used are:

- (KL) Kilotres= 1.00×10^3 litres (1 cubic metre)
- (ML) Megalires= 1.00×10^6 litres
- (GL) Gigalires= 1.00×10^9 litres
- (TL) Teralires= 1.00×10^{12} litres

Surface Supplies

Distribution and volume

As described above, permanent rivers and streams flow in only a small part of the continent. The average annual discharge of Australian rivers has been recently assessed at 398 teralires (TL) of which 100 TL is now estimated to be exploitable for use on a sustained yield basis. This is small in comparison with river flows on other continents. In addition, there is a pronounced concentration of runoff in the summer months in northern Australia while the southern part of the continent has a distinct, if somewhat less marked, winter maximum.

Variability of flow

Even in areas of high rainfall, large variability in flow means that, for local regional development, most streams must be regulated by surface storage. However, in many areas

evaporation is so great that storage costs are high in terms of yield. Extreme floods also add greatly to the cost of water storage, because of the need for adequate spillway capacity.

Potential development

The portion of runoff able to be diverted for use is very low compared to other continents, and results from the high variability of streamflow, high rates of evaporation and the lack of storage sites on many catchments. On an Australia-wide basis, only 21.5 per cent of the divertible resource has currently been developed for use; much of the remaining resource is available in remote regions where development is impractical and uneconomic. In areas such as the Murray–Darling Division, where water is a scarce resource, there are few resources not yet developed, and management is focusing on greater efficiency in water use.

SURFACE WATER RESOURCES AND USE BY DRAINAGE DIVISIONS

(Source: Australian Water Resources Council, 1987)

		<i>Surface water resources (teralitres per annum)</i>				
<i>Drainage division</i>		<i>Mean annual runoff</i>	<i>Divertible resource</i>	<i>Developed Use</i>	<i>resource</i>	<i>Use as % of developed</i>
I	North-East Coast	83.9	22.9	3.5	0.97	28
II	South-East Coast	41.9	15.1	4.3	2.03	47
III	Tasmania	52.9	10.9	1.0	0.17	17
IV	Murray–Darling	24.3	12.4	10.0	8.05	81
V	South Australian Gulf	0.9	0.7	0.1	0.23	*100
VI	South-West Coast	6.7	2.9	0.4	0.38	95
VII	Indian Ocean	4.0	0.3	—	0.00	0
VIII	Timor Sea	80.7	22.0	2.0	0.10	5
IX	Gulf of Carpentaria	92.5	13.2	0.1	0.12	*100
X	Lake Eyre	6.3	0.2	—	0.01	33
XI	Bulloo–Bancannia	1.1	—	0.00	0.00	0
XII	Western Plateau	1.6	0.1	0.00	0.00	0
Australia		398	100	21.5	12.06	56

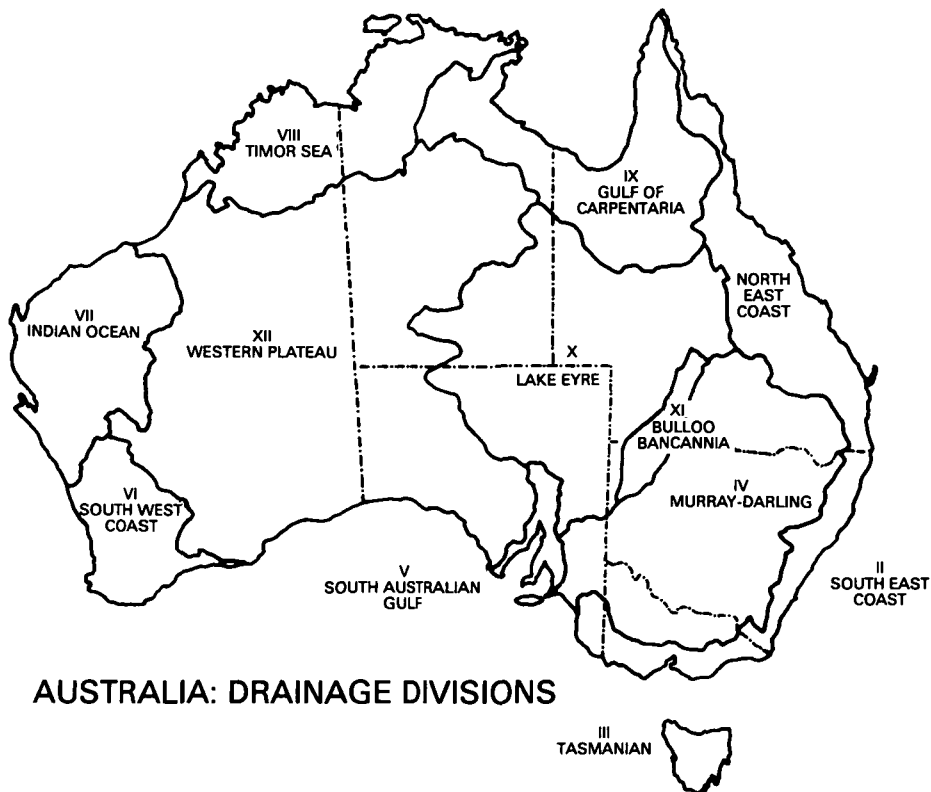
* Includes use of water from unregulated sources.

The resource is assessed within a framework comprising four levels:

- the **total water resource** is the volume of water present in the environment, measured as mean annual runoff for surface water, and mean annual recharge for groundwater;
- the **divertible resource** is the portion of runoff and recharge which can be developed for use;
- the **developed resource** is the portion of the divertible resource which has been developed for use; and
- **resource utilisation** is a measure of the portion of the developed resource which is actually used.

Emphasis is given to the second level of assessment, the divertible resource, as the prime measure of the resource. The divertible resource is defined as 'the average annual volume of water which, using current technology, could be removed from developed or potential surface water or groundwater sources on a sustained basis, without causing adverse affects or long term depletion of storages'.

Drainage Divisions



AUSTRALIA: DRAINAGE DIVISIONS

Ground Water Supplies, Water Quality and Water Use

For further information concerning ground water supplies, water quality and water use in Australia see *Year Book* No. 73, pages 497-499.

Major Dams and Reservoirs

A *Register of Large Dams in Australia* was published by the Australian National Committee on Large Dams in December 1982. The publication included, in chronological order, all large dams completed or under construction up to December 1982. For a listing of dams with a gross reservoir capacity of more than 100 GL, see *Year Book* No. 73, pages 499-501. The list is based on the above publication and supplementary data for the latest years. A further edition of the Register of Large Dams in Australia is in preparation.

Water Management

Australia's water resources are managed by a large number of resource management agencies, irrigation authorities, metropolitan water boards, local government councils and private individuals. State authorities dominate the assessment and control of water resources as, under the Commonwealth Constitution, primary responsibility for management of water rests with the individual State Governments. The Commonwealth Government is responsible for matters relating to its Territories, and participates indirectly through financial assistance or directly in the coordination or operation of interstate projects through bodies such as the Murray-Darling Basin Commission. In other instances where political boundaries intersect some river basins, cooperation between Governments has been necessary to develop resources.

Australia's attitudes to water resources management have changed substantially over the last twenty years. Water management is no longer seen just in terms of storing water and regulating streams for consumption, but also in terms of conserving unregulated streams in an unmodified landscape for wild life preservation or recreation purposes or for possible social or economic use by future generations. In addition, agricultural, industrial and urban development has led to greater attention being paid to water quality management.

The development of water resources in the States has an important bearing on the Commonwealth's broad interests in economic management, resource allocation, foreign exchange earnings, distribution of income and related matters. Consequently, the Commonwealth has participated in water resource matters in the States in instances of mutual Commonwealth-States concern or in the national interest.

Commonwealth water policy

In September 1984, the Commonwealth released its new water policy. The objectives are to:

- ensure availability of water, adequate in quantity for all beneficial uses;
- adopt measures which improve the efficiency of water supply and use;
- develop a comprehensive approach to inter-related water and land management issues;
- encourage comprehensive long-term plans for the development and management of water resources; and
- implement financial and economic policies which distribute the costs of water supplies equitably and provide incentives for the more economic use of resources at government and individual level.

As part of the policy, funds are available to the States and the Northern Territory under a program, the Federal Water Resources Assistance Program (FWRAP) which commenced in 1984-85. Funds are available for purposes which include:

- water resource development or management activities/projects for agriculture, urban or industrial purposes;
- floodplain management;
- collaborative information programs;
- salinity reduction and land drainage;
- State-wide and broad regional water plans; and
- public education.

The Country Towns Water Supply Improvement Program which commenced under the Community Employment Program, has been continued as a sub-program of FWRAP.

The Commonwealth also contributes to the expenses of the Murray–Darling Basin Commission under the River Murray Waters Agreement and the Murray–Darling Basin Agreement. This includes the Commission's expenditure on administration, the construction and investigations program related to its regulatory responsibilities and the Murray–Darling Basin Salinity and Drainage Strategy and Natural Resources Management Strategy.

Australian Water Resources Council—AWRC

The AWRC was established in 1963 by joint action of the Commonwealth Government and the State Governments. The Council consists of the Commonwealth, State and Northern Territory Ministers with portfolio responsibilities for water resources; it is chaired by the Commonwealth Minister for Primary Industries and Energy.

The Council provides the peak forum for the water industry. A major shift in emphasis that has occurred in the water industry in recent years has been from water resource development to resource management and the focus of AWRC activities is on industry-wide issues such as micro-economic reform, particularly through demand management measures and organisational management. The AWRC is playing a leading role in the development of a national strategy for sustainable water quality management. The strategy provides a nationally consistent set of principles for water quality management, emphasising the need for economic efficiency as well as the need to maintain and improve environmental quality.

Council's terms of reference include the promotion of modern technology in the water industry, development of policies to protect the quality and quantity of surface and underground waters, coordination and dissemination of information, development of effective human resources management techniques and liaison with overseas and international organisations in the field of water resources. Council is supported by a Standing Committee, comprising permanent heads of relevant State authorities and the Commonwealth Department of Primary Industries and Energy; and four advisory committees.

Water resources research

The Department of Primary Industries and Energy is responsible for Commonwealth interests in water resource matters.

In July 1990, the Land and Water Resources Research and Development Corporation (LWRRDC) was established to provide leadership and national coordination of research into land, water and related non-commercial forestry issues. It will also be responsible for determining national research priorities and in doing so will consult its five 'representative organisations': the Australian Conservation Foundation, National Farmers' Federation, National Association of Forest Industries, Standing Committee on Soil Conservation, and the Standing Committee of the Australian Water Resources Council. The LWRRDC, which will initially be wholly funded from Commonwealth appropriation, will have \$10.92 million in funds in its establishment year (1990–91).

In regard to water research and development issues, the LWRRDC assumed the responsibilities performed until June 1990 by the Australian Water Research Advisory Council (AWRAC). AWRAC was established in June 1985 to advise on national research needs and on the Commonwealth funded National Water Research Program (NWRP). Funding for the NWRP was \$7.3 million in 1988–89 and \$7.0 million in 1989–90. Projects funded under the 1989 call included research on salinity, groundwater, stream ecology, wastewater management, hydrology and water treatment and quality. Activities to effectively disseminate the results of research were also undertaken.

The NWRP also funds twelve Centres of Concentration in Water Research and provides financial assistance to the Murray–Darling Freshwater Research Centre in Albury, the Urban Water Research Association of Australia and the National Irrigation Research Fund.

In 1989–90, CSIRO spent approximately \$15 million (of direct appropriation funds) on water resources research. Competitive research grants, consultancies, and collaborative research provides an additional amount of approximately \$5m for work of direct relevance to the Australian water industry. The Division of Water Resources (resulting from the amalgamation in 1987 of the Divisions of Groundwater Research, Water and Land Resources, and the Centre for Irrigation and Freshwater Research) has a total staff of more than 230 with laboratories in Perth, Adelaide, Canberra and Griffith. The Division's task is to develop new and improved practices for the definition, use, and management of Australia's water resources. The Division of Chemicals and Polymers, based at Clayton, Victoria, is responsible for research on new methods of treating municipal water and wastewater, and cleaning up effluents from a wide range of manufacturing industries. The Centre for Environmental Mechanics conducts research on soil–water processes, evapotranspiration and physical limnology. The Division of Coal and Energy Technology carries out research aimed at assessing the impact on natural waters of mining and industrial processing. Research on soil–water processes and erosion is conducted by the CSIRO Division of Soils.

CSIRO is a partner with AWRAC, the River Murray Commission, and the Albury–Wodonga Development Corporation in the Murray–Darling Freshwater Research Centre.

At the State level, water agencies have extensive laboratory facilities for water quality testing. However, most water related research is undertaken in research centres associated with agriculture, fisheries, forestry and environmental authorities. At the regional level, some of the larger authorities providing water supply and sewerage services undertake applied research on a very limited scale.

A significant proportion of Australian water research is undertaken by researchers in tertiary education institutions with the aid of either internal funding or grants from outside bodies, such as AWRAC or the Australian Research Grants Committee. Water research is carried out within a range of disciplines, including the biological and social sciences and engineering.

International Aspects and National and Interstate Agreements

For further information on international aspects and for national and interstate agreements on the management of water resources *see Year Book* No. 73, pages 504–507.

New South Wales

Administration

The New South Wales Department of Water Resources was set up in 1987, succeeding the previous Water Resources Commission. The Department is responsible for maximising the long term benefits of the State's water resources to meet the changing diversity of water uses and values of the community. Main responsibilities of the Department are to coordinate policies and programs of State and local government authorities providing water supplies and other water services; plan for future water needs; operate the rural water supply network; control the use and management of surface water and ground water resources through water licensing and transfer systems; provide floodplain management and flood mitigation services in non-tidal areas; provide for wetlands, wild and scenic rivers and instream or environmental water needs; improve water quality; control salinity; maintain water resource assessment programs; and effectively manage the State's water infrastructure.

Water use

Irrigation takes up the largest volume of consumption water use in NSW, on average 75 per cent, with urban water consumption in Newcastle, Sydney and Wollongong taking up the bulk of the remaining 25 per cent.

Urban water

Major metropolitan urban water supplies are managed by central water boards at Newcastle and Sydney. Water sources for major cities of Sydney and Wollongong are good quality rivers and associated storages on the Hawkesbury, Georges and Shoalhaven Rivers. Newcastle's water supply is taken from the Chichester and Grahamstown Reservoirs and from ground water in coastal sandbeds. Country towns develop their own water supply systems ranging from run-of-river pumping to ground water extractions, to dams built specifically for urban water supply. Metropolitan water authorities are increasingly managing urban water demand to reduce water consumption by a range of mechanisms including pricing and persuasion. Drought management and asset management are more recent areas of concern for metropolitan water utilities who are also increasing their interest in balanced environmental management of water supply catchments.

Irrigation

The bulk of irrigation in New South Wales is within the Murray–Darling Basin, the centre of recent Commonwealth/State initiatives in land and water management to reduce salinity problems. Twenty four storages, including four shared with Victoria and South Australia and one shared with Queensland, regulate water supplies in the Basin.

Two main irrigation arrangements exist Statewide. Licensed irrigation occurs where licensees take water from rivers, usually by pumping at their own cost. Around 1.5 million megalitres per annum is used in this way.

Irrigation Areas and Districts form the second type of irrigation. These are located on the three southern inland rivers—the Murray, Murrumbidgee and Lachlan and include over 6,300 farms and holdings covering nearly 1.4 million hectares. About a third of this area is usually irrigated using 1.4 million megalitres per annum. Extractions from licensed high-yielding bores now approach 300 gegalitres per annum.

The annual gross value of production in the Murray–Darling system is around \$800 million, about 20 per cent of the State's total agricultural production. Nevertheless the growing extent of land degradation and salinisation in the Murray–Darling Basin is reducing productivity and increasing costs of production.

Future planning and programs

Water management is coordinated through the NSW Water Resources Council, which was established in 1988 and advises the Minister for Natural Resources. It is composed of the heads of government agencies which have a role in water management along with representatives of major interest groups. The Council is coordinating state water planning activities and has released a State Rivers Policy and other policies in being developed.

With large dams on all the main inland rivers in NSW, few further major irrigation storages are likely to be constructed. An enlargement of Pindari Dam on the Severn River in the north of the State is planned, to provide an additional volume of 85,000 megalitres of regulated supply annually. This is to be funded as a joint venture with local water users and the Government, the first time that private financial contributions towards the construction of a major irrigation storage dam has been negotiated.

However, improving water use efficiency is one management target for the irrigation sector and heavy industry. This is being achieved throughout the State through improved rural water delivery systems, management of urban water demand, and monitoring of agricultural and urban water losses. In the rural sector transferable water rights, licensing and variable water allocations serve to increase water use efficiency.

Ameliorating waterlogging and salinisation of farming lands is an environmental management priority for the Commonwealth and States, and NSW is pursuing this through a State funded SALT ACTION initiative and through the Murray–Darling Basin Ministerial Council. For further information on salination see special article *Salinity—An Old*

Environmental Problem in Year Book No. 73 (1990). NSW is achieving the integration, coordination and consultation required in developing land and water management on a catchment basis through the Total Catchment Management framework which was given statutory backing in the *Catchment Management Act, 1989*. A state coordinating committee oversees policy while seven regional Total Catchment Management (TCM) committees have been established to coordinate programs and planning. Floodplain management and flood irrigation programs are being continued. Policies addressing State Wetlands, State Rivers, and Groundwater are being prepared. Aspects of development such as intensive cattle feed lots are being promoted vigourously, while potential for water quality inputs are being closely monitored.

Victoria

Administration

Water resources in Victoria are administered by three major agencies, the Office of Water Resources, the Melbourne Metropolitan Board of Works and the Rural Water Commission. The Office of Water Resources, formerly the Department of Water Resources, is an agency of the Department of Conservation and Environment (established 1990), responding to the Minister on matters regarding the water sector. The Melbourne Metropolitan Board of Works is a statutory corporation servicing most of Melbourne with water and sewerage as well as providing various other services such as drainage and parklands. The Rural Water Commission is a public business authority primarily concerned with providing water for a variety of uses to rural Victoria.

Aside from these major agencies, some one hundred and forty non-metropolitan authorities and thirty river management authorities are involved in managing the resource. Non-metropolitan authorities range widely in size, serving from 200,000 to less than a thousand people in rural townships, while river management authorities are responsible for protecting the State's rivers.

Water use

In an average year water consumption in Victoria is as follows:

- 77 percent irrigated agriculture;
- 16 percent urban; and
- seven percent rural stock and domestic.

Rural water supply systems

- **Goulburn–Campaspe–Loddon.** The main storage is Lake Eildon with a capacity of 3,390 gigalitres. The main products in these systems are dairy products, fruit, wool and fat lambs. Annual production of deciduous canning fruits in the eastern part of the system is about two thirds of Australia's total.
- **Murray River System.** The Murray Valley Irrigation Area and the Torrumbarry Irrigation System are irrigated by water diverted at the Yarrawonga and Torrumbarry Weirs respectively. These areas are devoted mainly to dairying, fat lambs, fruit, vineyards, orchards and market gardens. Downstream from Swan Hill, the First Mildura Irrigation Trust and four Commission Districts are supplied by pumping, and produce mainly dried vine fruits, citrus fruits and table and wine grapes.
- **Southern Systems.** The Macalister district, supplied from the Macalister River and regulated by Lake Glenmaggie, is devoted mainly to dairying.
- **Werribee and Bacchus Marsh.** These districts produce fresh fruit, vegetables and dairy products mainly for the local domestic market. Irrigation is supplied from the Werribee River system which is regulated by three main storages: Pykes Creek Reservoir, Melton Reservoir and Lake Merrimu.
- **Wimmera–Mallee Domestic and Stock Supply System.** Storages in the Grampian Ranges ensure farm water supplies for dry land, pastoral and cereal farming in the

Wimmera and Mallee. There are small areas of irrigation supplied from this system near Horsham and Murtoa.

Future programs

Future capital programs for the water sector in Victoria include:

- provision of water distribution and sewerage services to developing metropolitan areas and regional country centres;
- improved water and sewage treatment facilities; particularly in non-metropolitan regions; and
- infrastructure replacement, including rehabilitation of headworks in irrigation areas.

Queensland

Administration

The control of surface and underground water is exercised by the Commissioner of Water Resources on behalf of the Crown through the licensing of all artesian bores, sub-artesian bores within districts declared for the purpose, and works for the conservation and use of surface water together with the issuing of permits for domestic and stock water use.

In respect of the water resources of the State, the Commission is required to prepare a complete description and keep a record of naturally occurring surface and underground water; take steps to protect the resources from factors likely to be detrimental to their quality or diminish their quantity; investigate and survey any natural water resource; coordinate the investigation, evaluation and development of plans for the control of floodwaters and mitigation of flood damage; construct and manage works for the conservation, replenishment, utilisation and distribution of water; provide advice to local authorities in relation to water supply, sewerage, drainage, flood mitigation and swimming pools; and provide an extension and design service for on-farm development of water resources.

As the water resource assessment and planning authority, the coordination of this resource is ensured, for the net benefit of the community. This includes rural, urban, industrial, mining and other users to bring the overall planning together for continuity. The Commission assesses the water resources and determines how these can best satisfy present and future demands for water related activities. The Commission develops, manages, operates and maintains all State owned water conservation works, having an overall management role at the broad resource level as well as in day-to-day activities of many areas.

Summary of schemes

Approximately half of the area irrigated in Queensland now uses water from storages constructed by the Water Resources Commission. The balance is irrigated from unsupplemented surface or underground supplies spread widely throughout the State. Because of the predominance of irrigation by private diversion from streams, as opposed to channel systems delivering water to farms, most of the storages release water to maintain supplies downstream.

Irrigation areas and projects

Approximately one-third of the area irrigated in Queensland each year is concentrated in eight Irrigation Areas constituted under the *Water Resources Act 1989* where the supply is generally reticulated by channel systems to the farms. Irrigation projects are schemes established under the *Water Resources Act 1989*, where water is released from storages to maintain supplies for pumping under licence to land adjacent to the streams. Details of the projects are set out in the accompanying table.

IRRIGATION AREAS AND PROJECTS, QUEENSLAND, 1989-90

	<i>Announced allocations(a)</i>				<i>Actual use(a)</i>		
	<i>Irrigation</i>		<i>Other uses</i>		<i>Irrigation</i>	<i>Other uses</i>	<i>Area irrigated</i>
	<i>Outlets</i>	<i>Allocation</i>	<i>Outlets</i>	<i>Allocation</i>			
	No.	megalitres	No.	megalitres	megalitres	megalitres	hectares
Irrigation Areas—							
Bundaberg(a)	2,227	318,254	6	15,625	193,856	7,945	45,295
Burdekin River	592	72,406	234	114	82,332	115	15,138
Dawson Valley	304	43,801	9	3,043	25,091	1,411	4,874
Emerald	226	99,553	4	27,448	107,349	21,754	21,578
Eton	574	53,930	48	8,567	24,497	9,967	14,653
Lower Mary River	149	15,665	—	—	9,637	—	3,400
Mareeba-Dimbulah	1,223	81,154	1,182	80,059	60,165	138,718	30,016
St George(b)	271	71,511	31	3,368	61,625	2,740	14,150
<i>Sub-Total</i>	<i>5,566</i>	<i>756,274</i>	<i>1,514</i>	<i>138,224</i>	<i>564,552</i>	<i>182,650</i>	<i>149,104</i>
Irrigation projects—							
Awoonga-Callide Pipeline	—	—	2	11,000	—	10,401	—
Barker-Barambah	116	28,829	4	1,600	5,107	1,715	4,700
Bedford Weir							
(Company Pipelines)(c)	n.a.	n.a.	15	4,987	n.a.	3,691	—
Bingeang Weir							
(Company Pipelines)(c)	n.a.	n.a.	28	9,852	n.a.	8,292	—
Blackwater Water							
Supply System	—	—	26	6,639	—	6,386	—
Bowen-Broken Rivers	—	—	47	9,268	—	2,224	—
Boyne River	53	15,901	—	—	5,572	—	1,100
Callide Dam							
(and Pipelines)	343	30,272	19	4,898	22,081	4,097	12,400
Chinchilla Weir	30	2,942	1	1,160	1,139	669	1,200
Condamine Groundwater	352	65,420	14	4,008	29,901	2,594	n.a.
Dumaresq River	183	62,744	5	1,575	17,454	1,481	10,500
Eungella Dam							
(and Pipelines)	—	—	44	6,400	—	5,557	—
Fitzroy River Barrage(d)	140	11,341	—	—	n.a.	—	n.a.
Logan River	165	11,196	6	4,130	3,310	1,711	3,906
Lower Lockyer	188	11,412	—	56	5,454	—	4,300
Macintyre Brook	153	18,204	1	450	6,571	310	2,300
Mary Valley	208	12,275	4	7,014	5,747	3,884	2,760
Tarong Water Supply							
System	—	—	—	27,327	—	27,327	—
Three Moon Creek	110	13,707	8	601	12,218	459	3,500
Upper Burnett	240	29,673	4	1,560	18,257	687	2,800
Upper Condamine	107	29,543	3	3,328	15,215	2,188	9,600
Warrill Valley	424	20,005	6	13,700	8,313	4,715	8,170
<i>Sub-Total</i>	<i>2,812</i>	<i>363,464</i>	<i>237</i>	<i>119,553</i>	<i>156,339</i>	<i>88,388</i>	<i>67,236</i>
Total	8,378	1,119,738	1,751	257,777	720,891	271,038	216,340

(a) Includes Groundwater component. (b) Irrigation includes some waterharvesting component. (c) Now included in Emerald Irrigation Area figures. (d) Tentative figures, being reviewed and may change.

Underground water supplies

The availability of underground water, particularly the Great Artesian Basin, has played a major part in the development of the pastoral industry in Queensland. Underground water is also used extensively for irrigation on individual farms, particularly along the coastal fringe, and for domestic purposes. Some 45 per cent of the area irrigated in Queensland receives its supplies from underground sources. In accordance with the requirements of the *Water Resources Act 1989* the investigation of the availability of underground water is being pursued by geological mapping, investigation drilling and hydro-geological assessment. The predominant areas where water from this source is used for irrigation are the Burdekin Delta, Condamine Valley, Bundaberg, Lockyer Valley, Callide Valley and Pioneer Valley.

Groundwater supply and drainage schemes

The *Water Resources Act 1989* provides for the constitution of an area for various works including water supply for stock, domestic and irrigation purposes, drainage and improvement of subterranean water supplies and the creation of a Board to administer the area.

Seventeen Drainage schemes, 57 Bore Water areas and 24 Rural Water Supply schemes are in operation.

Western Australia

Administration

The Water Authority of Western Australia controls the majority of water-related services in Western Australia. It was constituted under the provisions of the *Water Authority Act 1984*, and administers eight other Acts and associated by-laws and regulations.

The Water Authority is responsible, under the control of the Minister for Water Resources, for the general administration of the Act. An eleven-member Board of Management controls the Authority's operations and reports to the Minister.

The Water Authority 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 several 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, which range from town schemes serving fewer than 50 people to the Perth metropolitan scheme serving a population of 1,100,000.

The table which follows shows the principal water storages in Western Australia.

Considerable use is made of ground water by individual farmers, pastoralists, market gardeners, etc., and it is estimated that over 100,000 bores are in use in the State. Both artesian and non-artesian 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, mining companies are responsible for the provision of their own water supplies. Industries also use ground water in substantial quantities, particularly in the processing of titanium, iron and alumina.

RESERVOIRS—STORAGE CAPACITY(a)
(Megalitres)

<i>Reservoir</i>	<i>Storage Capacity</i>	<i>Reservoir</i>	<i>Storage Capacity</i>
Canning(b)	90,500	Samson Brook	9,170
Churchman Brook(b)	2,200	Serpentine Pipehead(b)	2,640
Drakes Brook	2,290	Serpentine(b)	194,500
Fitzroy	4,650	17-Mile Dam(c)	5,489
Glen Mervyn	1,490	South Dandalup(b)	208,200
Harding	63,800	Stirling	56,123
Harvey Weir	9,126	Victoria(b)	860
Kununurra Lake (Ord River)	97,400	Waroona	14,954
Logue Brook	24,300	Wellington	184,900
Mundaring	77,000	Wungong(b)	60,000
Lake Argyle (Ord River)	5,797,000		

(a) At 30 June, 1989. (b) Serves the Perth Metropolitan Area. (c) On Uralla Creek, an anabranch of the Fitzroy River.

Perth metropolitan water supply

Perth is supplied from a number of dams and pipeheads in the Darling Range and from ground water schemes located on the Swan Coastal Plain. Water gravitates or is pumped from these sources to service reservoirs and tanks located at high points over the metropolitan area for gravity feed to consumers. Perth's water consumption is currently about 200 gegalitres per year and is increasing.

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 ground water usage in Broome, Gascoyne, Swan and South West Coastal Ground Water areas. The control of other areas has been tailored to the specific problems known to exist.

- **Goldfields and Agricultural Areas Water Supply.** This scheme provides water from Mundaring Weir to consumers in the Central Agricultural Areas and the Eastern Goldfields.
- **West Pilbara Water Supply Scheme.** The West Pilbara Water Supply serves the towns of Dampier, Karratha, Wickham, Point Samson and Roebourne as well as the industrial complexes at Dampier, the Burrup Peninsula and Cape Lambert. Water is supplied exclusively from the Millstream aquifer and the Harding Dam.
- **Geraldton Regional Water Supply Scheme.** The Geraldton Regional Water Supply serves consumers in the towns of Geraldton, Dongara, Port Denison, Mullewa, Walkaway, Eradu and Narngulu with water being drawn from the Wicherina, Allanooka and Wye Springs borefields.
- **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 is drawn from Wellington Reservoir, which has a capacity of 185 million m³, and supplied to towns from Brookton and Kondinin in the north to Kojonup and Gnowangerup in the south and to Lake Grace in the east as well as 600,000 hectares of farmland.
- **Port Hedland Regional Water Supply Scheme.** The Port Hedland Regional Water Supply provides water for the consumers of Port Hedland and South Hedland from the complementary De Grey and Yule River borefields.
- **Lower Great Southern Towns Water Supply Scheme.** This scheme supplies the towns of Albany, Mt Barker and Kendenup. Water is drawn from three sources; Two Peoples Bay east of Albany (from which the water is treated for colour removal), Limeburner's Creek and bores which are located on the west of Princess Royal Harbour.
- **Mandurah Regional Water Supply Scheme.** This scheme provides water to the town of Mandurah and areas to the south and east. Approximately 90 per cent of the water consumed is supplied by gravity from the South Dandalup Dam with the remainder supplied from bores at Ravenswood.
- **Supplies to other country towns.** Nearly 150 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 responsible for the provision and maintenance of tanks and wells as a source of cartage water for farmers and a number of small communities in gold mining and agricultural areas.

The Water Authority also undertakes design and construction of water services for Aboriginal communities on behalf of the Aboriginal and Torres Strait Islander Commission. The Authority under contract to the Aboriginal Affairs and Planning Agency assists communities in operating and maintaining schemes and training community operators.

Irrigation schemes

The Water Authority is responsible for the operation and maintenance of seven irrigation and 15 drainage schemes throughout the State from Albany in the south to Kununurra in the north.

Irrigation schemes have been established by the State Government on the coastal plain south of Perth in the Waroona, Harvey, Collier River and Preston Valley Irrigation Districts between Waroona and Donnybrook, the water being channelled from dams in the adjacent Darling Range.

There is a thriving plantation industry situated at Carnarvon near the mouth of the Gascoyne River. This centre is one of the major producers in Western Australia of tomatoes, watermelons, pumpkins, cucumbers, capsicums and runner beans. Carnarvon also supplies capsicums, zucchinis and pumpkins to the eastern States. It produces over half the bananas consumed in Western Australia as well as limited supplies of citrus fruit, mangoes and avocados.

The rainfall at Carnarvon is extremely variable and averages little more than 230 millimetres per annum. Agricultural development has been made possible only by irrigation with ground water. Water is obtained from the growers' own irrigation pumping plants and from the government-controlled Carnarvon Groundwater Supply Scheme which is supplied from bores along the Gascoyne River.

The Ord Irrigation Project provides for the ultimate development of 72,000 hectares of clay soils and additional areas of sandy soils adjoining the clays. Water is currently supplied to 14,000 hectares.

South Australia

Administration

All major water resources and most public water supply schemes in South Australia are administered by the Engineering and Water Supply Department under the various statutes mentioned below.

- The *Waterworks Act 1932*, which empowers the Minister of Water Resources to impound or divert the water from any lake, watercourse or underground source for the purpose of establishing and maintaining public water supply schemes to serve proclaimed water districts throughout the State.
- The *Water Conservation Act 1935*, provides for the control of small reservoirs, bores, tanks, etc. established in remote areas as emergency water supplies or to assist local development.
- The *Murray–Darling Basin Act 1983* (which renames the *River Murray Waters Act 1983*) ratifies the Murray–Darling Basin Agreement of October 1987. The Department is the delegated constructing and operating authority for the Murray–Darling Basin Commission in South Australia and has built and operates the Lake Victoria regulating storage, nine locks and weirs along the river and the five barrages at the River Mouth.
- The *Water Resources Act 1990*, provides for the management of all aspects of water—surface and underground, quality and quantity. The Act provides for the control of diversions of surface waters from Proclaimed Watercourses and for the withdrawal of underground waters from Proclaimed Regions. It establishes a South Australian Water Resources Council and Regional Advisory Committees as vehicles for public participation in the water resources management process, and a Water Resources Appeal Tribunal to give individuals the opportunity to appeal against decisions of the Minister pursuant to the Act.

Summary of schemes

South Australian irrigation commenced with an agreement involving the Chaffey brothers in 1887 whereby an area was made available for the establishment of certain irrigation works at Renmark. Currently water diversions totalling more than 445,216 ML are made for government, cooperative and private irrigation schemes in the South Australian section of the River Murray. The authority controlling River Murray irrigation is the Engineering and Water Supply Department.

Except for quantities held in various lock pools and natural lakes, no water from the Murray is stored within South Australia for irrigation purposes. In addition to irrigation from the River Murray there are considerable areas irrigated from underground sources.

Adelaide Metropolitan Water Supply

In 1989–90, River Murray pipelines supplied 23 per cent of the total intake to the Metropolitan Adelaide Water Supply System, compared to 36 per cent for the previous year. The principal sources of supply for the nine storages in the Mount Lofty Ranges are the Rivers Onkaparinga, Torrens, South Para, Myponga and Little Para. Total metropolitan consumption was 194,249 ML.

Country reticulation supplies

A number of reservoirs in the Barossa Ranges and other local sources are augmented by the Morgan–Whyalla, Swan Reach–Stockwell and Tailem Bend–Keith pipelines which provide River Murray water to extensive country areas. Surface and underground resources have been developed to supply most country centres not covered by the larger schemes. Total country consumption was 70,668 ML.

River Murray

Where irrigation water in excess of plant requirements has been applied, perched water tables develop. Rising to the level of tree roots, these cause the death of orchards from salination and water-logging. Most orchards and vineyards are now drained by plastic and tile drainage systems, thus restoring their health and productivity. Several measures have been taken to reduce drainage water in excess of irrigation requirements. An investigation into the feasibility of replacing open channels with pipe in the remaining unrehabilitated government irrigation areas has been undertaken, to provide irrigators with a reliable and flexible water supply. An Irrigated Crop Management Service has been initiated by the Department of Agriculture to assist irrigators to improve water use efficiency and productivity. Disposal of drainage water is achieved by pumping to basins on river flats where it is evaporated, or by discharge into the river when it is in flood—apart from those areas connected to the Noora Drainage Disposal Scheme, completed in 1984. In the same year, another salinity project, the Rufus River Groundwater Interception Scheme, was commissioned. This scheme involves intercepting saline seepage to Rufus River (which flows from Lake Victoria to the Murray) and pumping it to an evaporation basin east of Lake Victoria and outside the river valley.

The Murray–Darling Basin Commission is pursuing two main strategies to maintain and improve the quality of River Murray water and improve the management of associated lands. The first is Salinity and Drainage Strategy and secondly, the Natural Resources Management Strategy.

The Woolpunda Groundwater Interception Scheme is being constructed under the first of these strategies, to intercept extensive natural saline seepages to the river. Another scheme, sited in the Chowilla Creek area, is being reviewed within the context of a broader management plan for this environmentally important area. Schemes to mitigate irrigation induced salt loads at Waikerie, Loxton and several private irrigation areas are also being investigated as part of this strategy and any salinity impacts caused by developments in the upstream States are being accounted for.

Under the second of these strategies, nutrient loads from the irrigated swamps in the lower river are being estimated to gauge their importance and develop appropriate management measures. In addition, development controls administered under the Planning and Water Resources Acts reduce the risks and consequences of flooding, and of degradation of the river and floodplain.

Tasmania

Main purposes of water conservation and utilisation

Contrary to popular belief, Tasmania is heavily dependent on water conservation in maintaining reliable sources of supply for irrigation, stock and domestic requirements, and urban and industrial water supplies. This is due to an annual summer drought between January and March, when most run-of-the-river flows only support ordinary riparian needs or very limited irrigation and many smaller streams cease to flow.

The total surface water usage for domestic, industrial, and agricultural purposes in Tasmania is only 1 per cent of the potential exploitable yield, compared with a national figure of about 13 per cent. Despite this, economic, environmental and social constraints are beginning to restrict further development of the total yield for these purposes.

Excluding power generation storages, the total capacity of water conservation dams in the State is about 150 gegalitres, almost half of which is in on-farm dams.

There is widespread use of farm dams for irrigation which is needed to maintain overall production because of the summer drought and the lack of pasture and crop growth in the State's cold winters.

The vast majority of the State's water resources are used for power generation, based on a large, integrated system of water storages. This system also benefits other water users by enabling greatly increased regulation of many streams.

Administration

In Tasmania, water supply was once exclusively the responsibility of local government authorities, but three statutory authorities, the Hobart Regional Water Board, the Rivers and Water Supply Commission and the North West Regional Water Authority, now operate bulk supply schemes. While the Board is responsible for bulk supplies in the Hobart area, the Commission exercises control over the use of the State's water resources and the Authority controls water supply to a number of northern municipalities.

The Division of Mines and Mineral Resources of the Department of Resources and Energy administers the development and use of the State's ground water resources.

The Hydro-Electric Commission controls most of the surface water resources in the higher rainfall areas of the State for power generation purposes, and jointly administers certain catchments with the Rivers and Water Supply Commission where other demands exist in addition to power generation.

The Rivers and Water Supply Commission and the former Mines Department have been amalgamated to form the Department of Resources and Energy.

Rivers and Water Supply Commission

The Commission is empowered by the *Water Act 1957* to take water in streams and lakes, or to issue others with licences to do so; licensing covers supply to specific industries as well as for irrigation. The Commission is concerned with drainage trusts' operations, river improvements, irrigation, stream gauging, its own regional water schemes and with assessing proposals for water supply, sewerage and drainage of towns. It operates in a similar manner to the Hobart Regional Water Board in controlling the water schemes serving the East Tamar region (North Esk Regional Water Supply), the West Tamar area (West Tamar Water Supply) and the Prosser River Scheme near Orford. The North Esk

Regional Water Supply Scheme supplies industrial users at Bell Bay and municipalities on the eastern bank of the River Tamar. The West Tamar Water Supply serves the Beaconsfield Municipality. The local government authorities retain primary responsibility for reticulation and sale to consumers, except to certain industrial users.

In Municipalities not serviced by the Hobart Regional Water Board, the Rivers and Water Supply Commission or the North West Regional Water Authority, the supply of water is a function of the local municipal council.

Irrigation

The Rivers and Water Supply Commission is in charge of three major irrigation schemes, these being the Cressy-Longford Irrigation Scheme (opened in 1974), the South East Irrigation Scheme, Stage I (opened in 1986), both of which supply water via open channel, and the Winnaleah Irrigation Scheme which supplies water via pipelines.

Of the three schemes, Cressy-Longford is the largest (serving 88 properties) with 10,000 hectares being fit for irrigation. The Coal River Scheme is capable of serving 107 properties of which 3,800 hectares are fit for irrigation. The Winnaleah Scheme serves 1,500 hectares on 72 properties.

The majority of land irrigated in the State in 1986-87 was watered by private schemes either by pumping directly from unregulated streams or from on-farm storages. Pasture still predominates as the major crop irrigated but vegetables and other crops now constitute 33 per cent of the total area irrigated.

Northern Territory

Administration

Under the *Northern Territory Control of Waters Act 1981*, control of natural waters is vested in the Crown. The diversion of water is prohibited except under prescribed conditions. The Act requires that drilling for ground water be carried out only by drillers who are registered under the Act and who are required to provide the Government with information on bores drilled. In particular areas, described as Water Control Districts, where stricter control is necessary, the construction or use of a well or water bore without a permit can be prohibited.

Under the *Water Supplies Development Act 1960*, any landholder engaged in pastoral or agricultural production may seek information or advice from the Commissioner of Water Development who is appointed under the Act. Legislative review is proceeding and it is expected that a new Water Act will replace the current statutes during 1990.

The Water Resources Division of the Power and Water Authority is responsible for the assessment, planning and management of surface and ground water resources throughout the Northern Territory. It carries out systematic stream gauging, the collection of data relating to the quantity and quality of surface and ground water, flood prevention and control, and waste disposal and baseline inventory. It is involved in water pollution studies and control, and carries out environmental assessments of water and related developments. It also provides an advisory service under the Water Supplies Development Act and administers permits and licences under the Control of Waters Act.

Surface water

Hydrological investigations and data collection are undertaken across the Northern Territory and the data are published by the Water Resources Division. The program includes base stream gauging stations and pluviographs (automatic rainfall recorders).

Groundwater

For information on Northern Territory ground water (and surface water) resources see the Northern Territory Department of Mines and Energy's publication *Water Northern*

Territory—Volume 1, the Department of Resources and Energy's publications *Australia's Groundwater Resources, 1983* and the Australian Water Resources Council's publication *1985 Review of Australia's Water Resources and Water Use*.

Of approximately 21,824 bores and wells registered in the Territory to 30 June 1990, 24.7 per cent were for pastoral use, 14.9 per cent were investigation bores, 31.7 per cent served urban and domestic supplies, 5.2 per cent were for agriculture, 17 per cent were used for mining and the remaining 6.5 per cent for various other uses.

Water supplies

The largest water conservation projects in the Territory are the Darwin River Dam (259.0 gegalitres) and the Manton Dam (15.7 gegalitres) which both serve Darwin with a reticulated water supply. Ground water from McMinns Lagoon area can be used to augment supply.

Most other towns and communities, including Alice Springs, Tennant Creek, Jabiru and Nhulunbuy, are supplied from ground water.

Irrigation in the Territory is expanding, but is not extensive, being confined to locations near Darwin, Adelaide River, Daly River, Katherine, Ti Tree and Alice Springs for the purpose of growing fruit, vegetables, fodder crops, pastures and some dairying. Most of this irrigation is carried out using bore water.

There is increasing demand for water resources assessment studies and assistance for relatively small irrigation projects.

Australian Capital Territory

Administration

The provisions of the *ACT Electricity and Water Act 1988* give responsibility for the supply of water to the Territory to the ACT Electricity and Water Authority (ACTEW), a statutory authority established on 1 July 1988. ACTEW also provides the bulk water supply to Queanbeyan.

Surface water

Surface water storages supplying the ACT (population about 277,900) and the city of Queanbeyan (population about 20,500) are located to the south-west and south-east. The storages to the south-west are in the heavily timbered, mountainous Cotter River catchment within the ACT, the storages being Corin Dam (75.5 gegalitres), Bendora Dam (10.7 gegalitres) and Cotter Dam (4.7 gegalitres). The storage to the south-east in New South Wales in the Queanbeyan River catchment (over which the Commonwealth has permanent water rights) on the western slopes of the Great Dividing Range is the Googong Dam (125.0 gegalitres).

The existing storages on the Cotter and Queanbeyan Rivers have an ultimate combined capacity to serve 401,000 persons. The remaining water resource within the ACT is the Gudgenby River which is at present not utilised but has the potential to serve approximately 200,000 persons.

A network of stream gauging stations in the ACT (run by ACT Electricity and Water) monitors surface water resources. A number of these gauging stations are provided with telemeters to provide a flood warning system in association with the Bureau of Meteorology.

Groundwater

Groundwater in the ACT and environs occurs mainly in fractures in crystalline rock such as granite and volcanic rocks; in folded and fractured slate; and, rarely, in solution cavities in limestone. Alluvial aquifers of significance are restricted to the Lake George basin and small areas along mature sections of the Molonglo and Murrumbidgee rivers. Groundwater

has been used in the past by most primary producers to augment surface storage. Groundwater production bores in the ACT have yields ranging between about 0.4 and 20 KL per hour; 3 KL per hour is about the average yield. However, many farm bores have fallen into disuse as a result of the Government's resumption of freehold land within the ACT, and because of the rapid expansion of urban growth. The Bureau of Mineral Resources has provided a bore-siting, ground water-quality and yield-prediction service in and around the ACT since the early 1950s and has maintained a network of observation bores which have been monitored regularly.

The Bureau of Mineral Resources provides technical advice to landholders and drilling contractors on groundwater and, occasionally, on runoff.

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THE COLLECTION AND PRESERVATION OF AUSTRALIA'S DOCUMENTARY HERITAGE

(This special article has been contributed by John Thompson, Director of Australian Collections and Services, from the National Library of Australia)

In Australia, the collecting and preservation of the paper-based documentary heritage of the country is a responsibility shared by a number of institutions, such as national, state, tertiary and local libraries. It also rests with a range of archival agencies such as the Australian Archives located in Canberra which has regional offices in each State and Territory, and State archives which have been set up and are maintained by each State Government. In addition, over recent years there has been an expansion of archival activity in the private sector as various corporations (particularly those operating in the mining and banking industries) have set up archival agencies of their own, both to manage current records and to care for older material which has accumulated over long periods of time.

The proliferation of collecting institutions of various kinds which has occurred in recent years is a reflection of two key factors. First, Australians have come to place importance on documenting and researching their national heritage. Secondly, with the establishment of the Australian Society of Archivists Incorporated (ASAI) and the setting up of accredited courses of study to supply the archival profession, there has developed since the 1970s a strong sense of professional purpose and identity amongst archivists. This new professionalism has worked to raise standards of practice within a range of archival agencies and has contributed to a higher level of awareness within the community of the importance of the paper-based materials which form a key part of our national documentary heritage. Archival management, as a distinct professional occupation, has become as important and as necessary a community task as librarianship, art and museum curatorship or the management and interpretation of historic buildings and natural history sites.

In 1983, the ASAI published under the title 'Our Heritage' (Canberra, 1983) a directory of archives and manuscript repositories in Australia. That directory lists 187 repositories of archives and manuscripts as against 51 repositories which had been identified and listed in a 1969 directory. Almost certainly, the number of institutions has again increased as new collecting needs or specialisations have emerged.

In comprehending the nature of archival and manuscript materials, it is important to draw a distinction between these two categories of records. The ASAI has provided the following definition of archives:

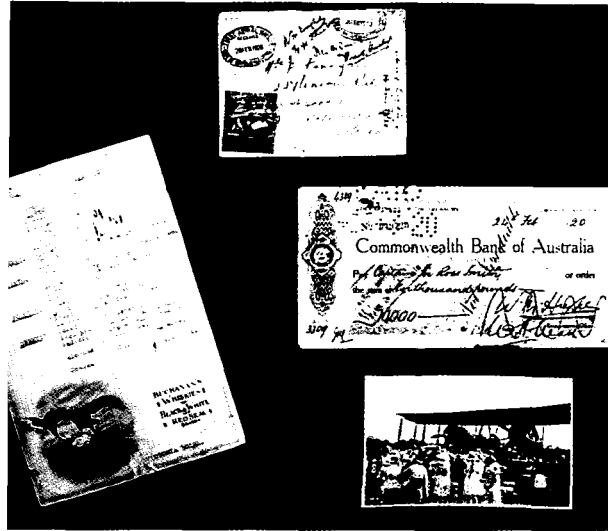
Archives are those records which have been selected for permanent preservation, as a result of their administrative, financial, legal or research and information value. They are selected from amongst those records which are no longer required for the conduct of current activities. Archives are not necessarily 'old' records. Once a record is no longer required for frequent reference it is ready for consideration as an archive, even if it was created only a few days, weeks or months ago.

The other key criterion in defining archival material is that the records are written documents and other media of recorded information which are created in the course of the activities of a government or semi-government agency, a private organisation or an individual. But while the term archives thus applied has a generic character, it should be noted that a certain distinction may be applied to other kinds of records such as single documents or artificial collections of documents assembled by individuals or institutions,

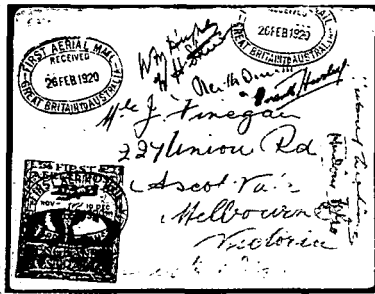


Notebook, chronometer and magnifying glass of William Bligh. Photo courtesy National Library of Australia.

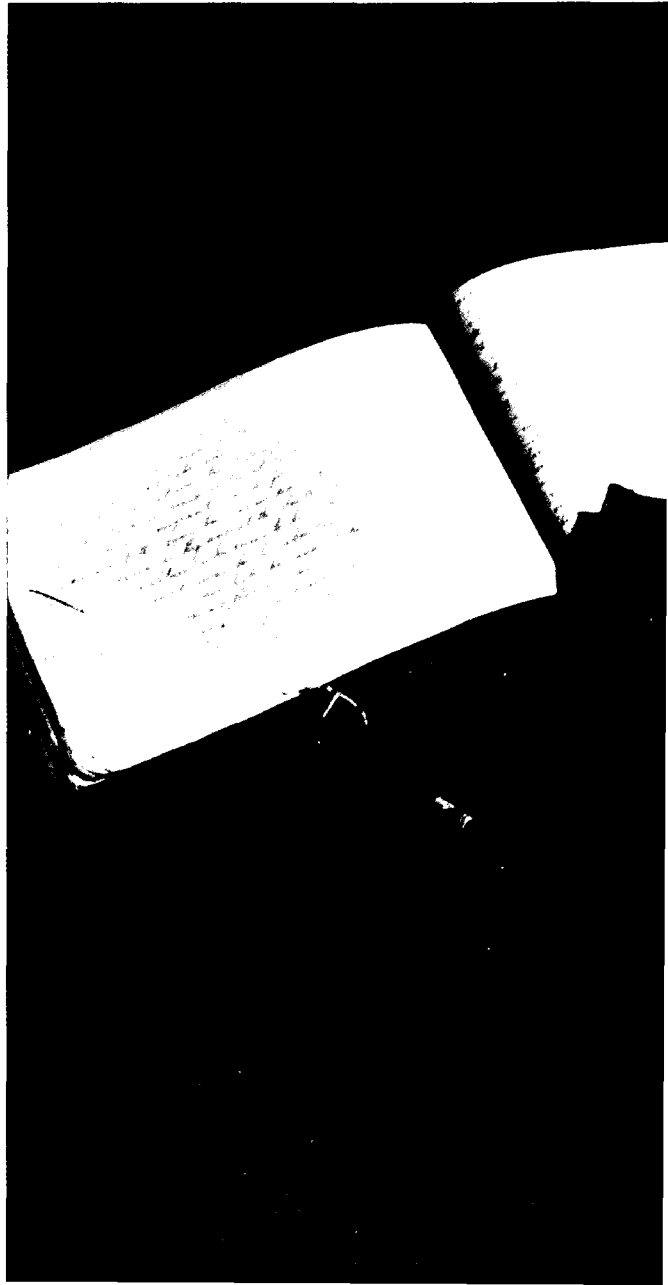
Records relating to the first England to Australia Air Race (Crome Collection, National Photo courtesy National Library of Australia.



A selection of forms of material that can be found in manuscript collections. P

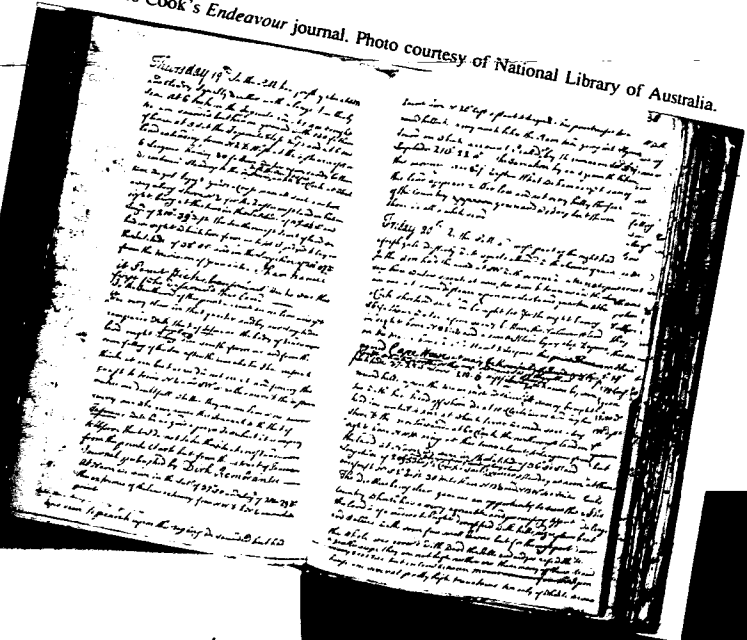


Letter carried aboard Keith and Ross Smith's plane in the first England to Australia Air Race (Crome Collection, National Library of Australia). Photo courtesy National Library of Australia.

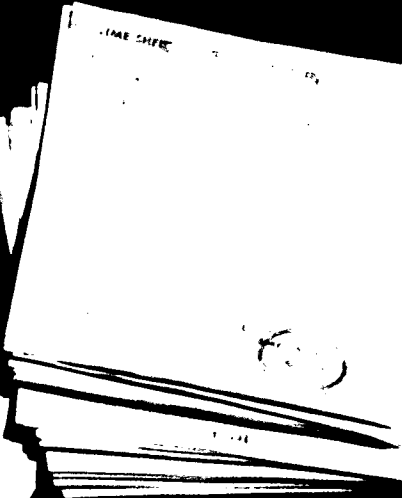
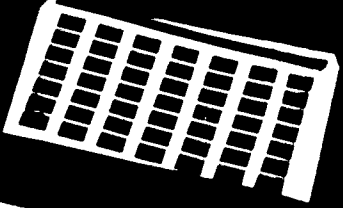


of Australia).

Captain James Cook's Endeavour journal. Photo courtesy of National Library of Australia.



courtesy of National Library of Australia.



Indent of the convict ship *Friendship* which carried Irish political prisoners to Australia, 1799. Photo courtesy of National Library of Australia.

number of
 40 of men embarked from New York
 to be on board the *Friendship* transport
 for Botany Bay with their several crimes & sentences

Names	Crimes	Sentences
John Brannen	United Irishman to serve for life	ditto
Matthew Dillon	ditto	ditto
John Walsh	ditto	ditto
James O'Connell	ditto	ditto
James Foley	Disembarked from the voyage for life	ditto
James O'Sullivan	United Irishman	ditto
John Ryan	ditto	ditto
James Kelly	ditto	ditto
John Woods	ditto	ditto
George Lacey	ditto	ditto
Stephen Coulter	ditto	ditto
James Cronin	ditto	ditto
William Gibson	ditto	ditto
John Dunn	ditto	ditto
George Carroll	ditto	ditto
William Smith	ditto	ditto
James Murphy	ditto	ditto
John White	ditto	ditto
Bryan Stanton	ditto	ditto
James Stanton	ditto	ditto



Manuscript Reading Room, National Library of Australia. Photo courtesy of National Library of Australia.

each item having intrinsic historical or aesthetic significance. Such material is generally identified, particularly within libraries both in Australia and overseas, as manuscripts.

In Australia, the tradition of acquiring and preserving documentary material for retention in public collections extends back to the nineteenth century. In 1867 the Public (now State) Library of South Australia purchased a group of documents relating to the early history of the colony. The records of the Burke and Wills Expedition were acquired in 1874 by the Public (now State) Library of Victoria, while in 1884 the Government of New South Wales purchased in England a quantity of the Australian papers of the great eighteenth century botanist Sir Joseph Banks. These papers were placed in what was then called the Free Public Library in Sydney, the forerunner of the present-day State Library of New South Wales.

The collecting and preservation of such materials tended during these years to be ad hoc and lacking in any systematic or coherent purpose. The overall approach of most Australian libraries during the nineteenth century and, indeed, well into the twentieth, was largely passive. It was left to a few private individuals to build up interesting collections of documents and records. The best-known of these collectors was David Scott Mitchell who, during a period of almost forty years, accumulated a remarkable collection of Australiana which formed the nucleus of the now world-famous Mitchell Library at the State Library of New South Wales in Sydney. Mitchell assembled what has been described as 'the most comprehensive collection of early Australian manuscripts'. His collection provided a rich base upon which, with the help of a generous financial endowment left at the time of his death, has been handsomely built upon by a succession of librarians right up until the present day. The Mitchell Collection today comprises the personal papers of many individuals who played a prominent part in the foundation, settlement and development of New South Wales as well as men and women who have been prominent in political, social, cultural, literary and artistic life at both a state and national level.

For a long period, the Mitchell Library dominated the collecting field in Australia. Indeed, it was not until the 1950s that the collecting environment began to change with the emergence of distinct Australiana departments in a number of state libraries such as the J.S. Battye Library of West Australian History in 1956 and the La Trobe Library in the State Library of Victoria in 1965. Prior to this period, the Commonwealth National Library, the forerunner to the present-day National Library of Australia, had begun to acquire some important documentary material, including, in 1923, the *Endeavour Journal* (1768-1771) of Captain James Cook R.N., and, in the following decade, the first of a number of collections of prime ministerial papers. The National Library has gone on to develop an outstanding collection of papers of prominent Australian men and women across a wide range of national endeavour and achievement. Today it is one of the leading custodians of private papers and archival material and is a major centre for research based on these and other collections of Australian material. For much of the early twentieth century period, historical societies were also active collectors of historical records, sometimes more so than the established libraries.

The provision for the preservation of archival records of governments remained poor for many years largely as a result of an inadequate understanding of the distinction between archival principles and the practice of librarianship. The dominant tradition in Australia was for the management of archival records of government to be placed under library control, a situation which continued until the 1960s. Gradually new archival legislation began to be developed to provide separate and distinct charters to federal and state archival agencies. There is now almost universally a clear distinction in Australia between the work which is done by the national and state archival agencies and the various research libraries such as the National Library of Australia and the State Library of New South Wales which maintain collections of private or personal papers as well as records of private organisations, businesses or societies.

In addition to the work done by the major national and state archival agencies and the various state libraries, there has been another tradition of specialist collecting which has assumed a new vigour in recent years. This tradition began after the First World War when the Australian War Memorial began to acquire private diaries and letters as well as official records relating to Australia's participation in various wars. Since then, a plethora of other specialist record-collecting agencies has emerged, bodies such as the Australian Academy of Science, the Percy Grainger Museum in the University of Melbourne and the National Film and Sound Archive in Canberra. Within a number of Australian universities, various collecting specialisations have also been developed. Perhaps the best known of these is the University of Melbourne Archives which, since the 1950s, has built up an outstanding source of business and trade union records as well as collections of personal papers of men and women of achievement in a wide range of disciplines. Considerable strength in the field of business and trade union records is also maintained by the Archives of Business and Labour in the Australian National University in Canberra.

A number of Australian university libraries have developed a strong interest in acquiring and maintaining collections of literary manuscripts and personal papers of Australian writers. The Fryer Library in the University of Queensland is probably the best-known of these repositories but impressive work is now being done by the Library of the Australian Defence Force Academy in Canberra which has built up, in a remarkably short time, a strong collection of literary manuscripts and related records of younger Australian writers. The Baillieu Library in the University of Melbourne, the Reid Library in the University of Western Australia and the Barr Smith Library in the University of Adelaide have also acquired some important collections of literary and related papers.

Although traditionally most Australian libraries have built their collections by gift, there has emerged in recent years a greater emphasis on the purchase of material, largely in response to strong competition now evident between collecting institutions. Writers in particular have become conscious that their papers have a monetary value and are usually keen to capitalise on the willingness of libraries to pay for such material. A trend has emerged whereby writers will now seek to have their papers assessed by a number of institutions and then to accept the best financial offer. This is an issue of some concern as generally most purchases are made from funds made available to institutions through public appropriation.

A strong market has also developed for other kinds of records, particularly the papers and related records of artists and painters which have attracted the interest of some wealthy private collectors. Several antiquarian book sellers in Australia have also developed an interest in the manuscript trade and this has further added to the difficulties faced by public sector libraries in finding the funds to pay for increasingly high-priced collections. The Commonwealth Government's Taxation Incentives for the Arts Scheme established in 1978 has provided some relief since it offers taxation benefits to donors of material to accredited collecting institutions. Paradoxically, however, the Scheme has also served to set by definition a commercial framework against which almost all manuscript and archival collecting activity is now set.

Other forms of documentary material are also collected by a range of public institutions in Australia. Map materials will be found in several different kinds of collections although the main collections of printed maps have been developed in libraries. The most important of these is located in the National Library of Australia in Canberra though strong collections have also been built up in the State Libraries of New South Wales and Victoria and in the Baillieu Library in the University of Melbourne. Each of these institutions places a strong emphasis on Australian materials of both historical and current interest. Pictorial materials, especially photographs, are collected in most of the large public sector libraries though it should be noted that photographs will also form integral parts of larger collections of manuscript and archival records. Philatelic materials are widely but not systematically distributed amongst several different kinds of collecting institutions. Important

collections are held by the National Library of Australia, the State Library of New South Wales and the Powerhouse Museum in Sydney. More recently, Australia Post has established its own museum to serve as a comprehensive repository of Australia's philatelic history.

In the three years leading up to the Australian bicentenary celebrations in 1988, the Australian Bicentennial Authority conducted the Historic Records Search, a project designed to locate, identify and record documentary material of historic importance preserved in private ownership. Over 3,000 collections of major importance were located during this Search. A full listing and description of these records was prepared and has recently been published in microfiche format by the National Library of Australia which has also undertaken responsibility for the maintenance of the register. The records may also be accessed on line through the OZLINE database available through the National Library of Australia.

Preservation of cultural and heritage materials has now become an important part of the management agenda for custodial institutions. Over the past twenty years there has been a substantial investment made by the major archives and libraries in high quality conservation facilities and in the appointment of expert staff, now largely recruited from training programs available in Australia. While substantial backlogs of material remain to be treated, Australia has achieved remarkable progress in a short time in the conservation management of its heritage collections. A greater financial investment is still required if fragile materials are to be secured for the benefit of future generations. Valuable work is being done by conservators working cooperatively across institutional boundaries to set appropriate preservation standards and agreed priorities for the treatment of these materials.

A number of professional societies and associations are also active in the field both to raise the standards of professional practice and to serve as lobby groups to achieve a higher level of political support for the specialised work which is required to preserve Australia's documentary heritage. Such bodies include the Australian Council of Archives, the Australian Council for Library and Information Services, the Australian Library and Information Association, the Institute for the Conservation of Cultural Materials and the Museums Association of Australia.

Australia has a strong and interesting record of achievement in the preservation and management of its documentary heritage. A wide-range of institutions has emerged, especially since the 1960s to achieve a more substantial collecting effort over a wide spectrum. Greater coordination of this effort could be achieved through cooperative programs to identify and list holdings and to establish more effective control over collections as well as to improve community access. There are signs, however, that such cooperative efforts are now being explored and it may be expected that with the assistance of a national computer network, control of, and access to, the documentary heritage of Australia will be greatly enhanced as the country moves towards the celebration of the centenary of Australian federation in 2001.